RESULTS

OF THE

MAGNETICAL AND METEOROLOGICAL

OBSERVATIONS

MADE AT

THE ROYAL OBSERVATORY, GREENWICH,

IN THE YEAR

1879:

UNDER THE DIRECTION OF

SIR GEORGE BIDDELL AIRY, K.C.B. M.A. LL.D. D.C.L.,

ASTRONOMER ROYAL.

PUBLISHED BY ORDER OF THE BOARD OF ADMIRALTY

IN OBEDIENCE TO HER MAJESTY'S COMMAND.

LONDON:
PRINTED BY GEORGE EDWARD EYRE AND WILLIAM SPOTTISWOODE,
PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY.
FOR HER MAJESTY'S STATIONERY OFFICE.

1881.

ERRATA.

GREENWICH MAGNETICAL AND METEOROLOGICAL OBSERVATIONS, 1876.

Introduction, page *xx*, line 13, *for* quality, *read* quantity.

" page *xxix*, line 14 from bottom, *for* later, *read* earlier.

GREENWICH MAGNETICAL AND METEOROLOGICAL OBSERVATIONS, 1877.

Introduction, page *xxix*, line 14 from bottom, *for* later, *read* earlier.

" page *liv*, line 9 from bottom, *for* porcelain, *read* opal glass.

Page (xxxvi), insert in notes on left-hand page, "The amount of " Sunshine on July 27 was in part estimated, on account of wrong " adjustment of the instrument."

GREENWICH MAGNETICAL AND METEOROLOGICAL OBSERVATIONS, 1878.

Introduction, page *xxix*, line 15 from bottom, *for* later, *read* earlier.

" page *lv*, line 24, *for* porcelain, *read* opal glass.

" page *lxii*, line 3, *for* wires, *read* silk fibres.

Page (iii), in title, *after* MAGNETIC OBSERVATIONS, *insert* (EXCLUDING A DAY OF MAGNETIC DISTURBANCE).

Page (li), in the notes at foot of right-hand page, line 5, *for* Cubic of Air, *read* Cubic Foot of Air.

Page (liii), last line in notes on right-hand page, *dele* "which appears in the following tables."

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RESULTS

OF

MAGNETICAL AND METEOROLOGICAL OBSERVATIONS.

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GREENWICH MAGNETICAL AND METEOROLOGICAL OBSERVATIONS, 1879.

INTRODUCTION.

§ I. *Buildings of the Magnetic Observatory.*

IN consequence of a representation by the Astronomer Royal, dated 1836, January 12, and a memorial by the Board of Visitors of the Royal Observatory, dated 1836, February 26, addressed to the Lords Commissioners of the Admiralty, an additional space of ground on the south-east side of the former boundary of the Observatory grounds was inclosed from Greenwich Park for the site of a Magnetic Observatory, in the summer of 1837. (This ground was in 1868 extended 100 feet to the south; but no building has been erected on the extension for purposes connected with magnetism or meteorology.) The Magnetic Observatory was erected in the spring of 1838. Its nearest angle in its present form is about 174 feet from the nearest point of the S.E. dome, and about 30 feet from the office of Clerk of Works. It 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, as originally built, was that of a cross with four equal arms, very nearly in the direction of the cardinal magnetic points as they were in 1838; the length within the walls, from the extremity of one arm of the cross to the extremity of the opposite arm, was 40 feet, the breadth of each arm 12 feet. In the spring of 1862, the northern arm was extended 8 feet. The height of the walls inside is 10 feet, and the ceiling of the room is about 2 feet higher. The northern arm of the cross is separated from the central square by a partition, so as to form an ante-room, which is occupied by computers of the Magnetical and Meteorological Department. The meridional magnet for observations of absolute declination, formerly used also for observations of variations of declination, (placed in its position in 1838), is mounted in the southern arm; and the theodolite by which the magnet-collimator is viewed, and by which circumpolar stars for determination of the astronomical meridian are also observed, (for which observation an opening is made in the roof, with proper shutters) is in the southern arm, near the southern boundary of the central square. The bifilar magnet, for variations of horizontal magnetic force (erected at the end of 1840), was mounted near the northern wall of the eastern-arm; and the balance-magnetometer, for variations of vertical magnetic force (erected in 1841) was mounted near the northern wall of the western arm. Important changes have subsequently been made in the positions of these instruments, as will be mentioned below. The sidereal-time-clock is in the south arm, near the south-east re-entering angle. The fire-grate (constructed of copper, as far as possible) is near the north end of the west side of the ante-room. Some of these fixtures may contain trifling quantities of iron; and, as the ante-room is used as a computing room, it is impossible to avoid the introduction of iron in small quantities; great care, however, is taken to avoid it as far as possible.

In 1864, a room, called the Magnetic Basement, was excavated below the whole of the Magnetic Observatory except the ante-room; the descent to it is by a staircase close to the south wall of the western arm of the building.

For the theodolite, a brick pier was built from the ground below the floor of the Basement, rising through the ceiling into the south arm of the upper room, and supporting the theodolite in exactly the same position as before.

Instead of a single meridional magnet performing the double functions of "magnet for determining absolute magnetic declination," and "magnet carrying a mirror for photographic register," there are now two meridional magnets, one in the Upper Room and one in the Basement. The upper (original) magnet is in a position about 10 inches north of its former position; it carries a collimator, for observation by the theodolite; but, in reversion of position of the collimator, the collimator is always either above or below the magnet, so that the magnet is always in the same vertical. The lower magnet, procured in the year 1864, is in nearly the same vertical with the upper magnet; it carries the mirror for the photographic register of the continual changes of declination. A massive brick pier is built in the south arm of the Basement, covered by a stone slab; upon it is fixed the gun-metal stand carrying the photographic lamp, and the slit through which it shines; from the stone slab rise three smaller piers, upon which crossed slates are placed; and from these rises a small pier through the ceiling, to the height of 18 inches above the upper floor, carrying the suspension pulleys of the lower magnet; the skein of silk, which supports the lower magnet, passes through a hole in one of the slates. Upon the slates on the brick piers rest the feet of the original wooden stand carrying the suspension of the upper magnet. As, from time to time, the wooden stand has been shifted slightly to the west, with change of the magnetic meridian, its western support had, in course of time, reached such a position that it became necessary in 1876 to place, on the top of the original slate, another slate, bound by brass cramps to the brick pier, but projecting further west. On this the support of the wooden stand now rests.

The bifilar-magnetometer is in the Basement, in a position vertically below its former position. A massive brick pier, surmounted by a thick slab of stone (upon which the metal stand carrying the photograph lamp and slit is fixed) supports a pier consisting of a back and return-sides, which rises through the ceiling about 2 feet above the upper floor, and is crowned by a slate slab that carries the suspension of the bifilar-magnetometer, and also supports the electrometer.

The vertical-force magnetometer is in the Basement, in a position vertically below its former position; it rests upon a brick pier, capped by a thick stone; to which also is fixed the plate of metal with slit through which passes the light of the photographic lamp.

To the lower part of the theodolite-pier, within the Basement, are fixed telescopes for eye-observation of the bifilar and vertical-force magnetometers. They are protected from accidental violence by guards fixed to the floor, first attached on 1871, May 2.

At the south-east re-entering angle of the Basement (which has been rebated for the purpose) is the horizontal photographic cylinder, which receives the traces of the movements of the declination-magnet and the bifilar-magnet. The angle is so far cut away that the straight line joining their suspensions passes at the distance of one foot from the wall, and thus the cylinder receives the light from the concave mirrors carried by both instruments, at right angles to its surface. The vertical cylinder which receives the traces of the movements of the vertical-force-magnet, and of the self-registering barometer near it, is east of the vertical force pier.

In the south-east corner of the eastern arm is placed the apparatus for self-registration of the spontaneous galvanic currents on the wires leading respectively from Angerstein Wharf to Lady Well Station (on the Mid Kent Railway), and from North Kent Junction (on the Greenwich Railway) to the Morden College end of the Blackheath Tunnel (on the North Kent Railway). The straight lines connecting these points intersect each other nearly at right angles, at a point not far distant from the Observatory (see § 12 below).

The mean-time-clock is on the west wall of the south arm of the Basement.

Adjoining the north wall is the table for photographic operations. Much water is used in these operations, and therefore a pump is provided in the grounds at a distance of about 30 feet from the nearest magnetometer, by which the water is withdrawn from the cistern at the east end of the photographic table and at once discharged into a covered drain. In August of the year 1879, in consequence of changes in the small buildings, the pump was removed to the north-east corner of the north arm of the magnetic building.

Near the west end of the photographic table and fixed to the north wall is the Sidereal Standard Clock of the Astronomical Observatory, Dent 1906, communicating with the Chronograph and other clocks in the Astronomical Department by galvanic wires. It was established in this position at the end of May 1871.

The Basement is warmed by a gas-stove, and ventilated by a large copper tube nearly two feet in diameter, receiving the flues from the stove and all the lamps, and passing through the upper room to a revolving cowl above the roof. Each of the arms of the basement has a window facing the south, but in general the window-wells are closely stopped.

The variations in the temperature of the instruments have been greatly reduced by their location within this Basement.

A platform, erected above the roof of the Magnetic Building, is used principally for observations of meteors. The sunshine-instrument is placed on a table on this platform.

On the outside of the Magnetic Observatory, near the north-east corner of the ante-room, a pole 79 feet in height is fixed, for the support of the conducting wire to the electrometers; the electrometers formerly planted in the window-seat at the north-end of the ante-room have been now removed (see § 23). In 1879, June, the pole was also removed.

The apparatus for naphthalizing the gas used in the photographic registration is mounted in a small detached zinc-built room, erected in 1863, near the west side of the ante-room. The use of the naphthalizing process, which had been discontinued in the years 1865 to 1870, has since 1871 been resumed.

In 1863, a range of seven rooms, usually called the Magnetic Offices, was erected near the southern fence of the grounds, as it existed after the addition made in 1837. Since the summer of 1863, observations of Dip and Deflexion have been made in the westernmost of these rooms, Office No. 7. On 1871, December 1, the Watchman's Clock was moved from the Quadrant Passage of the Astronomical Observatory to Magnetic Office No. 3, and on 1872, November 14, it was again moved from Office No. 3 to No. 1. Offices Nos. 2, 3, and 4 are now used for photographic purposes in connection with the Photoheliograph placed in a dome adjoining Office No. 3 on the south side.

At the distance of 28 feet south (magnetic) from the south-east angle of the southern arm is an open shed about $10^{ft}\ 6^{in}$ square, supported by four posts at the height of 8 feet, with an adjustible opening at the center of the roof. Under this shed are placed the large dry-bulb and wet-bulb thermometers, with a photographic cylinder, whose axis is vertical, between them; and external to these are the gas flames, whose light passing through the thermometer-tubes above the quicksilver makes photographic traces upon the paper which covers the cylinder.

In October of the year 1879 the "Naylor" Equatoreal was mounted in the ground which had been added in 1868. On account of its proximity to the Magnetic Office No. 7, in which the observations of Dip, and Deflexions of a Magnet for measure of Horizontal Force, are made, it was thought that the iron of the instrument might in some small degree influence these observations. The most delicate test of the existence of any appreciable effect appeared to be the observation of the time of vibration of the magnet used in the Deflexion experiments. On, however, collecting these observations for some months preceding and following the time of planting the Equatoreal in the position mentioned, no appreciable influence on the observed time of vibration could be detected.

For better understanding of these descriptions, the reader is referred to the Descriptions of Buildings and Grounds with accompanying Maps, attached to the Volumes of Astronomical Observations for the years 1845 and 1862.

§ 2. *Upper Declination-Magnet and Apparatus for observing it.*

The theodolite, with which the meridional magnet is observed, is by Simms: the radius of its horizontal circle is 8·3 inches: it is divided to 5′; and is read to 5″, by three verniers, carried by the revolving frame of the theodolite. The fixed frame stands upon three foot-screws, which rest in brass channels let into the stone pier that stands upon the brick pier rising from the ground of the Magnetic Basement. The revolving frame carries the Y's (with vertical adjustment at one end) for a telescope with transit-axis: the length of the axis is $10\frac{1}{2}$ inches: the length of the telescope 21 inches: the aperture of the object glass 2 inches. The Y's are not carried immediately by the T head which crosses the vertical axis of the revolving frame, but by pieces supported by the ends of that T head, and projecting horizontally from it: the use of this construction is to allow the telescope to be pointed sufficiently high to see δ Ursæ Minoris above the pole. The eye-piece of the telescope carries only one fixed horizontal wire, and one vertical wire moved by a micrometer-screw. The opening in the roof of the building permits the observation of circumpolar stars, as high as δ Ursæ Minoris above the pole, and as low as β Cephei below the pole.

For supporting the magnet, a braced wooden tripod-stand is provided, whose feet, as above described, rest upon slates covering brick piers in the Magnetic Basement. Upon the cross-bars of the stand rests a double rectangular box (one box completely inclosed within another), both boxes being covered with gilt paper on their exterior and interior sides, and having holes at their north and south ends for illumination of the collimator or reversed telescope carried by the magnet, and for viewing the collimator from the theodolite. The holes in the outer box are covered with glass. On the southern side of the principal upright piece of the stand is a moveable upright bar, turning in the vertical E. and W. plane, upon a pin in its center (which is fixed in the principal upright), and carrying at its top a brass frame supporting two pulleys for suspension of the magnet; this construction is adopted as convenient for giving an E. and W. movement (now very rarely required) to the point of suspension, by giving a motion to the lower end of the bar. The pulleys, whose axes are E. and W., project one on the north side of the moveable upright, the other on the south side, and are adapted to carry a flat leather strap. Formerly this strap was attached directly to the suspension skein, but at the beginning of the year 1877 this manner of attachment was changed. The end of the strap depending from the north pulley is now connected to a square wooden rod sliding in the corresponding squared hole of a fixed wooden bracket. The suspension skein is attached to the lower end of the wooden rod, so that in raising or lowering the magnet carrier (necessary in some operations) no alteration is made in the free length of the suspension skein. The strap passes from the north pulley over the south pulley, and thence downwards to a small windlass, fixed to the lower part of the moveable upright. The height of the two pulleys above the floor is about 11 ft. 4 in., and the height of the magnet is about 2 ft. 11 in.; the length of the rod, carrying at its upper end the torsion circle, and at its lower end the cradle supporting the magnet, is 1 ft. 4 in.; and the length of strap and rod below the north pulley is about 1 ft. 3 in.; so that the length of the free suspending skein is about 5 feet 10 inches. On 1879, July 10, the cord connecting the leather strap with the small windlass gave way; a new cord was at once attached and the magnet remounted, the same suspension-skein being used.

The magnet was made by Meyerstein, of Göttingen: it is a bar 2 feet long, $1\frac{1}{2}$ inch broad, and about $\frac{1}{4}$ inch thick: it is of hard steel throughout. The magnet-carrier was also made by Meyerstein, but it has since been altered by Simms. The magnet is inserted sideways and fixed by a screw in the double square hook which constitutes the lower part of the magnet-carrier. This lower part turns stiffly on a vertical axis, independently of the upper part, and carries with it the graduated torsion circle: to the upper part is fixed the vernier for reading the circle. The upper part of the magnet-carrier is simply hooked into the skein.

The suspending skein is of silk fibre, in the state in which it is first prepared by silk manufacturers for further operations; namely, when several fibres from the cocoon are united by juxtaposition only (without twist) to form a single thread. The skein is strong enough to support perhaps three times the weight of the magnet, &c.

In the summer and autumn of 1864, an attempt was made to suspend the magnet by a steel wire, capable of supporting the weight 15 lbs.; but the torsion force was found to be so large as greatly to diminish the value of the observations; and the skein was restored on 1865, January 20. (A similar attempt was made for suspension of the lower magnet; the skein, however, was restored on 1865, January 30.)

The upper magnet carries two sliding brass frames, firmly fixed in their places by means of pinching-screws. One of these contains, between two plane glasses, a cross of delicate cobwebs; the other holds a lens of 13 inches focal length and nearly 2 inches aperture. This combination, therefore, serves as a reversed telescope without a tube: the cross of cobwebs is seen very well with the theodolite-telescope, when the suspension-bar of the magnet is so adjusted as to place the object-glass of the reversed telescope in front of the object-glass of the theodolite, their axes coinciding. The wires are illuminated by a lamp and lens at night, and by a reflector during the day.

In the original mounting of this magnet the small vibrations were annihilated by a copper oval or "damper," thus constructed: A copper bar, about one inch square, is bent into a long oval form, intended to encircle the magnet (the plane of the oval curve being vertical). A lateral bend is made in the upper half of the oval, to avoid interference with the suspension-piece of the magnet. The effect of this damper is, that after every complete or double vibration of the magnet, the amplitude of the oscillation is reduced in the proportion of 5 : 2 nearly.

On mounting the photographic magnetometer in the basement, the damper was removed from its place surrounding the upper magnet, and was adjusted to encircle the photographic magnet. The upper magnet remained unchecked in its vibrations till 1866, January 23, when the lower part of its carrier was connected with a horizontal brass bar which vibrates in water.

OBSERVATIONS RELATING TO THE PERMANENT ADJUSTMENTS OF THE UPPER DECLINATION-MAGNET AND ITS THEODOLITE.

1. Determination of the inequality of the pivots of the theodolite-telescope.

1875, August 31. The theodolite was clamped, so that the transit-axis was at right angles to the meridian. The illuminated end of the axis of the telescope was first placed to the East: the level was applied, and its scale was read; the level was then reversed, and its scale was again read; it was then again reversed, and again read, and so on successively six times. The illuminated end of the axis was then placed to the West, and the level was applied and read as before. This process was repeated several times, and the result was, that when the level indicates the axis to be horizontal, the pivot at the illuminated end is really too low by 1″·5. Other determinations made 1875, September 21, and 1876, December 1, gave respectively 1″·3 and 1″·1. The value applied during the year 1879 to the mean level reading is 1^{div}·3 as before, equivalent to 1″·4.

2. Value of one revolution of the micrometer-screw of the theodolite-telescope.

On 1870, December 29, the magnet was made to rest on blocks of wood, and its collimator was used as a fixed mark at an infinite distance. The micrometer of the theodolite-telescope was placed at a definite reading, the telescope was turned until the micrometer-wire bisected the cross, and the circle was then read. The result of several comparisons of circle-readings corresponding to large values of micrometer-reading with circle-readings corresponding to small values of micrometer-reading was, that one revolution = 1′. 34″·2. Similar experiments made 1875, September 1 and December 28, gave respectively 1′. 34″·1, and 1′. 34″·2. The value used throughout the year 1879 is 1′. 34″·2.

3. Determination of the micrometer-reading for the line of collimation of the theodolite-telescope.

1879, January 28. The vertical axis of the theodolite had been adjusted to verticality, and the transit-axis was made horizontal. The declination-magnet was made to rest on blocks, and the cross-wires carried by it were used as a collimator for determining the line of collimation of the telescope of the theodolite. The telescope was reversed after each observation. The mean of 10 double observations was 100r·090. Other observations taken at different times during the year satisfactorily confirmed this value. The value 100r·090 was used throughout the year.

4. Determination of the effect of the mean-time-clock on the declination-magnet.

The observations by which this has been determined are detailed in the volumes for 1840—1841, 1844, and 1845. It appeared that it was necessary to add 9″·41 to every reading of the theodolite. The clock was removed to the basement in 1864, having now nearly the same relative position to the lower declination-magnet which formerly it had to the upper. No correction is now applied.

5. Determination of the compound effect of the vertical-force-magnet and the horizontal-force-magnet on the declination-magnet.

The details applying to the combined effect of the horizontal-force-magnet and first vertical-force-magnet will be found in the volumes for 1840—1841, 1844, and 1845. It appeared that it was necessary to subtract 55″·22 from all readings of the theodolite. In 1848 a new vertical-force-magnet was introduced, and the subtractive quantity was then found to be 42″·2. A few experiments made on 1864, May 26, with the horizontal-force-magnet, and an old vertical-force-magnet in the new positions in the basement, seemed to show that the theodolite readings required a subtractive correction of 36″·9, but no numerical correction has since been applied. No experiments have been made since mounting the vertical-force-magnet now in use.

6. Determination of the error of collimation for the plane glass in front of the outer box of the declination-magnet.

1879, January 28. The magnet was made to rest on blocks. The micrometer head of the telescope was to the east. The plane glass has the word "top" engraved on it, and, in ordinary use, this word is always kept east. The cross-wire carried by the collimator of the magnet was observed with the engraved word alternately east and west. The result of 10 double observations was, that in the ordinary position of the glass 18″·5 is to be added to all readings. On 1879, December 9, further observations gave 19″·1. The value 18″·8 has been used throughout the year 1879.

7. Determination of the error of collimation of the magnet-collimator, with reference to the magnetic axis of the magnet.

1878, December 10. Observations were made by placing the declination-magnet in its stirrup, with its collimator alternately above and below, and observing the collimator-wire by the theodolite-telescope; the windlass of the suspending skein being so moved that the collimator in each observation was in the line of the theodolite-telescope. The observation was repeated several times. The mean half excess of reading with collimator above (its usual position), over that with collimator below, was 26′. 13″·6. Observations made 1879, December 9, gave 26′. 2″·2. The mean of these values, or 26′. 7″·9, has been used during the year 1879.

8. Effect of the damper.

In the volume for 1840—1841 observations are exhibited showing that the oval copper bar, or damper, which then surrounded what is now the upper declination-magnet, had but little or no effect. Repeated observations, of less formal character, in succeeding years, have confirmed this result. The same bar has encircled the lower declination-magnet since the year 1864. The following observations were made in the year 1865, for ascertaining the effect of the damper on the lower declination-magnet under various circumstances.

On 1865, February 8 and 10, and March 2, the time of vibration of the magnet was observed :—

Mean of times with damper in usual position	23ˢ·888
Mean of times with damper reversed end for end......................	24·508
Mean of times when damper was removed..............................	23·153

These seem to indicate a repulsion of the magnet by the damper, but the magnet came to rest so rapidly that the observations are very uncertain.

On several days from 1865, April 2 to May 12, observations were made for ascertaining the deflection of the magnet produced by turning the damper through a small angle round a vertical axis, passing through its center.

DAMPER IN USUAL POSITION.

			′ ″
Damper turned through 2°	N. end towards E.,	increase of western declination	−1. 27
	N. end towards W.,	,, ,, ,, ...	+1. 25
Damper turned through 4°	N. end towards E.,	,, ,, ,, ...	−2. 16
	N. end towards W.,	,, ,, ,, ...	+3. 11
Damper turned through 6°	N. end towards E.,	,, ,, ,, ...	−3. 10
	N. end towards W.,	,, ,, ,, ...	+2. 55
Damper turned through 8°	N. end towards E.,	,, ,, ,, ...	−1. 22
	N. end towards W.,	,, ,, ,, ...	+1. 45

DAMPER REVERSED END FOR END.

			′ ″
Damper turned through 2°	N. end towards E.,	increase of western declination	..... +0. 12
	N. end towards W.,	„ „ „	...... +0. 20
Damper turned through 4°	N. end towards E.,	„ „ „	...... 0. 0
	N. end towards W.,	„ „ „	...... +0. 26
Damper turned through 6°	N. end towards E.,	„ „ „	...... +0. 5
	N. end towards W.,	„ „ „	...... +0. 5
Damper turned through 8°	N. end towards E.,	„ „ „	...... −0. 10
	N. end towards W.,	„ „ „	...... +0. 5

The first series shews clearly that the damper in its usual position drags the magnet; the second shews no certain effect. It seems that the damper possesses two kinds of magnetism, one permanent, the other transiently induced, of nearly equal magnitude; their sum being about $\frac{1}{100}$ part of the terrestrial effect for the same deflexion.

From 1865, July 25 to August 9, observations were made to ascertain whether the effect of an external deflecting cause is the same with the damper present and the damper removed. The observation was extremely difficult, as the magnet was perpetually in vibration when the damper was removed. A small magnet on the east side of the N. end of the magnetometer, with its north end pointing towards the East (and therefore diminishing the western declination of the magnetometer), was moved to the distance (about five feet) at which it produced a deviation of 5′ nearly. The apparent western declination was observed, damper present, and damper removed. It appeared to be less with damper present than with damper removed, by 0′. 53″. The separate results are very discordant. If the conclusion has any validity, it tends to show a repulsive power in the damper, opposite to that found in the preceding experiments. This experiment is regarded as inconclusive.

9. Calculation of the constant used throughout the year 1879 in the reduction of the observations of the upper declination-magnet, the micrometer-head of the theodolite-telescope being East.

Reading for line of collimation - - - - - -	100r·090
	° ′ ″
Micrometer equivalent - - - - - - -	−2. 37. 8·5
Correction for the plane glass in front of the outer box, in its usual position	+ 18·8
The collimator above the magnet. Correction for error of collimation -	− 26. 7·9
Constant to be used in the reduction of the observations - - -	−3. 2. 57·6

10. Determination of the time of vibration of the upper declination-magnet under the action of terrestrial magnetism.

On 1873, August 7, this was found to be $31^s\cdot40$; on 1874, December 31, $31^s\cdot33$; on 1875, December 31, $31^s\cdot25$; on 1877, January 10, $31^s\cdot21$; on 1879, January 28, $31^s\cdot22$; and on 1879, December 9, $31^s\cdot21$.

11. Fraction expressing the proportion of the torsion-force to the earth's magnetic force.

By the same process which is described in the Magnetical Observations 1847, but with the system of suspension and silk skein at present in use, the proportion was found, on 1877, January 10, $\frac{1}{155}$; on 1877, December 18, $\frac{1}{155}$; on 1879, January 28, $\frac{1}{155}$; and on 1879, December 9 (after disturbance of the suspension, see page *viii*), $\frac{1}{176}$.

DETERMINATION OF THE READINGS OF THE HORIZONTAL CIRCLE OF THE THEODOLITE CORRESPONDING TO THE ASTRONOMICAL MERIDIAN.

The reading of the circle corresponding to the astronomical meridian is determined by occasional observation of the stars Polaris and δ Ursæ Minoris when near the meridian, either above or below pole. Six measures are usually taken on each night of observation.

The error of level is determined by application of the spirit-level at the time of observation: due regard being paid, in the reduction, to the inequality of pivots already found. One division of the level is considered = $1''\cdot0526$. The azimuth-reading is then corrected by the quantity:—

Correction = Elevation of W. end of axis × tan. star's altitude.

The readings of the azimuth circle increase as the instrument is turned from N. to E., S., and W.; from which it follows that (telescope pointing to North), the correction must have the same sign as the elevation of the W. end.

The correction for the azimuth of the star observed has been usually computed independently in every observation, by a peculiar method, of which the principle is fully explained in the volumes for 1840-1841, 1843, 1844, 1845. The formula and table used are the following:—

Let $A_{\prime\prime}$ = seconds of arc in star's azimuth,

C_s = seconds of time in star's hour-angle,

$a_{\prime\prime}$ = seconds of arc in star's N.P.D. for the day of observation,

Then $\log. A_{\prime\prime} = \log. C_s + \log. E + \log (a_{\prime\prime} + F) + \log. \cos. \phi$.

The values of log. E, F, and log. cos. ϕ, are given in the following table:—

TABULATED VALUES of LOG. Cos. ϕ, for DIFFERENT VALUES of C_s, and of the QUANTITIES LOG. E, and F, for the STARS, POLARIS and δ URSÆ MINORIS.

Hour Angle.	Log. Cos. ϕ for			
	Polaris.	δ Ursæ Minoris.	Polaris S.P.	δ Ursæ Min. S.P.
m				
1	9·99999	9·99999	9·99999	9·99999
2	999	999	999	999
3	999	999	999	999
4	998	998	998	998
5	996	996	997	997
6	994	994	996	996
7	992	992	994	995
8	990	989	992	993
9	988	986	990	991
10	985	983	988	989
11	981	979	985	987
12	978	975	982	984
13	974	971	979	981
14	970	966	975	978
15	966	961	972	975
16	961	955	968	971
17	956	950	964	968
18	951	944	959	964
19	945	937	955	960
20	939	930	950	956
21	932	923	945	951
22	926	915	939	946
23	919	908	933	941
24	912	900	928	936
25	904	891	922	930
26	896	882	915	925
27	888	873	909	919
28	880	863	902	912
29	871	853	894	906
30	9·99862	9·99843	9·99887	9·99900
Log. E	6·09721	6·13638	−6·03899	−6·00617
F	−186″·79	−944″·71	+181″·57	+886″·86

Sometimes, when the star has been observed at larger hour angles, the azimuthal correction has been taken from a manuscript table, having for arguments "Hour Angle" and different values of "North Polar Distance."

Observations for determining the theodolite readings corresponding to the astronomical meridian were made on the following days in 1879:—January 9; March 1; April 11; May 16, 19, 31; June 10, 28; July 26, 29; August 28; September 25; October 1; November 5, 22. As a check on the continued steadiness of the theodolite, observations of a fixed mark (a small hole in a plate of metal above the Observatory Library) have been taken twenty-six times at intervals through the year. The concluded mean reading for the south astronomical meridian used throughout the year was 27°. 5′. 30″·4.

The following is a description of the method of making and reducing the eye-observations of the declination-magnet:—

A fine horizontal wire (as stated on page *vii*) is fixed in the field of view of the theodolite-telescope, and another fine vertical wire is fixed to a wire-plate, moved right and left by a micrometer screw. On looking into the telescope, the diagonally placed cross of the magnetometer is seen, and, during vibration of the magnet, will be observed to pass alternately right and left. The observation is made by turning the micrometer till its wire bisects the image of the magnet-cross at the pre-arranged times, and reading the micrometer. Then the verniers of the horizontal circle are read.

The mean-time clock is kept very nearly to Greenwich mean time (its error being ascertained each day), and the clock-time for each determination is arranged before hand. Chronometer M'Cabe 649 has usually been employed for observation.

If the magnet be in a state of disturbance, the first observation is made by the observer applying his eye to the telescope about one minute before the pre-arranged time; he bisects the magnet-cross by the micrometer wire at 45^s, and again at 15^s before that time, also at 15^s and 45^s after that time. The intervals of these four observations are the same nearly as the time of vibration of the magnet (page *xiii*), and the mean of all the times is the same as the pre-arranged time. The times of observation are usually $1^h. 5^m$, $3^h. 5^m$, $9^h. 5^m$, and $21^h. 5^m$ of Greenwich mean time.

The mean of each pair of adjacent readings of the micrometer is taken (giving three means), and the mean of these three is adopted as the result. In practice, this is done by adding the first and fourth readings to the double of the second and third, and dividing the sum by 6.

After removal of the copper damper from the upper to the lower declination-magnet in the year 1864, the upper magnet was usually in a state of vibration; but, since the introduction of the water-damper on 1866, January 23, the number of instances of excessive vibration has been very small. When it appears to be nearly free from vibration, two bisections only of the cross are made, one about 15^s before the time recorded, the other about 15^s after that time, and the mean adopted as result. (The lower magnet, encircled by the copper damper, never exhibits any troublesome vibrations.)

The adopted result is converted into arc, supposing $1^r = 1'. 34''{\cdot}2$, and the quantity thus deduced is added to the mean of the vernier-readings, to which is applied the constant given in article 9 of the permanent adjustments; the difference between this number and the adopted reading for the Astronomical South Meridian is taken; and thus is deduced the magnetic declination, which is used in determining the zero for the photographic register.

§ 3. *General principle of construction of Photographic self-registering Apparatus for continuous Record of Magnetic and other Indications.*

The general principle adopted for all the photographic instruments is the same. For the register of each indication, an accurately turned cylinder of ebonite is provided (excepting that for the electrometer, which is of brass). The axis of the cylinder is placed parallel to the direction of the change of indication which is to be registered. If there are two indications whose movements are in the same direction, both may be registered on the same cylinder; thus, the Declination and the Horizontal Force, whose indications of changes of the respective elements travel horizontally, can both be registered upon one cylinder with axis horizontal; the same remark applies to the register of two different galvanic Earth-Currents; the Vertical Force and Barometer can both be registered upon one cylinder with axis vertical; and similarly the Dry-Bulb Thermometer and the Wet-Bulb Thermometer.

To the ends of each ebonite cylinder there are fixed circular brass plates, that which is near the clock-work having a diameter somewhat greater than that of the cylinder. In the further fittings there is a little difference between those for vertical and those for horizontal cylinders. Each horizontal cylinder has a pivot fixed in the brass plate at each end; these revolve each upon two antifriction wheels of the fixed frame. The vertical cylinders have no pivots; there is a perforation through the center of the lower or larger brass plate which, when the cylinder is mounted, is fitted upon a vertical spindle projecting upwards from the center of a second horizontal brass plate; this second brass plate sustains the weight of the vertical cylinder and turns horizontally, being supported by three antifriction wheels (each in a vertical plane) carried by the fixed frame.

Uniform rotatory motion is given to the cylinders by the action of clock or chronometer-work, regulated by either pendulum or duplex-escapement, or chronometer-escapement. For three of the cylinders the axis is placed opposite to the center of the chronometer, and a fork at the end of the hour hand takes hold of a winch fixed to the plate of the cylinder, or (in the vertical cylinders) to the plate that sustains the cylinder. In the cylinder for galvanic earth-currents, and in that of the electrometer, the connection is made by toothed wheels. For the horizontal cylinders, the plane of the chronometer work is vertical; for the vertical cylinders, it is horizontal.

The cylinders employed for the Declination and Horizontal Force registers, for the Vertical Force and Barometer registers, and for the Earth Current registers, are $11\frac{1}{2}$ inches high, and $14\frac{1}{4}$ inches in circumference; those for the thermometers are 10 inches high, and 19 inches in circumference; that for the electrometer is about $6\frac{1}{2}$ inches high and 19 inches in circumference.

Each cylinder, excepting that of the electrometer, is covered, when in use, by a tube of glass, which is open at one end, and has at the other end a circular plate of ebonite or brass, perforated at its center. The tube is a little larger than the cylinder; its open end is kept in position by a narrow collar of ebonite, and the opposite end by a circular piece of brass fixed to the smaller brass plate at the end of the cylinder.

To prepare the cylinder for register of indications, it is covered with a sheet of sensitised paper; the moisture on the paper usually causes the overlapping ends to adhere with sufficient firmness; the glass tube is then slipped over it, and the cylinder thus prepared is placed (if horizontal) with its pivots in bearing upon its two sets of antifriction wheels, or, (if vertical) with its end-brass-plate upon the rotating brass plate, and its central perforation upon the spindle of that plate; care is taken to ensure connection with the clock-work, and the apparatus is ready for action.

The trace for each instrument is produced by a flame of coal gas charged with the vapour of coal naphtha. For the magnetometers the light shines through a small aperture about $0^{in}\cdot 3$ long, and $0^{in}\cdot 01$ broad; for the earth-current-apparatus, the barometer, and the electrometer, the aperture is larger. The arrangements for throwing on the photographic paper of the revolving cylinder a spot of light which shall travel in the direction of the cylinder's axis with every motion of either magnetometer or galvanometer, or with the rise and fall of the mercury in the barometer, are as follows.

For each of the three magnetometers, a large concave mirror of speculum metal is carried by a part of the magnet-carrier; although it has a small movement of adjustment relative to the magnet-carrier, yet in practice it is very firmly clamped to it, so that the mirror receives all the angular movements of the magnet. The lamp is placed slightly out of the direction of the straight line drawn from the center of the concave mirror to the center of the cylinder which carries the photographic paper. By the concave mirror, the light diverging from the aperture is made to converge to a place nearly on the surface of the cylinder carrying the photographic paper. The form of the aperture, however, and the astigmatism caused by the inclined reflexion from the mirror, produce this effect, that the image is somewhat elongated and is at the same time slightly curved. To diminish the length there is placed near the cylinder a system of plano-convex cylindrical lenses of glass, with their axes parallel to the axis of the cylinder, and the image is thus reduced to a neat spot of light.

For the registers of galvanic earth-currents, the light, which falls upon a plane mirror carried by each galvanometer, is made to converge to a spot, by a system of cylindrical lenses.

For the barometer, the light, condensed by a vertically placed cylindrical lens, shines through a small horizontal slit in a plate of blackened mica (which moves with the fluctuations of the quicksilver), and thus forms a spot of light.

For the thermometers, the light shines through the vacant part of the tube, and thus forms a line of light.

For the electrometer, the light falling through a slit upon the small mirror carried by the needle support (§ 23), is thence reflected, and, by means of a plano-convex cylindrical lens brought to a small spot.

The spot of light (for the magnets, the earth-currents, the barometer, and the electrometer), or the boundary of the line of light (for the thermometers), moves, with the movements which are to be registered, in the direction of the axis of the cylinder, while the cylinder itself revolves. Consequently, when the paper is unwrapped from the cylinder, there is traced upon it (though not visible till the proper chemical agents have been applied) a curve, of which the abscissa measured in the direction of a line surrounding the cylinder is proportional to the time, while the ordinate measured in the direction parallel to the axis of the cylinder is proportional to the movement which is the subject of measure.

In the instruments for registering the motions of the magnets, the earth-currents, the barometer, and the electrometer, a line of abscissæ is actually traced on the paper, by a lamp giving a spot of light in an invariable position, the effect of which on the revolving paper is to trace a line surrounding the cylinder. For the thermometers this is not necessary, as the thermometer-scales are made to carry and to transfer to the photographic paper sufficient indications of the actual reading of the thermometers, by an apparatus which will be described in a following section (§ 16).

Every part of the cylinder apparatus for the magnets, for the earth-currents, and for the electrometer, is covered by cases of blackened zinc or wood, having slits for the moveable spots of light, and holes for the invariable spots; and all parts of the paths of the photographic light are protected as necessary by blackened zinc tubes from the admixture of extraneous light. The cylinder-apparatus for the thermometers is protected in the same manner, the whole, including the stems of the thermometers, and gaslights, being enclosed in a second zinc case, blackened internally.

In all the instruments, the following method is used for attaching, to the sheet of photographic paper, indications of the time when certain parts of the photographic trace were actually made, and for giving the means of laying down a time-scale applicable to every part of the trace. By means of a small moveable plate, arranged expressly for this purpose, the light which makes the trace can at any moment be completely cut off. An assistant, therefore, occasionally cuts off the light (registering in the proper book the clock-time of doing so), and after a few minutes withdraws the plate (again registering the time). The effect of this is to make a visible interruption in the trace, corresponding to registered times. By drawing lines from these points of interruption parallel to the axis of the cylinder, to meet the photographic line of abscissæ, or an adopted line of abscissæ parallel to it, points are defined upon the line of abscissæ corresponding to registered times. The whole length of the exposed part of the paper corresponds to the known time of revolution of the cylinder. A scale being prepared beforehand, whose value for the time of revolution corresponds in length to the circumference of the cylinder, the scale-readings for the registered times of interruption of light are applied to the ordinates corresponding to the interruptions, and the divisions of hours and minutes transferred at once from the scale to the line of abscissæ. In practice it is found that the length of the paper is not always the same, and it is necessary, therefore, to use for each instrument several pasteboard scales of different lengths, adapted to various lengths of the photographic sheets.

Since the year 1870, by means of an opening made in the chimneys of the registering lamps of the magnetometers, and in the chimneys of other lamps for the earth current galvanometers, the light at each instrument, when not interrupted, falls directly upon the cylindrical lens in front of the revolving cylinder, and, if allowed to act for a short time, produces, when the sheet is developed, a dark line upon the photographic paper. An apparatus of clock-work, specially arranged by Messrs. E. Dent and Co., acting upon small shutters, uncovers simultaneously the chimney-openings in all the lamps about $2\frac{1}{2}$ minutes before each hour, and covers them simultaneously about $2\frac{1}{2}$ minutes after each hour. In this way a good series of hour-lines in the direction of the ordinates is formed. By this arrangement increased accuracy of the time-registers has been obtained, and the labour of the computers much diminished. The system of interrupting the trace by hand is still retained, as giving means of checking the clock indication. No automatic registration of hour-lines has yet been arranged for the Barometer or for the Dry-bulb and Wet-bulb Thermometers. For the electrometer, its driving-clock interrupts the register at each hour as explained in § 23.

§ 4. *Lower Declination-Magnet; and Photographic self-registering Apparatus for Continuous Record of Magnetic Declination.*

The lower declination-magnet is made by Simms. It is 2 feet long, $1\frac{1}{2}$ inch broad, $\frac{1}{4}$ inch thick, of hard steel throughout, much harder than the upper declination-magnet.

The magnet-frame consists of an upper piece, whose top is a hook (to be hooked into the suspension-skein), and which carries a concave mirror used for the photographic record in the manner described above. The lower part of this upper piece turns in a graduated horizontal circle, similar to the torsion circle of the upper magnet, and attached to the lower piece or magnet-carrier proper. The lowest part of the carrier is a double square hook, in which the magnet is inserted and is kept in position by the pressure of three screws.

It has been mentioned in § 1 that a small pier, built upon one of the crossed slates which are laid upon three piers rising from below, carries the suspension-pulleys. The suspension-skein rises to one of these pulleys, passes horizontally over a second pulley about 5 inches south of it, and then descends obliquely to a windlass which is fixed to the stone slab about 2 ft. 3 in. south of the center of the magnet.

The height of the pulley above the floor of the Basement is 10 ft. $4\frac{3}{4}$ in. As the height of the magnet above the floor is 2 ft. $10\frac{1}{2}$ in., and the length of the magnet frame is 1 ft. 3 in., there remains 6 ft. $3\frac{1}{4}$ in. of free suspending skein. On 1879, June 7, the suspension-skein gave way. The defective part, near one end, being removed, the magnet was, on June 9, again suspended by the same skein.

One of the revolving cylinders (§ 3) is used for the photographic record of the Declination-Magnet and the Horizontal-Force-Magnet. In the preparation of the basement in 1864, as has been stated, the south-eastern re-entering angle was cut away, so that the straight line from the suspending skein of the declination-magnet to the center of those of the bifilar magnet passes through a clear space, in which the registering apparatus is placed.

The concave mirror of the declination-magnet is 5 inches in diameter, and is above the top of the magnet-box. The distance of the light aperture from the mirror is about 25·3 inches. The bright spot formed by the reflection of light from the mirror is received on the south side of the cylinder, near its west end.

For the declination-magnet, the values, in minutes and seconds of arc, of movements of the photographic spot in the direction of the ordinate, are thus deduced from a geometrical calculation founded on the measures of different parts of the apparatus. The distance of the cylinder from the concave mirror is 132·11 inches, and 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 is represented by 4·611 inches upon the photographic paper. A small scale of paste-board is prepared, (for which a glass scale is in some operations substituted,) whose graduations correspond in value to minutes and seconds so calculated. The zero of the ordinate-scale is found in the following manner. The time-scale having been laid down as is already described, and actual observations of the position of the upper declination-magnet having been made with the eye and the telescope (as has been fully described at page *xv*) at certain registered times, there is no difficulty (by means of these registered times) in defining the points of the photographic trace which correspond to the observed positions. The pasteboard scale being applied as an ordinate to one of these points, and being slid up and down till the scale reading which represents the reading actually taken by the eye-observation falls on that point, the reading of the scale where it crosses the line of abscissæ is immediately found. This process rests on the assumption that the movements of the upper and lower magnets are exactly similar. The various readings given by different observations, so long as there is no instrumental change, will scarcely differ, and may be combined in groups, and thus an adopted reading for the line of abscissæ may be obtained. From this, with the assistance of the same pasteboard scale, there can then be laid down without difficulty a new line, parallel to the line of abscissæ, whose ordinate would represent some whole number of degrees, or other convenient quantity.

§ 5. *Horizontal-Force-Magnet and Apparatus for observing it.*

The horizontal-force-magnet, furnished by Meyerstein of Göttingen, is, like the two declination-magnets, 2 feet long, $1\frac{1}{2}$ inch broad, and about $\frac{1}{4}$ inch thick. For its support (as is mentioned at page *iv*), a brick pier in the eastern arm of the Magnetic Observatory, built on the ground below the basement floor, rises through the floor of the upper room, and carries a slate slab, to the top of which a brass frame is attached, carrying two brass pulleys (with their axes in the same east and west line) in front of the pier, and two (in a similar position) at the back of the pier; these constitute the upper suspension-piece. A small windlass is attached to the back of the pier at a convenient height. The magnet-carrier consists of two parts. The upper part is a horizontal bar, $2\frac{1}{2}$ inches long, whose ends are furnished with verniers for reading the graduations of the torsion-circle (a portion of the lower part, to be mentioned below). On the upper side of this horizontal bar are two small pulleys with axes horizontal and at right angles to the vertical plane passing through the length of the bar: by these pulleys the apparatus is suspended, as will be mentioned. From the lower side of the horizontal bar, a vertical axis projects downwards through the center of the torsion-circle, in which it turns by stiff friction. The lower part of the magnet-carrier consists, first of the torsion-circle, a graduated circle about 3 inches in diameter: next, immediately below the central part of the torsion-circle, is attached (but not firmly fixed) a circular piece of metal from which projects downwards a frame that, by means of three cramps and screws, carries the photographic concave mirror, with the plane of its front under the center of the vertical axis: this circular piece of metal has a radial arm upon which acts a screw carried by the torsion-circle, for giving to the concave mirror small changes of azimuthal position. Thirdly, there is fixed to the torsion-circle, at the back of the mirror-frame but not touching it, a bar projecting downwards, bent horizontally under the mirror-frame and then again bent downwards, carrying the cramps in which the magnet rests; and, still lower, a small plane mirror, to which a fixed telescope is directed for observing by reflexion the graduations of a fixed scale (to be mentioned shortly). Under the two small pulleys mentioned above passes a skein of silk; its two branches rise up and pass over the front pulleys of the suspension-piece, then over its back pulleys, and then descend and pass under a single large pulley, whose axis is attached to a wire that passes down to the windlass. Supported by the two branches of the skein, the magnet swings freely, but the direction that it takes will depend on the angular position of its stirrup with respect to the upper horizontal bar; it is intended that the index should be brought to such a position on the torsion-circle that the two suspending branches should not hang in one plane, but should be so twisted that their torsion-force will maintain the magnet in a direction very nearly E. and W. magnetic (its marked end being W.); in which state an increase of the earth's magnetic force draws the marked end towards the N., till the torsion-force is sufficiently increased to resist it; or a diminution allows the torsion-force to draw it towards the S. The magnet, with its plane mirror, hangs within a double rectangular box (one box completely inclosed within another) covered with gilt paper, similar to that used for the declination-magnet; in its south side there is one long hole, covered with glass, through which the rays of light from the scale enter to fall on the plane mirror, and the rays reflected by the mirror pass to the fixed telescope. The vertical rod (below the torsion-circle), which carries the magnet-stirrup, passes through a hole in the top of the box. Above the magnet box is the concave mirror above mentioned. The height of the brass pulleys of the suspension-piece above the floor is $11^{ft.}\ 8^{in.}{\cdot}5$; that of the pulleys of the magnet-carrier is $4^{ft.}\ 2^{in.}{\cdot}5$; and that of the center of the plane mirror is about $3^{ft.}\ 1^{in.}$. The distance between the branches of the silk skein, where they pass over the upper pulleys, is $1^{in.}{\cdot}14$; at the lower pulleys the distance between them is $0^{in.}{\cdot}80$.

An oval copper bar (exactly similar to that for the declination-magnet), embraces the magnet, for the purpose of diminishing its vibrations.

The scale, which is observed by means of the plane mirror, is in a horizontal position, and is fixed to the South wall of the East arm of the Magnetic Basement. Till 1879, December 22, the scale was of pasteboard; on this day a new opal glass scale by Negretti and Zambra was substituted. The numbers of the scale increase from East to West, so that when the magnet is inserted in the magnet-cell with its marked end towards the West, increasing readings of the scale (as seen with a fixed telescope directed to the mirror which the magnet carries) denote an increasing horizontal force. A normal to the scale from the center of the plane-mirror meets the scale at the division 51 nearly; the distance from the center of the plane-mirror to division 51 of the scale is 90·8 inches.

The telescope is fixed on the east side of the brick pier which supports the stone pier of the declination-theodolite in the upper observing room. 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 telescope, is about 38°, and the plane of the mirror is therefore inclined to the axis of the magnet about 19°.

OBSERVATIONS RELATING TO THE PERMANENT ADJUSTMENTS OF THE HORIZONTAL-FORCE-MAGNET.

1. Determination of the times of vibration and of the different readings of the scale for different readings of the torsion-circle, and of the reading of the torsion-circle and the time of vibration when the magnet is transverse to the magnetic meridian.

To render the process intelligible, it may be convenient to premise the following explanation.

Suppose that the magnet is suspended in its stirrup which is firmly connected with the small plane mirror, with its marked end in a magnetic westerly direction (not exactly west, but in any westerly direction between north and south), and suppose that, by means of the telescope directed towards that mirror, the scale is read, or (which is the same thing) the position of the plane mirror and of the stirrup, and therefore that of the axis of the magnet, is defined. Now let the magnet be taken out of the stirrup and replaced with its marked end easterly. The terrestrial magnetic power will now act as regards torsion, in the direction opposite to that in which it acted before, and the magnet will therefore take up a different position. But by turning the torsion-circle, which changes the amount and direction of the torsion-power produced by the oblique tension of the suspending cords, the magnet may be made to take the same position, but with reversed direction of poles, as at first (which will be proved by the reading of the scale, as viewed in the plane mirror, being the same). The reading of the torsion-circle will now be different from what it was at first. The effect of this operation then is, to give us the difference of torsion-circle-readings for the same position of the magnet-axis with the marked end opposite ways, but it gives no information as to whether the magnet-axis is accurately transverse to the meridian, inasmuch as the same operation can be performed whether the magnet-axis is transverse or not.

But there is another observation which will inform us whether the magnet-axis is or is not accurately transverse. Let the time of vibration be taken in each position of the magnet. Resolve the terrestrial magnetic force acting on the poles of the magnet 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, with axis in the same position), 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 the time of vibration (if there were no other force) would be the same. But there is another force, namely, the longitudinal force; and when the marked end is northerly, this tends from the center of the magnet's length, and when it is southerly it tends towards the center of the magnet's length; and in a vibration of given extent this produces force, in one case increasing that due to the torsion and in the other case diminishing it. The times of vibration therefore will 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.

The criterion then of the position truly transverse to the meridian (which position is necessary in order that the indications of our instrument may apply truly to changes of the magnitude of terrestrial magnetic force without regard to changes of direction) is this. Find the readings of the torsion-circle which, with magnet in reversed positions, will give the same readings of the scale as viewed by reflexion in the plane mirror, and will also give the same time of vibration for the magnet. With these readings of the torsion-circle the magnet is transverse to the meridian; and the difference of the readings of the torsion-circle is the difference between the position when terrestrial magnetism acting on the magnet twists it one way, and the position when the same force twists it the opposite way, and is therefore double the angle due to the torsion-force of the suspending lines when they neutralize the force of terrestrial magnetism.

On 1879, January 2, some frayed parts of the suspension-skein were removed. The magnet was then remounted, and the following observations made:—

1879. Day.	The Marked end of the Magnet.							
	West.				East.			
	Torsion-Circle Reading.	Scale Reading.	Difference of Scale Readings for 1° of Torsion.	Mean of the Times of Vibration.	Torsion-Circle Reading.	Scale Reading.	Difference of Scale Readings for 1° of Torsion.	Mean of the Times of Vibration.
	°	div.	div.	s	°	div.	div.	s
Jan. 2	145 146 147	41·82 49·75 58·12	7·93 8·37	. . 20·72 20·60	228 229 230	43·44 52·16 59·65	8·72 7·49	20·52 20·68 20·82

The times of vibration and scale readings were sensibly the same, when the torsion-circle read 146°. 18′, marked end West, and 229°. 0′, marked end East, differing 82°. 42′. Half this difference, or 41°. 21′, is the angle of torsion when the magnet is transverse to the meridian. The value deduced from the whole of the observations above was 41°. 23′·2. On 1879, June 7, the cord sustaining the suspension-skein gave way. A new cord was attached on June 9, and the magnet remounted. On July 17 another set of observations for determination of the angle of torsion gave 41°. 20′·0, and a further set made on 1880, January 2, gave 41°. 22′·0.

The value adopted in the reduction of observations throughout the year 1879 was 41°. 22′·0.

The reading adopted for the torsion-circle, marked end of magnet west, was 146°. 0′ throughout the year.

2. Computation of the angle corresponding to one division of the scale, and of the variation of the horizontal force (in terms of the whole horizontal force) which moves the magnet through a space corresponding to one division of the scale.

It was found by accurate measurements, on 1864, November 3, that the distance from $51^{\text{div.}}$ on the scale to the center of the face of the plane mirror is 90·838 inches, and that the length of $30^{\text{div.}}85$ of the scale is exactly 12 inches; consequently the angle at the mirror subtended by one division of the scale is 14′. 43″·25, or, for change of one division of scale-reading, the magnet is turned through an arc of 7′. 21″·625.

The variation of horizontal force (in terms of the whole horizontal force) for a disturbance through one division of the scale, is computed by the formula, "Cotan. angle of torsion × value of one division in terms of radius." Using the numbers above given, the value is found to be 0·002431, which has been used throughout the year 1879.

3. Determination of the compound effect of the vertical-force-magnet and the declination-magnet on the horizontal-force-magnet, when suspended with its marked end towards the West.

The details of the experiments, made while the old vertical-force-magnet was in use, will be found in the several volumes for 1840—1841, 1844, and 1845. The effect was to increase the readings by $0^{\text{div.}}487$. On mounting a new vertical-force-magnet in 1848, similar experiments were made, and the resulting number was $0^{\text{div.}}45$. These quantities are totally unimportant in their influence on the registers of changes of horizontal force. No experiments have been made since the magnets were placed in the basement.

4. Effect of the damper.

In the year 1865, from May 17 to May 25, observations were made for ascertaining the deflection of the magnet produced by turning the damper through a small angle round a vertical axis passing through its center.

DAMPER IN USUAL POSITION.

			div.
Damper turned through 2°	W. end towards S.,	increase of scale-reading	−0·251
	W. end towards N.,	,, ,, ...	+0·050
Damper turned through 4°	W. end towards S.,	,, ,, ...	−0·34
	W. end towards N.,	,, ,, ...	+0·16

DAMPER REVERSED END FOR END.

			div.
Damper turned through 2°	W. end towards S.,	increase of scale-reading	−0·15
	W. end towards N.,	,, ,, ...	−0·02
Damper turned through 4°	W. end towards S.,	,, ,, ...	−0·12
	W. end towards N.,	,, ,, ...	+0·08

On 1865, July 25, observations were made to ascertain whether the effect of an external deflecting cause is the same with the damper present and the damper removed. A small magnet was placed with its marked end pointing north at the distance 4 feet south of the unmarked end of the horizontal-force-magnet, deflecting the magnet through $1^{\text{div.}}$ of the scale, and the scale-readings were observed with the damper in its usual place and with the damper away. Three experiments were made, containing twenty-four observations of position. Not the smallest difference of position of the horizontal-force-magnet was produced by the presence or absence of the damper. The observations were very easy, and the result is certain.

No experiments on the damper have been made since 1865.

5. Determination of the correction for the effect of temperature on the horizontal-force-magnet.

In the Introduction to the volume of Magnetical and Meteorological Observations for 1847 will be found a detailed account of observations made in the years 1846 and 1847 for determination of this element. The principle adopted was that of observing the deflection which the magnet (to be tried) produces on another magnet; the magnet (to be tried) being carried by the same frame which carries the telescope that is directed to the plane mirror attached to the other magnet, and which also carries the scale that is viewed in these experiments by reflection in that plane mirror. The rotation of the frame was measured by a graduated circle about 23 inches in diameter. The magnet (to be tried) was always on the eastern side of the other magnet. It was enclosed in a copper trough, which was filled with water at different temperatures. One end of the magnet (to be tried) was directed towards the other magnet. The values found for correction of the results as to horizontal force determined with the magnet at temperature t° in order to reduce them to what they would have been if the temperature of the magnet had been 32°, expressed as multiples of the whole horizontal force, were,*

When the marked end of the magnet (to be tried) was West,

$$0{\cdot}00007137\ (t-32) + 0{\cdot}000000898\ (t-32)^2.$$

When the marked end of the magnet (to be tried) was East,

$$0{\cdot}00009050\ (t-32) + 0{\cdot}000000626\ (t-32)^2.$$

The mean, or

$$0{\cdot}00008093\ (t-32) + 0{\cdot}000000762\ (t-32)^2$$

has been embodied in tables which have been used in the computation of the "Reduction of Magnetic Observations 1848–1857," attached to the volume of Observations for 1859, and in the computation for "Days of Great Magnetic Disturbance 1841–1857," attached to the volume for 1862. The same formula has been employed

* By inadvertence in printing the Introduction, 1847, the letter t has been used in two different senses, as commencing from 0° and as commencing from 32°.

in the "Reduction of the Magnetic Observations, 1858–1863," published in the volume for 1867.

In the year 1864 observations were made for ascertaining the temperature-coefficient by heating the magnet by hot air. The magnet, whose variation of power in different temperatures was to be determined, was placed in a copper box planted upon the top of a copper gas stove, whose heat could be regulated by manipulation of a tap, and from which rose a stream of heated air (not the air vitiated by combustion) through a large opening in the bottom of the box. The stove used for this purpose was the same which is now used for warming the Magnetic Basement. It was placed in the Magnetic Office, No. 7, in a position south magnetic of the deflexion-apparatus. The hot air which rose through the opening in the center of the bottom was discharged by adjustible openings near the extreme ends of the top. Three windows were provided for reading three thermometers. The box, and the magnet which it inclosed, were placed in a magnetic E. and W. position. The needle whose deflection exhibited the power of the magnet was that which is employed in the ordinary use of the deflexion-apparatus. The proportion of the power of the magnet (under definite circumstances) to the earth's directive horizontal power was expressed by the tangent of the angle of deviation. Observations were made with temperatures both ascending and descending. The intervals of observation at different temperatures were sufficiently small to permit the assumption that the earth's force had not sensibly changed. The following is an abstract of the principal results:—

Omitting some days of less perfect series, satisfactory series of observations were made on 1864, February 21, 22, 23, and March 10. The tangents of angle of deflection were as follows:-

13	observations with	marked end E } 13 ,, ,, W	at mean temperature	36°·8	Fahrenheit gave	0·403711
21 / 25	,, / ,,	marked end E } ,, W	,,	61·3	,,	0·400836
17 / 16	,, / ,,	marked end E } ,, W	,,	90·3	,,	0·400579

From these it was inferred that the tangent of angle of deflection could be represented by—

$$0·404559 \times \left\{1 - 0·0004610 \times (t - 32) + 0·000005061 \times (t - 32)^2\right\}$$

On comparing the quantity within the bracket (which expresses the law of magnetic power as depending on temperature) with that found in 1847, which, as above stated, is—

$$\left\{1 - 0·00008093 \times (t - 32) - 0·000000762 \times (t - 32)^2\right\}$$

d 2

it will be seen that the difference is great. The second terms differ greatly in magnitude, and the third terms in sign.

Possibly some light may be thrown on the difference by the following remark. The two formulæ give the same values for $t = 32^\circ$ and for $t = 97^\circ\cdot3$. And they give equal degrees of change per degree when $t = 65^\circ$. It would seem therefore that the real discordance is in the experimental values for the mean temperatures only, or principally; and that it is probable that there is some error in the hot-air process for the middle temperatures.

The results of a similar examination of the Old Vertical Force Magnet, which was in use from 1848 to the beginning of 1864, are here inserted, although not applying to the observations of the present volume. Omitting less perfect series, observations made on 1864, February 21 and 24, gave the following values for tangents of angles of deflection:—

7 observations with marked end E 7 „ „ W	at mean temperature	34°·2	Fahrenheit gave	0·279985
9 „ marked end E 11 „ „ W	„	57·0	„	0·275111
7 „ marked end E 7 „ „ W	„	86·5	„	0·270778

From these it was inferred that the tangent of angle of deflection could be represented by—

$$0\cdot280526 \times \left\{1 - 0\cdot00088607 \times (t - 32) + 0\cdot0000045594 \times (t - 32)^2\right\}$$

The expression found in 1847 for the law of force in the original Vertical Force Magnet was—

$$\left\{1 - 0\cdot00015816 \times (t - 32) - 0\cdot000001172 \times (t - 32)^2\right\}$$

giving a discordance of the same kind as that found for the horizontal force, but still larger. The formulæ agree only when $t = 32^\circ$ and when $t = 159^\circ\cdot0$. The discordance cannot be removed by a supposition similar to that made above.

Returning now to the temperature-correction of the Horizontal Force Magnet. The unsatisfactory character of the comparisons just given made it desirable at the beginning of 1868 to try the method of heating the air of the Magnetic Basement generally (by means of the gas-stove), leaving the magnets in all respects in their ordinary state, and comparing their indications as recorded in the ordinary way, but at different temperatures.* Experiments were at first made at intervals of a few hours in the course of one day, but it was soon found that the magnet did not acquire the proper temperature; moreover, the result was evidently affected by

* This method was first used for magnets, so far as I am aware, at the Kew Observatory. It had been used for pendulums by General Sir Edward Sabine and by myself.

diurnal inequality. After this, an entire day was in each case devoted to the effects of each temperature (high or low, as the case might be). The principal series of observations were made with the horizontal force magnet in its ordinary position, or marked end to the west; but a few were made with the marked end to the east. In some instances, the numbers given are the result each of several observations; but in other instances, the result is that of a single observation, taken when all the apparatus had acquired unusual steadiness. The following are the results:—

RESULTS OF TEMPERATURE EXPERIMENTS UPON THE HORIZONTAL FORCE MAGNET, MARKED END WEST.

1868. MONTH and DAY. (Civil.)	Temperature.	Scale Reading.	Change of Temperature.	Change of Scale Reading.	Change of Scale Reading reduced to Parts of the whole Horizontal Force.	Change of Horizontal Force corresponding to a change of 1° of Temperature (in Parts of the whole H.F.).
	°	div.	°	div.		
January 3	56·8	60·82	6·3	0·65	0·001579	0·000250
3	50·5	61·47				
4	49·5	61·47	6·0	0·12	·000292	·000049
4	55·5	61·35				
6	59·3	60·91	10·0	0·71	·001725	·000172
7	49·3	61·62	7·4	0·57	·001385	·000187
9	56·7	61·05				
10	58·9	60·91	7·6	0·80	·001943	·000256
11	51·3	61·71	8·0	0·53	·001288	·000161
12	59·3	61·18				
13	59·5	61·26	5·6	0·16	·000389	·000070
14	53·9	61·42				
14	55·2	61·74	2·7	0·31	·000753	·000279
16	52·5	62·05	9·0	1·27	·003086	·000343
17	61·5	60·78	8·0	0·46	·001118	·000143
18	53·5	61·24	6·1	0·31	·000753	·000123
19	59·6	60·93				
January 31	60·7	58·63	10·1	0·31	·000753	·000075
February 4	50·6	58·94	9·7	0·88	·002138	·000220
5	60·3	58·06	9·2	0·80	·001943	·000211
7	51·1	58·86	8·5	0·82	·001992	·000234
10	59·6	58·04				
14	59·7	58·64	9·6	0·82	·001992	·000208
16	50·1	59·46	9·7	0·49	·001190	·000123
18	59·8	58·97	11·6	0·48	·001166	·000100
20	48·2	59·45	10·6	0·43	·001045	·000099
21	58·8	59·02				
Mean . .	..	..	..	..	....	0·000174

RESULTS OF TEMPERATURE EXPERIMENTS UPON THE HORIZONTAL FORCE MAGNET, MARKED END EAST.

1868. Month and Day. (Civil.)	Temperature.	Scale Reading.	Change of Temperature.	Change of Scale Reading.	Change of Scale Reading reduced to Parts of the whole Horizontal Force.	Change of Horizontal Force corresponding to a change of 1° of Temperature (in Parts of the whole H.F.).
	°	div.	°	div.		
January 21	60·2	60·73	9·7	1·42	0·003449	0·000355
22	50·5	59·31				
24	58·6	62·56	7·3	1·02	·002477	·000339
24	51·3	61·54	8·0	0·32	·000777	·000097
27	59·3	61·86	10·3	0·35	·000850	·000083
29	49·0	61·51	11·9	0·30	·000729	·000061
31	60·9	61·81				
Mean . .	..	...	..	..	....	0·000187

These results do not differ greatly from those which are given by application of the formula found in 1847. It is important to observe that they include the entire effects of temperature upon all the various parts of the mounting of the magnet, as well as on the magnet itself; and for this reason appear to be deserving of great confidence. Still it seemed prudent, at present, to omit application of corrections for temperature.

The method of observing with the horizontal-force-magnet is the following:—

A fine vertical wire is fixed in the field of view of the telescope, which is directed to the plane mirror carried by the magnet. On looking into the telescope, the graduations of the fixed scale, mentioned in page *xxii*, are seen; and during the oscillations of the magnet, the divisions of the scale are seen to pass alternately right and left across the wire. The clock-time, for which the position of the magnet is to be determined, is 5 minutes earlier than that for the observation of declination. The first observation is made by the observer applying his eye to the telescope 40^s (or about two vibrations) before the arranged time, and, if the magnet is in a state of vibration, he observes the next four extreme points of vibration on the scale, and the mean of these is adopted in the same manner as for the declination-observations; but if it appears to be at rest, then at 10^s before the pre-arranged time, he notes the reading of the scale; and 10^s after the pre-arranged time he notes whether the reading continues the same, and if it does, that reading is adopted as the result. If there is a slight difference in the readings, the mean is taken. The times of observation are usually 1^h, 3^h, 9^h, and 21^h of Greenwich mean time.

The number of instances when the magnet was observed in a state of vibration during the year 1879 is very small.

A thermometer, the stem and bulb of which reach 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, that actually contains the magnet. Readings of this thermometer are taken on every week day, at 0^h, 1^h, 2^h, 3^h, 9^h, 21^h, 22^h, and 23^h. Its index error is insignificant. A few readings are taken on Sunday. Self-registering maximum and minimum thermometers placed outside the box were formerly read twice every day, but in consequence of the very small diurnal range of temperature, these observations have not been continued.

§ 6. *Photographic self-registering Apparatus for Continuous Record of Magnetic Horizontal Force.*

Referring to the general description of photographic apparatus, the following remarks apply more particularly to that which is attached to the horizontal-force-magnet. A concave mirror of speculum-metal, 4 inches in diameter, is carried by the magnet-carrier. The light of a gas-lamp shines through a small aperture about $0^{in}\cdot3$ high, and $0^{in}\cdot01$ broad (which is supported by the solid base of the brick pier carrying the magnet-support), at the distance of about 21·25 inches from the concave mirror, and is made to converge to a point, on the north surface and near the east end of the same revolving cylinder which receives the light from the concave mirror of the declination-magnet. A cylindrical lens parallel to the axis of the cylinder receives the somewhat elongated image of the source of light, and converts it into a well-defined spot. The motions of this spot parallel to the axis represent the angular movements of the magnet which are produced by an increase of terrestrial magnetic force overcoming more completely the torsion-force of the bifilar suspension, or by a diminution of terrestrial force yielding to the torsion-force.

As the spot of light from the horizontal-force-mirror falls on the side of the cylinder opposite to that on which the light from the declination-mirror falls, the same time-scale will not apply to both; it is necessary to prepare a time-scale independently for each.

The following is the calculation by which the scale of horizontal force on the photographic sheet is determined. The distance between the surface of the concave mirror and the surface of the cylinder is 134·436 inches; consequently, one degree of angular motion of the magnet, producing two degrees of angular motion of the reflected ray, moves the spot of light through 4·6927 inches. For the year 1879 the adopted value of variation of horizontal force for one degree of angular motion of the magnet = sin. 1° × cotan. 41°. 22′·0 = 0·019821; and the movement of the spot of light for 0·01 part of the whole horizontal force is 2·368 inches. With this fundamental number, the graduations of the pasteboard scale for measure of horizontal force have been prepared.

§ 7. *Vertical-Force-Magnet, and Apparatus for observing it.*

The vertical-force-magnet in use to 1848 was made by Robinson; that in use from 1848 to 1864, January 20, was by Barrow. The magnet now in use is by

Simms. Its length is $1^{ft.}$ $6^{in.}$; it is pointed at the ends. After some trials, it was re-magnetized by Mr. Simms on 1864, June 15. Between 1864, August 27, and September 27, a new knife-edge was attached to it, to remedy a defect which, as was afterwards found, arose from a cause that had no relation to the knife-edge. Its supporting frame rests upon a solid pier, built of brick and capped with a thick block of Portland stone, in the western arm of the magnetic basement. Its position is as nearly as possible symmetrical with that of the horizontal-force-magnet in the eastern arm. Upon the stone block is fixed the supporting frame, consisting of two pillars (connected at their bases) on whose tops are the agate planes upon which vibrate the extreme parts of the knife-edge (to be mentioned immediately). The carrier of the magnet is an iron frame, to which is attached, by clamps and pinching screws, a steel knife-edge, about 8 inches long. The steel knife-edge passes through an aperture in the magnet. The axis of the magnet is as nearly as possible transverse to the meridian, its marked end being east. The axis of vibration is as nearly as possible north and south. To the southern end of the iron frame, and projecting further south than the end of the knife-edge, is fixed a small plane mirror, whose plane makes with the axis of the magnet an angle of $52\frac{3}{4}^{\circ}$ nearly. The fixed telescope (to be mentioned) is directed to this mirror, and by reflexion at the surface of the mirror it views a vertical scale (to be mentioned shortly). The height of this mirror above the floor is about $2^{ft.}$ $10^{in.}6$. Before the introduction of the photographic methods, the magnet was placed in a perforation of a brass frame midway between its knife-edges. But since the photographic method was introduced, the magnet has been placed excentrically; the distance of its southern face from the nearest end of the southern knife-edge being nearly 2 inches, and a space of $4\frac{1}{2}$ inches in the northern part of the iron frame being left disposable. In this disposable space there is attached to the iron frame by three clips a concave mirror of speculum-metal, with its face at right angles to the length of the magnet; it is used in the photographic system (shortly to be described). Near the north end of the iron frame are fixed in it two screw-stalks, upon which are adjustible screw-weights; one stalk is horizontal, and the movement of its weight affects the position of equilibrium of the magnet (which depends on the equilibrium between the moments of the vertical force of terrestrial magnetism on the one hand and of the magnet's center of gravity on the other hand); the other stalk is vertical, and the movement of its weight affects the delicacy of the balance, and varies the magnitude of its change of position produced by a change in the vertical force of terrestrial magnetism.

The whole is inclosed in a rectangular box. This box is based upon the stone block above mentioned; and in it the magnet vibrates freely in the vertical plane. In the south side of the box is a hole covered by glass, through which pass the rays of light from the scale to the plane mirror, and through which they are reflected from the plane mirror to the telescope. And at the east end is a large hole covered by glass, through which passes the light from the lamp to the concave mirror, and through which it is reflected to the photographic cylinder (to be described hereafter).

The telescope is fixed to the west side of the brick pier which supports the stone pier in the upper room carrying the declination-theodolite. Its position is symmetrical with that of the telescope by which the horizontal-force-magnet is observed; so that a person seated in a convenient position can, by an easy motion of the head left and right, observe the vertical-force and horizontal-force-magnets.

The scale is vertical: it is fixed to the pier which carries the telescope, and is at a very small distance from the object-glass of the telescope. Till 1879, December 23, the scale was of pasteboard; on this day a new opal glass scale by Negretti and Zambra was substituted. The wire in the field of view of the telescope is horizontal. The telescope being directed towards the mirror, the observer sees in it the reflected divisions of the scale passing upwards and downwards over the fixed wire as the magnet vibrates. The numbers of the scale increase from top to bottom; so that, when the magnet is placed with its marked end towards the East, increasing readings (as seen with the fixed telescope) denote an increasing vertical force.

OBSERVATIONS RELATING TO THE PERMANENT ADJUSTMENTS OF THE VERTICAL-FORCE-MAGNET.

1. Determination of the compound effect of the declination-magnet, and horizontal-force-magnet, and of the iron affixed to the electrometer pole, on the vertical-force-magnet.

The experiments applying to the combined effect of the two magnets are given in the volumes for 1840–1841, 1844, and 1845: and those applying to the electrometer pole in the volume for 1842. It appeared that no sensible disturbance was produced on the magnet formerly in use. No experiments have been made with the new magnet. The electrometer-pole was removed in 1879, June.

2. Determination of the time of vibration of the vertical-force-magnet in the vertical plane.

In the year 1879, vibrations of the vertical-force-magnet were observed on 80 different days, and with readings of various divisions of the scale. The mean time of vibration adopted was $14^{s}{\cdot}018$ throughout the year.

3. Determination of the time of vibration of the vertical-force-magnet in the horizontal plane.

1879, December 31. The magnet with all its apparatus was suspended from a tripod in Magnetic Office, No. 6, its broad side being in a plane parallel to the horizon; therefore, its moment of inertia was the same as when it is in observation. A telescope, with a wire in its focus, was directed to the reflector carried by the magnet. A scale of numbers was placed on the floor of the room, at right angles to the long axis of the magnet, or parallel to the mirror. The magnet was observed only at times when it was swinging through a small arc. From 500 vibrations, the mean time of one vibration $=17^{s}{\cdot}255$. This number is used through the year 1879.

4. Computation of the angle through which the magnet moves for a change of one division of the scale; and calculation of the disturbing force producing a movement through one division, in terms of the whole vertical force.

The distance from the scale to the mirror is 186·07 inches, and each division of the scale $=\frac{12}{30 \cdot 85}$ inches. Hence the angle which one division subtends, as seen from the mirror, is 7′. 11″·19; and therefore the angular movement of the normal to the mirror, corresponding to a change of one division of the scale, is half this quantity, or 3′. 35″·60.

But the angular movement of the normal to the mirror is not the same as the angular movement of the magnet; but is less in the proportion of unity to the cosine of the angle which the normal to the mirror makes with the magnet, or in the proportion of unity to the sine of the angle which the plane of the mirror makes with the magnet. This angle has been found to be $52\frac{3}{4}°$; therefore, dividing the result just obtained by sine $52\frac{3}{4}°$, we have, for the angular motion of the magnet corresponding to a change of one division of the scale, 4′. 30″·85.

From this, the value, in terms of the whole vertical force, of the disturbing force, producing a change of one division, is to be computed by the formula, "Value of one division in terms of radius × cotan. dip × $\frac{T'^2}{T^2}$"; where T' is the time of vibration in the horizontal plane, and T the time of vibration in the vertical plane.

For the year 1879, T' was assumed = 17ˢ·255, T = 14ˢ·018, adopted value of dip = 67°. 37′. From these numbers, the change of vertical force, in terms of the whole vertical force, corresponding to one division of the scale, is found = 0·000819.

5. Investigation of the temperature-correction of the vertical-force-magnet.

The new or Simms vertical-force-magnet was subjected to experiments by inclosing it in a copper box, and warming it by an injection of hot air, and observing the amount of deviation which it produced on the suspended magnet used in the deflexion-apparatus for absolute measure of horizontal force, at the same time and in the same manner as were the horizontal-force-magnet and the old vertical-force-magnet, in the experiments described in pages *xxvii* and *xxviii*. Observations made on 1864, February 20, 25, March 3, 9, gave, for the tangents of the angles of deflection,—

16 observations with	marked end E	at mean temperature	36°·6	Fahrenheit, gave	0·172352
18 „	„ W				
33 „	marked end E	„	62·2	„	0·171657
29 „	„ W				
26 „	marked end E	„	93·3	„	0·171389
27 „	„ W				

From these it appeared that the tangent of the angle of deflection might be represented by—

$$0 \cdot 172522 \times \left\{ 1 - 0 \cdot 0002233 \times (t - 32) + 0 \cdot 000001894 \times (t - 32)^2 \right\}$$

The quantity within the brackets (which represents the variation of magnetic power in terms of the whole power of the magnet) shows the same peculiarities as those found for the other magnets; that the third term is large, and has a sign opposite to that of the second term.

The factor of variation for 1° of Fahrenheit, when $t = 62°$, is $-$ 0·0001097.

After these observations, the new vertical-force-magnet was re-magnetized by Mr. Simms, on 1864, June 15.

In the beginning of 1868, observations were made in the method already described for the horizontal-force-magnet, by heating the magnetic basement to different temperatures, and observing the scale-reading in the ordinary way. The results are as follows :—

RESULTS OF TEMPERATURE EXPERIMENTS UPON THE VERTICAL-FORCE-MAGNET.

1868. Month and Day.		Temperature.	Scale Reading.	Change of Temperature.	Change of Scale Reading.	Change of Scale Reading reduced to Parts of the whole Vertical Force.	Change of Vertical Force corresponding to a change of 1° of Temperature (in Parts of the whole V.F.)
		°	div.	°	div.		
January	3	56·0	56·45				
	4	48·2	46·52	7·8	9·93	0·006482	0·000831
	5	59·6	61·49	11·4	14·97	·009772	·000857
January	6	59·6	61·73				
	7	49·0	46·84	10·6	14·89	0·009720	·000917
	10	59·5	61·62	10·5	14·78	·009648	·000919
	11	49·7	48·70	9·8	12·92	·008434	·000861
	12	62·0	64·40	12·3	15·70	·010249	·000833
	13	53·4	53·33	8·6	11·07	·007226	·000840
	14	55·4	55·72	2·0	2·39	·001560	·000780
	16	52·3	50·79	3·1	4·93	·003218	·001038
	17	63·7	66·13	11·4	15·34	·010014	·000878
	18	52·4	53·26	11·3	12·87	·008402	·000743
	20	60·7	62·19	8·3	8·93	·005829	·000702
	22	50·6	47·82	10·1	14·37	·009381	·000929
	23	59·6	59·60	9·0	11·78	·007690	·000854
	25	49·6	46·67	10·0	12·93	·008441	·000844
	26	60·5	60·62	10·9	13·95	·009107	·000836
	29	49·3	44·78	11·2	15·84	·010340	·000923
	31	63·1	64·55	13·8	19·77	·012906	·000935
February	4	51·0	47·11	12·1	17·44	·011385	·000941
	5	62·3	64·02	11·3	16·91	·011039	·000977
	6	50·6	46·43	11·7	17·59	·011483	·000981
	7	53·3	49·10	2·7	2·67	·001743	·000646
	8	50·6	45·55	2·7	3·55	·002317	·000858
	10	62·1	62·76	11·5	17·21	·011235	·000977
February	14	60·6	57·70				
	16	49·0	36·75	11·6	20·95	0·011298	·000974
	18	61·9	58·85	12·9	22·10	·011919	·000924
February	18	61·9	58·05				
	20	50·0	41·96	11·9	16·09	0·011749	·000987
	21	62·6	56·82	12·6	14·86	·010851	·000861
Mean . .		..	..	..	..	...	0·000880

The coefficient of temperature-correction given by these experiments is enormously greater than any that has been found in any previous experiments. Yet there would appear to be no doubt of its accuracy. And it is easy to see that an instrument, subjected to the effects of gravity working differentially on its two ends, is liable to great changes depending on temperature which have no connection with magnetism. For instance, if the point, at which the magnet is grasped by its carrier, is not absolutely coincident with its center of gravity, a sensible change in the space intervening between the grasping point and the center of gravity may be produced by a small change of temperature, and a disturbance of equilibrium and a great change of apparent magnetic position will follow. There appears to be no way of avoiding these evils but by maintaining almost uniform temperature; a condition which has been almost perfectly preserved in the year 1879. In the reductions which follow, no correction is applied for temperature.

The method of observing with the vertical-force-magnet is the following:—

A fine horizontal wire is fixed in the field of view of the telescope, which is directed to the small plane mirror carried by the magnet. On looking into the telescope, the graduations of the fixed vertical scale are seen; and during the oscillations of the magnet, the divisions of the scale are seen to pass alternately upwards and downwards across the wire. The clock-time, for which the position of the magnet is to be determined, is the same as that for the horizontal force magnet. The observer applies his eye to the telescope about two vibrations before the arranged time, and if the magnet is in motion he observes its place at the next four extreme points of vibration; and the mean of these is taken as for the declination-magnet. But if the magnet is apparently at rest, then at one half-time of vibration before the arranged time, and at an equal interval after the arranged time, the reading of the scale is noted; if the reading continues the same that reading is adopted, if there is a slight difference, the mean is taken. The times of observation are usually 1^h, 3^h, 9^h, and 21^h of Greenwich mean time.

The number of instances in 1879 in which the magnet was found in a state of vibration is very small.

A thermometer, the stem and bulb of which reach considerably below the attached scale, is so planted in a nearly upright position on the magnet box, that the bulb projects into the interior of the box. Readings of this thermometer are taken on every week day, at 0^h, 1^h, 2^h, 3^h, 9^h, 21^h, 22^h, and 23^h. Its index error is insignificant. A few readings are taken on Sunday. Self-registering maximum and minimum thermometers were formerly read twice daily, but in consequence of the very small diurnal range of temperature these observations have not been continued.

§ 8. *Photographic self-registering Apparatus for Continuous Record of Magnetic Vertical Force.*

The concave mirror which is carried by the vertical-force-magnet is 4 inches in diameter; its mounting has been described in the last article. At the distance of about 22 inches from that mirror, and external to the box, is the horizontal aperture, about $0^{in}\cdot3$ in length and $0^{in}\cdot01$ in breadth, carried by the same stone block which carries the supports of the agate planes. The lamp which shines through this aperture is carried by a wooden stand. The light reflected from the mirror passes through a cylindrical lens with its axis vertical, very near to the cylinder carrying the photographic paper, and finally forms a well-defined spot of light on the cylinder of paper, at the distance of 100·18 inches from the mirror. As the movements of the magnet are vertical, the axis of the cylinder is vertical. The cylinder is about $14\frac{1}{4}$ inches in circumference, being of the same dimensions as those used for the declination and horizontal-force magnets, and for the earth-currents. The forms of the exterior and interior cylinders, and the method of mounting the paper, are in all respects the same as for the declination and horizontal-force magnets; but the cylinder is supported by being merely planted upon a circular horizontal plate (its position being defined by fitting a central hole in the metallic cap of the cylinder upon a central pin in the plate), which rests on anti-friction rollers and is made by chronometer-work to revolve once in twenty-four hours. The trace of the vertical-force-magnet is on the west side of the cylinder.

On the east side, the cylinder receives the trace produced by the barometer (to be described hereafter). A pencil of light from the lamp which is used for the barometer shines through a fixed aperture; and by a system of prisms and a small cylindrical lens, a photographic base-line is traced upon the cylinder of paper, similar to that on the cylinder of the declination and horizontal-force magnets.

The scale for the ordinates of the photographic curve of vertical force is thus computed. Remarking that the radius which determines the range of the motion of the spot of light is double the distance 100·18 inches, and is therefore = 200·36 inches, the formula used in the last section, when applied to $\frac{\text{disturbing force}}{\text{whole vertical force}} = 0\cdot01$, gives value of division $= 200\cdot36 \times \tan.\ \text{dip} \times \left(\frac{T}{T'}\right)^2 \times 0\cdot01$. Using the values of T, T′, and of dip, given on page *xxxiv*, the value of the ordinate of the photographic curve for $\frac{\text{disturbing force}}{\text{whole vertical force}} = 0\cdot01$, thus obtained, is, for the year 1879, 3·211 inches. With this value, the pasteboard scale, used for measuring the photographic ordinates, has been prepared.

§ 9. *Dipping Needles, and Method of observing the Magnetic Dip.*

The instrument with which all the dips in the year 1879 have been observed, is that which, for distinction, is called Airy's instrument. It is mounted on a stout block of wood in the Magnetic Office No. 7. The following description will probably suffice to convey an idea of its peculiarities:—

The form of the needles, the form of their axes, the form of the agate bearings, and the general arrangement of the relieving apparatus, are precisely the same as those in Robinson's and other instruments. But the form of the observing apparatus is greatly modified, in order to secure the following objects:—

I. To obtain a microscopic view of the points of the needles, as in the instruments introduced by Dr. Lloyd and General Sir E. Sabine.

II. To possess at the same time the means of observing the needles while in a state of vibration.

III. To have the means of observing needles of different lengths.

IV. To give an illumination to the field of view of each microscope, directed from the side opposite to the observer's eye, so that the light may enter past the point of the needle into the object glass of the microscope, forming a black image of the needle-point in a bright field of view.

V. To give facility for observing by day or night.

With these views, the following form is given to the apparatus:—

The needle, and the bodies of the microscopes, are inclosed in a square box. The base of the box, two vertical sides, and the top, are made of gun-metal (carefully selected to insure its freedom from iron); but the sides parallel to the plane of vibration of the needle are of glass. Of the two glass sides, that which is next the observer is firmly fixed; it is hereafter called "the graduated glass-plate." The other glass side can be withdrawn, to open the box, for inserting the needle, &c.

An axis, whose length is perpendicular to the plane of vibration of the needles, and is as nearly as possible in the line of the axis of the needle, supported on two bearings (of which one is cemented in a hole in the graduated glass-plate, the other being upon a horizontal bar near to the agate support of the needle-axis), carries a transverse arm, about 11 inches long, or rather two arms, projecting about $5\frac{1}{2}$ inches on each side of the axis. Each of these projecting arms carries three fixed microscopes on each side, adapted in position to the lengths of the needles to be mentioned shortly.

The microscope-tube thus carried is not the entire microscope, but so much as contains the object-glass and the field-glass. Upon the plane side of the field-glass (which is turned towards the object-glass), a series of parallel lines is engraved by etching with fluoric acid. The object-glass is so adjusted that the image of the needle-point is formed upon the plane side of the field-glass; and thus the parallel lines can be used for observing the needle in a state of vibration; and, one of them being adopted as standard, the lines can be used for reference to the graduated circle (to be mentioned). All this requires that there be an eye-glass also for the microscope.

The axis of which we have spoken is continued through the graduated glass-plate, and there it carries another transverse arm parallel to the former, and generally similar to it, in which are fixed three sockets and eye-glasses. Thus, reckoning from the observer's eye, there are the following parts:—

(1.) The eye-glass.

(2.) The graduated glass-plate (its graduations, however, not intervening in this part of the glass, the graduated circle being so large as to include, within its circumference, all the microscopes).

(3.) The field-glass, on the further surface of which the parallel lines are engraved.

(4.) The object-glass.

(5.) The needle.

(6.) The removeable glass side of the box.

(7.) The illuminating reflector, to be described hereafter.

The optical part of the apparatus being thus described, we may proceed to speak of the graduated circle.

The graduations of the circle (whose diameter is about $9\frac{3}{4}$ inches) are etched on the inner surface of the graduated glass-plate. These divisions (as well as the parallel lines on the field glasses of the microscopes) are beautifully neat and regular, and appear to be superior to those engraved on metal. The same piece of metal, which carries the transverse arms supporting the microscope bodies, carries also two arms with verniers for reading their graduations. These verniers (being adapted to transmitted light) are thin plates of metal, with notches instead of lines. The reading of the verniers is very easy. The portion of the axis which is external to the graduated glass-plate (towards the observer), and which has there, as already stated, two arms for carrying the microscope eye-glasses, has also two arms for carrying the lenses by which the verniers and glass-plate graduations are viewed. These four arms are the radii of a circle, which can be fixed in position by a clamp, attached to the gun-metal casing of the graduated glass-plate, and furnished with the usual slow-motion screw.

The entire system of the two arms carrying the microscope-bodies, the two arms carrying the microscope eye-glasses, the two arms carrying the verniers, and the two arms carrying the reading-glasses for the verniers, is turned rapidly by means of a button on the external side of the graduated glass-plate, or is moved slowly by means of the slow-motion screw just mentioned.

It now remains only to describe the illuminating apparatus. On the outside of the removeable glass plate, there are supports for the axis of a metallic circle turning in a plane parallel to the plane of needle-vibration. This circle has four slotted radii, which support eight small frames carrying prismatic glass reflectors, each of which can turn on an axis that is in the plane of the circle but transverse to the radius. Two of these reflectors are for the purpose of sending light through the verniers, and therefore are fixed at the same radial distance as the verniers; the other six are intended for sending light past the ends of the needles through the six microscopes, and are therefore fixed at distances corresponding to the fixed microscopes. The circle was originally turned by a small winch near the observer's hand, at present, the winch is removed, as its axis was found to be slightly magnetic. At each observation, it is necessary to turn the circle which carries the reflectors; but this is the work of an instant.

The light which illuminates the whole is a gas-burner, in the line of the axis of rotation. Its rays fall upon the glass prisms, each of which, turning on its axis, can be adjusted so as to throw the reflected light in the required direction.

The whole of the apparatus, as thus described, is planted upon a horizontal plate admitting of rotation in azimuth: the plate is graduated in azimuth, and verniers are fixed to the gun-metal tripod stand. The gas-pipe is led down the central vertical axis, and there communicates by a rotatory joint with the fixed gas-pipes.

The needles adapted for use with this instrument are—

B_1, a plain needle	each 9 inches long.
B_2, a plain needle	
B_3, a loaded needle with adjustible load	
B_4, a needle whose plane passes through the axis of the needle	
C_1, a plain needle	each 6 inches long.
C_2, a plain needle	
C_3, a loaded needle with adjustible load	
C_4, a needle whose plane passes through the axis of the needle	
D_1, a plain needle	each 3 inches long.
D_2, a plain needle	
D_3, a loaded needle with adjustible load	
D_4, a needle whose plane passes through the axis of the needle	

The needles constantly employed are B_1, B_2, C_1, C_2, D_1, D_2.

In discussing carefully the observations taken with this instrument (as well as with other dip-instruments), great trouble was sometimes experienced in determining the zenith-point (or reading of the vertical circle when the points of the needle are in the same vertical). To remedy this, a "zenith-point-needle" was constructed by Mr. Simms, which has since been used as need required. It is a flat bar of brass; with pivots similar to those of the dip-needles; and with three pairs of points corresponding to the three lengths of needles used; loaded at one end so as to take a position perfectly definite with respect to the direction of gravity; observed with the microscopes, and reversed for another observation, exactly as the dip-needles. For each of the different lengths of dip-needles, the zenith-point is determined by observation of that pair of points of the zenith-point-needle whose interval is the same as the length of the dip-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 from time to time adjusted in level. The readings of the first-mentioned level have for some years (since 1867) been recorded at each separate observation of dip, and since the beginning of the year 1875, these observed readings have been regularly employed to correct the apparent value of dip for the small outstanding error of level. The instrument is maintained so nearly level that the correction usually amounts to a few seconds of arc only.

The Dip Instrument and all the needles are examined, at the close of each year, and at other times if thought desirable, by Mr. Dover. A new axis was supplied to the needle B_2 between May 13 and 28.

§ 10. *Observations for the absolute Measure of the Horizontal Force of Terrestrial Magnetism.*

In the spring of 1861, a Unifilar Instrument, similar to those used in and issued by the Kew Observatory, was procured by the courteous application of General Sir Edward Sabine, from the makers, Messrs. J. T. Gibson and Son; and after having been subjected to the usual examinations, at the Kew Observatory, for determination of its constants (by the kindness of Professor Balfour Stewart), was mounted at the Royal Observatory. Observations with this instrument, which is mounted on a stout block of wood in the Magnetic Office No. 7, were commenced on 1861, June 11, and the instrument is still in use.

The deflected magnet (whose use is merely to ascertain the proportion which the power of the deflecting magnet at a given distance bears to the power of terrestrial magnetism) is 3 inches long, carrying a small plane mirror. The deflecting magnet is 4 inches long; it is a hollow cylinder, carrying in its internal tube a collimator, by means of which its time of vibration is observed in another apparatus. The frame which supports the suspension-piece of the deflected magnet carries also the telescope directed to the magnet-mirror; it rotates round the vertical axis of a horizontal graduated circle whose external diameter is 10 inches. The deflecting magnet is always placed on the east or west side of the deflected magnet, with one end towards the deflected magnet. In the reduction of the observations, the precepts contained in the skeleton form prepared at the Kew Observatory have received the strictest attention.

The following is the explanation of the method of reduction.

The distance between the centers of the deflected and deflecting magnets being known, it is found (from observations made at Kew) that the magnetism of the deflecting magnet is so altered by induction that the following multipliers of its magnetic moment ought to be used in computing the Absolute Force:—

At distance 1·0 foot, factor is	1·00031
1·1	1·00023
1·2	1·00018
1·3	1·00014
1·4	1·00011
1·5	1·00009

The correction of the magnetic power for temperature t_0 of Fahrenheit, reducing all to 35° of Fahrenheit, is

$$0·00013126\,(t_0-35)+0·000000259\,(t_0-35)^2$$

A_1 is $\frac{1}{2}$(distance)^3 × sine deflection, corrected by the two last-mentioned quantities, for distance 1 foot; A_2 is the similar expression for distance 1·3 foot; P is $\frac{A_1 - A_2}{A_1 - \frac{A_2}{(1·3)^2}}$; but this is not convenient for logarithmic calculation, especially as the values of the logarithms of A_1 and A_2 are, in the calculation, first obtained. The difference between A_1 and A_2 being small, (Log. A_1 — Log. A_2) $\frac{A_1}{\text{modulus}}$ may be written in the numerator in place of $A_1 - A_2$, and in the denominator A_1 may be put for A_2. Making these changes, P = (Log. A_1 — Log. A_2) $\frac{1·69}{(1·69 - 1)\text{ modulus}}$ = (Log. A_1 — Log. A_2) × 5·64. A mean value of P is adopted from various observations; then m being the magnetic moment of the deflecting magnet, and X the Horizontal component of the Earth's magnetic force, we have $\frac{m}{X}=A_1 \times \left(1 - \frac{P}{1}\right)$ for smaller distance, or $= A_2 \times \left(1 - \frac{P}{1·69}\right)$ for larger distance. The mean of these is adopted for the true value of $\frac{m}{X}$.

For computing the value of mX from observed vibrations, it is necessary to know K, the moment of inertia of the magnet as mounted. The value of log. π^2K furnished by Professor Stewart is 1·66073 at temperature 30°, and 1·66109 at temperature 90°. Then putting T for the time of the magnet's vibration as corrected for induction, temperature, and torsion-force, the value of mX is $= \frac{\pi^2K}{T^2}$. From the combination of this value of mX with the former value of $\frac{m}{X}$, m and X are immediately found. In the year 1878, a new and entirely independent determination of the value of K was made. It very satisfactorily confirmed the adopted value.

It appears, from a comparison of observations given in the Introduction to the *Magnetical and Meteorological Observations*, 1862, that the determinations with the

Old Instrument (in use to 1861) ought to be diminished by $\frac{1}{117}$ part, to make them comparable with those of the Kew Unifilar.

The computation of the values of m and X was, to the year 1857, made in reference to English measure only, using the foot and the grain as the units of length and weight; but, for comparison with foreign observations of the Absolute Intensity of Magnetism, it is desirable that X should be expressed also in reference to Metric measure, in terms of the millimètre and milligramme. If an English foot be supposed equal to α times the millimètre, and a grain be equal to β times the milligramme, then it is seen that, for the reduction of $\frac{m}{X}$ and mX to Metric measure, these must be multiplied by α^3 and $\alpha^2\beta$ respectively. Hence X^2 must be multiplied by $\frac{\beta}{\alpha}$, and X by $\sqrt{\frac{\beta}{\alpha}}$. Assuming that the mètre is equal to 39·37079 inches, and the gramme equal to 15·43249 grains, $\log.\sqrt{\frac{\beta}{\alpha}}$ will be found to be $= 9{\cdot}6637805$, and the factor for reducing the English values of X to Metric values will be 0·46108 or $\frac{1}{2{\cdot}1689}$. The values of X in Metric measure thus derived from those in English measure are given in the proper table. The value of X is sometimes required in terms of the centimètre and gramme, commonly known as the C. G. S. unit (centimètre-gramme-second unit), and values in terms of this unit are obtained by dividing those referred to the millimètre and milligramme by 10.

§ 11. *Explanation of the Tables of Results of the Magnetical Observations.*

The results contained in this section (so far as relates to the three magnetometers) are founded upon or derived entirely from the measures of the ordinates of the Photographic Curves, and refer to the astronomical day.

Telescope observations of the magnetometers have usually been made four times every day, except on Sunday, on which day three observations have usually been taken. These observations have been employed for forming values of the base lines on the photographic sheets. Finally a new base line, representing a convenient reading in round numbers of the element to which it applies, has been then drawn on each sheet for convenience of further treatment.

Before further discussing the records, the first step usually taken is to divide the days of observation into two groups; in one of which the magnetism was generally so tranquil that it appeared proper to use those days for determination of the laws of diurnal inequality; while in the other group the movements of the magnetic instruments were so violent, and the photographic curves traced by them so irregular, that it appeared impossible to employ them, except by the exhibition of every motion of the magnet during the day. A similar division into groups had been made in two Memoirs printed in the *Philosophical Transactions*. For the year 1879, however, no days have been found exhibiting sufficient irregularity to render separation necessary.

The whole of the photographic sheets for the year were therefore treated in the following way:—Through each photographic curve a pencil line was drawn, representing, as well as could be judged, the general form of the curve without its petty irregularities. These pencil curves only were then used; and their ordinates were measured, with the proper pasteboard scales, at every hour. These measures being entered in a form having double argument, the vertical argument ranging through the 24 hours of the astronomical day, and the horizontal argument through the days of a calendar month, the means of the numbers standing in the vertical columns give 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.

The temperature of the magnetometers was maintained in so great uniformity through each day that the final determination of the diurnal inequalities of horizontal and vertical force should possess great exactitude, although, in regard to vertical force, the magnitude of the temperature co-efficient introduces an element of some uncertainty. It was, however, impossible to maintain similar uniformity of temperature through all the seasons. Following the general principle adopted in recent years, the results are given uncorrected for temperature; corresponding tables of mean temperature being now in all cases added. It is deemed best that, in the yearly volumes, the results should be thus given, as more easily admitting of independent examination. When, as is done from time to time, the results for series of years are collected for general discussion, the temperature corrections are duly taken into account.

It has been the custom, in preceding volumes, to exhibit the varying Declination in the sexagesimal divisions of the circle, and the variable parts of the Horizontal Force and the Vertical Force, in terms of the whole Horizontal Force and whole Vertical Force respectively. This custom is still retained; but since the year 1872 an addition has been made, carrying out the principle suggested by C. Chambers, Esq., Superintendent of the Colaba Observatory, Bombay, that all the variable inequalities should be expressed in terms of Gauss's Magnetic Unit. In applying this principle, reference is made to metrical units of measure and weight instead of British units; a change from the first proposal, which, it is believed, has received the assent of Mr. Chambers. The formulæ for converting the original numbers into the new numbers are the following:—

$$\frac{\text{Variations of H. F. in metrical measure}}{\text{H. F. in metrical measure}} = \frac{\text{Variation in former measure}}{\text{Whole value in former measure}}$$

from which,

$$\text{Variation of H. F. metrical} = \frac{\text{H. F. metrical}}{\text{Former H. F.}} \times \text{former variation.}$$

The mean value, for the year, of $\frac{\text{H. F. metrical}}{\text{Former H. F.}} = 1{\cdot}803$; and this therefore is the factor to be employed for transformation.

Similarly,

$$\text{Variation of V. F. metrical} = \frac{\text{V. F. metrical}}{\text{Former V. F.}} \times \text{former variation.}$$

The Former V. F. (in the same manner as Former H. F.) = 1; but the V. F. metrical = H. F. metrical × tan. dip. The factor is therefore 1·803 × tan. 67°. 36′. 55″ = 4·3777.

The values given in Tables VIII. and XIII. for the adopted zeros (in metrical units) of the variable forces, are formed by multiplying 0·8600 and 0·9600 (the adopted zeros in the former expressions) by these factors respectively.

For Variation of Declination, expressed in minutes, the metrical factor is 1·803 × sin. 1′ = 0·0005245.

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

In preceding years, allusion has been made to the occasional dislocations of the curve of Vertical Force. No such dislocation has occurred during the year 1879.

On examining the monthly values of Vertical Force in each year since the mounting of the Vertical Force Magnet which has been used since 1865, it is remarked that the value for each December is less than that for the preceding January by about $\frac{1}{100}$ part of the whole: a quantity far greater than the change deduced from the combination of Dip and Absolute Horizontal Force. This is undoubtedly caused by gradual diminution of the power of the magnet; its determination is supported by the increase in the time of horizontal vibration.

In the Tables of Results of Observations of the Magnetic Dip, the result of each separate observation of Dip with each of the six needles in ordinary use is given, and also the concluded monthly and yearly values for each needle.

The table giving the results of the observations for Absolute Measure of Horizontal Force requires no particular explanation.

§ 12. *Wires and Photographic self-registering Apparatus for continuous Record of Spontaneous Terrestrial Galvanic Currents.*

In order to obtain an exhibition of the spontaneous galvanic currents which in some measure are almost always discoverable in the earth, and which occasionally are very powerful, it was necessary to extend two insulated wires from an earth connexion at the Royal Observatory, in two directions nearly at right angles to each other, to considerable distances, where they would again make connexion with the earth. By the kindness of the Directors of the South Eastern Railway Company, to whom the Royal Observatory has on several occasions been deeply indebted, two connexions were made in the year 1862; one to a station near Dartford, at the direct distance $9\frac{3}{4}$ miles nearly, in azimuth (measured from North, to East, South, West) 102° astronomical or 122° magnetical, the length of the connecting wire being about $15\frac{2}{3}$ miles; the other to a station near Croydon, at the direct distance 8 miles, in azimuth 209° astronomical, or 229° magnetical, the length of the connecting wire being about $10\frac{1}{2}$ miles. At these two stations connexion was made with earth. The details of the courses were as follows. The wires were soldered to a water pipe in the Magnetic Ground at the Royal Observatory. Thence they entered the Magnetic Basement, and passed through the coils of the galvanometers of the photographic self-registering apparatus (to be shortly described). They were then led up the electrometer mast to a height exceeding 50 feet, and thence swung across the grounds to a chimney above the Octagon Room. They descended thence, and were led to a terminal board in the Astronomical Computing Room, to which an intermediate galvanometer could be attached for eye-observation of the currents. From this point they were led to the "Battery Basement," and, with other wires, passed under the Park to the Greenwich Railway Station, and thence upon the telegraph poles of the South Eastern Railway. One wire branched off at the junction with the North Kent Railway to Dartford, the other at the junction with the main line of railway to Croydon. At both places from 1865, November 20, their connexion with earth was made by soldering to iron water-pipes, as at the Royal Observatory. Previously the Dartford and Croydon earth-connexions had been different.

These wires remained in the places described till the end of 1867. It had been discovered in experience that a much smaller separation of the extreme points of earth-connexion would suffice, and it was conjectured that advantage might arise from making the two earth-connexions of each wire on opposite sides of the Observatory and nearly equidistant from it, instead of making one earth-connexion of each within the Observatory grounds. In 1868, therefore, the following wire-courses were substituted. One wire is connected with earth, by a copper plate, at the Lady Well station of the Mid-Kent Railway; it is thence led to the North Kent Junction with the Greenwich Railway, to the Royal Observatory (for communication with the self-registering apparatus), back to the North Kent Junction, then by North Kent Railway and Angerstein Branch to the Angerstein Wharf, where it is connected with earth by a copper plate. The other wire is connected with earth by a copper plate at the North Kent Junction, then passes to the Royal Observatory and back to the Junction, and then along the North Kent Railway to the Morden

College end of the Blackheath Tunnel, where it is connected with earth in the same manner. The straight lines connecting the extreme points of the wires cross each other near the middle of their lengths and near the Royal Observatory; the length of the first line is nearly 3 miles, and its azimuth 56° N. to E. (magnetic); that of the second line is nearly $2\frac{1}{2}$ miles, and its azimuth 136°. But, in the circuitous courses above described, the length of the first wire is about $10\frac{3}{8}$ miles, and that of the second $6\frac{1}{4}$ miles. These wires were established and brought into use on 1868, August 20. On 1877, September 19, the route of two of the branches was changed. The Angerstein Wharf and Blackheath branches, instead of passing from Greenwich viâ North Kent Junction, now pass along the new railway line through Greenwich, and thence respectively to Angerstein Wharf and Blackheath. The length of the section "Lady Well—Angerstein Wharf" is now about $7\frac{1}{2}$ miles, and that of the section "North Kent Junction—Blackheath" about 5 miles. The names and connexions of the Observatory ends of the four branches were identified in 1870; in 1871, June; again in 1872; on 1873, April 17; on 1874, April 15; 1875, May 6; and 1877, May 15. These were again identified on 1877, October 29, in consequence of the change of route made on 1877, September 19; also on 1879, January 10.

The apparatus for receiving the effects of the galvanic currents consists essentially of two magnetic needles (one for each wire), each suspended by a hair so as to vibrate horizontally within a double galvanic coil, exactly as in an ordinary galvanometer (supposed to be laid horizontally); these coils being respectively in the courses of the two long wires. The number of folds of the wire in each coil was 150 (or 300 in the double coil of each instrument) throughout the year. A current of one kind, in either wire, causes the corresponding needle to turn itself through an angle nearly proportioned to the strength of the current, in one direction; a current of the opposite kind causes it to turn in the opposite direction. These turnings are registered by the following apparatus.

To the carrier of each magnet is fixed a small plane mirror, which receives all the azimuthal motions of the magnet. The light of a gas-lamp passes through a minute aperture, and shines upon the mirror; the divergent pencil is converted into a convergent pencil by refraction through crossed cylindrical lenses (one with axis vertical before the pencil reaches the mirror, and one with axis horizontal where the pencil is received from the mirror), which, under the circumstances, were more convenient than spherical lenses. A spot of light is thus formed upon the photographic paper wrapped upon a cylinder of ebonite, which is covered by a glass cylinder, and made to rotate in twenty-four hours by clock-work, exactly as for the register of the magnetic elements. As in the case of declination and horizontal-force, the two earth currents make their registers upon opposite sides of the same barrel, and upon different parts of the sheet; the same gaslight serving for the illumination of both.

A portion of a zero-line for either record is obtained at any time by simply breaking the galvanic communication.

The photograph records were regularly made, with the wires in the first position, from 1865, March 15, to the end of 1867. Fifty-three days, on which the magnetic disturbances were active, were selected for special examination; and for these the equivalent galvanic currents in the north and west directions were computed, and their effects in producing apparent magnetic disturbances in the west and north directions were inferred. They correspond almost exactly with those indicated by the magnetometers. Then the records for all the days of tranquil magnetism were reduced in the same manner, not for comparison with the magnetometer-results, but for ascertaining the diurnal laws of the galvanic currents. These laws were found to be very different from the laws of magnetic diurnal inequalities. These discussions have been communicated to the Royal Society in two papers, printed respectively in the *Philosophical Transactions* for 1868 and 1870.

The records with the earth connexions in the new positions have been regularly made since 1868, August 20, but have not yet been discussed.

§ 13. *Standard Barometer.*

The Barometer is a standard, by Newman, mounted in 1840. It is fixed on the South wall of the West arm of the Magnetic Observatory. The tube is $0^{in}\cdot565$ in diameter; the cistern is of glass. The depression of the mercury due to capillary attraction is $0^{in}\cdot002$, but no correction is on this account applied. The graduated scale which measures the height of the mercury is made of brass, and to it is affixed a brass rod, passing down the inside of one of the upright supports, and terminating in a conical point of ivory; this point in observation is made just to touch the surface of the mercury in the cistern, and the contact is easily seen by the reflected and the actual point appearing *just* to meet each other. The rod and scale are made to slide up and down by means of a slow-motion screw. The scale is divided to $0^{in}\cdot05$.

The vernier subdivides the scale divisions to $0^{in}\cdot002$; it is moved by a slow-motion screw, and in observation is adjusted so that the ray of light, passing under the back and front of the semi-cylindrical plate carried by the vernier, is a tangent to the highest part of the convex surface of the mercury in the tube.

At the bottom of the instrument are three screws, turning in the fixed part of the support, and acting on the piece in which the lower pivot of the barometer-frame turns, for adjustment to verticality: this adjustment is examined occasionally.

The readings of this barometer, until 1866, August 20^d. 0^h, are considered to be coincident with those of the Royal Society's flint-glass standard barometer. On that day a change was made in the barometer. It had been remarked that the slow-motion-screw at the bottom of the sliding rod (for adjusting the ivory point to the surface of the mercury in the cistern) was partly worn away: and on August 20 the sliding rod was removed from the barometer by Mr. Zambra to remedy this defect. It was restored on 1866, August $30^{d}. 3^{h}$. Before the removal of the sliding rod, barometric comparisons had been made with a standard barometer the property of Messrs. Murray and Heath, and with two barometers, Negretti and Zambra, Nos. 646 and 647. While the sliding rod of the Greenwich standard was removed, Negretti and Zambra 647 was used for daily observations. After the new equipment of the standard barometer, another series of comparisons with the same barometers was made: from which it was found (the three auxiliaries giving accordant results) that the readings of the barometer, in its new state, required a correction of $-0^{in}\cdot006$. This correction has been applied to every observation commencing with that at 1866, August $30^{d}. 9^{h}$.

In the spring of the year 1877 an elaborate comparison of the Standard Barometers of the Greenwich and Kew Observatories was made under the direction of the Kew Committee. (See *Proceedings of the Royal Society*, vol. 27, page 76.) Mr. Whipple, Superintendent of the Kew Observatory, brought four barometers to Greenwich on three separate occasions. The result of a large number of comparisons showed that the difference between the Greenwich and Kew standards does not exceed 0·001 inch. In this is of course included the above-mentioned correction of $-0^{in}\cdot006$.

The height of the cistern above the mean level of the sea is 159 feet. This element is founded upon the determination of Mr. Lloyd, in the *Philosophical Transactions*, 1831; the elevation of the cistern above the brass piece inserted in a stone in the transit-room, now the Astronomer Royal's official room (to which Mr. Lloyd refers), being $5^{ft}. 2^{in}$.

The barometer has usually been read at 21^{h}, 0^{h}, 3^{h}, 9^{h} (astronomical), and corrected by application of the index error given above. Every reading has been reduced to the reading which would have been obtained at the temperature 32° of the mercury, and corrected for expansion of the brass scale, by application of the correction given in Table II. (pages 82 to 87) of the "Report of the Committee of Physics" of the Royal Society. For immediate use the mean of the reduced readings has then been taken for each civil day, and finally converted into mean daily reading, by application of the correction inferred from Table XIV. of the "Reduction of Greenwich Meteorological Observations, 1847–1873." These results do not appear in the present volume, but results deduced from the photographic records, as will be further on mentioned (in § 26).

In the printed record of the barometrical and all other meteorological observations, the day is to be understood, generally, as defined in civil reckoning.

§ 14. *Photographic self-registering Apparatus for continuous Record of the Readings of the Barometer.*

The Photographic self-registering Apparatus for continuous Record of Magnetic Vertical Force is furnished (as has been stated) with a vertical cylinder covered with photographic paper and revolving in 24 hours. North of the surface of this cylinder, at the distance of about 30 inches, is a large syphon barometer, the bore of the upper and lower extremities of its arms being about 1·1 inch. A glass float, for which at the beginning of the year 1879 a metallic float was substituted, partly immersed in the mercury of the lower extremity is partially supported by a counterpoise acting on a light lever, leaving a definite part of the weight of the float to be supported by the mercury. This lever is lengthened to carry a vertical plate of opaque mica having a small horizontal slit, whose distance from the fulcrum is nearly eight times the distance of the point of attachment of the float wire, and whose movement, therefore, is nearly four times the movement of the column of a cistern-barometer. Through this slit the light of a lamp, collected by a cylindrical lens, shines upon the photographic paper. The barometer rests on a platform which can be raised or lowered by a screw, so as to bring the photographic trace to a convenient part of the sheet. As regards the effect of temperature, it will be understood, from the construction of the apparatus, that the record is influenced only by the expansion of the column of mercury (about 4 inches in length) in the lower tube of the barometer; and from this circumstance, in combination with the near uniformity of temperature maintained in the basement, no perceptible effect is produced on the register.

The scale of time is established by means of occasional interruptions of the light, and the scale of measure is established by comparison with occasional eye-observations.

This barometer was brought into use in 1848, but its indications were not satisfactory till the mercury was boiled in the tube by Messrs. Negretti and Zambra on 1853, August 18, since which time they have appeared unexceptionable.

A discussion of the photographic records of the Barometer from 1854 to 1873 is published in the "Reduction of Greenwich Meteorological Observations, 1847–1873."

§ 15. *Thermometers for ordinary Observation of the Temperature of the Air and of Evaporation.*

The Dry-Bulb Thermometer, the Wet-Bulb Thermometer, the Maximum Self-Registering Thermometers, both dry and wet, and the Minimum Self-Registering Thermometers, dry and wet, all for determination of the temperature of the air and of evaporation, are mounted on a revolving frame whose fixed vertical axis is planted in the ground. From the year 1846 to 1863 the post forming the vertical axis was about 23 feet south (astronomical) of the S.W. angle of the south arm of the Magnetic Observatory; in 1863 it was moved to its present position, about 35 feet south (astronomical) of the S.W. angle. A frame revolves on this post, consisting of a horizontal board as base, of a vertical board projecting upwards from it connected with one edge of the horizontal board, and of two parallel inclined boards (separated about three 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. The air passes freely between all these boards. In September of the year 1878 some small additions were made, mainly with the object of better protecting the thermometers from the influence of radiation.

The dry and wet-bulb thermometers are attached to the outside, and near the center of the vertical board; their bulbs are about 4 feet above the ground and projecting from 2 inches to 3 inches below the horizontal board. The maximum and minimum thermometers for air are placed towards one vertical edge, and those for evaporation towards the other vertical edge, with their bulbs at almost the same level, and near to those of the dry and wet-bulb thermometers. Above the thermometers is a small projecting roof to protect them from rain. The frame is always turned with the inclined side towards the sun. It is presumed that the thermometers are thus sufficiently protected.

The graduations of all the thermometers used in the Royal Observatory since the year 1840 rest fundamentally upon those of a Standard Thermometer, the property of Mr. Glaisher, which derives its authority from comparison with original thermometers constructed by the late Rev. R. Sheepshanks about the years 1840–1843, in the course of his preparations for the construction of the National Standard of Length. The whole of the radical determinations of Freezing Point, Boiling Point, and Subdivision of Volume of Tube, were made by Mr. Sheepshanks with the utmost care: it is believed that these were the first original thermometers that had been constructed in England for many years. This thermometer continued to be the standard of reference until June of the year 1875.

By the kindness of the Kew Committee of the Royal Society, a new Kew Standard Thermometer, No. 515, was, in the year 1875, supplied to the Royal Observatory; and, commencing with the month of July of that year, all thermometers have been compared with the new standard, which will hereafter be referred to as the R. O. standard.

In order to determine whether any sensible difference exists between the indications of Mr. Glaisher's standard and those of the R. O. standard, the errors of all thermometers that, in the year 1875, had been recently referred to both standards, were collected for comparison. The details of this comparison will be found in the

Introduction to the Magnetical and Meteorological Observations for 1875, page *xlviii.* The result arrived at was that the standards were practically identical.

The Dry-Bulb and Wet-Bulb thermometers by Horne and Thornthwaite remained in use until November 13. To February 28 the dry-bulb thermometer required correction as follows:—

Below	65°	subtract 1°·1
Above	65	1·2

From March 1 to November 13 the corrections applied were:—

Below	65°	subtract 1°·2
Above	65	1·3

The wet-bulb thermometer to February 28 required correction as follows:—

Below	55°	subtract 1°·0
Between	55 and 70°	0·9
"	70 and 80	0·7
Above	80	0·6

From March 1 to November 13 the corrections applied were:—

Below	55°	subtract 1°·2
Between	55 and 70°	1·1
"	70 and 80	0·9
Above	80	0·8

On November 14 the wet-bulb thermometer was accidentally broken. Both thermometers were dismounted, and, pending the construction of a new pair of thermometers, two thermometers by Watkins and Hill (the property of Mr. Ellis) were until December 3 employed. One thermometer, marked B, used as dry-bulb, required correction as follows:—

Below	33°	subtract 0°·1
Between	34 and 37°	0·2
"	38 and 40	0·3
"	41 and 44	0·4
"	45 and 55	0·5
"	56 and 63	0·6

The corrections required by the other thermometer, marked A, and used as wet-bulb, were:—

Below	35°	subtract 0°·2
Between	36 and 43°	0·3
"	44 and 50	0·4
"	51 and 54	0·5
"	55 and 57	0·6
"	58 and 61	0·7
"	62 and 65	0·8

On December 3 a new pair of thermometers by Negretti and Zambra was brought into use. These thermometers, No. 45354 as dry-bulb, and No. 45355 as wet-bulb, required no correction.

The self-registering thermometers for temperature of air and evaporation are by Negretti and Zambra. The construction of the thermometers for maximum temperature is as follows.

There is a small detached piece of glass in the tube, at the bent part (near the bulb), through which the piece of glass cannot pass down. The column of mercury in rising is forced through the contraction produced by the piece of glass; but in falling it is unable to pass the glass, and the lower mass of mercury descends into the bulb, leaving a vacant space below the glass, and a portion of the mercury above it. The piece of glass operates as an efficient valve. The thermometer used for maximum temperature of the air was No. 8527; it required a subtractive correction of 0°·9.

The maximum wet-bulb thermometer until February 25, when it was accidentally broken, was No. 1575. Its corrections were as follows:—

	°	°
Below	55..........................subtract	0·3
Above	55..................................	0·4

There was no maximum wet-bulb thermometer in use from February 25 until March 21. On the latter-mentioned day Negretti and Zambra No. 44285 was brought into use. It required correction as follows:—

	°	°
Below	55..................................	0·0
Above	55..........................subtract	0·1

The minimum self-registering thermometers by Negretti and Zambra are alcohol thermometers (on Rutherford's principle). A sliding glass index allows the alcohol in rising to pass above it, but is drawn down by the peculiar action of the bounding surface of the fluid when it sinks. The readings of that for minimum temperature of the air, No. 4386, required until February 28 a subtractive correction of 0°·3. From March 1 no correction was applied. The minimum wet-bulb, No. 3627, required an additive correction of 0°·9.

The eye-readings of the dry-bulb and wet-bulb thermometers have usually been taken at the hours (astronomical reckoning) 21^h, 0^h, 3^h, 9^h, and corrected by application of the corrections already given. For immediate use the means of the corrected readings of the dry-bulb and wet-bulb thermometers have been taken and converted into mean daily readings, by the application of a correction inferred from Table LI. of the "Reduction of Greenwich Meteorological Observations, 1847–73," but the results do not appear in this volume, the photographic records being now employed, as will be further on explained (in § 26).

§ 16. *Photographic self-registering Apparatus for continuous Record of the Readings of the Dry-Bulb and Wet-Bulb Thermometers.*

About 28 feet south (magnetic) of the south-east angle of the south arm of the Magnetic Observatory, and about 25 feet east of the thermometers for eye-observations, is an open shed 10 ft. 6 in. square, standing upon posts 8 feet high, under which are placed the photographic thermometers, the dry-bulb thermometer towards the east, and the wet-bulb thermometer towards the west. The bulbs of the thermometers are 8 inches in length, and 0·4 inch internal bore, and their centers are about 4 feet above the ground. The bulb of the thermometer employed as wet-bulb is covered with muslin throughout its whole length, which is kept moist by means of capillary passage of water along cotton wicks leading from a vessel filled with water.

There are small adjustments admitting the raising or dropping of the thermometers, so that the register of their changing readings may fall on a convenient part of the paper. The thermometer frames are covered by plates having longitudinal apertures, so narrow, that any light which may pass through them is completely, or almost completely, intercepted by the broad flat column of mercury in the thermometer-tube. Across these plates a fine wire is placed at every degree; those at the decades of degrees, and also those at 32°, 52°, and 72°, being coarser than the others. A gas lamp is placed about 9 inches from each thermometer (east of the dry bulb and west of the wet bulb), and its light, condensed by a cylindrical lens, whose axis is vertical, shines through the thermometer-tube above the surface of the mercury, and forms a well-defined line of light upon the photographic paper, which is wrapped around the cylinder. The axis of this cylinder is vertical; its mounting is in all respects similar to that of the Vertical Force cylinder. As the cylinder, covered with photographic paper, revolves under the light, which passes through the thermometer-tube, it receives a broad sheet of photographic trace, whose breadth (in the direction of the axis of the cylinder) varies with the varying height of the mercury in the thermometer-tube. Parts of the light in its passage are intercepted by the wires placed across the tube at every degree, and there are, therefore, left upon the paper corresponding lines in which there is no photogenic action. In consequence of a want of complete uniformity in different parts of the photographed scales, owing to inequality in the bore of the tube in both thermometers, new thermometers with better tubes were prepared by Messrs. Negretti and Zambra, and mounted on 1878, November 1. By this means the scales on the paper were rendered quite uniform.

The cylinder was at first made to revolve in 48 hours; the daily photographic traces of the two thermometers were thus simultaneously registered on opposite sides of the cylinder, sometimes slightly intermixing. The length of the glass cylinder used till 1869, March, is 13½ inches, and its circumference is about 19 inches. On 1869, March 5, an ebonite cylinder was introduced, whose length is 10 inches, and circumference about 19 inches; and at a later time the cylinder was made to revolve in 50 hours instead of 48 hours, to insure the separation of the records of the two thermometers. In March of the year 1878 the time of revolution was further increased to 52 hours.

The photographic records of the dry-bulb and wet-bulb thermometers have been discussed from 1848 to 1868. The results exhibit the diurnal inequality of the temperature of the air and of evaporation, as grouped by months, as grouped by periods of high and low temperature, as grouped by periods of high and low atmospheric pressure, as grouped by cloudless or overcast sky, and as grouped by directions of the wind. They are published in the "Reduction of Greenwich Meteorological Observations, 1847–1873."

§ 17. *Thermometers for Solar Radiation and Radiation to the Sky.*

The thermometer for Solar Radiation, which to the end of the year 1864 was placed in an open box about 10 feet south of the south-west angle of the south arm of the Magnetic Observatory, is now laid on the grass, near the same place.

The thermometer is a self-registering maximum mercurial thermometer of Negretti and Zambra's construction (No. 5964); its bulb is blackened, and enclosed in a glass sphere from which the air has been exhausted. Its graduations are correct, and the numbers inserted in the tables are those read from the instrument without alteration. The thermometer is read at 21^h, 0^h, 3^h, and 9^h daily; the highest of these readings is adopted as the maximum for the day. On April 17 the thermometer No. 5964 was broken. A new thermometer, Negretti and Zambra No. 43418, was brought into use on April 18. It required no correction.

The use of a thermometer with blackened bulb not inclosed in an exhausted sphere was discontinued at the end of 1865.

The thermometer for radiation to the sky is placed near to the Solar Radiation thermometer, with its bulb resting on short grass, and fully exposed to the sky. It is a self-registering minimum spirit thermometer of Rutherford's construction, Horne and Thornthwaite No. 3120. Its graduation is practically correct, and the numbers inserted in the table are those read from the scale without alteration. It is read every day at 21^h, and, except in summer, also at 9^h.

§ 18. *Thermometers sunk below the Surface of the Soil at different Depths.*

These thermometers were made by Messrs. Adie of Edinburgh, under the immediate superintendence of the late Professor J. D. Forbes. The graduation was made by Professor Forbes himself.

The thermometers are four in number. They are all 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 is attached in its whole length to a slender piece of wood, which is planted in the hole with it. The place of the hole is 20 feet south (magnetic) of the extremity of the south arm of the Magnetic Observatory, and opposite the center of its south front.

The soil consisted of beds of sand; of flint-gravel with a large proportion of sand; and of flints with a small proportion of sand, cemented almost to the consistency of pudding-stone. Every part of the gravel and sand extracted from the hole was perfectly dry.

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 the tubes, from the bulb to the graduated scale, is very small. In that part to which the scale is attached, the tube is larger.

The thermometer No. 1 was dropped into the hole to such a depth that the center 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 center of its bulb was 12 French feet below the surface; No. 3 and No. 4 till the centers 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, the parts 8·5, 10·0, 11·0, and 14·5 inches, respectively, are tube with narrow bore.

The projecting parts of the tubes are protected by a wooden case or box fixed to the ground; the sides of the box are perforated with numerous holes, and it has a double roof. In the North face of this box is a large plate of glass through which the thermometers are read. Within the box are two smaller thermometers, one (No. 5) whose bulb is sunk one inch in the ground, and one (No. 6) whose bulb is in the free air nearly in the center of the box.

The fluid of the four long thermometers is alcohol tinged with a red colour.

The lengths of 1° on the scales of Nos. 1, 2, 3 and 4, are respectively about 1·9 inch, 1·1 inch, 0·9 inch, and 0·5 inch; and the ranges of the scales, as first mounted, were, 43°·0 to 52°·7, 42°·0 to 56°·8, 39°·0 to 57°·5, and 34°·2 to 64°·5.

These ranges for Nos. 2, 3, and 4, were found to be insufficient in some years, particularly those of Nos. 3 and 4, or the thermometers sunk to the depth of 6 feet and 3 feet.

In 1857, June 22, Messrs. Negretti and Zambra removed from Nos. 3 and 4 a quantity of fluid corresponding to the extent of 5° on their scales, and the scales of these two thermometers were then lowered by that linear extent, making the readings the same as before.

In subsequent years it was found that the amount of fluid removed was somewhat too great, for at the lower end of the scale the 6-foot thermometer sometimes fell below the limit of its scale or 44°; and the 3-foot thermometer below 39°·0; in which cases the alcohol sank into the capillary tube.

The readings at the early part of the series were at times defective at high temperatures, but always complete at low temperatures; afterwards, they were generally complete at high temperatures, and at times defective at low temperatures. The two combined, however, will enable us to complete all readings.

On 1869, July 21, Mr. Zambra removed fluid from No. 1 to the amount of 2°·7, and from No. 2 to the amount of 1°·5, and inserted in No. 4 fluid to the amount of 1°·5. The scales were re-engraved, to make the reading at every temperature the same as before.

In 1877, May, new opal glass scales were applied to these thermometers, by which the facility of reading is much increased.

The ranges of the scales are now,—for No. 1, 46°·0 to 55°·5; for No. 2, 43°·0 to 58°·0; for No. 3, 44°·0 to 62°·0; and for No. 4, 37°·0 to 68°·0.

These thermometers are read every day, at noon, and the readings appear in the printed volumes without correction. The index errors of Nos. 1, 2, 3, and 4 are unknown, but from comparisons made with the standard thermometer in November 1879 it would appear that No. 5 reads too high by 0°·2, and No. 6 too high by 0°·4.

The observations of these thermometers from 1846 to 1859 have been elaborately reduced by Professor Everett; the results are printed as an Appendix to the Greenwich Observations for 1860. Abstracts of the observations of these thermometers (giving mean monthly temperatures) for the period 1847 to 1873 have since been published in the "Reduction of Greenwich Meteorological Observations 1847–1873."

§ 19. *Thermometers immersed in the Water of the Thames.*

The self-registering maximum and minimum thermometers for determining the highest and lowest temperatures of the water of the Thames are observed every day at 9^h a.m.

The thermometers, inclosed in a wooden trunk, were originally attached to the side of the "Dreadnought" hospital ship. Commencing with 1871, January 12, they were attached to the Police Ship "Scorpion," moored in Blackwall Reach. In the month of May 1874, the wooden trunk was shifted from the "Scorpion" to the "Royalist," moored in the same place. The first readings with the thermometers in the last-mentioned position were taken 1874, May 5.

The wooden trunk, about 5 feet in height, and closed at the bottom, is firmly fixed to the side of the "Royalist;" the bottom and the sides, to the height of 3 feet, are perforated with a great number of holes, so that the water can easily flow through; the thermometers are suspended within this trunk so as to be about 2 feet below the surface of the water, and 1 foot from the bottom of the trunk.

The observations have been made by the Resident Inspector on board, by permission of Lieut.-Col. Sir Edmund Y. W. Henderson, R.E., K.C.B., Commissioner of Metropolitan Police.

The thermometer used for maximum temperature (a thermometer on Phillips's principle) is Horne and Thornthwaite No. 22242; that for minimum temperature is Horne and Thornthwaite No. 22243. Both thermometers require an additive correction of 0°·3.

On October 18 the "Royalist" received such damage in consequence of another vessel having come into collision with her that she was removed, on October 19, into the West India Dock. The temperatures given from October 20 to 25 are those of the water of the dock. The readings were then discontinued. The ship was not again moored in the river, but in the year 1880 was placed on the river bank, near high-water mark, in which position no further observations of the temperature of the water could be made. This series of observations is now therefore terminated.

§ 20. *Osler's Anemometer.*

This anemometer is fixed above the north-western turret of the ancient part of the Observatory, and is self-registering: it was made by Newman, on a plan furnished by A. Follett Osler, Esq., F.R.S., but has received several changes since it was originally constructed. A large vane, which is turned by the wind, and from which a vertical spindle proceeds down nearly to the table in the north-western turret, gives motion by a pinion upon the spindle to a rack-work carrying a pencil. In 1866 the vane-shaft was made to bear upon anti-friction-rollers running in a cup of oil. The pencil makes a mark upon a paper affixed to a board which is moved uniformly in a direction transverse to the direction of the rack-motion. The movement of the board is effected by means of a second rack connected with the pinion of a clock.

The paper has lines printed upon it corresponding to the positions which the pencil must take when the direction of the vane is N., E., S., or W.; and also has transversal lines corresponding to the positions of the pencil at every hour. The original adjustment for azimuth, made in the year 1841, was obtained by observing, from a certain point on the roof of the octagon room, the time of passage of a star behind the vane-shaft, and computing from that observation the azimuth, by which means the direction plate, placed above the registering table, was adjusted to position. Then, on a calm day, the direction pointer (to which reference is made in adjusting, on the sheet, the position of the direction pencil) was brought into exact correspondence with the large vane. The adjustment for azimuth was further verified by observation of stars in the year 1850, and again in the year 1878. A fixed mark, at a known azimuth, is now attached to the north-eastern turret for the purpose of at any time examining the position of the direction plate.

For the pressure of the wind the construction originally arranged by Mr. Osler was in use till the middle of 1866, when certain modifications were made in it by Mr. Browning, as represented in Figure 3 of the engraving at the end of the Introduction to the volume for 1866. To the vane-shaft is attached a rectangular frame C, which rotates with the vane. To this frame are firmly attached the ends of four strong springs D, which rise from the point of attachment in a vertical direction, are then bent so as to descend below the frame C, and are then bent upwards so as to rise a short distance, where they terminate, each of them thus forming a large hook. To the interior of each strong spring, near to its upper bend, is affixed a very weak spring, which descends free into the lower bend or hook of the strong spring, so that its lower end may be moved by a light pressure till it reaches and takes bearing against the bent-up part of the strong spring, after which it cannot be further moved without moving the strong spring, and will therefore require much greater pressure. The four ends of these four light springs carry the circular pressure-plate A by the following connexions. The two which are farthest from A, or which are below the wide part of the vane, are united by a light horizontal cross-bar G; and from the ends of these springs proceed four light bars E, which are attached to points of the pressure-plate A, near its circumference. The two ends of light springs which are nearest to A are also united by a light horizontal cross bar, which is attached to a projection from the center of the plate A. (The diagonal lines upon A, in the diagram, represent indistinctly two strengthening edge-bars upon the pressure-plate, and the projection above mentioned is fixed to their intersection.) The weight of the pressure-plate thus rests entirely on the slender springs; it is held steadily in position, as regards the opposition to the wind, and it moves without sensible friction. A light wind drives it through a considerable space, until the ends of one pair of light springs touch their large hooks; then for every additional pound of pressure the movement is smaller, till the ends of the other pair of light springs touch their large hooks; after this the movement for every additional pound of pressure is still further diminished. This apparatus was arranged by Mr. Browning. The communication with the pencil below is similar to that in the first construction: the cord and pulley are omitted in the drawing to avoid confusion.

The pressure-pencil below is carried by a radial bar, whose length is parallel to the scale of hours; it is brought to zero by a light spring.

The area of the pressure-plate is 2 square feet, or double that in the old construction. The scale of indications on the recording sheet was determined experimentally as in the old instrument; yet it was remarked that the pressures of wind per square foot appeared generally greater than formerly. It was suspected that the inertia of the tension-weight acting against the pressure-spring, and that of the pencil-weight, may have produced an injurious effect: both these weights were replaced by springs, 1872, February 21. The pencil-spring has since been removed and weight applied as necessary.

The scale for small pressures is much larger, and their indications much more certain than formerly. A pressure of an ounce per square foot is clearly shown.

A rain gauge of peculiar construction is carried by this instrument, by which the fall of rain is registered with reference to the time of the fall. It is described in § 22.

A fresh sheet of paper is applied to this instrument every day at 22^h mean solar time.

§ 21. *Robinson's Anemometer.*

Two instruments, constructed on the principle described by Dr. Robinson in the *Transactions of the Royal Irish Academy*, vol. xxii., have been at different periods in use. The first, made by Negretti and Zambra, and used from 1859, October, to 1866, October, did not give a continuous record, and required to be read off from time to time. The second instrument, made by Mr. Browning, and used since 1866, October, gives a continuous register. Both instruments have been mounted above the small building on the roof of the Octagon Room. The principal parts of the Browning instrument are represented in Figures 1 and 2 of the engraving at the end of the Introduction for 1866. The motion is given (as in the former instrument) by the pressure of the air on four hemispherical cups, the distance of the center of each from the axis of rotation being 15·00 inches. 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. The horizontal arms are connected with a vertical spindle, upon which is an endless screw working in a toothed wheel connected with a train of wheels, furnished with indices capable of registering one mile and decimal multiples of a mile up to 1,000 miles. A pinion C upon the axis of one of the wheels (which, in the figure, occupies a place too high) acts in a rack J, drawing it upwards by the ordinary motion of the revolving cups. The rack is pressed to the pinion by a spring, and, when it has been drawn up, it can be pressed by hand in opposition to the spring so as to release it from the pinion, and can then be pushed down, again to be raised by the action of the wheel-work. The rack is connected at the bottom with a sliding rod D, which passes down into the chamber below, where it draws up the sliding pencil-carrier E. The pencil F, which it carries, traces its indications upon the sheet of paper wrapped round a barrel, whose axis is vertical, and which by spindle connexion with the clock H is made to revolve in 24 hours. The revolving cups and wheel-work are so adjusted that a motion of the pencil upwards of one inch represents a motion of the air through 100 miles. The curve traced upon the barrel exhibits, therefore, the aggregate of the air's movements, and also the air's velocity, at every instant of the day.

In the year 1860, on July 3, 4, and 13, experiments were made in Greenwich Park, with the instrument by Negretti and Zambra, then in use, to ascertain the correctness of the theory of Robinson's anemometer; the point to be verified being that the scale of the instrument, founded on the supposition that the horizontal motion of the air is about three times the space described by the centers of the cups, is correct.

A post about 5 feet high with a vertical spindle in the top was erected, and on this spindle turned a horizontal arm, carrying at the extremity of its longer portion Robinson's anemometer, and on its shorter portion a counterpoise. The distance from the vertical spindle of the post to the vertical axis of the anemometer was $17^{ft.}\ 8^{in.}\cdot 7$. The reading of the dial was taken, and then the arm was made to revolve in the horizontal plane 50 or 100 times, an attendant counting the number of revolutions, and the reading of the dial was again taken. In this manner 1,000 revolutions were made in the direction N.E.S.W.N., and 1,000 revolutions in the direction N.W.S.E.N. In some of the experiments the air was sensibly quiet, and in others there was a little wind; the result was,

For a movement of the instrument through one mile,

Beam revolving N.E.S.W. (opposite to the direction of rotation of the Anemometer-cups)	1·15 was registered.
Beam revolving N.W.S.E. (in the same direction as the Anemometer-cups)	0·97 was registered.

The results from rapid revolutions and from slow revolutions were sensibly the same.

This may be considered as sufficiently confirming the accuracy of the theory.

§ 22. *Rain Gauges.*

The rain-gauge connected with Osler's anemometer is 50 feet 8 inches above the ground, and 205 feet 6 inches above the mean level of the sea. It exposes to the rain an area of 200 square inches (its horizontal dimensions being 10 by 20 inches).

The collected water passes through a tube into a vessel suspended in a frame by spiral springs, which lengthen as the water accumulates, until 0·25 of an inch is collected in the receiver; it then discharges itself by means of the following modification of the syphon. A copper tube, open at both ends, is fixed in the receiver, in a vertical position, with its end projecting below the bottom. Over the top of this tube a larger tube, closed at the top, is placed loosely. The smaller tube thus forms the longer leg, and the larger tube the shorter leg, of a syphon. The water, having risen to the top of the smaller tube, gradually falls through it into the uppermost portion of a tumbling bucket, fixed in a globe under the receiver. When full, the bucket falls over, throwing the water into a small pipe at the lower part of the globe; the water completely fills the bore of the pipe; its descent causes an imperfect vacuum in the globe, sufficient to cause a draught in the longer leg of the syphon, and the whole contents run off. After leaving the globe, the water is carried away by a waste-pipe attached to the building. The springs at the same time shorten and raise the receiver. The descent and ascent of the water-vessel move a radius-bar which carries a pencil; and this pencil makes a trace upon the paper carried by the sliding board of the self-registering anemometer. As the trace is rather long in proportion to the length of the radius-bar, the bar has now been furnished by Mr. Browning with a "parallel motion," which makes the motion of the pencil sensibly straight.

The scale on the printed paper was adjusted by repeatedly filling the water-vessel until it emptied itself. The weight of the quantity necessary to cause one discharge being thus accurately determined, its bulk was ascertained, and this bulk being divided by the area of the surface of the rain receiver gave the corresponding measure of the scale.

A second gauge, with an area 77 square inches nearly, is placed close to the preceding, the receiving surface of both being on the same horizontal plane.

A third gauge is placed on the roof of the Octagon room, at 38 feet 4 inches above the ground, and 193 feet 2 inches above the mean level of the sea. It is a simple cylinder gauge, 8 inches in diameter and about 50¼ square inches in area. The height of the cylinder is 13½ inches; at the depth of 1 inch from the top within the cylinder is fixed a funnel (an inverted cone) of 6 inches perpendicular height; with the point of this funnel is connected a tube, ⅕ of an inch in diameter, and 1½ inch in length; ¾ of an inch of this tube is slightly curved, and the remaining ¾ of an inch is bent upwards, terminating in an aperture of $\frac{1}{8}$ of an inch in diameter. By this arrangement, the last few drops of water remain in the bent part of the tube, and the water is some days evaporating. The upper part of the funnel or bore of the cone is connected with a brass ring, which has been turned in a lathe, and this is connected with a circular piece 6 inches in depth, which passes outside the cylinder, and rests in a water joint, attached to the inner cylinder, and extending all round.

A fourth gauge is placed on the roof of the Magnetic Observatory. Its receiving surface is 21 feet 9 inches above the ground, and 176 feet 7 inches above the mean level of the sea. It is similar in construction to the third gauge, and has been substituted for that placed, until the end of the year 1878, above the Library, the latter having been in some degree overshadowed by the dome of the Great Equatoreal. The elevation of the new gauge is a few inches only less than that of the old gauge.

A fifth gauge is planted on the roof of the Photographic Thermometer shed, 10 feet above the ground, and 164 feet 10 inches above the mean level of the sea. Its construction is the same as that of the third gauge.

A sixth gauge is a self-registering rain-gauge on Crosley's construction, made by Watkins and Hill. The surface exposed to the rain is 100 square inches. The collected water falls into a vibrating bucket, whose receiving concavity is entirely above the center of motion, and which is divided into two equal parts by a partition whose plane passes through the axis of motion. The pipe from the rain-receiver terminates immediately above the axis. Thus that part of the concavity which is highest is always in the position for receiving water from the pipe. When a certain quantity of water has fallen into it, it preponderates, and, falling, discharges its water into a cistern below; then the other part of the concavity receives the rain, and after a time preponderates. Thus the bucket is kept in a state of slow vibration. To its axis is attached an anchor with pallets, which acts upon a toothed wheel by a process exactly the reverse of that of a clock-escapement. This wheel communicates motion to a train of wheels, each of which carries a hand upon a dial-plate; and thus inches, tenths, and hundredths are registered. The gauge is placed on the ground, 21 feet South of the Magnetic Observatory, and 156 feet 6 inches above the mean level of the sea.

The seventh and eighth gauges are placed near together, about 16 feet south of the Magnetic Observatory, 5 inches above the ground, and 155 feet 3 inches above the mean level of the sea. They are similar in construction and area to No. 3. These gauges are sunk about 8 inches in the ground.

Another gauge (the ninth) was established at the end of the year 1875 at the Police ship "Royalist," moored in Blackwall Reach. Its receiving surface is 17 feet above the level of the river. It was brought into use on 1876, January 1. The "Royalist" was moved into the West India Dock on October 19, in consequence of an accident (see page *lviii*), and remained in dock until the end of the year. The exposure of the gauge in the latter position was not quite so good as in the river. The observations terminate at the end of the year 1879.

All these gauges, except No. 8, are read at 21^h daily; in addition, Crosley's gauge and No. 7 are read daily at 9^h. No. 8 is read at the end of each month only, to check the summation of the daily readings of No. 7. All are read at midnight of the last day of each month.

§ 23. *Electrometer.*

Until the year 1877 the electricity of the atmosphere was collected by means of an insulated exploring wire suspended from the top of the Octagon Room to the top of a pole 79 feet high situated close to the north arm of the Magnetic Observatory; thence the wire was led down the pole and brought into connexion with an insulated receiving bar within the Magnetic Observatory, with which various electrometers and other apparatus could be brought into communication at pleasure. The several annual volumes, until the year 1877, contain detailed descriptions of all these arrangements. The action of this apparatus was frequently unsatisfactory, and its use was altogether discontinued in August of the year 1877, in view of the establishment of a Thomson's self-recording electrometer, received from Mr. White, of Glasgow, in the same year. For a very full description of the principle of this instrument reference may be made to Sir W. 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 has been planted in the Upper Magnet Room on the slate slab which carries the suspension piece 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 decreased 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.

The electricity of the atmosphere is collected by means of Sir William Thomson's water-dropping apparatus. 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 was in the first instance insulated by means of plain ebonite pillars, but this was found not to be sufficiently satisfactory, and in January of the year 1879 pillars of glass, each one encircled and nearly completely inclosed by a glass vessel containing sulphuric acid, were substituted with excellent effect. A pipe passes out from the cistern through the south face of the building, and extends about six feet into the atmosphere, the nozzle from which the water flows being about ten feet above the ground. The water in the cistern is filled up two or three times each day, so that a good and nearly constant water pressure is maintained: it passes from the end of the pipe into the atmosphere through a very small hole, and immediately breaks into drops. A wire leads from the cistern to one of the pairs of electrometer-quadrants already described, the other pair of quadrants being placed in connexion with earth. The water breaking into drops brings the cistern into the same electrical potential as that point of the atmosphere, and this potential is communicated to the pair of quadrants in connexion therewith. The varying potential of the atmosphere thus influences the motions of the within-contained 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 as respects that of the earth.

The small mirror carried by the needle, as before described, is used for the purpose of obtaining photographic record of the motions of the needle. 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 cylinder turned by clock-work, and on which is placed a properly sensitized sheet of paper. Originally one sheet contained the record for 48 hours, but in March of the year 1879 the time of revolution of the cylinder was changed in order to obtain a more extended time scale, which was made equal to that of the two anemometers, each sheet then containing the record for 24 hours only, as is the case with all the other registers. The motion of the beam of light being horizontal, the axis of the registering cylinder is also horizontal. A second fixed mirror, by means of the same gas-lamp, causes an invariable reference line to be traced round the cylinder. The actual zero is frequently determined by cutting off communication with the cistern and placing the pairs of quadrants in metallic connexion by means of a small commutator. At each hour the driving-clock shuts off the light from the cylindrical lens for a few minutes, thereby interrupting the trace and giving a time scale. An assistant also occasionally interrupts the light at arbitrary times, as described at page *xviii*, for the other photographic registers.

The instrument was brought into a state in which eye observations could be regularly made on 1878, July 12, and the arrangements for photographic registration were complete in August 1878. But the insulation was frequently defective until the establishment of the sulphuric acid insulators at the beginning of the year 1879, as before mentioned. Commencing with 1879, February 8, the records were, however, quite satisfactory.

In regard to the treatment of the photographic curves, a pencil line was first drawn, representing the general form of the curve, in the same way as for the magnetic registers (page *xliv*). Then using a scale of inches, and calling the zero 10·00 (to avoid negative values), the hourly ordinates were measured and entered into a form, in the same way as described for the magnetic ordinates, so that mean daily values, and also mean values at every hour in each month could be determined. The values so found are contained in the tables on pages (lxiii) and (lxiv), and it will be understood that they are simply comparative. All days on which the photographs are good are included, no days being omitted on account of unusual electrical disturbance, it having been found difficult to decide on any limit beyond which it would seem proper to reject the results. It is, however, proposed, at a future time, to consider separately the more disturbed days in relation to other meteorological elements, taking for discussion together the days selected from several years.

During the autumn some inconvenience was caused by cobwebs making connexion between the cistern or its pipe and the walls of the building, and in the month of December there were interruptions owing to the freezing of the water in the exit pipe.

§ 24. *Instrument for the Registration of Sunshine.*

The instrument with which the record of duration of sunshine is obtained is one contrived by J. F. Campbell, Esq., and kindly placed by him at the service of the Royal Observatory. It consists of a very accurately formed sphere of glass, nearly 4 inches in diameter, supported concentrically within a well turned hemispherical metal bowl in such a manner that the image of the sun, formed when the sun shines, falls always on the concave surface of the bowl. A strip of some suitable material being fixed in the bowl, the sun, when shining, burns away the material at the points at which the image successively falls, by which means the record of periods of sunshine is obtained. The strip is removed after sunset, and a new one fixed ready for the following day. The material used is blackened millboard. The register is frequently much interrupted, continuous sunshine through a whole day being a comparatively rare circumstance. The place of the meridian is marked on the strip before removing it from the bowl. A series of time scales, suitable for different periods of the year, having been prepared, the proper scale is selected and placed against the record, which is then easily 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 during each hour (reckoning from apparent noon) through the month are thus readily formed. The instrument gives fairly the duration of sunshine, but (usually) no register is obtained at altitudes of less than 5°. Indeed, on fine days the register, which usually has a certain breadth, tapers off in the early morning and late evening hours to a fine point, thus showing the extent to which registration under the best circumstances is effective. 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. In January of the year 1878 degrees of azimuth and altitude were engraved on the metal bowl to facilitate adjustment of the recording strip. The instrument is placed on a table upon the platform above the Magnetic House.

§ 25. *Ozonometer.*

The Ozonometer (furnished by Messrs. Horne and Thornthwaite) 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, and blackened inside, and so constructed that there is free circulation of air through the box, without exposure of the paper to light. The papers are exposed and collected at 21^h, 3^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 values for any given civil day, three-fourths of the value registered at 21^h, the values registered at 3^h and 9^h, and one-fourth of that registered at the following 21^h, are added together, the resulting sum (which appears in the tables of "Daily Results") being taken as the value referring to the civil day. The mean of the 21^h, 3^h, and 9^h values, as observed, are also given for each month in the foot notes.

§ 26. *Explanation of the Tables of Results of the Meteorological Observations.*

The results contained in this section refer generally to the civil day commencing at midnight.

All results throughout the section, so far as relates to the Barometer, and the Temperature of the Air and Evaporation, and to deductions made therefrom (excepting observations of maximum and minimum temperature), are founded upon the photographic records. The form into which the readings from the photographic sheets were first entered is one having a double argument, the horizontal argument ranging through the 24 hours of the civil day, and the vertical argument through the days of a calendar month. The means of the numbers standing in the vertical columns being then taken, we obtain the mean monthly photographic values of the particular element at each hour of the day, the means of the numbers in the horizontal columns giving the mean daily value. To correct the values for instrumental error it is to be remarked that the standard barometer and the standard dry-bulb and wet-bulb thermometers of the Observatory are read by eye at 21^h, 0^h, 3^h, and 9^h of every day, except on Sundays and a few other days. The comparison of these readings (corrected for temperature in the case of the barometer) with the corresponding readings from the photographs, gives the correction applicable to the photographic readings at those hours. The mean correction at each of these hours being taken through a month, corrections are interpolated for the intermediate hours, which being applied to the corresponding means of the photographic readings, the true value at each hour is obtained. 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 for the several elements are in each month obtained.

Considering the construction of the photographic barometer (already described), and having regard to the circumstance that the basement temperature is maintained so nearly uniform, the effect produced on the photographic record by changes of temperature is very small, so that the corrections can, without sensible error, be grouped by months in the way described. As regards the dry-bulb and wet-bulb thermometers, the process of correction is equivalent to giving the photographic indications in terms of the standard dry-bulb and wet-bulb thermometers exposed on the free stand.

The mean daily values of the barometer, and of the dry-bulb and wet-bulb thermometers, giving air and evaporation temperatures, found in the way described, are those inserted in the "Daily Results of the Meteorological Observations." The mean hourly values are given in following tables (pages (lii) and (liii)).

From the mean daily temperatures of the air and of evaporation are deduced, by use of Glaisher's Hygrometrical Tables, the mean daily temperature of the dew-point and degree of humidity. The factors used for calculating the dew-point given in these tables 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-bulb and wet-bulb thermometers. The first part of this investigation was published in full, in the volume of *Magnetical and Meteorological Observations* for 1844, pages 67–72; it was based upon all the observations made up to that time. Subsequently, the comparison was extended to include all the simultaneous observations of these instruments made at the Royal Observatory, Greenwich, from 1841 to 1854, with some observations taken at high temperatures in India, and others at low and medium temperatures at Toronto. The results at the same temperature were found to be the same at these different localities, so far as the climatic circumstances permitted comparison.

The following table exhibits the result of the entire comparison.

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

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 and degree of humidity in each month (pages (liii) and (liv)) have been calculated from the corresponding mean hourly values of air and evaporation temperatures (pages (lii) and (liii)).

The excess of the mean temperature of the air on each day above the average of 20 years, given in the "Daily Results," is found by comparing the numbers contained in column 6 with a table of average daily temperatures found by smoothing 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.

SMOOTHED VALUES of the MEAN TEMPERATURE of the AIR as 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 20 is that recorded by the gauge No. 7, whose receiving surface is 5 inches above the ground. This gauge is usually read at 21^h and 9^h. The continuous record of Osler's self-registering gauge shows whether the amounts measured at 21^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 21^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 (li) and (lxv), 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 electricity are derived from Thomson's Electrometer (described in § 23). On some days, not necessary to be specified, during interruption or failure of photographic registration, the results depend on eye observations.

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.

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 remarks before it apply (roughly) to the interval from midnight to 6 A.M., and those following it to the interval from 6 A.M. 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, the whole sky being represented by 10.

a	denotes	*aurora borealis*	h	denotes	*haze*
ci	...	*cirrus*	slt-h	...	*slight haze*
ci-cu	...	*cirro-cumulus*	hl	...	*hail*
ci-s	...	*cirro-stratus*	l	...	*lightning*
cu	...	*cumulus*	li-cl	...	*light clouds*
cu-s	...	*cumulo-stratus*	lu-co	...	*lunar corona*
d	...	*dew*	lu-ha	...	*lunar halo*
hy-d	...	*heavy dew*	m	...	*mist*
f	...	*fog*	slt-m	...	*slight mist*
slt-f	...	*slight fog*	n	...	*nimbus*
tk-f	...	*thick fog*	p-cl	...	*partially cloudy*
fr	...	*frost*	r	...	*rain*
ho-fr	...	*hoar frost*	c-r	...	*continued rain*
g	...	*gale*	fr-r	...	*frozen rain*
hy-g	...	*heavy gale*	fq-r	...	*frequent rain*
glm	...	*gloom*	hy-r	...	*heavy rain*
gt-glm	...	*great gloom*	c-hy-r	...	*continued heavy rain*

m-r	denotes	*misty rain*	sc	denotes	*scud*
fq-m-r	...	*frequent misty rain*	li-sc	...	*light scud*
oc-m-r	...	*occasional misty rain*	sl	...	*sleet*
oc-r	...	*occasional rain*	sn	...	*snow*
sh-r	...	*shower of rain*	oc-sn	...	*occasional snow*
shs-r	...	*showers of rain*	slt-sn	...	*slight snow*
slt-r	...	*slight rain*	so-ha	...	*solar halo*
oc-slt-r	...	*occasional slight rain*	sq	...	*squall*
th-r	...	*thin rain*	sqs	...	*squalls*
fq-th-r	...	*frequent thin rain*	fq-sqs	...	*frequent squalls*
oc-th-r	...	*occasional thin rain*	hy-sqs	...	*heavy squalls*
hy-sh	...	*heavy shower*	fq-hy-sqs	...	*frequent heavy squalls*
slt-sh	...	*slight shower*	oc-sqs	...	*occasional squalls*
fq-shs	...	*frequent showers*	t	...	*thunder*
hy-shs	...	*heavy showers*	t-sm	...	*thunder storm*
fq-hy-shs	...	*frequent heavy showers*	th-cl	...	*thin clouds*
oc-hy-shs	...	*occasional heavy showers*	v	...	*variable*
li-shs	...	*light showers*	vv	...	*very variable*
oc-shs	...	*occasional showers*	w	...	*wind*
s	...	*stratus*	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 an intensity of the modification described, thus, s s, is very strong; v v, very variable. In a few cases 0 indicates no electricity, 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 preceding sections.

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 1841–1878.

The tables of Meteorological Abstracts, following the Tables of "Daily Results," require in general no special explanation. The mean amount of cloud, page (li), is the mean found from observations made usually at 21^h, 0^h, 3^h, and 9^h of each day.

It may be pointed out that the monthly means for Barometer, and Temperature of Air and Evaporation, contained in the tables referring to diurnal inequality, pages (lii) and (liii), do not, in some cases, agree with the true monthly means given in the "Daily Results," pages (xxiv) to (xlvi), and in the table on page (li), in consequence of occasional failure or interruption of the photographic process. They are, however, the proper means to be used in connexion with the numbers standing in each case immediately above them, for formation of the actual diurnal inequality. The "Number of Days employed" indicates the months in which any days are thus deficient.

§ 27. *Observations of Luminous Meteors.*

In arranging for the observations of meteors, the directions circulated by the Committee of the British Association have received careful attention. On the nights specially mentioned in the directions systematic watch has been kept whenever the weather was sufficiently favourable. These nights are, January 2, and 15 to 19; February 10 and 19; March 1 to 4 and 18; April 20, and 25 to 30; May 18; June 6 and 20; July 17, 20, and 29; August 3 and 7 to 13 (especially August 10); September 10; October 1 to 6 and 16 to 23; November 12 to 14, 19, 28, and 30; December 6 to 14 (especially December 11) and December 24.

Special arrangements were made in the August and November periods for observing through the night, two observers being usually charged with the observations at these times, so that observations of all meteors that should present themselves might be secured.

The observers in the year 1879 were Mr. Ellis, Mr. Nash, Mr. Greengrass, Mr. Hugo, Mr. Simmons, and Mr. A. Pead. Their observations are distinguished by the initials E., N., G., H., S., and P., respectively.

§ 28. *Details of the Chemical Operations for the Photographic Records.*

The paper used in 1879 was that known as Whatman's royal, a paper not specially prepared for photographic purposes.

First Operation.—Preliminary Preparation of the Paper.

The chemical solutions used in this process are the following:—

(1.) Sixteen grains of Iodide of Potassium are dissolved in one ounce of distilled water.

(2.) Twenty-four grains of Bromide of Potassium are dissolved in one ounce of distilled water.

(3.) When the crystals are dissolved, the two solutions are mixed together, forming the bromo-iodising solution. The mixture will keep through any length of time. Immediately before use, it is filtered through filtering paper.

A quantity of the paper, sufficient for the consumption of several weeks, is treated in the following manner, sheet after sheet.

The sheet of paper is pinned by its four corners to a horizontal board. Upon the paper, a sufficient quantity (about 50 minims, or $\frac{5}{48}$ of an ounce troy) of the bromo-iodising solution is applied, by pouring it upon the paper in front of a glass rod, which is then moved to and fro till the whole surface is uniformly wetted by the solution. Or, the solution may be evenly distributed by means of a camel-hair brush.

The paper thus prepared is allowed to remain in a horizontal position for a few minutes, and is then hung up to dry in the air; when dry, it is placed in a drawer, and may be kept through any length of time.

Second Operation.—Rendering the Paper sensitive to the Action of Light.

A solution of Nitrate of Silver is prepared by dissolving 50 grains of crystallized Nitrate of Silver in one ounce of distilled water. Since the magnetic basement has been used for photography, 15 minims of Acetic Acid have always been added to the solution.

Then the following operation is performed in a room illuminated by yellow light.

The paper is pinned upon a board somewhat smaller than itself, and by means of a glass rod its surface is wetted with 70 minims of the Nitrate of Silver solution. It is allowed to remain a short time in a horizontal position, and, if any part of the paper still shines from the presence of a part of the solution unabsorbed into its texture, the superfluous fluid is taken off by the application of blotting paper.

The paper, still damp, is immediately placed upon the cylinder, and is covered by the exterior glass tube, and the cylinder is mounted upon the revolving apparatus, to receive the spot of light formed by the mirror, which is carried by the magnet; or to receive the line of light passing through the thermometer tube.

Third Operation.—Development of the Photographic Trace.

When the paper is removed from the cylinder, it is placed as before upon a board, and a saturated solution of Gallic Acid, to which a few drops of Aceto-Nitrate of Silver are occasionally added, is spread over the paper by means of a glass rod, and this action is continued until the trace is fully developed. The solutions are kept in the magnetic basement, and are always used at the temperature of that room. When the trace is well developed, the paper is placed in a vessel with water, and repeatedly washed with several changes of water; a brush being passed lightly over both sides of the paper to remove any crystalline deposit.

Fourth Operation.—Fixing the Photographic Trace.

The Photograph is placed in a solution of Hyposulphite of Soda, made by dissolving four or five ounces of the Hyposulphite in a pint of water; it is plunged completely in the liquid, and allowed to remain from one to two hours, until the yellow tint of the Iodide of Silver is removed. After this the sheet is washed repeatedly with water, allowed to remain immersed in water for 24 hours, and afterwards placed within folds of cotton cloths till nearly dry. Finally it is either ironed, or placed between sheets of blotting-paper and pressed.

§ 29. *Personal Establishment.*

The personal establishment during the year 1879 has consisted of William Ellis, Esq., Superintendent of the Magnetical and Meteorological Department, and William Carpenter Nash, Esq., Assistant.

Three or four computers have usually been attached to the Department.

Royal Observatory, Greenwich, G. B. AIRY.
1880, December 13.

ROYAL OBSERVATORY, GREENWICH.

RESULTS

OF

MAGNETICAL OBSERVATIONS.

1879.

ROYAL OBSERVATORY, GREENWICH.

REDUCTION

OF THE

MAGNETIC OBSERVATIONS.

1879.

TABLE I.—MEAN WESTERN DECLINATION of the MAGNET on each ASTRONOMICAL DAY, as deduced from the MEAN of TWENTY-FOUR HOURLY MEASURES of ORDINATES of the PHOTOGRAPHIC REGISTER on that DAY.

1879.

Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	18°	18°	18°	18°	18°	18°	18°	18°	18°	18°	18°	18°
d	′	′	′	′	′	′	′	′	′	′	′	′
1	44·0	44·1	42·7	41·5	41·2	39·9	41·5	40·2	39·3	40·1	39·3	38·2
2	44·4	43·4	43·3	41·8	41·3	40·6	41·5	41·3	38·6	40·0	39·5	38·1
3	43·8	43·7	42·8	41·7	41·0	40·9	41·5	40·4	38·7	40·2	38·7	38·3
4	44·4	44·2	42·2	41·9	41·3	40·7	40·9	40·4	38·8	39·8	39·2	38·4
5	44·1	43·4	42·3	41·4	41·8	40·8	40·7	41·1	38·7	40·4	39·4	38·0
6	43·7	43·0	43·1	41·2	41·0	40·5	41·9	41·1	38·5	39·5	39·4	37·5
7	43·9	43·0	43·1	41·2	40·4	..	40·8	40·9	39·4	39·8	39·3	37·9
8	43·7	42·5	43·1	41·6	40·8	..	41·1	40·9	38·5	42·7	39·1	37·6
9	44·2	42·8	42·7	41·9	40·6	..	41·2	41·0	38·4	39·9	38·7	36·1
10	44·4	42·9	42·9	41·9	40·7	40·2	41·5	40·4	37·0	39·6	38·8	36·1
11	44·1	42·8	43·4	42·1	40·4	39·6	41·0	41·0	37·9	39·7	39·2	36·0
12	43·7	43·2	43·4	41·7	40·1	39·5	41·0	40·6	37·6	39·6	39·0	35·5
13	42·8	42·8	44·0	42·3	39·4	39·7	40·9	41·1	37·9	39·8	38·6	35·7
14	43·1	42·9	43·0	41·8	39·9	40·2	41·2	40·2	38·1	39·6	39·4	36·0
15	44·5	43·0	41·8	41·8	40·0	39·8	41·6	40·6	38·0	39·8	39·1	35·8
16	44·0	43·1	42·3	41·3	39·8	40·2	41·7	40·5	38·0	39·6	38·8	35·8
17	43·7	43·4	42·5	41·0	40·0	41·8	..	41·0	38·3	39·5	38·4	35·8
18	44·0	42·8	42·2	41·2	40·2	41·7	41·5	40·0	37·4	39·9	38·6	35·6
19	44·2	43·0	41·8	39·0	39·7	40·9	41·1	38·7	38·3	39·9	38·9	35·7
20	43·8	42·6	42·3	41·6	40·1	40·8	40·8	38·7	38·6	39·6	38·9	35·5
21	43·7	43·7	42·4	41·3	39·6	41·3	41·0	38·9	38·7	39·8	38·2	35·8
22	44·5	43·1	43·1	41·2	39·4	41·3	41·3	38·2	38·4	39·8	38·3	36·3
23	44·4	43·6	43·1	40·8	40·0	41·1	41·3	38·0	37·7	39·4	38·2	36·0
24	44·4	44·2	42·9	40·8	39·3	40·7	40·6	38·1	40·6	39·4	38·5	35·0
25	44·2	43·7	42·2	41·7	39·3	40·9	40·9	38·6	40·7	39·6	38·2	35·9
26	43·7	43·7	42·7	40·9	40·1	40·8	41·4	37·6	40·5	39·7	38·5	35·5
27	43·6	42·9	42·4	41·1	40·2	41·0	40·8	37·8	39·9	39·3	38·0	35·2
28	44·0	42·5	41·7	40·8	40·1	40·6	40·5	38·0	40·3	39·6	..	35·3
29	44·1		41·2	40·8	41·2	40·6	40·6	37·2	40·3	39·4	38·1	35·7
30	43·7		42·0	41·6	40·7	41·2	41·1	38·4	39·8	39·9	37·6	35·5
31	44·3		42·0		40·2		40·9	39·5		38·9		35·2

TABLE II.—MEAN MONTHLY DETERMINATION of the WESTERN DECLINATION of the MAGNET at every HOUR of the DAY; obtained by taking the MEAN of all the DETERMINATIONS at the same HOUR of the DAY through the MONTH.

1879.

Hour, Greenwich Mean Solar Time.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	18°	18°	18°	18°	18°	18°	18°	18°	18°	18°	18°	18°
h	′	′	′	′	′	′	′	′	′	′	′	′
0	45·9	45·7	46·3	45·4	44·5	44·7	45·4	45·2	43·5	43·7	41·4	38·2
1	46·2	46·3	47·4	46·4	45·1	45·6	46·5	46·0	44·2	44·0	41·5	38·5
2	45·6	45·9	47·0	45·7	44·8	45·4	46·3	45·2	43·3	43·3	40·8	37·9
3	44·7	44·8	45·7	44·0	43·7	44·7	45·0	43·4	41·5	41·9	39·9	37·3
4	44·2	43·5	44·2	42·9	42·6	43·4	43·4	41·7	40·0	40·8	39·5	37·3
5	44·2	43·3	43·1	41·9	41·3	42·0	42·2	40·1	39·2	40·3	39·3	36·9
6	43·9	43·1	42·5	41·2	40·6	41·0	41·4	39·5	38·7	39·7	38·8	36·3
7	43·6	42·8	42·0	41·1	40·2	40·6	41·1	39·6	38·4	39·2	38·3	35·8
8	43·1	42·4	41·5	40·9	39·9	40·4	41·0	39·3	38·1	38·9	37·7	35·2
9	42·7	42·0	41·2	40·6	39·8	40·4	41·0	39·0	37·7	38·5	37·2	34·8
10	42·7	41·9	41·0	40·5	39·7	40·4	40·9	38·4	37·5	38·3	37·3	34·6
11	43·1	42·1	40·9	40·4	39·6	40·4	40·7	38·3	37·6	38·3	37·3	34·8
12	43·2	42·3	41·3	40·3	39·4	40·1	40·3	38·3	37·4	38·4	37·5	35·1
13	43·3	42·6	41·6	40·7	39·3	40·0	40·3	38·4	37·6	38·8	38·0	35·5
14	43·5	42·8	41·7	40·7	39·3	39·8	40·2	38·1	37·5	39·0	38·5	35·9
15	43·8	42·8	41·9	40·7	39·3	39·6	40·0	38·0	37·3	39·0	38·6	36·2
16	43·9	43·0	41·8	40·3	38·8	38·8	39·3	37·9	37·2	39·1	38·4	36·3
17	43·7	42·7	41·7	39·9	38·0	37·5	38·2	37·1	37·1	39·0	38·3	36·3
18	43·7	42·7	41·4	39·5	37·5	36·9	37·7	36·3	36·8	38·8	38·3	36·2
19	43·6	42·5	41·0	38·5	36·8	36·6	37·3	35·8	36·3	38·5	38·1	36·1
20	43·4	42·3	40·5	38·1	36·9	36·7	37·4	36·2	36·2	37·9	38·0	36·1
21	43·6	42·2	40·5	38·9	37·9	37·8	38·2	37·7	37·0	37·9	37·9	35·9
22	44·5	43·0	42·0	40·9	40·0	39·9	40·3	40·1	39·1	39·6	39·0	36·4
23	45·2	44·5	44·2	43·3	42·7	42·7	43·1	43·0	41·4	42·3	40·5	37·4

TABLE III.

1879.			
Month.	MEAN WESTERN DECLINATION of the MAGNET IN EACH MONTH.	EXCESS OF WESTERN DECLINATION above 18°, converted into WESTERLY FORCE, and expressed in terms of GAUSS'S UNIT measured on the METRICAL SYSTEM.	MONTHLY MEANS of all the DIURNAL RANGES of the WESTERN DECLINATION, as deduced from the Twenty-four Hourly Measures of each day.
	° ′		′
January	18. 44·0	0·02308	4·6
February	18. 43·2	·02266	5·4
March	18. 42·6	·02234	8·4
April	18. 41·4	·02171	9·0
May	18. 40·3	·02114	9·1
June	18. 40·6	·02129	9·8
July	18. 41·1	·02156	9·9
August	18. 39·7	·02082	10·8
September	18. 38·8	·02035	9·4
October	18. 39·8	·02088	7·6
November	18. 38·8	·02035	5·6
December	18. 36·3	·01904	4·9
Mean	18. 40·5	0·02127	7·9

The unit adopted in column 3 is the Millimètre-Milligramme-Second Unit. To express the forces on the Centimètre-Gramme-Second (C.G.S.) system, the numbers must be divided by 10, equivalent to shifting the decimal point one step towards the left.

TABLE IV.—MEAN HORIZONTAL MAGNETIC FORCE, expressed in terms of the Mean Horizontal Force for the Year, and diminished by a Constant (0·86000 nearly), uncorrected for TEMPERATURE, on each ASTRONOMICAL DAY; as deduced from the MEAN of TWENTY-FOUR HOURLY MEASURES of ORDINATES of the PHOTOGRAPHIC REGISTER on that DAY.

1879.												
Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d												
1	..	0·12666	0·12617	0·12537	0·12654	0·12608	0·12607	0·12728	0·12803	0·12900	0·12870	0·12960
2	0·12575	·12664	·12658	·12556	·12671	·12656	·12651	·12705	·12841	·12909	·12933	·12979
3	·12669	·12682	·12610	·12588	·12709	·12655	·12644	·12737	·12872	·12934	·12958	·13017
4	·12614	·12666	·12634	·12579	·12712	·12646	·12680	·12712	·12945	·12883	·12946	·13019
5	·12625	·12663	·12588	·12611	·12666	·12654	·12626	·12754	·12940	·12915	·12925	·13063
6	·12662	·12662	·12563	·12647	·12601	·12712	·12648	·12759	·12909	·12913	·12943	·13027
7	·12671	·12679	·12550	·12581	·12635	..	·12623	·12791	·12893	·12892	·12956	·12994
8	·12698	·12667	·12620	·12588	·12615	..	·12694	·12802	·12842	·12884	·12975	·12878
9	·12695	·12690	·12575	·12621	·12594	..	·12687	·12862	·12912	·12906	·12948	·12946
10	·12682	·12556	·12637	·12588	·12590	·12598	·12676	·12805	·12793	·12941	·12920	·12892
11	·12716	·12551	·12636	·12598	·12633	·12587	·12666	·12798	·12841	·12821	·12870	·12867
12	·12749	·12543	·12641	·12640	·12593	·12621	·12705	·12807	·12821	·12815	·12906	·12969
13	·12673	·12559	·12610	·12611	·12564	·12622	·12689	·12817	·12779	·12848	·12914	·12924
14	·12652	·12515	·12639	·12611	·12558	·12667	·12713	·12820	·12762	·12822	·12906	·12905
15	·12625	·12522	·12569	·12563	·12559	·12719	·12685	·12803	·12761	·12792	·12968	·12861
16	·12612	·12563	·12512	·12606	·12547	·12695	·12741	·12835	·12790	·12781	·13077	·12903
17	·12619	·12570	·12538	·12631	·12580	·12755	..	·12868	·12829	·12859	·12972	·12850
18	·12632	·12577	·12542	·12643	·12599	·12671	·12690	·12888	·12818	·12874	·12918	·12881
19	·12659	·12573	·12545	·12572	·12620	·12724	·12675	·12790	·12815	·12898	·12872	·12925
20	·12604	·12558	·12536	·12584	·12570	·12718	·12682	·12719	·12776	·12876	·12935	·12925
21	·12660	·12581	·12545	·12594	·12562	·12715	·12713	·12734	·12822	·12909	·12930	·12958
22	·12689	·12609	·12525	·12592	·12581	·12748	·12667	·12773	·12920	·12926	·12979	·12826
23	·12700	·12581	·12480	·12608	·12643	·12838	·12651	·12799	·12880	·12848	·13024	·12854
24	·12712	·12605	·12561	·12607	·12505	·12589	·12679	·12768	·12906	·12831	·13042	·12879
25	·12690	·12594	·12599	·12647	·12558	·12600	·12686	·12793	·12889	·12824	·13004	·12873
26	·12693	·12612	·12599	·12641	·12594	·12651	·12732	·12846	·12905	·12857	·13012	·12882
27	·12659	·12629	·12601	·12641	·12611	·12588	·12696	·12865	·12924	·12882	·12952	·12905
28	·12622	·12613	·12595	·12645	·12639	·12545	·12668	·12796	·12939	·12860	..	·12860
29	·12615		·12514	·12621	·12632	·12513	·12597	·12776	·12927	·12879	·13003	·12858
30	·12625		·12532	·12637	·12595	·12628	·12594	·12777	·12955	·12857	·12966	·12935
31	·12634		·12530		·12612		·12652	·12833		·12837		·12945

TABLE V.—DAILY MEANS of READINGS (usually eight on each Day) of the THERMOMETER placed within the box inclosing the HORIZONTAL FORCE MAGNETOMETER, for each ASTRONOMICAL DAY.

1879.

Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
1	..	57·3	60·8	63·1	62·8	64·4	65·1	69·3	64·8	65·4	63·3	57·3
2	59·7	59·1	59·6	62·4	62·2	63·9	64·3	67·9	65·4	64·1	61·0	56·3
3	59·9	59·9	59·7	62·3	62·2	63·7	63·8	68·1	65·5	63·8	61·1	55·4
4	59·2	59·7	61·1	63·1	62·4	64·0	63·4	67·8	66·2	66·3	62·4	54·7
5	58·2	60·1	62·5	63·6	63·5	64·7	63·6	66·4	66·6	66·6	62·9	54·5
6	57·5	61·8	62·3	62·7	63·4	65·8	64·4	65·6	67·8	66·0	63·1	55·7
7	56·6	62·2	61·7	63·7	62·6	..	65·2	65·6	67·2	65·4	63·3	56·2
8	54·8	63·0	61·4	63·2	62·4	..	63·4	66·0	65·8	64·9	63·5	58·0
9	55·4	64·0	61·8	63·2	62·4	..	63·1	64·8	64·8	65·1	63·7	58·7
10	54·7	62·9	62·0	61·9	62·1	65·6	63·4	66·6	64·8	65·0	63·8	59·0
11	54·2	62·0	61·7	60·5	62·6	65·0	63·5	68·9	65·9	65·1	63·3	58·1
12	55·0	62·1	60·8	60·7	63·6	64·1	64·5	68·8	66·5	64·8	62·2	57·1
13	58·5	62·1	59·4	60·1	63·6	64·7	65·0	69·6	66·8	65·4	61·7	59·9
14	60·3	62·3	60·7	60·6	63·7	66·3	64·6	70·6	66·1	65·2	61·1	61·2
15	60·6	62·1	62·1	62·3	63·1	66·2	64·7	70·3	66·6	64·1	59·0	61·7
16	59·9	61·4	63·2	62·2	63·4	65·2	64·6	67·2	67·2	63·6	56·4	59·5
17	59·9	60·8	62·4	62·1	63·7	63·8	..	65·0	67·3	64·6	59·5	58·0
18	59·9	60·2	62·8	62·3	63·7	64·0	65·7	65·9	67·3	65·8	62·7	58·6
19	59·4	60·7	63·1	62·6	64·5	65·2	64·8	67·1	67·9	66·2	61·9	58·8
20	57·5	60·9	63·3	63·1	65·0	65·4	64·0	69·0	66·9	65·4	60·3	58·6
21	56·6	60·0	62·5	62·3	65·2	64·0	63·5	68·7	65·3	64·8	60·3	58·3
22	56·1	59·3	61·5	62·6	64·7	62·9	64·7	67·3	64·2	65·7	59·6	60·1
23	55·9	59·3	60·6	63·3	63·2	63·3	65·9	67·0	64·5	67·3	59·0	59·6
24	56·4	59·1	59·1	63·2	64·5	64·0	66·6	67·4	62·9	66·7	58·7	59·7
25	57·6	59·2	59·3	63·7	64·5	63·4	65·8	66·2	62·7	64·5	59·9	59·2
26	58·7	59·0	60·1	64·0	64·0	63·8	65·2	64·9	63·6	64·4	59·5	57·9
27	58·9	59·9	60·4	62·6	64·2	66·3	66·6	66·3	63·4	64·7	58·2	58·6
28	58·7	61·4	61·2	62·3	64·1	66·2	68·5	66·7	64·3	64·5	..	61·8
29	58·8		62·3	62·9	64·1	66·1	69·9	65·6	64·7	64·6	56·1	61·5
30	58·7		63·1	62·8	64·1	66·0	70·6	65·1	64·8	64·5	57·2	58·7
31	58·3		63·5		64·2		70·0	64·0		64·1		59·0

TABLE VI.—MEAN MONTHLY DETERMINATION of the HORIZONTAL MAGNETIC FORCE, expressed in terms of the Mean Horizontal Force for the Year, and diminished by a Constant (0·86000 nearly), uncorrected for TEMPERATURE, at every HOUR of the DAY; obtained by taking the MEAN of all the DETERMINATIONS at the same HOUR of the DAY through each MONTH.

1879.

Hour, Greenwich Mean Solar Time.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
h												
0	0·12642	0·12579	0·12545	0·12553	0·12555	0·12586	0·12597	0·12722	0·12803	0·12823	0·12932	0·12927
1	·12669	·12607	·12565	·12593	·12581	·12616	·12633	·12753	·12847	·12848	·12959	·12949
2	·12681	·12630	·12578	·12612	·12600	·12654	·12668	·12776	·12861	·12863	·12963	·12949
3	·12679	·12626	·12591	·12625	·12620	·12674	·12694	·12795	·12857	·12873	·12960	·12942
4	·12668	·12617	·12583	·12634	·12634	·12679	·12707	·12806	·12857	·12878	·12957	·12935
5	·12662	·12612	·12577	·12639	·12659	·12697	·12719	·12816	·12865	·12889	·12964	·12927
6	·12661	·12609	·12581	·12645	·12676	·12706	·12722	·12826	·12877	·12900	·12966	·12917
7	·12653	·12606	·12591	·12653	·12675	·12712	·12728	·12841	·12894	·12904	·12967	·12903
8	·12643	·12603	·12596	·12650	·12655	·12704	·12727	·12840	·12900	·12902	·12955	·12887
9	·12646	·12603	·12590	·12643	·12648	·12697	·12724	·12842	·12896	·12897	·12951	·12884
10	·12645	·12606	·12591	·12635	·12640	·12691	·12717	·12837	·12891	·12895	·12948	·12895
11	·12648	·12607	·12595	·12638	·12634	·12684	·12712	·12837	·12900	·12898	·12953	·12903
12	·12645	·12611	·12592	·12629	·12628	·12681	·12706	·12830	·12894	·12890	·12952	·12905
13	·12643	·12605	·12583	·12626	·12622	·12679	·12690	·12831	·12890	·12891	·12943	·12901
14	·12648	·12604	·12579	·12621	·12611	·12678	·12689	·12831	·12889	·12893	·12948	·12907
15	·12652	·12607	·12577	·12615	·12614	·12679	·12687	·12821	·12893	·12891	·12953	·12922
16	·12664	·12615	·12583	·12616	·12611	·12679	·12691	·12816	·12890	·12888	·12962	·12930
17	·12673	·12620	·12589	·12615	·12608	·12679	·12690	·12812	·12887	·12894	·12966	·12941
18	·12683	·12623	·12599	·12614	·12597	·12652	·12673	·12795	·12881	·12886	·12974	·12950
19	·12684	·12620	·12598	·12602	·12570	·12626	·12640	·12772	·12858	·12877	·12973	·12946
20	·12676	·12607	·12575	·12567	·12543	·12594	·12598	·12730	·12822	·12839	·12958	·12945
21	·12653	·12588	·12544	·12523	·12525	·12567	·12566	·12700	·12779	·12800	·12932	·12924
22	·12635	·12567	·12527	·12496	·12519	·12561	·12552	·12687	·12753	·12777	·12913	·12914
23	·12633	·12555	·12527	·12505	·12529	·12576	·12563	·12695	·12763	·12784	·12912	·12911

TABLE VII.—MONTHLY MEANS of READINGS of the THERMOMETER placed within the box inclosing the HORIZONTAL FORCE MAGNETOMETER, at each of the ordinary Hours of Observation.

1879.

Hour, Greenwich Mean Solar Time.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
h	°	°	°	°	°	°	°	°	°	°	°	°
0	57·7	60·6	61·3	62·4	63·3	64·5	65·2	67·2	65·5	65·0	60·7	58·2
1	57·9	60·7	61·5	62·5	63·5	64·8	65·4	67·4	65·8	65·1	60·8	58·3
2	58·0	60·8	61·6	62·6	63·5	65·1	65·6	67·6	66·0	65·2	61·0	58·4
3	58·0	60·8	61·7	62·7	63·7	65·2	65·7	67·8	66·2	65·2	61·0	58·6
9	58·3	61·1	61·9	63·0	64·2	65·4	65·9	67·6	65·9	65·4	61·4	58·9
21	57·7	60·8	61·3	62·5	63·4	64·2	64·7	66·1	65·0	65·2	60·7	58·4
22	57·7	60·7	61·2	62·3	63·4	64·3	64·8	66·4	65·1	65·0	60·6	58·4
23	57·7	60·7	61·2	62·3	63·3	64·3	65·0	66·6	65·2	64·9	60·5	58·3

TABLE VIII.

1879.

Month.	Mean Horizontal Magnetic Force in each Month, uncorrected for Temperature. Expressed in terms of the Mean Horizontal Force for the Year, and diminished by a Constant (0·86000 nearly).	Expressed in terms of Gauss's Unit measured on the Metrical System, and diminished by a Constant (1·55058 nearly).	Mean Temperature.
			°
January	0·12658	0·22822	57·9
February	·12605	·22727	60·8
March	·12577	·22676	61·5
April	·12606	·22729	62·5
May	·12606	·22729	63·5
June	·12656	·22819	64·7
July	·12671	·22846	65·3
August	·12792	·23064	67·1
September	·12860	·23187	65·6
October	·12870	·23205	65·1
November	·12953	·23354	60·9
December	·12921	·23297	58·4

The unit adopted in column 3 is the Millimètre-Milligramme-Second Unit. To express the forces on the Centimètre-Gramme-Second (C.G.S.) system, the numbers must be divided by 10, equivalent to shifting the decimal point one step towards the left.

The value 0·86000 of Horizontal Force corresponds to 1·55058 of Gauss's Unit on the Metrical (Millimètre-Milligramme-Second) system, and to 0·15506 on the C.G.S. system.

TABLE IX.—MEAN VERTICAL MAGNETIC FORCE, expressed in terms of the Mean Vertical Force for the Year, and diminished by a Constant (0·96000 nearly), uncorrected for TEMPERATURE, on each ASTRONOMICAL DAY; as deduced from the MEAN of TWENTY-FOUR HOURLY MEASURES of ORDINATES of the PHOTOGRAPHIC REGISTER on that DAY.

1879.

Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d												
1	. .	0·03492	0·03637	0·03775	0·03666	0·03717	0·03667	0·03749	0·03549	0·03517	0·03282	0·02999
2	. .	·03660	·03571	·03668	·03632	·03661	·03593	·03676	·03537	·03448	·03154	·02880
3	. .	·03662	·03560	·03707	·03589	·03664	·03554	·03744	·03531	·03384	·03274	·02831
4	0·03588	·03651	·03698	·03747	·03662	·03654	·03545	·03704	·03615	·03622	·03312	·02725
5	·03545	·03650	·03753	·03803	·03738	·03676	·03570	·03581	·03662	·03589	·03343	·02780
6	·03518	·03798	·03745	·03694	·03657	·03761	·03660	·03542	·03723	·03495	·03391	·02897
7	·03433	·03724	·03673	·03789	·03612	·03718	·03660	·03600	·03583	·03450	·03366	·02898
8	·03383	·03802	·03680	·03705	·03562	·03673	·03495	·03611	·03484	·03416	·03391	·03080
9	·03445	·03816	·03698	·03723	·03570	·03618	·03519	·03490	·03432	·03489	·03425	·03098
10	·03392	·03781	·03745	·03627	·03611	·03700	·03582	·03689	·03436	·03496	·03385	·03069

TABLE IX.—MEAN VERTICAL MAGNETIC FORCE, expressed in terms of the Mean Vertical Force for the Year, &c.—*concluded.*

1879.

Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d												
11	0·03337	0·03782	0·03692	0·03519	0·03683	0·03676	0·03637	0·03762	0·03552	0·03478	0·03355	0·02971
12	·03395	·03757	·03628	·03529	·03706	·03554	·03697	·03708	·03615	·03442	·03239	·02923
13	·03648	·03742	·03559	·03488	·03732	·03686	·03693	·03801	·03608	·03492	·03197	·03135
14	·03730	·03743	·03653	·03546	·03748	·03759	·03645	·03814	·03490	·03492	·03154	·03218
15	·03738	·03728	·03746	·03719	·03670	·03738	·03670	·03735	·03581	·03339	·03025	·03174
16	·03645	·03657	·03802	·03697	·03710	·03637	·03639	·03543	·03607	·03338	·02862	·02945
17	·03676	·03631	·03684	·03628	·03755	·03527	·03678	·03433	·03625	·03436	·03157	·02958
18	·03668	·03604	·03814	·03652	·03749	·03593	·03658	·03533	·03621	·03521	·03331	·03046
19	·03606	·03677	·03820	·03692	·03792	·03659	·03599	·03671	·03614	·03526	·03243	·03083
20	·03502	·03681	·03726	·03762	·03819	·03680	·03539	·03779	·03573	·03437	·03116	·02957
21	·03440	·03581	·03653	·03618	·03790	·03559	·03515	·03703	·03483	·03385	·03125	·02920
22	·03389	·03599	·03663	·03695	·03715	·03488	·03650	·03584	·03360	·03496	·03053	·03142
23	·03396	·03568	·03557	·03775	·03666	·03596	·03697	·03616	·03408	·03591	·03014	·03010
24	·03472	·03538	·03445	·03753	·03761	·03611	·03705	·03639	·03270	·03581	·03098	·03065
25	·03555	·03575	·03501	·03777	·03733	·03566	·03644	·03514	·03357	·03386	·03173	·03025
26	·03603	·03533	·03589	·03783	·03702	·03579	·03590	·03434	·03418	·03317	·03121	·02901
27	·03627	·03608	·03586	·03677	·03733	·03762	·03729	·03609	·03397	·03444	·03008	·02931
28	·03582	·03732	·03646	·03651	·03695	·03693	·03781	·03573	·03507	·03437	..	·03202
29	·03630		·03722	·03733	·03672	·03755	·03828	·03536	·03485	·03435	·02979	·03082
30	·03623		·03782	·03703	·03697	·03735	·03853	·03492	·03455	·03398	·02971	·02876
31	·03553		·03751		·03705		·03790	·03403		·03401		..

TABLE X.—DAILY MEANS of READINGS (usually eight on each Day) of the THERMOMETER placed within the box inclosing the VERTICAL FORCE MAGNETOMETER, for each ASTRONOMICAL DAY.

1879.

Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
1	..	57·4	60·9	63·1	62·7	64·0	65·0	68·5	64·2	64·8	63·1	57·1
2	..	59·4	59·7	62·2	62·3	63·7	64·3	66·9	65·0	64·3	61·0	56·3
3	..	59·8	59·5	62·2	61·9	63·5	63·9	67·3	65·5	63·8	61·2	55·7
4	59·4	59·6	61·0	62·8	62·2	63·5	63·2	67·1	66·2	66·4	62·2	54·7
5	58·3	60·0	62·2	63·6	63·4	63·8	63·4	65·9	66·6	66·6	62·5	54·4
6	57·4	61·6	62·3	62·7	63·3	64·9	64·0	65·1	67·9	66·1	62·9	56·1
7	56·4	61·6	61·2	63·4	62·6	65·0	64·5	65·3	66·9	65·5	63·3	56·4
8	55·3	62·2	61·3	62·6	62·0	64·5	63·0	65·6	65·7	64·9	63·4	58·2
9	55·8	62·5	61·5	63·0	61·8	64·2	62·8	64·7	64·8	65·1	63·8	58·8
10	55·4	62·1	61·9	61·9	62·0	65·0	63·2	65·8	64·8	65·2	63·7	59·0
11	54·6	62·0	61·7	60·3	62·6	64·8	63·5	67·7	65·7	65·2	63·4	57·9
12	55·5	62·0	60·9	60·4	63·2	63·6	64·6	67·5	66·2	64·6	62·4	56·2
13	58·8	61·9	59·9	60·1	63·4	64·4	64·7	68·1	66·0	65·4	61·9	60·0
14	60·1	61·8	60·7	60·7	63·7	65·4	64·2	68·9	65·2	65·3	60·9	61·4
15	60·6	61·8	62·3	62·3	63·0	65·3	64·6	69·1	65·8	64·0	59·0	61·6
16	60·0	61·3	63·1	62·2	63·6	64·5	64·5	66·5	66·5	63·8	56·3	59·0
17	59·9	60·7	62·2	61·6	63·8	63·4	64·9	64·5	66·7	64·6	59·6	58·1
18	60·0	60·1	63·0	62·1	64·0	63·6	65·1	65·3	66·8	65·7	62·5	59·1
19	59·4	60·9	63·1	62·6	64·6	63·9	64·1	66·8	67·2	65·9	61·8	59·5
20	57·6	61·0	62·4	63·2	65·0	64·2	63·6	68·6	66·7	65·2	60·6	58·5
21	56·7	60·1	61·7	62·1	65·0	63·5	63·4	68·3	65·7	64·8	60·6	58·0
22	56·1	59·4	61·4	62·6	64·4	62·6	64·4	66·9	64·3	65·5	59·7	60·4
23	56·1	59·4	60·5	63·3	63·2	63·0	65·6	66·9	64·5	67·0	59·0	59·3
24	56·8	59·4	59·1	63·2	64·0	63·5	66·4	67·1	62·8	66·5	58·8	59·6
25	57·5	59·5	59·3	63·7	64·3	63·1	65·7	65·9	62·6	64·6	60·1	59·3
26	58·4	59·1	60·1	63·9	64·0	63·3	65·3	64·9	63·7	64·3	59·7	58·1
27	58·7	59·8	60·2	62·8	64·4	65·2	66·7	65·9	63·5	64·6	58·1	58·6
28	58·5	61·3	61·0	62·3	63·8	65·5	67·8	66·2	64·5	64·4	..	61·5
29	58·7		62·0	63·0	63·8	66·1	68·8	65·4	64·8	64·8	56·5	60·9
30	58·7		62·8	62·9	63·7	65·8	69·4	64·9	64·5	64·4	56·9	57·7
31	58·1		63·1		63·6		69·1	63·7		64·1		..

TABLE XI.—MEAN MONTHLY DETERMINATION of the VERTICAL MAGNETIC FORCE, expressed in terms of the Mean Vertical Force for the Year, and diminished by a Constant (0·96000 nearly), uncorrected for TEMPERATURE, at every HOUR of the DAY; obtained by taking the MEAN of all the DETERMINATIONS at the same HOUR of the DAY through each MONTH.

1879.

Hour, Greenwich Mean Solar Time.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
h												
0	0·03514	0·03633	0·03611	0·03617	0·03613	0·03605	0·03606	0·03595	0·03489	0·03415	0·03157	0·02959
1	·03524	·03651	·03640	·03643	·03647	·03644	·03635	·03633	·03530	·03442	·03178	·02982
2	·03532	·03664	·03664	·03670	·03669	·03674	·03667	·03666	·03558	·03461	·03190	·02998
3	·03539	·03673	·03683	·03686	·03689	·03694	·03685	·03690	·03577	·03475	·03201	·03009
4	·03545	·03677	·03699	·03700	·03716	·03713	·03707	·03707	·03587	·03485	·03206	·03012
5	·03555	·03681	·03709	·03715	·03739	·03724	·03717	·03713	·03590	·03487	·03218	·03021
6	·03562	·03692	·03713	·03723	·03751	·03727	·03721	·03713	·03586	·03489	·03221	·03028
7	·03566	·03696	·03720	·03725	·03751	·03725	·03719	·03705	·03576	·03485	·03222	·03031
8	·03566	·03694	·03714	·03731	·03749	·03715	·03711	·03695	·03559	·03482	·03222	·03029
9	·03566	·03689	·03702	·03726	·03746	·03704	·03703	·03675	·03543	·03469	·03218	·03022
10	·03562	·03683	·03694	·03719	·03740	·03693	·03689	·03654	·03536	·03464	·03210	·03014
11	·03558	·03685	·03695	·03724	·03741	·03685	·03675	·03635	·03527	·03473	·03210	·03008
12	·03556	·03685	·03693	·03722	·03737	·03674	·03657	·03622	·03520	·03477	·03210	·03005
13	·03555	·03688	·03688	·03719	·03729	·03660	·03641	·03604	·03515	·03477	·03206	·03002
14	·03553	·03685	·03682	·03709	·03718	·03648	·03627	·03590	·03507	·03473	·03202	·03000
15	·03547	·03682	·03675	·03703	·03707	·03636	·03616	·03579	·03498	·03466	·03196	·02994
16	·03540	·03676	·03665	·03691	·03698	·03627	·03610	·03569	·03488	·03461	·03190	·02989
17	·03534	·03670	·03658	·03684	·03682	·03619	·03603	·03561	·03481	·03456	·03184	·02983
18	·03528	·03666	·03650	·03677	·03674	·03611	·03596	·03553	·03474	·03452	·03177	·02979
19	·03527	·03664	·03651	·03675	·03662	·03603	·03592	·03548	·03469	·03450	·03172	·02977
20	·03519	·03654	·03643	·03663	·03652	·03603	·03590	·03548	·03463	·03448	·03165	·02968
21	·03506	·03643	·03626	·03648	·03639	·03596	·03592	·03549	·03459	·03442	·03155	·02955
22	·03501	·03633	·03610	·03629	·03618	·03590	·03596	·03555	·03463	·03422	·03144	·02949
23	·03501	·03628	·03603	·03608	·03604	·03586	·03592	·03560	·03470	·03404	·03133	·02944

TABLE XII.—MONTHLY MEANS of READINGS of the THERMOMETER placed within the box inclosing the VERTICAL FORCE MAGNETOMETER, at each of the ordinary Hours of Observation.

1879.

Hour, Greenwich Mean Solar Time.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
h	°	°	°	°	°	°	°	°	°	°	°	°
0	57·8	60·5	61·3	62·4	63·3	64·2	64·9	66·6	65·5	65·1	60·8	58·4
1	57·9	60·6	61·5	62·5	63·4	64·4	65·1	66·9	65·7	65·2	61·0	58·5
2	57·9	60·7	61·5	62·5	63·4	64·5	65·2	67·0	65·8	65·2	61·0	58·6
3	58·0	60·7	61·6	62·6	63·6	64·6	65·3	67·1	65·8	65·3	61·1	58·7
9	58·1	60·8	61·6	62·8	63·9	64·6	65·3	66·8	65·4	65·1	61·3	58·7
21	57·6	60·5	61·1	62·3	63·2	63·8	64·5	65·6	64·8	65·0	60·6	58·1
22	57·6	60·5	61·1	62·2	63·2	63·8	64·6	65·9	65·0	64·9	60·5	58·1
23	57·5	60·5	61·1	62·2	63·1	63·9	64·7	66·0	65·1	64·8	60·5	58·1

TABLE XIII.

1879.

Month.	Mean Vertical Magnetic Force in each Month, uncorrected for Temperature. Expressed in terms of the Mean Vertical Force for the Year, and diminished by a Constant (0·96000 nearly).	Mean Vertical Magnetic Force in each Month, uncorrected for Temperature. Expressed in terms of Gauss's Unit measured on the Metrical System, and diminished by a Constant (4·20261 nearly).	Mean Temperature.
			°
January	0·03540	0·15497	57·8
February	·03670	·16066	60·6
March	·03670	·16066	61·3
April	·03688	·16145	62·4
May	·03695	·16176	63·4
June	·03657	·16009	64·2
July	·03648	·15970	65·0
August	·03622	·15856	66·5
September	·03519	·15405	65·4
October	·03461	·15151	65·1
November	·03191	·13969	60·9
December	·02994	·13107	58·4

The unit adopted in column 3 is the Millimètre-Milligramme-Second Unit. To express the forces on the Centimètre-Gramme-Second (C.G.S.) system, the numbers must be divided by 10, equivalent to shifting the decimal point one step towards the left.

The value 0·96000 of Vertical Force corresponds to 4·20261 of Gauss's Unit on the Metrical (Millimètre-Milligramme-Second) system, and to 0·42026 on the C.G.S. system.

TABLE XIV.—MEAN, through the Range of Months, of the MONTHLY MEAN DETERMINATIONS of the DIURNAL INEQUALITIES of DECLINATION, HORIZONTAL FORCE, and VERTICAL FORCE, for the Year 1879.

(The Results for Horizontal Force and Vertical Force are not corrected for Temperature.)

January to December.

Hour, Greenwich Mean Solar Time.	Inequality of Declination.	Equivalent in terms of Gauss's Unit measured on the Metrical System.	Inequality of Horizontal Force.	Equivalent in terms of Gauss's Unit measured on the Metrical System.	Inequality of Vertical Force.	Equivalent in terms of Gauss's Unit measured on the Metrical System.
h	′					
0	+ 3·61	+ 0·00189	− 0·00043	− 0·00078	− 0·00045	− 0·00197
1	+ 4·26	+ 223	− 13	− 23	− 17	− 74
2	+ 3·72	+ 195	+ 5	+ 9	+ 5	+ 22
3	+ 2·50	+ 131	+ 13	+ 23	+ 21	+ 92
4	+ 1·41	+ 74	+ 15	+ 27	+ 33	+ 144
5	+ 0·60	+ 31	+ 21	+ 38	+ 43	+ 188
6	+ 0·01	+ 1	+ 26	+ 47	+ 48	+ 210
7	− 0·32	− 17	+ 29	+ 52	+ 47	+ 206
8	− 0·68	− 36	+ 24	+ 43	+ 43	+ 188
9	− 0·97	− 51	+ 20	+ 36	+ 34	+ 149
10	− 1·12	− 59	+ 18	+ 32	+ 25	+ 109
11	− 1·09	− 57	+ 19	+ 34	+ 22	+ 96
12	− 1·08	− 57	+ 16	+ 29	+ 17	+ 74
13	− 0·87	− 46	+ 11	+ 20	+ 11	+ 48
14	− 0·80	− 42	+ 10	+ 18	+ 3	+ 13
15	− 0·78	− 41	+ 11	+ 20	− 5	− 22
16	− 0·98	− 51	+ 14	+ 25	− 13	− 57
17	− 1·42	− 74	+ 17	+ 31	− 20	− 88
18	− 1·73	− 91	+ 13	+ 23	− 26	− 114
19	− 2·12	− 111	− 1	− 2	− 30	− 131
20	− 2·24	− 117	− 27	− 49	− 37	− 162
21	− 1·76	− 92	− 56	− 101	− 45	− 197
22	− 0·15	− 8	− 73	− 132	− 54	− 236
23	+ 1·98	+ 104	− 69	− 124	− 60	− 263

Hour, Greenwich Mean Solar Time.	Mean Readings of Thermometers.	
	Horizontal Force.	Vertical Force.
h	°	°
0	62·64	62·56
1	62·80	62·72
2	62·95	62·80
3	63·05	62·86
9	63·25	62·87
21	62·51	62·27
22	62·50	62·29
23	62·50	62·29

The unit adopted in columns 3, 5, and 7 is the Millimètre-Milligramme-Second Unit. To express the inequalities on the Centimètre-Gramme-Second (C.G.S) system, the numbers must be divided by 10, equivalent to shifting the decimal point one step towards the left.

ROYAL OBSERVATORY, GREENWICH.

RESULTS

OF

OBSERVATIONS

OF THE

MAGNETIC DIP.

1879.

RESULTS of OBSERVATIONS of MAGNETIC DIP, on each Day of Observation.

Day and Approximate Hour, 1879.	Needle.	Length of Needle.	Magnetic Dip.	Observer.
d h			° ′ ″	
January 7. 2	D 2	3 inches	67. 38. 33	N
10. 2	B 1	9 "	67. 36. 56	N
13. 3	D 1	3 "	67. 38. 38	N
21. 2	C 1	6 "	67. 36. 14	N
21. 3	C 2	6 "	67. 36. 6	N
23. 0	B 2	9 "	67. 35. 2	N
23. 2	B 1	9 "	67. 34. 57	N
28. 23	B 2	9 "	67. 34. 46	N
29. 0	B 1	9 "	67. 36. 30	N
29. 2	C 2	6 "	67. 37. 56	N
29. 23	C 1	6 "	67. 38. 26	N
30. 22	D 1	3 "	67. 39. 27	N
31. 2	D 2	3 "	67. 38. 47	N
31. 3	D 1	3 "	67. 37. 46	N
February 8. 1	C 1	6 "	67. 38. 3	N
12. 2	C 2	6 "	67. 35. 29	N
12. 23	C 2	6 "	67. 35. 56	N
13. 0	C 1	6 "	67. 36. 43	N
20. 2	D 1	3 "	67. 37. 42	N
24. 2	D 2	3 "	67. 39. 39	N
24. 23	B 2	9 "	67. 36. 25	N
25. 2	B 1	9 "	67. 37. 55	N
27. 23	C 2	6 "	67. 37. 18	N
28. 1	B 1	9 "	67. 35. 26	N
28. 2	D 2	3 "	67. 38. 44	N
March 5. 2	D 1	3 "	67. 39. 12	N
8. 2	C 1	6 "	67. 37. 52	N
13. 2	C 2	6 "	67. 37. 22	N
19. 0	B 2	9 "	67. 36. 15	N
19. 3	D 2	3 "	67. 39. 16	N
27. 0	C 2	6 "	67. 38. 34	N
27. 2	C 1	6 "	67. 36. 40	N
28. 2	B 1	9 "	67. 36. 3	N
28. 3	D 1	3 "	67. 38. 56	N
31. 2	B 2	9 "	67. 36. 1	N
April 5. 2	D 2	3 "	67. 36. 23	N
8. 2	C 1	6 "	67. 37. 17	N
19. 2	C 2	6 "	67. 36. 15	N
19. 3	D 1	3 "	67. 36. 55	N
23. 2	D 2	3 "	67. 39. 4	N
25. 1	B 1	9 "	67. 38. 30	N
25. 3	B 2	9 "	67. 35. 35	N
28. 1	C 2	6 "	67. 36. 47	N
28. 3	B 1	9 "	67. 35. 14	N
30. 0	B 2	9 "	67. 37. 49	N
May 5. 2	C 2	6 "	67. 36. 4	N
9. 2	C 1	6 "	67. 36. 19	N
13. 1	B 1	9 "	67. 36. 15	N
13. 2	B 2	9 "	67. 36. 54	N
22. 23	D 1	3 "	67. 37. 22	N
23. 1	C 2	6 "	67. 36. 8	N
23. 2	D 2	3 "	67. 38. 28	N
28. 1	B 2	9 "	67. 36. 45	N
May 28. 2	C 1	6 inches	67. 36. 10	N
28. 22	D 2	3 "	67. 37. 49	N
29. 0	C 1	6 "	67. 37. 45	N
29. 3	D 2	3 "	67. 37. 6	N
June 5. 2	C 1	6 "	67. 35. 24	N
12. 2	D 1	3 "	67. 38. 1	N
12. 23	B 1	9 "	67. 35. 21	N
13. 2	B 2	9 "	67. 37. 14	N
18. 2	C 2	6 "	67. 37. 49	N
20. 1	D 2	3 "	67. 39. 20	N
20. 2	D 1	3 "	67. 39. 5	N
26. 2	B 1	9 "	67. 34. 38	N
27. 0	C 1	6 "	67. 38. 35	N
27. 2	C 2	6 "	67. 36. 34	N
30. 2	B 2	9 "	67. 34. 13	N
July 4. 2	D 1	3 "	67. 36. 49	N
10. 0	B 1	9 "	67. 37. 32	N
10. 2	B 2	9 "	67. 36. 14	N
16. 2	C 1	6 "	67. 35. 52	N
19. 1	D 1	3 "	67. 36. 19	N
23. 0	C 1	6 "	67. 37. 31	N
23. 2	C 2	6 "	67. 36. 47	N
24. 2	D 2	3 "	67. 38. 7	N
28. 23	B 2	9 "	67. 36. 15	N
29. 1	B 1	9 "	67. 35. 20	N
29. 23	D 1	3 "	67. 37. 6	N
31. 2	D 2	3 "	67. 36. 56	N
August 1. 2	B 2	9 "	67. 35. 53	N
5. 23	C 2	6 "	67. 36. 20	E
7. 0	C 1	6 "	67. 37. 4	E
15. 2	D 1	3 "	67. 37. 52	N
21. 23	B 1	9 "	67. 36. 50	N
22. 0	B 2	9 "	67. 36. 35	N
22. 2	D 2	3 "	67. 38. 13	N
29. 0	C 2	6 "	67. 35. 56	N
29. 2	D 1	3 "	67. 36. 23	N
29. 3	D 2	3 "	67. 37. 29	N
30. 2	C 1	6 "	67. 35. 51	N
September 1. 2	D 1	3 "	67. 37. 23	N
3. 23	C 1	6 "	67. 34. 24	E
6. 1	C 1	6 "	67. 38. 19	N
9. 23	B 1	9 "	67. 34. 8	E
15. 2	C 2	6 "	67. 37. 25	N
18. 2	B 1	9 "	67. 35. 38	N
19. 0	B 2	9 "	67. 36. 20	N
25. 0	D 1	3 "	67. 37. 54	N
25. 1	D 2	3 "	67. 37. 22	N
26. 0	C 1	6 "	67. 36. 25	N
30. 1	B 1	9 "	67. 37. 22	N
30. 2	D 2	3 "	67. 38. 14	N
October 3. 2	D 1	3 "	67. 35. 41	N
10. 2	C 2	6 "	67. 35. 49	N

The initials E and N are those of Mr. Ellis and Mr. Nash respectively.

RESULTS of OBSERVATIONS of MAGNETIC DIP, on each Day of Observation—*concluded.*

Day and Approximate Hour, 1879.	Needle.	Length of Needle.	Magnetic Dip.	Observer.	Day and Approximate Hour, 1879.	Needle.	Length of Needle.	Magnetic Dip.	Observer.
d h			° ′ ″		d h			° ′ ″	
October 14. 2	B 1	9 inches	67. 35. 50	N	November 25. 2	B 1	9 inches	67. 36. 19	N
15. 1	C 1	6 „	67. 37. 3	E	26. 23	B 2	9 „	67. 35. 17	N
17. 2	D 2	3 „	67. 36. 39	N	27. 2	D 2	3 „	67. 37. 29	N
23. 0	B 2	9 „	67. 36. 32	N	28. 2	D 1	3 „	67. 37. 50	N
23. 2	D 1	3 „	67. 38. 2	N	29. 3	C 2	6 „	67. 37. 38	N
24. 0	D 2	3 „	67. 36. 35	N					
30. 1	B 2	9 „	67. 35. 34	N	December 5. 1	B 1	9 „	67. 35. 53	N
30. 2	C 1	6 „	67. 37. 14	N	5. 2	D 2	3 „	67. 36. 37	N
31. 2	C 2	6 „	67. 37. 48	N	10. 2	D 1	3 „	67. 37. 4	N
					11. 2	B 2	9 „	67. 37. 11	E
November 5. 2	B 1	9 „	67. 36. 6	N	19. 0	B 1	9 „	67. 35. 48	N
11. 2	B 2	9 „	67. 36. 8	N	19. 2	B 2	9 „	67. 34. 40	N
12. 2	D 1	3 „	67. 35. 10	N	23. 0	D 2	3 „	67. 38. 23	E
13. 2	C 1	6 „	67. 36. 59	E	24. 0	C 1	6 „	67. 35. 49	N
14. 2	C 2	6 „	67. 38. 6	N	27. 2	C 2	6 „	67. 37. 45	N
18. 0	D 1	3 „	67. 37. 37	N	29. 1	C 1	6 „	67. 37. 35	N
18. 1	D 2	3 „	67. 37. 50	N	29. 2	B 2	9 „	67. 35. 56	N
18. 2	C 2	6 „	67. 37. 35	N	30. 0	C 2	6 „	67. 36. 31	N

The initials E and N are those of Mr. Ellis and Mr. Nash respectively.

MONTHLY MEANS of MAGNETIC DIPS.

Month, 1879.	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. 36. 8	3	67. 34. 54	2	67. 37. 20	2
February	67. 36. 31	2	67. 36. 25	1	67. 37. 23	2
March	67. 36. 3	1	67. 36. 8	2	67. 37. 16	2
April	67. 36. 52	2	67. 36. 42	2	67. 37. 17	1
May	67. 36. 15	1	67. 36. 49	2	67. 36. 45	3
June	67. 34. 59	2	67. 35. 44	2	67. 36. 59	2
July	67. 36. 26	2	67. 36. 15	2	67. 36. 41	2
August	67. 36. 50	1	67. 36. 14	2	67. 36. 27	2
September	67. 35. 43	3	67. 36. 20	1	67. 36. 23	3
October	67. 35. 50	1	67. 36. 3	2	67. 37. 8	2
November	67. 36. 12	2	67. 35. 43	2	67. 36. 59	1
December	67. 35. 50	2	67. 35. 56	3	67. 36. 42	2
Means	67. 36. 6	Sum 22	67. 36. 4	Sum 23	67. 36. 54	Sum 24

Month, 1879.	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. 37. 1	2	67. 38. 37	3	67. 38. 40	2
February	67. 36. 14	3	67. 37. 42	1	67. 39. 11	2
March	67. 37. 58	2	67. 39. 4	2	67. 39. 16	1
April	67. 36. 31	2	67. 36. 55	1	67. 37. 44	2
May	67. 36. 6	2	67. 37. 22	1	67. 37. 48	3
June	67. 37. 12	2	67. 38. 33	2	67. 39. 20	1
July	67. 36. 47	1	67. 36. 45	3	67. 37. 32	2
August	6‑ 36. 8	2	67. 37. 8	2	67. 37. 51	2
September	67. 37. 25	1	67. 37. 38	2	67. 37. 48	2
October	67. 36. 48	2	67. 37. 52	2	67. 36. 37	2
November	67. 37. 46	3	67. 36. 52	3	67. 37. 39	2
December	67. 37. 8	2	67. 37. 4	1	67. 37. 30	2
Means	67. 36. 55	Sum 24	67. 37. 35	Sum 23	67. 37. 58	Sum 23

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

YEARLY MEANS of MAGNETIC DIPS for each of the NEEDLES, and GENERAL MEAN for the Year 1879.

Lengths of the several Sets of Needles.	Needles.	Number of Observations with each Needle.	Mean Yearly Dips from Observations with each Needle.	Mean Yearly Dips from each Set of Needles.	Mean Yearly Dip from all the Sets of Needles.
			° ′ ″	° ′ ″	° ′ ″
9-inch Needles	B 1	22	67. 36. 6	67. 36. 5	67. 36. 55
	B 2	23	67. 36. 4		
6-inch Needles	C 1	24	67. 36. 54	67. 36. 54	
	C 2	24	67. 36. 55		
3-inch Needles	D 1	23	67. 37. 35	67. 37. 47	
	D 2	23	67. 37. 58		

ROYAL OBSERVATORY, GREENWICH.

OBSERVATIONS

OF

DEFLEXION OF A MAGNET

FOR

ABSOLUTE MEASURE

OF

HORIZONTAL FORCE.

1879.

ABSTRACT of the OBSERVATIONS of DEFLEXION of a MAGNET for ABSOLUTE MEASURE of HORIZONTAL FORCE.

Month and Day, 1879.		Distances of Centers of Magnets.	Temperature.	Observed Deflexion.	Mean of the Times of Vibration of Deflecting Magnet.	Number of Vibrations.	Temperature.	Observer.
		ft.	°	° ′ ″	s		°	
January	30	1·0 1·3	35·8	10. 54. 43 4. 57. 7	5·605 5·604	100 100	35·9 36·5	N
February	27	1·0 1·3	38·7	10. 54. 36 4. 56. 58	5·607 5·601	100 100	38·2 40·1	N
March	29	1·0 1·3	54·8	10. 52. 22 4. 55. 56	5·615 5·613	100 100	55·3 56·1	N
April	30	1·0 1·3	56·7	10. 51. 31 4. 55. 47	5·613 5·613	100 100	58·9 57·6	N
May	29	1·0 1·3	59·6	10. 52. 36 4. 55. 48	5·617 5·617	100 100	59·5 60·6	N
June	28	1·0 1·3	69·5	10. 50. 1 4. 54. 52	5·617 5·622	100 100	71·2 71·8	N
July	24	1·0 1·3	67·9	10. 50. 9 4. 55. 0	5·619 5·623	100 100	67·6 71·5	N
August	26	1·0 1·3	61·1	10. 50. 41 4. 55. 20	5·614 5·618	100 100	60·7 61·0	N
September	26	1·0 1·3	67·8	10. 49. 16 4. 54. 25	5·615 5·623	100 100	69·1 68·6	N
October	24	1·0 1·3	60·0	10. 50. 20 4. 55. 8	5·624 5·622	100 100	60·1 59·6	N
October	28	1·0 1·3	52·9	10. 51. 45 4. 55. 25	5·620 5·621	100 100	52·1 53·9	E
November	27	1·0 1·3	39·2	10. 50. 57 4. 55. 13	5·610 5·616	100 100	39·1 39·7	N
December	26	1·0 1·3	33·9	10. 51. 51 4. 55. 37	5·616 5·617	100 100	33·2 34·8	N

The position of the Deflecting Magnet with regard to the suspended Magnet is always that which was formerly termed "Lateral." The Deflecting Magnet is placed on the East side of the suspended Magnet, with its marked pole alternately E. and W., and it is placed on the West side with its pole alternately E. and W.; and the deflexion in the table above is the mean of the four deflexions observed in those positions of the magnets.

The lengths of 1 foot and 1·3 foot correspond to 304·8 and 396·2 millimètres respectively.

The initials E and N are those of Mr. Ellis and Mr. Nash.

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

COMPUTATION of the VALUES of ABSOLUTE MEASURE of HORIZONTAL FORCE in the Year 1879.

Month and Day, 1879.		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.
							s				
January	30	0·09465	0·09482	−0·00423		8·97760	5·6045	0·16169	0·3712	3·909	1·802
February	27	0·09468	0·09481	−0·00344		8·97766	5·6040	0·16197	0·3714	3·910	1·803
March	29	0·09462	0·09474	−0·00316		8·97734	5·6140	0·16155	0·3711	3·909	1·803
April	30	0·09452	0·09472	−0·00513		8·97709	5·6130	0·16190	0·3711	3·912	1·804
May	29	0·09473	0·09478	−0·00124		8·97768	5·6170	0·16148	0·3712	3·908	1·802
June	28	0·09452	0·09464	−0·00310		8·97691	5·6195	0·16194	0·3710	3·913	1·804
July	24	0·09451	0·09466	−0·00378	−0·00317	8·97692	5·6210	0·16170	0·3709	3·912	1·804
August	26	0·09448	0·09465	−0·00451		8·97682	5·6160	0·16152	0·3708	3·912	1·804
September	26	0·09438	0·09447	−0·00226		8·97619	5·6190	0·16161	0·3706	3·915	1·805
October	24	0·09441	0·09457	−0·00417		8·97648	5·6230	0·16037	0·3702	3·908	1·802
October	28	0·09450	0·09455	−0·00124		8·97663	5·6205	0·16033	0·3702	3·907	1·801
November	27	0·09417	0·09426	−0·00248		8·97521	5·6130	0·16059	0·3697	3·915	1·805
December	26	0·09422	0·09431	−0·00248		8·97544	5·6165	0·15967	0·3694	3·909	1·803
Means		..	..	..	..	..	..	..	..	3·911	1·803

The value of X in column 10 is referred to the unit Foot-Grain-Second, and that in column 11 to the unit Millimètre-Milligramme-Second. To obtain X in the Centimètre-Gramme-Second (C.G.S.) unit, the value given in column 11 must be divided by 10, equivalent to shifting the decimal point one step towards the left.

ROYAL OBSERVATORY, GREENWICH.

RESULTS

OF

METEOROLOGICAL OBSERVATIONS.

1879.

MONTH and DAY, 1879.	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 of Mean 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 Daily Value.	Greatest of 24 Hourly Values.	Least of 24 Hourly Values.	Degree of Humidity (Saturation = 100).	TEMPERATURE. Highest in the Sun's Rays as shown by a Self-Registering Maximum Thermometer with blackened bulb in vacuo placed on the Grass.	Lowest on the Grass as shown by a Self-Registering Minimum Thermometer.	Of the Water of the Thames off Greenwich. Highest.	Of the Water of the Thames off Greenwich. Lowest.	Daily Duration of Sunshine.	Sun above Horizon.	Rain collected in a Gauge whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°	°	°	hours.	hours.	in.		
Jan. 1	Apogee	29·558	50·5	32·2	18·3	44·6	+ 6·5	42·7	40·4	4·2	8·4	0·0	86	52·9	25·1	42·3	39·3	0·0	7·9	0·781	6·5	..
2	..	29·896	32·6	26·3	6·3	30·9	− 7·0	29·5	25·6	5·3	9·0	0·3	80	45·3	25·1	42·3	40·3	0·0	7·9	0·260	1·0	..
3	..	29·254	46·5	30·8	15·7	36·7	− 1·1	36·0	35·0	1·7	4·8	0·2	94	49·4	26·1	43·3	40·3	0·0	7·9	0·647	3·0	..
4	..	29·647	37·5	28·9	8·6	33·6	− 4·1	32·1	29·4	4·2	7·7	0·0	84	42·8	27·0	42·3	39·8	0·0	7·9	0·000	3·0	..
5	..	29·949	35·3	26·0	9·3	30·7	− 6·9	29·9	27·8	2·9	7·3	0·0	88	43·9	24·0	41·3	38·7	1·9	7·9	0·000	0·0	..
6	Greatest Declination N.	30·045	30·1	22·5	7·6	27·6	−10·0	27·3	26·0	1·6	3·7	0·0	93	32·0	21·8	39·3	36·5	0·0	8·0	0·000	0·0	..
7	..	29·859	34·2	27·3	6·9	30·2	− 7·4	29·3	26·6	3·6	10·1	0·0	86	35·0	27·0	36·8	34·3	0·0	8·0	0·000	2·0	..
8	Full	29·524	34·2	26·7	7·5	29·6	− 8·1	28·0	22·8	6·8	9·7	2·3	74	58·3	26·7	35·3	33·3	1·6	8·0	0·000	8·0	..
9	..	29·822	34·7	24·6	10·1	29·9	− 7·8	28·2	22·8	7·1	10·1	2·8	73	51·3	22·0	33·8	32·3	0·9	8·1	0·016	1·7	..
10	..	29·508	27·4	21·4	6·0	24·7	−13·1	22·5	10·2	14·5	15·7	13·1	51	56·0	18·9	33·5	31·8	4·4	8·1	0·000	5·3	..
11	..	29·456	26·1	21·6	4·5	24·2	−13·7	23·5	20·1	4·1	6·4	2·8	83	34·9	18·7	32·8	31·8	0·0	8·1	0·013	0·0	..
12	..	29·898	35·0	19·4	15·6	26·3	−11·8	25·0	18·6	7·7	9·5	3·2	71	41·2	19·0	32·8	31·8	3·4	8·2	0·010	1·8	..
13	In Equator	29·959	46·4	35·0	11·4	41·8	+ 3·6	41·6	41·4	0·4	1·7	0·0	98	50·0	28·4	33·3	32·1	0·0	8·2	0·026	6·3	..
14	Perigee	29·760	45·3	36·2	9·1	42·4	+ 4·1	42·3	42·2	0·2	1·1	0·0	99	49·0	33·0	35·3	32·8	0·0	8·2	0·207	4·7	..
15	Last Qr.	29·559	45·5	32·8	12·7	39·2	+ 0·8	37·7	35·7	3·5	8·1	0·0	87	63·8	31·0	34·8	32·3	1·4	8·3	0·036	5·2	..
16	..	29·789	37·8	27·5	10·3	33·0	− 5·5	32·4	31·2	1·8	4·1	0·0	93	50·2	26·2	36·5	33·8	0·0	8·3	0·000	0·0	..
17	..	30·032	35·2	29·4	5·8	32·3	− 6·3	32·2	32·0	0·3	2·4	0·0	99	36·1	26·2	36·7	34·3	0·0	8·3	0·000	1·8	..
18	..	29·872	35·3	31·7	3·6	33·1	− 5·7	32·9	32·5	0·6	3·9	0·0	98	37·3	30·6	36·9	34·8	0·0	8·4	0·558	5·2	..
19	Greatest Declination S.	30·146	34·9	27·2	7·7	31·6	− 7·3	30·2	26·7	4·9	6·4	3·0	81	59·2	26·5	35·8	33·8	0·6	8·4	0·000	0·8	..
20	..	30·044	30·4	25·9	4·5	28·4	−10·7	27·6	24·5	3·9	5·2	1·8	85	38·8	25·2	35·1	33·3	0·0	8·5	0·000	5·5	..
21	..	29·774	29·8	25·6	4·2	27·9	−11·4	26·7	21·7	6·2	6·7	4·4	76	34·4	25·6	34·1	32·3	0·0	8·5	0·000	3·8	..
22	New	29·837	31·3	25·3	6·0	28·4	−11·1	26·3	18·1	10·3	12·9	7·5	63	44·6	23·3	33·3	32·1	0·6	8·6	0·000	0·0	..
23	..	29·836	29·9	24·4	5·5	28·1	−11·5	25·8	16·4	11·7	13·2	8·8	59	37·6	22·3	33·3	31·8	0·0	8·6	0·000	1·2	..
24	..	29·838	30·9	27·7	3·2	29·4	−10·3	27·2	19·7	9·7	11·1	7·5	65	36·4	27·7	33·3	32·3	0·0	8·7	0·018	3·8	..
25	..	29·890	32·1	28·5	3·6	30·6	− 9·2	30·0	28·3	2·3	3·3	1·4	91	34·0	28·2	33·3	31·8	0·0	8·7	0·000	0·2	..
26	In Equator	30·019	34·4	30·9	3·5	32·9	− 7·0	32·4	31·4	1·5	2·7	0·3	94	39·6	30·9	33·3	31·3	0·0	8·8	0·000	1·8	..
27	..	30·210	34·1	32·6	1·5	33·5	− 6·5	32·3	30·0	3·5	4·8	2·2	87	38·0	31·8	33·8	32·1	0·0	8·8	0·001	0·5	..
28	..	30·167	33·0	30·6	2·4	31·5	− 8·6	29·8	25·5	6·0	8·0	3·0	78	35·2	30·6	33·8	32·3	0·0	8·9	0·000	1·5	..
29	Apogee	30·083	33·5	29·7	3·8	32·0	− 8·2	31·0	28·7	3·3	5·1	2·7	87	37·2	29·7	34·3	32·3	0·0	8·9	0·000	0·0	..
30	First Qr.	30·117	33·2	30·6	2·6	31·5	− 8·8	30·5	28·0	3·5	6·1	2·0	86	34·4	30·5	33·8	32·3	0·0	9·0	0·013	0·0	..
31	..	30·099	31·8	29·6	2·2	30·7	− 9·7	28·5	22·3	8·4	9·5	5·6	69	36·0	29·6	34·3	33·1	0·0	9·0	0·000	1·5	..
Means	..	29·853	35·1	28·0	7·1	31·8	− 6·9	30·7	27·1	4·7	7·1	2·4	82·5	43·1	26·4	35·8	33·9	0·5	8·4	Sum 2·586	2·5	..
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	21	22

The results apply to the civil day, excepting those in Columns 16 and 17, which refer to the 24 hours ending 9h a.m. of the day against which the readings are placed.

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 results on January 8 for the Barometer, on January 2 and 5 for Air Temperature, and on January 5 for Evaporation Temperature, depend partly on values inferred from eye-observations, and those from January 1 to 4 for the Barometer, and from January 9 to 31 for Air and Evaporation Temperatures, are deduced entirely from eye-observations, on account of accidental loss of photographic register.

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

The Electrical Apparatus was not in action throughout the month.

The mean reading of the *Barometer* for the month was 29in·853, being 0in·124 *higher* than the average for the 20 years, 1854–1873.

TEMPERATURE OF THE AIR.

The highest in the month was 50°·5 on January 1; the lowest in the month was 19°·4 on January 12; and the range was 31°·1.
The mean of all the highest daily readings in the month was 35°·1, being 8°·5 *lower* than the average for the 38 years, 1841–1878.
The mean of all the lowest daily readings in the month was 28°·0, being 5°·9 *lower* than the average for the 38 years, 1841–1878.
The mean daily range was 7°·1, being 2°·6 *less* than the average for the 38 years, 1841–1878.
The mean for the month was 31°·8, being 6°·9 *lower* than the average for the 20 years, 1849–1868.

MONTH and DAY, 1879.	WIND AS DEDUCED FROM SELF-REGISTERING ANEMOMETERS. Osler's. General Direction. A.M.	Osler's. General Direction. P.M.	Osler's. Pressure on the Square Foot. Greatest.	Osler's. Pressure on the Square Foot. Least.	Osler's. Pressure on the Square Foot. Mean of 24 Hourly Measures.	Robinson's. Horizontal Movement of the Air.	CLOUDS AND WEATHER. A.M.	CLOUDS AND WEATHER. P.M.
			lbs.	lbs.	lbs.	miles.		
Jan. 1	WSW	ENE : NE	19·5	0·0	0·8	477	p.-cl, st.-w : 8, cu.-s, ci.-cu	10, slt.-f, r : 10, c.-r, sn : 10, sn, sl
2	NNE: N: NNW	W : SW : S : SSE	1·0	0·0	0·0	275	sn, sl : v, cu, ci, ci.-s	3, th.-cl, f : th.-cl : 5, lu.-ha
3	SE : WSW : W	WNW : N	2·8	0·0	0·1	225	10, r : 10, c.-r, f	10, th.-r : 10, c.-r : 10
4	NW	WNW	0·8	0·0	0·0	240	ho.-fr, h, f : 2, ci.-s, h, f	4, ci.-s, ci.-cu, slt.-f : 0, ho.-fr, slt.-h
5	WNW : WSW	WSW	0·0	0·0	0·0	197	0 : 0, m	0, m : 0, f
6	WSW	Calm : SW	0·0	0·0	0·0	35	0, ho.-fr : f	10, f : 10, f, ho.-fr
7	E	ESE	5·0	0·0	0·4	274	f, : 10, th.-r, f, sl	10 : 10, w
8	E	E : ENE	19·0	0·1	2·7	576	st.-w : 10, st.-w	6, ci.-s, ci.-cu, cu.-s, sc, st.-w : v, w
9	ENE	ENE	3·1	0·0	0·2	289	p.-cl : 10, sn	8, sn : v, ci.-cu
10	ESE	E	0·8	0·0	0·0	141	0 : 0	p.-cl, ci.-cu : 10, slt.-sn
11	ESE : NE	NE: E: WSW	0·2	0·0	0·0	167	10, sn : 10, sn	10 : 10, slt.-sn
12	NNW: WSW	WSW: SW: SSW	1·5	0·0	0·1	239	p.-cl : 0, ho.-fr, f, h	0, h : th.-cl : 6, th.-cl, h
13	SSW	WSW : SW	3·4	0·0	0·5	375	r : 10, th.-r	10, sc, th.-cl : v, hy.-d, m
14	S : SSE	S	3·2	0·0	0·4	351	v : 10, th.-r	10, th.-r : 10, c.-r
15	SW : WSW	WSW : W	5·8	0·0	0·8	466	v, r	v, cu.-s, ci.-cu : shs.-r, hl : 0
16	SW : S : E	ENE	0·2	0·0	0·0	153	ho.-fr : 10, f	v, ci, ci.-s : 0, slt.-f, ho.-fr
17	Calm	E : SE	0·1	0·0	0·0	86	10 : 10, f, ho.-fr	tk.-f, th.-cl : v, th.-cl
18	SE : ESE	ESE : ENE	0·7	0·0	0·1	242	10 : 10, sn	10, sn : 10, oc.-sn
19	ENE	ENE	1·3	0·0	0·0	233	10 : 6, cu.-s, ci.-cu	10, th.-r : v, ho.-fr
20	E : ESE	ESE	1·0	0·0	0·0	213	v : v, ho.-fr	10 : 10, ho.-fr
21	ESE : E	ENE	2·3	0·0	0·3	334	10 : 10	10, sl : 10
22	ENE	NE	6·1	0·0	0·6	466	10 : 10	8, cu.-s, ci.-cu, li.-sc : v
23	NE : ENE	NE : ENE	4·6	0·0	0·8	498	v : 10	10 : 10
24	NE : ENE	ENE : NE	3·4	0·0	0·5	432	10 : 10, oc.-sn	10 : 10, oc.-sn
25	NE:NNE:ENE	NE	1·1	0·0	0·1	329	10 : 10, slt.-sn	10 : 10, th.-r
26	NE	NE : ENE	0·0	0·0	0·0	228	10 : 10	10, slt.-sn, sl, th.-r : 10, slt.-r
27	ENE	ENE	0·9	0·0	0·0	281	10 : 10	10 : 10
28	NE : ENE	ENE	0·3	0·0	0·0	248	10 : 10, slt.-sn	10 : 10
29	NE	ENE	1·1	0·0	0·0	241	10 : 10, slt.-sn	10, oc.-sn : 10, oc.-sn
30	ENE	ENE : NE	0·6	0·0	0·0	236	10 : 10, slt.-sn	10, sn : 10
31	NE : ENE	E	0·8	0·0	0·0	232	10 : 10, slt.-sn	10 : 10
Means	...	...	..	..	0·3	283		
Number of Column for Reference.	23	24	25	26	27	28	29	30

The mean *Temperature of Evaporation* for the month was 30°·7, being 6°·7 *lower* than the average for the 20 years, 1849–1868.
The mean *Temperature of the Dew Point* for the month was 27°·1, being 8°·3 *lower* than the average for the 20 years, 1849–1868.
The mean *Degree of Humidity* for the month was 82·5, being 4·8 *less* than the average for the 20 years, 1849–1868.
The mean *Elastic Force of Vapour* for the month was 0in·148, being 0in·059 *less* than the average for the 20 years, 1849–1868.
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was 1gr·8, being 0gr·6 *less* than the average for the 20 years, 1849–1868.
The mean *Weight of a Cubic Foot of Air* for the month was 563 grains, being 11 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 0·06. The maximum daily amount of *Sunshine* was 4·4 hours on January 10.
The highest reading of the *Solar Radiation Thermometer* was 63°·8 on January 15; and the lowest reading of the *Terrestrial Radiation Thermometer* was 18°·7 on January 11.
The mean daily distribution of *Ozone* was, for the 12 hours ending 9 a.m., 2·1; for the 6 hours ending 3 p.m., 0·2; and for the 6 hours ending 9 p.m., 0·2.
The *Proportions of Wind* referred to the cardinal points were N. 6, E. 15, S. 5, and W. 4. One day was calm.
The *Greatest Pressure of the Wind* in the month was 19lbs·5 on the square foot on January 1. The mean daily *Horizontal Movement of the Air* for the month was 283 miles; the greatest daily value was 576 miles on January 8; and the least daily value 35 miles on January 6.
Rain fell on 12 days in the month, amounting to 2in·586, as measured in the simple cylinder gauge partly sunk below the ground; being 0in·480 *greater* than the average fall for the 38 years, 1841–1878.

MONTH and DAY, 1879.	Phases of the Moon.	BAROMETER. Mean of 24 Hourly Values (corrected and reduced to 32° Fahrenheit).	TEMPERATURE. Of the Air. Highest.	TEMPERATURE. Of the Air. Lowest.	TEMPERATURE. Of the Air. Daily Range.	TEMPERATURE. Of the Air. Mean of 24 Hourly Values.	TEMPERATURE. Of the Air. Excess of Mean above Average of 20 Years.	TEMPERATURE. Of Evaporation. Mean of 24 Hourly Values.	TEMPERATURE. Of the Dew Point. Deduced Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Greatest of 24 Hourly Values.	Difference between the Air Temperature and Dew Point Temperature. Least of 24 Hourly Values.	Degree of Humidity (Saturation = 100).	TEMPERATURE. Highest in the Sun's Rays as shown by a Self-Registering Maximum Thermometer with blackened bulb in vacuo placed on the Grass.	TEMPERATURE. Lowest on the Grass as shown by a Self-Registering Minimum Thermometer.	TEMPERATURE. Of the Water of the Thames off Greenwich. Highest.	TEMPERATURE. Of the Water of the Thames off Greenwich. Lowest.	Daily Duration of Sunshine.	Sun above Horizon.	Rain collected in a Gauge whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°	°	°	hours.	hours.	in.		
Feb. 1	..	29·889	30·4	27·3	3·1	28·9	−11·6	27·0	20·0	8·9	10·1	3·3	68	42·2	27·3	34·3	32·9	0·0	9·1	0·045	4·5	..
2	Greatest Declination N.	29·611	39·2	29·5	9·7	35·0	− 5·6	34·9	34·7	0·3	1·8	0·0	99	43·9	29·5	34·3	33·3	0·0	9·2	0·082	0·0	..
3	..	29·468	37·7	32·1	5·6	34·9	− 5·8	34·9	34·9	0·0	0·8	0·0	100	41·2	32·0	34·8	33·3	0·0	9·2	0·492	0·0	..
4	..	29·773	36·2	32·1	4·1	33·9	− 6·8	32·2	29·1	4·8	7·3	3·0	82	44·0	32·0	35·3	33·8	0·0	9·3	0·000	1·0	..
5	..	29·724	41·4	30·3	11·1	34·7	− 5·9	33·2	30·7	4·0	8·8	1·2	86	48·8	30·3	36·1	34·1	0·0	9·3	0·076	8·2	..
6	..	29·405	50·2	41·4	8·8	45·9	+ 5·5	44·0	41·9	4·0	6·1	1·8	86	63·2	37·7	37·3	34·3	0·4	9·4	0·002	8·5	..
7	Full	29·251	50·4	41·9	8·5	46·9	+ 6·7	45·9	44·8	2·1	4·2	0·0	92	54·8	39·4	38·3	35·3	0·0	9·4	0·177	12·2	..
8	..	29·322	52·2	42·1	10·1	47·2	+ 7·3	44·3	41·1	6·1	11·0	0·4	79	81·2	39·4	39·3	36·8	5·4	9·5	0·020	10·8	..
9	In Equator	29·162	52·8	46·3	6·5	49·9	+10·3	48·9	47·8	2·1	5·2	0·0	92	62·0	44·9	41·3	38·1	0·1	9·6	0·295	7·8	vN : wP : mP
10	Perigee	28·791	51·3	44·7	6·6	47·4	+ 8·1	46·7	45·9	1·5	4·2	0·0	94	53·2	44·0	42·1	39·1	0·0	9·6	0·712	12·0	wP : wP, mN:wN,wP
11	..	28·873	51·1	40·4	10·7	46·4	+ 7·3	45·0	43·5	2·9	5·9	0·0	90	69·5	39·0	42·8	39·8	0·0	9·7	0·092	4·5	wP : wP, ssN : ssP
12	..	29·486	44·3	34·9	9·4	39·2	+ 0·3	37·6	35·5	3·7	8·6	0·0	87	81·4	32·4	43·3	40·1	1·8	9·8	0·026	0·0	mP
13	Last Qr.	29·580	42·1	37·6	4·5	39·9	+ 1·1	38·5	36·6	3·3	5·3	0·9	89	47·8	36·1	44·3	41·3	0·0	9·8	0·077	1·3	mP : vN, mP
14	..	29·347	49·4	41·0	8·4	44·3	+ 5·6	43·3	42·1	2·2	5·7	0·4	92	64·0	40·9	45·1	42·3	0·1	9·9	0·082	4·5	sN : mP : sP
15	Greatest Declination S.	29·367	41·0	38·2	2·8	39·3	+ 0·6	38·6	37·7	1·6	3·0	0·7	94	47·5	38·2	45·3	42·8	0·0	9·9	0·002	2·8	vP
16	..	28·941	43·2	34·0	9·2	39·9	+ 1·1	38·4	36·4	3·5	8·4	0·5	88	51·5	32·0	44·5	42·8	0·3	10·0	0·226	1·5	sN : mP : mN, mP
17	..	28·846	41·9	31·7	10·2	36·1	− 2·8	35·1	33·6	2·5	6·9	0·8	91	58·8	29·4	43·8	41·7	0·6	10·1	0·086	0·0	mP : vP, vN
18	..	29·019	41·4	30·9	10·5	35·8	− 3·2	34·5	32·5	3·3	7·4	1·0	88	53·6	29·8	42·8	40·3	1·1	10·1	0·085	0·0	mP, mN : wP : vP
19	..	29·225	45·0	33·5	11·5	38·1	− 1·1	35·8	32·7	5·4	15·2	0·3	81	72·7	32·2	42·1	39·3	4·4	10·2	0·079	0·8	ssN : wP : sP, wN
20	..	28·951	45·2	32·2	13·0	36·0	− 3·3	34·6	32·5	3·5	10·1	0·6	87	81·0	31·0	41·3	39·3	4·6	10·3	0·184	2·2	ssN : wP : mP
21	New	29·026	39·3	28·7	10·6	33·0	− 6·5	32·0	30·0	3·0	5·7	0·4	89	73·2	27·9	40·8	38·3	1·6	10·3	0·752	0·0	sP, ssN : vP : ssP
22	In Equator	29·199	38·3	24·5	13·8	32·2	− 7·4	31·2	29·0	3·2	8·0	0·0	87	69·1	24·1	39·5	37·3	1·1	10·4	0·000	0·0	ssP
23	..	29·373	34·3	29·7	4·6	31·9	− 7·8	31·1	29·2	2·7	6·2	1·7	89	47·3	28·1	39·3	36·8	0·0	10·5	0·018	0·0	mP : ssN, vP
24	..	29·656	37·1	24·5	12·6	30·3	− 9·5	28·6	23·6	6·7	10·7	0·7	74	73·1	23·0	38·8	36·3	7·1	10·5	0·000	0·0	sP : ssP
25	Apogee	29·818	36·5	30·6	5·9	33·2	− 6·7	31·0	26·7	6·5	11·9	3·5	77	65·8	25·0	37·8	35·3	3·1	10·6	0·002	0·0	mP : sP
26	..	29·865	35·4	31·8	3·6	33·8	− 6·2	32·0	28·8	5·0	8·1	2·2	81	44·3	30·0	37·3	35·3	0·0	10·7	0·000	0·0	ssP
27	..	29·791	38·6	29·8	8·8	34·8	− 5·3	34·0	32·7	2·1	5·3	0·2	92	53·3	28·2	36·8	35·3	0·0	10·7	0·049	0·0	ssP : vP : ssP
28	..	29·567	46·7	38·3	8·4	42·3	+ 2·1	41·6	40·8	1·5	3·5	0·7	94	52·8	37·2	36·8	35·3	0·0	10·8	0·154	0·0	ssP : vP : vP, ssN
Means	..	29·369	42·6	34·3	8·3	38·3	− 1·4	37·0	34·8	3·4	7·0	0·9	87·4	58·6	32·9	39·8	37·5	1·1	9·9	Sum 3·815	3·0	..
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	21	22

The results apply to the civil day, excepting those in Columns 16 and 17, which refer to the 24 hours ending 9ʰ a.m. of the day against which the readings are placed.

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 results on February 21 and 25 for Air Temperature, and on February 21, 25, and 26 for Evaporation Temperature, depend partly on values inferred from eye-observations, and those from February 1 to 12 for Air and Evaporation Temperatures, are deduced entirely from eye-observations, on account of accidental loss of photographic register.

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

The Electrical Apparatus was not in action from February 1 to 8.

The mean reading of the *Barometer* for the month was 29ⁱⁿ·369, being 0ⁱⁿ·463 *lower* than the average for the 20 years, 1854–1873.

TEMPERATURE OF THE AIR.

The highest in the month was 52°·8 on February 9; the lowest in the month was 24°·5 on February 22 and 24; and the range was 28°·3.

The mean of all the highest daily readings in the month was 42°·6, being 2°·9 *lower* than the average for the 38 years, 1841–1878.

The mean of all the lowest daily readings in the month was 34°·3, being *the same as* the average for the 38 years, 1841–1878.

The mean daily range was 8°·3, being 2°·9 *less* than the average for the 38 years, 1841–1878.

The mean for the month was 38°·3, being 1°·4 *lower* than the average for the 20 years, 1849–1868.

MONTH and DAY, 1879.	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.
			lbs.	lbs.	lbs.	miles.		
Feb. 1	ESE	ESE : E	2·4	0·0	0·3	300	10 : 10	10 : 10, sl : 10, sn, r
2	E	ESE : SE	0·0	0·0	0·0	119	10, f : 10, f	10, f, r : 10, f
3	E : ENE	NE : NNE	1·1	0·0	0·1	325	10, f : 10, f, th.-r, m	10, slt.-f, c.-r: 10, c.-r : 10, sl, sn
4	NNE : N	NNE : NE : ESE	0·2	0·0	0·0	270	10 : 10, slt.-sn	10 : 10
5	SW : S	S : SSW	3·7	0·0	0·2	293	10 : 10	10, so.-ha : 10, slt.-r : 10, oc.-r, sc
6	SW	SW : WSW	4·5	0·0	0·4	485	p.-cl : 7, ci.-s, ci, li.-shs	10, oc.-r, w : v, ci.-cu : v, lu.-co, lu.-ha, sc
7	SSW	SW	8·0	0·0	2·0	606	th.-cl, lu.-ha, sc, st.-w: 10, r, st.-w	10, oc.-shs, sc, st.-w : 10, st.-w, sc : 10, li.-shs, w
8	WSW	SW	3·3	0·0	0·7	543	v, w : v, ci.-cu, cu.-s	7, cu.-s, ci.-cu, ci.-s: 10, r
9	SW	SW : SSE	4·0	0·0	0·8	508	10, c.-r : 10, th.-r	9, ci.-cu, sc, r : 10, c.-r
10	SW : SSE	SSW : SW	4·5	0·0	0·6	419	10, w : 10, r	10, fq.-r : 10, fq.-th.-r, st.-w: 10, r, st.-w
11	SW	SW : NE	2·5	0·0	0·2	322	10, r : 10, oc.-th.-r	10, oc.-th.-r : 10, oc.-th.-r
12	NNE	NNW: WSW: SW	0·2	0·0	0·0	215	10 : 9	10 : 10, f
13	SSW : SSE	SSE	1·3	0·0	0·1	269	10 : 10	10, r : 10, c.-r : 10, th.-r
14	SSE : SE	ESE: ENE: E	0·0	0·0	0·0	214	10, hy.-r : 10, th.-r	10, ci.-cu, cu.-s, ci : 10 : 10
15	E	ESE : SSE	0·0	0·0	0·0	210	10 : 10	10 : 10
16	SSE : S : NW	WNW : W	2·7	0·0	0·3	359	10, hy.-r : 10, w	10, w : v, shs.-r : v
17	WSW: SW: E: N	NW : WSW	1·1	0·0	0·0	173	p.-cl : 10, r, oc.-sn, glm	9, cu.-s, ci.-cu: shs.-r : 0
18	W : WSW	NW : SW	0·2	0·0	0·0	273	p.-cl, sn : v, ci, ci.-cu, slt.-h, slt.-f	10, sn, r : 10, r, sn
19	WSW	WSW: SSW: SE	2·3	0·0	0·1	354	10, sn, r : 10	5, th.-cl, cu.-s, ci.-cu : v, r, sl : v, r, sl
20	SW : WSW	WSW : W	1·9	0·0	0·1	321	10, r, sn : v, ci.-cu	6, cu.-s, cu, ci, sn : 10
21	SW : SE : NE	N: NE	0·2	0·0	0·0	188	v : sn : 10, sn	9, cu.-s, ci.-cu, ci: 10 : 10
22	ENE : NE	SE : E : ESE	0·0	0·0	0·0	94	10 : v, ci.-cu, ho.-fr	9, cu.-s, ci.-cu: v : 10
23	NNE: NNW: SW	WSW: ENE: NE	0·0	0·0	0·0	146	10 : 10, f, h	10, sn : 10, sn
24	NNE : SE	E : NE	0·4	0·0	0·0	185	v, ho.-fr : p.-cl	1, ci.-cu : 3
25	NNE	NNE : N	3·6	0·0	0·5	465	p.-cl : 2, ci	9, cu.-s, ci.-cu, sc, sn : v, ci.-cu, sn : 10, sn
26	N	NNE : N	5·7	0·0	1·3	520	10, w : 10, oc.-sn, w	10, oc.-sn, w : 10
27	NW : SW	SW	0·0	0·0	0·0	176	10 : 10, sn, slt.-r	10, fq.-th.-r : 10, th.-r : 10, th.-r, slt.-f
28	SW	SW : SSW	0·0	0·0	0·0	128	10, th.-r : 10	10 : 10, hy.-r
Means	...	...	..	..	0·3	303		
Number of Column for Reference.	23	24	25	26	27	28	29	30

The mean *Temperature of Evaporation* for the month was 37°·0, being 0°·9 *lower* than
The mean *Temperature of the Dew Point* for the month was 34°·8, being 0°·6 *lower* than
The mean *Degree of Humidity* for the month was 87·4, being 2·6 *greater* than
The mean *Elastic Force of Vapour* for the month was $0^{in}\cdot202$, being $0^{in}\cdot005$ *less* than
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was $2^{grs}\cdot4$, being *the same as*
The mean *Weight of a Cubic Foot of Air* for the month was 547 grains, being 7 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 8·8.

The mean proportion of *Sunshine* for the month (constant sunshine being represented by 1) was 0·11. The maximum daily amount of *Sunshine* was 7·1 hours on February 24.

The highest reading of the *Solar Radiation Thermometer* was 81°·4 on February 12; and the lowest reading of the *Terrestrial Radiation Thermometer* was 23°·0 on February 24.

The mean daily distribution of *Ozone* was, for the 12 hours ending 9 a.m., 2·2; for the 6 hours ending 3 p.m., 0·2; and for the 6 hours ending 9 p.m., 0·6.

The *Proportions of Wind* referred to the cardinal points were N. 6, E. 7, S. 8, and W. 7.

The *Greatest Pressure of the Wind* in the month was $8^{lbs}\cdot0$ on the square foot on February 7. The mean daily *Horizontal Movement of the Air* for the month was 303 miles; the greatest daily value was 606 miles on February 7; and the least daily value 94 miles on February 22.

Rain fell on 21 days in the month, amounting to $3^{in}\cdot815$, as measured in the simple cylinder gauge partly sunk below the ground; being $2^{in}\cdot433$ *greater* than the average fall for the 38 years, 1841–1878.

MONTH and DAY, 1879.	Phases of the Moon.	BAROMETER. Mean of 24 Hourly Values (corrected and reduced to 32° Fahrenheit).	TEMPERATURE. Of the Air. Highest.	TEMPERATURE. Of the Air. Lowest.	TEMPERATURE. Of the Air. Daily Range.	TEMPERATURE. Of the Air. Mean of 24 Hourly Values.	TEMPERATURE. Of the Air. Excess of Mean above Average of 20 Years.	TEMPERATURE. Of Evaporation. Mean of 24 Hourly Values.	TEMPERATURE. Of the Dew Point. Deduced Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Greatest of 24 Hourly Values.	Difference between the Air Temperature and Dew Point Temperature. Least of 24 Hourly Values.	Degree of Humidity (Saturation = 100).	TEMPERATURE. Highest in the Sun's Rays as shown by a Self-Registering Maximum Thermometer with blackened bulb in vacuo placed on the Grass.	TEMPERATURE. Lowest on the Grass as shown by a Self-Registering Minimum Thermometer.	TEMPERATURE. Of the Water of the Thames off Greenwich. Highest.	TEMPERATURE. Of the Water of the Thames off Greenwich. Lowest.	Daily Duration of Sunshine.	Sun above Horizon.	Rain collected in a Gauge whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°	°	°	hours.	hours.	in.		
Mar. 1	First Qr.	29·828	44·9	31·7	13·2	39·5	− 0·8	38·0	36·1	3·4	7·5	0·0	88	55·3	29·3	37·8	36·3	0·0	10·8	0·025	0·0	ssN : vP : vP
2	Greatest Declination N.	29·967	49·4	29·3	20·1	38·5	− 1·9	36·4	33·6	4·9	15·1	0·0	83	80·6	26·5	38·5	36·8	6·7	10·9	0·000	0·0	ssP
3	..	29·786	46·4	33·0	13·4	39·2	− 1·3	37·5	35·3	3·9	8·1	0·6	86	79·3	29·9	39·3	37·5	1·8	11·0	0·055	0·0	sP: sN, vP: sP
4	..	29·924	49·1	31·1	18·0	41·2	+ 0·7	38·7	35·6	5·6	10·7	2·7	81	81·2	29·0	40·3	38·1	2·6	11·1	0·000	1·5	ssP : vP
5	..	29·860	54·6	44·4	10·2	47·8	+ 7·3	45·6	43·2	4·6	7·6	2·5	85	80·6	42·2	41·3	38·8	0·6	11·1	0·000	5·5	mP : sP
6	..	30·025	53·9	37·2	16·7	44·7	+ 4·2	40·8	36·3	8·4	17·4	2·4	72	85·6	31·8	42·5	40·3	8·9	11·2	0·030	0·0	sP : vP, wN
7	..	30·339	49·4	32·2	17·2	40·9	+ 0·3	38·6	35·7	5·2	10·5	0·6	82	71·9	29·8	43·9	41·3	3·0	11·2	0·000	0·0	vP
8	Full: In Equator.	30·394	56·2	28·6	27·6	41·2	+ 0·6	38·5	35·1	6·1	17·0	0·0	79	90·3	26·2	44·3	41·3	7·1	11·3	0·000	0·0	sP
9	..	30·270	61·2	33·8	27·4	46·9	+ 6·2	42·8	38·2	8·7	21·5	0·2	72	96·5	27·7	44·3	41·3	8·4	11·4	0·000	0·0	ssP
10	Perigee	30·207	56·4	36·6	19·8	44·7	+ 4·0	42·2	39·3	5·4	11·8	0·5	81	99·0	33·2	45·3	42·3	2·7	11·4	0·000	0·0	sP: vP
11	..	30·139	51·3	41·7	9·6	45·2	+ 4·4	41·3	36·8	8·4	16·8	1·3	73	93·3	36·3	45·8	42·8	4·1	11·5	0·098	0·2	vP, wN: vP, wN
12	..	29·923	54·5	36·3	18·2	44·7	+ 3·9	41·0	36·7	8·0	14·0	3·8	73	75·1	32·1	46·1	43·3	0·4	11·6	0·000	1·0	mP
13	..	30·140	44·5	29·3	15·2	37·0	− 3·9	32·3	25·6	11·4	20·5	2·7	63	87·2	24·9	46·5	43·8	8·9	11·6	0·000	0·8	sP : vP, vN
14	Greatest Declination S.	30·002	39·0	30·0	9·0	34·9	− 6·1	33·3	30·7	4·2	8·8	0·7	84	49·3	27·3	46·3	43·5	0·0	11·7	0·042	0·4	sP: mP, ssN: vN, wP
15	Last Qr.	29·624	52·3	36·6	15·7	43·3	+ 2·2	40·1	36·3	7·0	15·6	0·5	76	87·7	35·8	46·3	43·7	6·5	11·8	0·046	1·1	ssN, vP : sP
16	..	29·574	54·1	37·5	16·6	47·3	+ 6·1	43·9	40·1	7·2	14·6	2·6	77	75·6	32·5	46·3	44·3	0·4	11·8	0·011	0·5	mP: sP, mN: ssP
17	..	29·900	44·5	37·3	7·2	40·5	− 0·8	39·4	38·0	2·5	5·3	0·0	91	58·3	32·2	46·5	44·3	0·0	11·9	0·003	3·5	..
18	..	29·711	56·2	35·3	20·9	44·9	+ 3·5	42·7	40·1	4·8	9·8	0·0	84	99·4	32·6	45·8	44·3	2·0	12·0	0·003	0·0	..
19	..	29·569	63·7	39·9	23·8	49·3	+ 7·9	45·9	42·3	7·0	19·0	0·7	77	102·6	34·8	45·8	44·3	6·8	12·0	0·019	0·0	..
20	..	29·618	54·7	40·8	13·9	46·2	+ 4·7	42·9	39·1	7·1	12·8	2·0	77	81·3	36·1	47·1	45·1	0·0	12·1	0·000	0·8	..
21	In Equator	29·647	48·9	37·0	11·9	40·8	− 0·8	38·6	35·8	5·0	10·5	2·3	83	91·0	36·5	47·3	45·3	1·0	12·2	0·000	2·2	..
22	New	29·593	37·3	35·1	2·2	35·9	− 5·8	34·4	32·1	3·8	5·5	2·1	86	40·7	34·7	46·5	44·8	0·0	12·2	0·006	0·0	vN, vP
23	..	29·669	36·4	32·3	4·1	34·1	− 7·7	32·4	29·5	4·6	7·8	0·0	82	46·2	29·2	46·3	44·3	0·0	12·3	0·000	3·2	wP, wN : wN, mP
24	..	29·691	33·4	29·2	4·2	31·5	−10·5	29·8	25·6	5·9	11·2	0·0	77	44·8	28·9	45·3	43·3	0·0	12·4	0·000	11·8	mP, wN
25	Apogee	29·626	32·9	29·5	3·4	31·7	−10·6	30·8	28·8	2·9	7·5	0·0	88	47·7	29·1	45·3	43·3	0·0	12·4	0·080	6·0	wP, wN : vP, wN
26	..	29·496	35·4	31·7	3·7	33·6	− 9·0	33·0	31·9	1·7	3·1	0·3	93	42·0	31·2	44·3	41·8	0·0	12·5	0·053	0·0	vP
27	..	29·410	39·8	31·9	7·9	35·8	− 7·2	34·5	32·5	3·3	6·4	0·3	88	53·5	31·6	43·8	41·3	0·8	12·6	0·000	0·0	sP : vP, wN
28	..	29·526	44·7	30·9	13·8	37·3	− 6·1	35·0	31·8	5·5	10·8	2·6	81	69·0	28·4	42·8	40·5	4·3	12·6	0·000	1·8	sP : vP : sP
29	Greatest Declination N.	29·533	59·7	36·8	22·9	47·4	+ 3·6	44·0	40·2	7·2	15·4	2·0	77	104·9	34·5	41·8	39·3	4·6	12·7	0·043	8·8	mP, wN : vP, vN
30	..	29·577	55·8	37·7	18·1	45·3	+ 1·0	42·6	39·5	5·8	12·8	0·7	80	101·1	33·9	41·3	38·8	5·1	12·8	0·029	10·2	sP : vP, vN : sP
31	First Qr.	29·480	57·0	42·8	14·2	47·3	+ 2·5	44·3	41·0	6·3	13·8	1·3	79	100·3	39·9	42·3	40·3	4·3	12·8	0·060	14·5	wP, mN : ssP
Means	..	29·808	49·0	34·8	14·2	41·2	− 0·3	38·8	35·6	5·7	11·9	1·1	80·6	76·5	31·9	44·1	41·8	2·9	11·8	Sum 0·603	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	21	22

The results apply to the civil day, excepting those in Columns 16 and 17, which refer to the 24 hours ending 9h a.m. of the day against which the readings are placed.

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 results on March 21 and 22 for Air Temperature, and on March 22 for Evaporation Temperature, depend partly on values inferred from eye-observations, on account of accidental loss of photographic register.

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

The Electrical Apparatus was not in action from March 17 to 21.

The mean reading of the *Barometer* for the month was 29in·808, being 0in·086 *higher* than the average for the 20 years, 1854–1873.

TEMPERATURE OF THE AIR.

The highest in the month was 63°·7 on March 19; the lowest in the month was 28°·6 on March 8; and the range was 35°·1.
The mean of all the highest daily readings in the month was 49°·0, being 0°·8 *lower* than the average for the 38 years, 1841–1878.
The mean of all the lowest daily readings in the month was 34°·8, being 0°·4 *lower* than the average for the 38 years, 1841–1878.
The mean daily range was 14°·2, being 0°·4 *less* than the average for the 38 years, 1841–1878.
The mean for the month was 41°·2, being 0°·3 *lower* than the average for the 20 years, 1849–1868.

MONTH and DAY, 1879.	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.
			lbs.	lbs.	lbs.	miles.		
Mar. 1	N : NNE	NE : WSW	0·3	0·0	0·0	184	10, th.-r : 10	10 : v, f : 0, tk.-f, d
2	SW : WSW	SW : SSW	1·0	0·0	0·0	222	0, f, ho.-fr : 0, f	1, ci.-cu : 0 : 0
3	SSW : SW	WSW : WNW : SW	1·6	0·0	0·1	283	0, ho.-fr : v, ci, ci.-cu, r	10, r : v, m : 0, lu.-ha
4	SSW	SW	7·2	0·0	0·5	392	p.-cl, ho.-fr : v, ci, ci.-s	10 : 10, th.-cl, ci.-cu, lu.-ha
5	SW	SW	9·0	0·0	1·6	588	p.-cl, w : v, st.-w	10, st.-w : v, st.-w : th.-cl, w, lu.-co
6	WNW : WSW	W : WNW : WSW	2·5	0·0	0·1	257	v, m.-r, hy.-sh : 0, slt.-f, h	0, h : 0, h
7	SW	S : SSE	0·0	0·0	0·0	135	0, ho.-fr : 0, h, slt.-m	th.-cl, h, slt.-f : 0, h, slt.-f, lu.-co : 0
8	ENE	SE : ESE : ENE	0·0	0·0	0·0	126	0, slt.-f, ho.-fr : 0, tk.-f	0 : 0, lu.-co, f
9	S : W : WSW	WSW	0·0	0·0	0·0	182	0, lu.-co, ho.-fr : 0, m, f	th.-cl : 0
10	SW : WSW	WSW	2·8	0·0	0·2	378	slt.-f : 10, slt.-f, slt.-r	7, cu.-s, ci.-cu, ci.-s, th.-cl : 10
11	WSW : N	N : NW : WSW	2·0	0·0	0·1	278	10, fq.-shs : v, ci.-cu, th.-cl	9, cu.-s, ci.-cu : 10 : 10
12	WSW	WSW : NNE	7·6	0·0	1·4	547	10 : 10, w	9, cu.-s, ci, w : v, w : 9
13	N	NNW : NW : WSW	2·5	0·0	0·2	296	v : 0	th.-cl : 5, th.-cl, f
14	W : NE : SE	SW	0·1	0·0	0·0	156	10 : 10, sn	10, sn, r : 10, r : 10, c.-r
15	WSW	SW : SSW	7·8	0·0	0·7	414	10, r : v, cu.-s, ci, so.-ha, w	v, ci.-cu, ci, so.-ha, w : v
16	SW	SW : WSW	2·3	0·0	0·3	347	10, slt.-r : 10, oc.-r	v, slt.-r, so.-ha : v
17	NE : ESE	ESE : E	0·7	0·0	0·0	195	10 : 10, oc.-th.-r	10, oc.-r : 10
18	ESE : SE : S	SSW : S : SE	0·0	0·0	0·0	114	p.-cl : v, ci.-cu, oc.-slt.-r	9, cu.-s, ci.-cu, shs.-r : 8, cu.-s, ci.-cu, l
19	SE : E : NE	E : ENE	0·9	0·0	0·0	182	10, r : 3, ci.-cu, ci	3, ci, ci.-s, so.-ha : v : 10
20	NE	NE	1·2	0·0	0·1	269	10 : 10	10 : th.-cl : 10
21	NE	NNE : N	2·0	0·0	0·2	337	10 : 10	9, cu.-s, ci.-cu : 10, th.-r
22	NE	NE	7·0	0·0	1·0	502	10, th.-r, slt.-sn : 10, w	10, w : 10, slt.-r : 10, w
23	NE	ENE	15·0	0·1	2·1	591	10 : 10, oc.-sn, w	10, slt.-sn, st.-w : v, st.-w : v, st.-w
24	ENE	ENE	9·2	0·0	2·1	552	10, slt.-sn, st.-w : 10, sn, st.-w	10, oc.-sn, st.-w : 10, w : 10
25	ENE	ENE	4·4	0·0	0·6	384	10 : 10, sn	10, sn : 10, sn
26	NE : ENE	E : ENE	2·1	0·0	0·0	217	10, sl : 10, sn, sl	10, sn, sl : 10
27	ENE	ENE : NE : NNE	2·0	0·0	0·1	284	10 : 7, cu.-s, ci.-cu, ci, oc.-slt.-r	10, oc.-slt.-r : 10, oc.-slt.-r : 10
28	N	NW : SW : S	1·1	0·0	0·0	216	10 : 10	v, th.-cl, h : 9, cu.-s, ci.-cu
29	S : SW	SW : WSW	5·6	0·0	0·6	410	10, w : 10, oc.-r	v, cu.-s, ci.-cu, cu, ci, r, hl : v, ci.-cu, l, lu.-ha
30	SSW	SSW	9·0	0·0	0·7	413	p.-cl : 8, cu.-s, ci.-cu	7, cu.-s, ci.-cu, ci, shs.-r, w : sc, lu.-ha, lu.-co
31	S : SSW	SSW	4·7	0·0	0·3	330	10, r : 9, ci.-cu, cu.-s	v, ci.-cu, cu, cu.-s, li.-shs, so.-ha : v, lu.-ha, lu.-co
Means	...	...	..	..	0·4	316		
Number of Column for Reference.	23	24	25	26	27	28	29	30

The mean *Temperature of Evaporation* for the month was 38°·8, being 0°·2 *lower* than the average for the 20 years, 1849–1868.
The mean *Temperature of the Dew Point* for the month was 35°·6, being 0°·4 *lower* than the average for the 20 years, 1849–1868.
The mean *Degree of Humidity* for the month was 80·6, being 0·3 *less* than the average for the 20 years, 1849–1868.
The mean *Elastic Force of Vapour* for the month was 0in·208, being 0in·004 *less* than the average for the 20 years, 1849–1868.
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was 2grs·4, being 0gr·1 *less* than the average for the 20 years, 1849–1868.
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 6·8.

The mean proportion of *Sunshine* for the month (constant sunshine being represented by 1) was 0·25. The maximum daily amount of *Sunshine* was 8·9 hours on March 6 and 13.

The highest reading of the *Solar Radiation Thermometer* was 104°·9 on March 29; and the lowest reading of the *Terrestrial Radiation Thermometer* was 24°·9 on March 13.

The mean daily distribution of *Ozone* was, for the 12 hours ending 9 a.m., 1·4; for the 6 hours ending 3 p.m., 0·7; and for the 6 hours ending 9 p.m., 0·3.

The *Proportions of Wind* referred to the cardinal points were N. 7, E. 7, S. 8, and W. 8. One day was calm.

The *Greatest Pressure of the Wind* in the month was 15lbs·0 on the square foot on March 23. The mean daily *Horizontal Movement of the Air* for the month was 316 miles; the greatest daily value was 591 miles on March 23; and the least daily value 114 miles on March 18.

Rain fell on 14 days in the month, amounting to 0in·603, as measured in the simple cylinder gauge partly sunk below the ground; being 0in·888 *less* than the average fall for the 38 years, 1841–1878.

MONTH and DAY, 1879.	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 of Mean 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 Daily Value.	Greatest of 24 Hourly Values.	Least of 24 Hourly Values.	Degree of Humidity (Saturation = 100).	TEMPERATURE. Highest in the Sun's Rays as shown by a Self-Registering Maximum Thermometer with blackened bulb in vacuo placed on the Grass.	Lowest on the Grass as shown by a Self-Registering Minimum Thermometer.	Of the Water of the Thames off Greenwich. Highest.	Of the Water of the Thames off Greenwich. Lowest.	Daily Duration of Sunshine.	Sun above Horizon.	Rain collected in a Gauge whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°	°	°	hours.	hours.	in.		
Apr. 1	..	29·493	52·6	41·8	10·8	45·6	+ 0·3	42·9	39·8	5·8	11·2	2·0	81	85·8	38·5	43·8	41·3	1·0	12·9	0·000	1·8	sP, wN: vP, wN
2	..	29·450	57·4	35·9	21·5	43·8	− 1·9	40·9	37·5	6·3	17·2	0·2	79	99·1	32·9	44·1	41·8	3·9	13·0	0·002	3·0	sP: vP, mN: ssP
3	..	29·421	54·7	33·9	20·8	41·0	− 5·1	39·4	37·4	3·6	13·2	0·3	87	91·9	30·1	44·8	42·3	2·6	13·0	0·083	0·0	sP, mN: ssN, vP
4	..	29·630	56·8	32·0	24·8	45·0	− 1·4	40·5	35·3	9·7	21·8	0·0	69	93·6	28·6	46·3	43·3	9·3	13·1	0·000	1·0	mP: vP, wN: ssP
5	In Equator	29·625	56·2	38·8	17·4	47·2	+ 0·6	45·1	42·8	4·4	9·6	1·1	85	76·2	33·0	45·8	43·8	0·5	13·2	0·048	1·8	sP: vP: sP
6	Full	29·276	52·4	42·2	10·2	46·4	− 0·3	44·7	42·8	3·6	5·9	1·5	88	72·6	39·3	47·5	44·8	0·1	13·2	0·102	15·2	sP: vN, sP
7	Perigee	28·846	60·7	44·5	16·2	51·3	+ 4·5	48·2	45·0	6·3	14·8	0·8	79	102·6	40·5	48·3	45·1	4·5	13·3	0·257	17·5	vN, wP: sP, ssN
8	..	29·072	57·8	43·8	14·0	50·0	+ 3·2	46·6	43·0	7·0	14·4	2·1	78	93·4	40·4	49·5	45·8	2·1	13·4	0·000	1·5	wP: vP, wN: sP
9	..	29·294	54·7	41·9	12·8	46·4	− 0·5	44·4	42·1	4·3	6·7	0·9	86	88·0	38·9	49·5	46·1	1·0	13·4	0·271	0·0	sP: wN, vP: vN, vP
10	..	29·578	45·6	33·6	12·0	40·9	− 6·0	39·8	38·5	2·4	6·5	1·1	91	52·8	32·5	50·3	46·8	0·0	13·5	0·236	3·0	mN, wP: vP
11	Greatest Declination S.	29·896	42·1	29·0	13·1	35·4	−11·6	32·3	27·4	8·0	13·1	5·6	72	87·7	25·5	49·3	46·3	3·7	13·6	0·000	6·0	mP: sP: ssP
12	..	29·721	42·3	27·7	14·6	33·6	−13·5	32·0	29·1	4·5	10·3	0·3	84	63·9	24·0	49·3	46·8	0·2	13·6	0·176	3·8	ssP: vP, vN
13	Last Qr.	29·477	46·9	32·0	14·9	37·7	− 9·5	35·0	31·3	6·4	16·3	0·6	78	90·3	30·3	48·8	46·3	2·7	13·7	0·079	10·2	wP: mP
14	..	29·391	43·8	32·3	11·5	37·5	− 9·9	35·4	32·5	5·0	11·7	1·3	82	76·0	31·0	47·8	45·3	1·0	13·7	0·112	16·5	mP: mP, vN
15	..	29·343	58·3	33·4	24·9	43·6	− 3·9	40·3	36·4	7·2	20·4	0·3	76	103·2	32·2	47·3	44·3	4·3	13·8	0·030	1·5	mN, wP: mP
16	..	29·362	44·1	36·1	8·0	40·4	− 7·2	38·5	36·1	4·3	8·1	0·9	85	59·2	35·8	46·5	44·3	0·0	13·9	0·334	0·0	mN: wP
17	..	29·489	49·4	33·2	16·2	40·2	− 7·6	37·7	34·5	5·7	13·0	2·2	80	74·9	29·0	46·3	44·3	2·4	13·9	0·068	0·0	wP, wN, vP, vN: wP
18	In Equator	29·721	47·4	32·8	14·6	40·0	− 7·9	37·2	33·6	6·4	12·1	1·9	78	96·4	28·9	45·3	44·3	1·9	14·0	0·000	0·7	vP
19	..	29·670	54·2	30·2	24·0	42·2	− 5·8	38·6	34·2	8·0	16·8	0·0	74	118·1	27·9	45·3	42·8	7·9	14·1	0·000	7·0	wP
20	..	29·270	54·6	38·1	16·5	45·0	− 3·1	43·3	41·3	3·7	8·2	0·7	87	78·9	33·3	46·3	43·8	0·3	14·1	0·462	5·5	mN: wP
21	New: Apogee	29·311	44·1	38·3	5·8	41·1	− 7·1	38·7	35·7	5·4	9·9	1·8	81	57·0	36·0	46·3	44·3	0·0	14·2	0·000	2·8	wP
22	..	29·401	52·4	32·8	19·6	42·3	− 5·9	39·3	35·6	6·7	12·8	1·0	78	88·4	29·9	46·5	44·3	1·5	14·2	0·000	1·5	wP
23	..	29·319	56·8	40·0	16·8	46·3	− 2·0	44·6	42·7	3·6	8·0	1·3	88	99·3	37·8	46·8	44·8	0·1	14·3	0·155	7·5	wP, wN
24	..	29·654	53·4	38·7	14·7	46·1	− 2·2	44·0	41·6	4·5	9·8	1·1	85	84·2	35·0	47·5	45·3	0·2	14·4	0·000	0·0	wP
25	Greatest Declination N.	29·860	58·6	33·4	25·2	45·8	− 2·6	43·1	40·0	5·8	13·6	0·0	81	111·7	32·2	47·8	45·5	2·0	14·4	0·106	7·0	wP: wP, wN
26	..	29·524	60·8	41·7	19·1	49·5	+ 1·1	45·9	42·1	7·4	18·1	1·0	76	130·1	38·8	49·3	46·3	8·0	14·5	0·000	4·0	mP
27	..	29·501	59·0	41·1	17·9	48·0	− 0·4	45·1	41·9	6·1	15·4	1·1	80	114·1	36·1	50·5	47·3	5·0	14·5	0·074	8·2	wP: wN: vP
28	..	29·813	52·1	37·0	15·1	44·1	− 4·4	41·0	37·4	6·7	12·4	1·4	76	86·2	32·0	51·5	48·3	0·1	14·6	0·000	0·8	wP
29	First Qr.	30·121	54·3	33·7	20·6	44·3	− 4·2	39·2	33·2	11·1	19·2	1·0	65	122·0	28·6	51·5	48·3	6·2	14·7	0·000	2·0	vP
30	..	30·048	53·8	38·0	15·8	43·9	− 4·7	40·4	36·3	7·6	17·8	2·5	75	120·5	34·9	50·8	48·3	2·1	14·7	0·004	0·7	vP
Means	..	29·519	52·6	36·3	16·3	43·5	− 4·0	40·8	37·6	5·9	12·9	1·2	80·1	90·6	33·1	47·7	45·1	2·5	13·8	Sum 2·599	4·3	..
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	21	22

The results apply to the civil day, excepting those in Columns 16 and 17, which refer to the 24 hours ending 9h a.m. of the day against which the readings are placed.

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 results on April 29 for Air Temperature, and on April 11 and 29 for Evaporation Temperature, depend partly on values inferred from eye-observations, on account of accidental loss of photographic register.

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 29in·519, being 0in·284 *lower* than the average for the 20 years, 1854–1873.

TEMPERATURE OF THE AIR.

The highest in the month was 60°·8 on April 26; the lowest in the month was 27°·7 on April 12; and the range was 33°·1.
The mean of all the highest daily readings in the month was 52°·6, being 5°·2 *lower* than the average for the 38 years, 1841–1878.
The mean of all the lowest daily readings in the month was 36°·3, being 3°·0 *lower* than the average for the 38 years, 1841–1878.
The mean daily range was 16°·3, being 2°·2 *less* than the average for the 38 years, 1841–1878.
The mean for the month was 43°·5, being 4°·0 *lower* than the average for the 20 years, 1849–1868.

MONTH and DAY, 1879.	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.
			lbs.	lbs.	lbs.	miles.		
April 1	SW	ENE : S	0·0	0·0	0·0	137	10 : 8, ci, th.-cl, f, so.-ha	9,cu.-s,slt.-f : 10, slt.-r : 10
2	SW : WSW	SW : SSW	0·1	0·0	0·0	169	10 : v	8,cu.-s,ci.-cu,ci.-s,glm : v, lu.-ha, lu.-co
3	WSW	NNW : SE : WSW	0·1	0·0	0·0	127	p.-cl, lu.-ha : 0, m, f	v, th.-cl, m, r, hl, l, t : ci.-cu, slt.-f
4	WSW : SW	SW : SSW	0·9	0·0	0·0	205	9, ci.-cu, ho.-fr : 6, th.-cl, so.-ha	4, ci.-cu, ci,cu.-s,so.-ha : 0, d
5	SSW	SSW	2·1	0·0	0·2	260	v : 10, th.-r	10 : 10, shs.-r : 10, th.-r
6	SSW : S	S : SE	8·5	0·0	0·5	315	10 : 10, w	10, r, w : 10, c.-r : 9, cu.-s, ci.-cu
7	SE : S	SSW : SE	2·2	0·0	0·2	303	10, shs.-r : 9, oc.-slt.-r	7, cu.-s, ci.-cu : v, shs.-r, Lunar Rainbow
8	SSE : WSW	WNW : NNW : N	0·0	0·0	0·0	178	9 : 10	9, cu.-s, ci.-cu : 8
9	WNW : WSW	N	0·0	0·0	0·0	176	p.-cl : 8, ci, th.-cl	9, cu.-s, ci.-cu, m : 10, r
10	NNE : ENE	ENE : NE	3·5	0·0	0·4	364	10, hy.-r : 10, th.-r	10, th.-r : 10, r : 10
11	NNE : NE	NNE	8·0	0·0	1·1	528	10, w : 10, st.-w	vv, cu.-s, cu, slt.-sn, w : v
12	N : WSW	SW : S : SE	0·0	0·0	0·0	152	0 : v, h, slt.-sn	10, oc.-sn, sl : 10, sn, sl
13	SE : SSE	SE : ENE : NE	2·5	0·0	0·2	276	10 : 10, r	9,cu.-s,ci.-cu,cu,so.-ha : th.-cl, ci.-s
14	NE : ENE	E : ENE	2·2	0·0	0·3	344	p.-cl : 7,cu.-s,ci.-cu,ci,ci.-s	10, r : 10, c.-r, oc.-sn
15	NE	SW : S : N : NE	0·2	0·0	0·0	128	10 : 7, cu.-s, cu, ci.-cu, sh.-r	8, cu.-s, cu, ci.-cu : 10, r
16	NNE	N : NW : W	0·5	0·0	0·0	209	10, r, sn : 10, shs.-r	10, shs.-r : 10 : 10
17	WSW : NW	Variable	3·3	0·0	0·0	188	10 : 10, n, glm, r, sn	9,cu.-s,ci.-cu,n,shs.-r : v, r : 0
18	NNW : N	N : NNE	0·6	0·0	0·0	202	ho.-fr : 8, cu.-s,ci.-cu,slt.-sh	10,cu.-s,th.-cl : v : 0
19	E : Calm	SSE : SE : E	1·6	0·0	0·0	180	v : cu.-s, ci.-cu	v,cu.-s,ci.-cu : p.-cl : 1, th.-cl
20	ESE	WSW	1·6	0·0	0·0	184	v, r : 10, c.-r	10, shs.-r : 8, cu.-s, shs.-r
21	N : NNE	NNE : N	3·9	0·0	0·4	391	10 : 10	10 : 10
22	NNW : NE	SE : SSW : SSE	0·0	0·0	0·0	111	10 : 10	9, th.-cl, slt.-r : 10, slt.-r
23	ESE	E : ESE	0·3	0·0	0·0	126	10, r : 10, r	10 : 10, oc.-r
24	ENE : NNE	NNE : N	0·5	0·0	0·0	170	10 : 10	10 : v : 0
25	SW : SE	SSW : SSE : S	2·3	0·0	0·2	218	v : 10, th.-cl, so.-ha	9, cu.-s, ci.-cu, r : 10, c.-r
26	WSW : W	SW : S	1·5	0·0	0·0	273	v : 8, cu.-s, ci.-cu	6,cu.-s,ci.-cu : v, slt.-sh : 0, l
27	SE : NE	E : N	1·6	0·0	0·1	215	v : 8,cu.-s,ci.-cu,sc,hl,oc.-r	v, cu.-s, ci.-cu, oc.-shs : v, ci.-cu, th.-cl
28	NNE : N	NNE	2·4	0·0	0·4	356	p.-cl : 10	10 : v, ci.-cu, ci.-s
29	NNE	NE : SW	0·6	0·0	0·1	238	p.-cl : v, ci.-cu, ci	8,cu.-s,ci.-cu,cu : v : 10
30	SW : NW : NE	ENE : ESE	0·6	0·0	0·0	161	10 : 9, ci, cu.-s, ci.-cu	9,ci.-cu,cu.-s,ci : 10 : 10
Means	...	...	..	..	0·1	229		
Number of Column for Reference.	23	24	25	26	27	28	29	30

The mean *Temperature of Evaporation* for the month was 40°·8, being 3°·1 *lower* than
The mean *Temperature of the Dew Point* for the month was 37°·6, being 2°·7 *lower* than
The mean *Degree of Humidity* for the month was 80·1, being 3·2 *greater* than
The mean *Elastic Force of Vapour* for the month was 0^{in}·225, being 0^{in}·025 *less* than
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was 2^{grs}·6, being 0^{gr}·3 *less* than
The mean *Weight of a Cubic Foot of Air* for the month was 544 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 7·9.

The mean proportion of *Sunshine* for the month (constant sunshine being represented by 1) was 0·18. The maximum daily amount of *Sunshine* was 9·3 hours on April 4.

The highest reading of the *Solar Radiation Thermometer* was 130°·1 on April 26; and the lowest reading of the *Terrestrial Radiation Thermometer* was 24°·0 on April 12.

The mean daily distribution of *Ozone* was, for the 12 hours ending 9 a.m., 2·4; for the 6 hours ending 3 p.m., 1·1; and for the 6 hours ending 9 p.m., 0·8.

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^{lbs}·5 on the square foot on April 6. The mean daily *Horizontal Movement of the Air* for the month was 229 miles; the greatest daily value was 528 miles on April 11; and the least daily value 111 miles on April 22.

Rain fell on 16 days in the month, amounting to 2^{in}·599, as measured in the simple cylinder gauge partly sunk below the ground; being 0^{in}·962 *greater* than the average fall for the 38 years, 1841–1878.

MONTH and DAY, 1879.	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 of Mean 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 Daily Value.	Greatest of 24 Hourly Values.	Least of 24 Hourly Values.	Degree of Humidity (Saturation = 100).	TEMPERATURE. Highest in the Sun's Rays as shown by a Self-Registering Maximum Thermometer with blackened bulb in vacuo placed on the Grass.	Lowest on the Grass as shown by a Self-Registering Minimum Thermometer.	Of the Water of the Thames off Greenwich. Highest.	Of the Water of the Thames off Greenwich. Lowest.	Daily Duration of Sunshine.	Sun above Horizon.	Rain collected in a Gauge whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°	°	°	hours.	hours.	in.		
May 1	..	29·986	50·3	35·4	14·9	41·4	− 7·3	37·9	33·5	7·9	17·8	1·9	74	111·1	30·8	51·5	48·8	4·3	14·8	0·190	6·3	wP, wN
2	In Equator	30·145	51·8	34·0	17·8	42·0	− 6·9	37·8	32·7	9·3	15·3	2·0	71	112·3	29·9	50·8	47·9	5·3	14·8	0·000	0·0	wP
3	..	30·267	56·3	31·0	25·3	43·1	− 6·0	38·9	33·9	9·2	20·6	1·5	70	129·1	27·1	50·8	47·8	11·3	14·9	0·002	4·2	wP
4	..	30·329	57·2	30·8	26·4	44·7	− 4·7	40·6	35·8	8·9	18·1	1·7	71	128·5	25·0	50·8	47·8	12·8	14·9	0·000	3·7	wP
5	Perigee	30·268	66·2	34·0	32·2	51·0	+ 1·3	44·0	36·7	14·3	25·7	1·4	58	131·8	28·6	51·3	48·3	12·2	15·0	0·000	3·0	vP
6	Full	29·949	51·0	36·0	15·0	44·7	− 5·3	40·8	36·3	8·4	14·1	2·1	72	101·7	30·4	51·3	48·8	2·5	15·1	0·181	0·0	wN : vP
7	..	29·855	47·9	35·0	12·9	39·6	−10·7	36·0	31·3	8·3	15·0	3·2	72	107·0	29·8	51·3	48·3	1·9	15·1	0·000	1·0	vN : vP
8	Greatest Declination S.	29·844	47·3	32·2	15·1	40·9	− 9·7	36·5	31·0	9·9	16·1	3·1	68	104·3	29·5	51·3	48·3	2·3	15·2	0·000	0·0	mP, wN
9	..	29·629	55·5	35·0	20·5	44·3	− 6·5	41·1	37·4	6·9	13·0	2·4	76	99·7	29·5	50·8	47·7	0·3	15·2	0·002	1·3	o : wP
10	..	29·857	50·1	30·0	20·1	41·1	−10·0	35·9	29·4	11·7	18·9	5·3	63	123·0	24·6	51·3	48·1	4·0	15·3	0·000	4·2	wP
11	..	29·889	48·5	36·2	12·3	44·0	− 7·4	41·3	38·1	5·9	12·6	2·9	79	92·5	30·7	51·3	47·5	1·1	15·3	0·068	3·5	wP : mN : wP
12	..	29·958	62·1	42·5	19·6	51·8	0·0	46·7	41·5	10·3	20·1	1·7	68	110·0	37·8	51·1	48·1	4·9	15·4	0·000	0·0	wP, wN : wN, sP
13	Last Qr.	29·927	60·6	38·4	22·2	50·1	− 2·0	46·3	42·3	7·8	14·4	1·4	75	129·5	31·0	51·3	48·8	4·4	15·4	0·020	10·2	mP
14	..	29·681	58·2	46·0	12·2	50·4	− 2·1	47·2	43·8	6·6	13·2	1·3	79	126·3	44·0	52·1	49·3	3·6	15·5	0·036	6·8	wP, ssN : vN, vP
15	In Equator	29·780	49·1	42·2	6·9	45·5	− 7·4	42·6	39·3	6·2	13·2	2·4	79	90·8	40·4	53·3	49·8	0·5	15·5	0·277	0·0	sP : vN : wN, wP
16	..	29·937	55·4	40·7	14·7	47·7	− 5·6	44·8	41·7	6·0	11·8	1·8	80	93·1	36·8	53·3	49·8	0·9	15·6	0·000	0·0	wP : mP
17	..	29·822	59·9	37·0	22·9	49·5	− 4·2	45·6	41·5	8·0	14·1	0·5	74	119·3	34·0	53·3	49·3	4·0	15·6	0·010	6·0	mP : mP, wN
18	Apogee	29·475	58·2	46·9	11·3	50·3	− 3·8	47·9	45·4	4·9	11·0	1·5	84	107·6	45·0	53·3	50·3	0·4	15·7	0·088	12·0	wP : mP
19	..	29·653	63·9	45·0	18·9	52·4	− 2·0	48·9	45·3	7·1	14·8	1·5	77	127·5	39·5	53·8	50·7	7·5	15·7	0·000	0·0	wP
20	..	29·837	70·2	39·3	30·9	53·5	− 1·2	49·5	45·5	8·0	18·7	0·4	74	142·3	35·2	54·3	51·3	2·1	15·8	0·000	0·0	wP : wN, mP
21	New	29·958	70·6	48·0	22·6	56·7	+ 1·7	51·8	47·3	9·4	15·8	2·9	70	141·4	44·2	54·3	51·5	4·8	15·8	0·000	2·0	mP : sP
22	Greatest Declination N.	29·950	69·2	46·2	23·0	56·6	+ 1·3	52·0	47·7	8·9	14·6	0·8	72	135·5	38·5	55·3	51·7	3·6	15·9	0·000	0·2	sP : mP
23	..	29·970	52·5	44·1	8·4	49·3	− 6·2	45·7	41·9	7·4	10·4	2·5	76	86·2	42·0	56·3	52·5	2·6	15·9	0·259	0·8	wN, mP : vP, vN : wP
24	..	29·972	69·8	42·2	27·6	54·5	− 1·2	48·9	43·5	11·0	18·5	5·1	66	140·7	35·7	56·8	53·3	9·5	16·0	0·000	1·8	mP : wP : mP
25	..	29·713	58·4	44·6	13·8	51·9	− 4·0	48·9	45·8	6·1	14·4	1·5	80	89·2	40·5	55·5	52·5	1·4	16·0	0·234	6·0	wP, wN : mP : sP
26	..	29·630	61·1	40·6	20·5	50·3	− 5·8	46·8	43·1	7·2	13·1	1·1	77	130·0	36·8	56·3	52·8	4·4	16·0	0·047	8·7	mP
27	..	29·442	58·9	47·3	11·6	51·1	− 5·2	48·5	45·8	5·3	11·2	1·3	82	111·2	44·6	57·3	53·8	0·1	16·1	0·224	13·2	wP, wN
28	First Qr.	29·433	60·6	46·6	14·0	51·8	− 4·7	49·5	47·2	4·6	9·5	1·0	84	125·2	45·5	57·5	54·1	3·9	16·1	0·936	14·8	wN : wP : wN
29	In Equator	29·484	63·5	45·3	18·2	51·9	− 4·9	48·1	44·3	7·6	14·4	0·8	75	141·2	45·2	57·3	53·8	7·5	16·1	0·772	14·5	wN, mP
30	..	29·653	62·6	44·9	17·7	53·1	− 3·9	48·6	44·1	9·0	16·7	3·3	71	136·2	40·0	57·7	54·3	8·3	16·2	0·000	14·8	wP
31	..	29·521	63·4	44·3	19·1	52·8	− 4·5	49·6	46·4	6·4	12·9	2·5	79	110·5	37·7	58·5	55·3	3·2	16·2	0·015	5·7	wP : ssN, mP
Means	..	29·833	58·4	40·1	18·3	48·6	− 4·5	44·8	40·6	8·0	15·2	2·0	74·1	117·2	35·8	53·6	50·4	4·4	15·6	Sum 3·361	4·7	..
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	21	22

The results apply to the civil day, excepting those in Columns 16 and 17, which refer to the 24 hours ending 9h a.m. of the day against which the readings are placed.

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 29in·833, being 0in·056 *higher* than the average for the 20 years, 1854–1873.

TEMPERATURE OF THE AIR.

The highest in the month was 70°·6 on May 21; the lowest in the month was 30°·0 on May 10; and the range was 40°·6.
The mean of all the highest daily readings in the month was 58°·4, being 5°·9 *lower* than the average for the 38 years, 1841–1878.
The mean of all the lowest daily readings in the month was 40°·1, being 3°·8 *lower* than the average for the 38 years, 1841–1878.
The mean daily range was 18°·3, being 2°·1 *less* than the average for the 38 years, 1841–1878.
The mean for the month was 48°·6, being 4°·5 *lower* than the average for the 20 years, 1849–1868.

MONTH and DAY, 1879.	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.
			lbs.	lbs.	lbs.	miles.		
May 1	E : NE	NE : NNE	3·2	0·0	0·1	211	p.-cl : 7, ci.-cu, ci	8,cu.-s,ci.-cu,ci,sh.-r,sn: v, shs.-r, sn: 0
2	NNE : NE	NE : NNE	4·1	0·0	0·4	377	p.-cl : v, cu	10, oc.-slt.-r : v : 0
3	N : NNE	NNE : E : ENE	0·7	0·0	0·1	196	v : 5, cu.-s. ci.-cu	1, ci.-cu : 0
4	NE	NE : ESE	0·5	0·0	0·0	173	0 : 0	1, th.-cl : 0
5	NNE : NE	NNE : N	0·1	0·0	0·0	150	0 : 0	0 : 0
6	Calm : NNE	NNE : N	5·2	0·0	0·7	364	v, r : 10, c.-r, gt.-glm, w	9, cu.-s, ci.-cu : v : 0
7	N	NNE	4·4	0·0	1·1	457	v : 10, oc.-sn	10, r, oc.-sn : v, slt.-sh : 0
8	N : NNE	N : SW : SSW	0·8	0·0	0·1	215	ho.-fr : 10	10, cu.-s, ci.-cu : 5
9	WSW : NW	N : NNE	3·3	0·0	0·2	311	10, r : 10, slt.-r	10, n : v : 0
10	N : NNW	N: NNE: S: SSW	0·5	0·0	0·0	170	p.-cl : 7, cu.-s, ci.-cu, slt.-sn	8, cu.-s, ci.-cu : 9, cu.-s, ci.-cu
11	SW : SSW	SW : SSW	2·0	0·0	0·1	281	p.-cl : 10, r	10, shs.-r : 10
12	WSW : NW	NNW : N : SW	0·3	0·0	0·0	148	p.-cl : 6, cu.-s, ci.-cu, ci, h	8, h : v,cu.-s,slt.-h: 0
13	SW	WSW: SW: SSW	2·8	0·0	0·2	278	v : 10	8, cu.-s, ci.-cu, cu : 10, slt.-r
14	SW : WSW	WSW: WNW: NW	5·1	0·0	0·5	353	10, shs.-r : 10, cu.-s, ci.-cu, shs.-r	8,ci.-cu,cu.-s,ci.-s,r,t: 10, r
15	WNW	WNW: NW: NNW	8·0	0·0	1·0	557	p.-cl : v, st.-w, shs.-r	10, r, st.-w : 10, fq.-r, w : 10
16	NNW : N	N : NNE : SSW	1·7	0·0	0·1	286	10 : 10	10 : v : 0
17	S : SSW	S : SE	0·7	0·0	0·0	197	p.-cl : 4, ci.-cu	9, cu.-s, ci.-cu : 10, th.-r
18	SE	SE : ENE	0·3	0·0	0·0	229	10, r : 10, r	10 : v, cu.-s, ci.-cu
19	NE : NNE	N : E : SE	0·7	0·0	0·0	202	p.-cl : 9, ci.-cu, cu.-s	7, ci.-cu, cu.-s: v : 1, s, d
20	NE : SW	SW	0·0	0·0	0·0	94	p.-cl, m : 8, ci.-cu, ci, slt.-h	8,cu.-s,ci.-cu,ci,oc.-slt.-r: v, cu.-s
21	SW : WSW	WSW : SSW	0·0	0·0	0·0	187	0 : 8, ci.-s, ci.-cu	8, cu.-s, ci.-cu : v : 1, th.-cl
22	WSW	WSW : SW	0·2	0·0	0·0	203	p.-cl : 9, cu.-s, ci.-cu	10,cu.-s,ci.-cu,ci.-s: v : 10, oc.-r
23	NW	NW : NNW	5·0	0·0	0·6	408	10, r : 10, r, w	10, oc.-r : 10 : 5,cu.-s,ci.-cu
24	N : NE	SW : SSW	0·1	0·0	0·0	198	p.-cl : 5, ci.-s, li.-cl	7, ci.-cu, ci.-s, slt.-h: 8, ci.-cu, ci.-s, cu.-s
25	SSW : N	N:NE:NW:WSW	0·6	0·0	0·0	229	10, r : 10, th.-r, gt.-glm	v : 1, cu.-s, cu
26	SW : WSW	SW : SSW	2·2	0·0	0·2	300	v : 7, cu.-s, ci.-cu, ci.-s, slt.-sh	9, slt.-sh : 10, th.-r : 10, shs.-r
27	S : SE : ESE	E : ENE	1·0	0·0	0·0	217	10, r : 10, shs.-r	10, r : 10, r
28	ENE	ENE : ESE : NNE	2·1	0·0	0·1	275	10, r : 10	9, cu.-s, ci.-cu : 10, r
29	NW : SW : SSW	SSW	0·9	0·0	0·1	277	10, hy.-r, l, t : 10	7, cu.-s, ci.-cu, cu, t : 2, cu.-s
30	S : SSW	SSW : SSE	1·4	0·0	0·1	290	p.-cl : 9, cu.-s, ci.-cu, slt.-r	8, cu.-s, ci.-cu: v : 0
31	SSE : SE	SW : SSW	0·6	0·0	0·0	223	p.-cl : 9, cu.-s, ci.-cu, slt.-r	9, shs.-r : v, sh.-r : 1, s
Means	...	...	..	..	0·2	260		
Number of Column for Reference.	23	24	25	26	27	28	29	30

The mean *Temperature of Evaporation* for the month was 44°·8, being 4°·1 *lower* than
The mean *Temperature of the Dew Point* for the month was 40°·6, being 4°·5 *lower* than
The mean *Degree of Humidity* for the month was 74·1, being 1·3 *less* than
The mean *Elastic Force of Vapour* for the month was $0^{in}\cdot253$, being $0^{in}\cdot048$ *less* than
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was $2^{grs}\cdot9$, being $0^{gr}\cdot5$ *less* than
The mean *Weight of a Cubic Foot of Air* for the month was 544 grains, being 6 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 7·0.

The mean proportion of *Sunshine* for the month (constant sunshine being represented by 1) was 0·28. The maximum daily amount of *Sunshine* was 12·8 hours on May 4.

The highest reading of the *Solar Radiation Thermometer* was 142°·3 on May 20; and the lowest reading of the *Terrestrial Radiation Thermometer* was 24°·6 on May 10.

The mean daily distribution of *Ozone* was, for the 12 hours ending 9 a.m., 2·2; for the 6 hours ending 3 p.m., 1·6; and for the 6 hours ending 9 p.m., 0·9.

The *Proportions of Wind* referred to the cardinal points were N. 10, E. 5, S. 9, and W. 7.

The *Greatest Pressure of the Wind* in the month was $8^{lbs}\cdot0$ on the square foot on May 15. The mean daily *Horizontal Movement of the Air* for the month was 260 miles; the greatest daily value was 557 miles on May 15; and the least daily value 94 miles on May 20.

Rain fell on 15 days in the month, amounting to $3^{in}\cdot361$, as measured in the simple cylinder gauge partly sunk below the ground; being $1^{in}\cdot327$ *greater* than the average fall for the 38 years, 1841–1878.

MONTH and DAY, 1879.	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 of Mean 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 Daily Value.	Greatest of 24 Hourly Values.	Least of 24 Hourly Values.	Degree of Humidity (Saturation = 100).	TEMPERATURE. Highest in the Sun's Rays as shown by a Self-Registering Maximum Thermometer with blackened bulb in vacuo placed on the Grass.	Lowest on the Grass as shown by a Self-Registering Minimum Thermometer.	Of the Water of the Thames off Greenwich. Highest.	Of the Water of the Thames off Greenwich. Lowest.	Daily Duration of Sunshine.	Sun above Horizon.	Rain collected in a Gauge whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°	°	°	hours.	hours.	in.		
June 1	..	29·444	62·3	48·6	13·7	53·3	− 4·2	50·5	47·7	5·6	12·7	1·4	81	127·0	44·8	58·5	55·3	3·4	16·2	0·192	9·8	mP : mP, vN
2	..	29·496	61·6	45·9	15·7	52·2	− 5·5	50·6	49·0	3·2	10·8	1·2	89	109·9	42·8	58·3	55·3	0·9	16·3	0·316	10·3	wP, mN : vN, wP
3	Perigee	29·417	62·8	44·3	18·5	51·8	− 6·1	49·9	48·0	3·8	9·7	1·0	87	128·3	40·0	58·5	55·3	1·2	16·3	0·375	1·5	ssN, mP : wP: sN, mP
4	Full	29·710	66·8	41·3	25·5	52·9	− 5·2	48·9	44·9	8·0	17·5	1·3	74	143·0	36·1	58·1	55·3	7·8	16·3	0·005	0·0	sP: wP,wN: sP
5	Greatest Declination S.	29·673	67·9	42·7	25·2	56·0	− 2·2	50·8	45·9	10·1	22·5	0·4	69	152·2	35·8	58·1	55·3	7·6	16·4	0·007	4·2	sP: mP : vP
6	..	29·544	69·2	51·9	17·3	58·2	− 0·1	55·4	52·9	5·3	12·4	1·2	82	139·0	51·2	59·3	56·3	4·7	16·4	0·209	10·0	ssN, mP : mP
7	..	29·524	66·2	51·5	14·7	57·6	− 0·8	55·4	53·4	4·2	9·0	0·2	86	104·0	46·2	59·8	57·3	0·0	16·4	0·598	7·8	mP: ssN,sP
8	..	29·441	68·4	51·6	16·8	58·5	0·0	54·8	51·5	7·0	15·7	1·2	77	125·3	45·8	60·5	57·3	6·7	16·4	0·063	8·8	mP
9	..	29·633	64·2	49·0	15·2	56·9	− 1·6	53·9	51·1	5·8	10·3	2·6	81	135·0	42·0	60·3	57·8	4·4	16·4	0·012	14·0	mP:sP
10	..	29·863	71·2	48·7	22·5	58·0	− 0·6	52·4	47·4	10·6	20·3	1·5	68	152·0	40·1	60·8	58·5	13·5	16·5	0·000	4·5	mP : ssP
11	In Equator: Last Quarter.	29·828	62·9	47·0	15·9	56·5	− 2·2	54·2	52·0	4·5	10·3	1·8	85	99·0	40·6	61·3	58·3	0·6	16·5	0·210	4·8	mP : ssN : sP
12	..	29·810	65·7	50·1	15·6	56·1	− 2·7	53·0	50·1	6·0	13·1	1·8	80	142·2	44·7	61·3	58·1	7·8	16·5	0·041	5·7	mP,sN: wP
13	..	29·918	67·8	49·9	17·9	57·2	− 1·7	53·8	50·7	6·5	14·4	1·4	79	141·0	43·1	61·3	58·3	2·8	16·5	0·002	0·8	wP : wN : vN, wP
14	..	29·936	72·7	49·0	23·7	59·5	+ 0·4	56·0	52·9	6·6	17·5	0·6	79	138·0	44·0	61·3	57·8	7·1	16·5	0·000	1·2	wP : mP : wP
15	Apogee	29·716	66·3	56·8	9·5	59·9	+ 0·6	58·2	56·7	3·2	6·1	1·5	90	112·1	56·6	61·8	58·3	0·3	16·5	0·273	7·1	wP : wP : mP
16	..	29·404	69·0	52·0	17·0	59·2	− 0·3	57·2	55·4	3·8	9·9	0·8	88	122·3	49·0	62·3	59·3	2·1	16·5	0·141	4·6	wP
17	..	29·370	68·4	51·5	16·9	57·8	− 1·9	54·0	50·6	7·2	14·6	1·4	77	144·0	48·6	62·8	59·8	8·5	16·6	0·000	8·5	mP
18	..	29·606	67·6	51·6	16·0	58·6	− 1·3	54·5	50·8	7·8	15·7	1·8	75	143·0	47·0	62·3	59·3	3·5	16·6	0·000	0·0	mP: vP : sP
19	Greatest Dec. N.: New.	29·728	67·5	48·7	18·8	58·1	− 2·1	54·4	51·1	7·0	13·3	1·8	77	137·2	43·2	62·3	59·3	5·4	16·6	0·010	5·8	sP : mP
20	..	29·642	70·8	53·1	17·7	60·4	− 0·1	57·1	54·3	6·1	14·2	0·8	80	141·7	51·0	63·3	60·1	3·0	16·6	0·141	3·8	wP : mP : mP
21	..	29·600	60·6	52·4	8·2	56·2	− 4·6	54·0	51·9	4·3	8·0	1·7	86	93·5	50·1	63·8	61·3	0·0	16·6	0·261	11·5	wP
22	..	29·660	64·6	52·4	12·2	56·4	− 4·7	51·5	46·9	9·5	14·8	5·0	70	130·4	50·0	63·3	60·1	2·6	16·6	0·000	1·0	mP : sP : ssP
23	..	29·701	66·2	46·5	19·7	55·2	− 6·2	50·6	46·2	9·0	16·0	2·9	72	137·1	43·8	62·3	59·8	1·6	16·6	0·000	9·5	sP : sP : wP
24	..	29·470	66·5	50·0	16·5	54·9	− 6·8	51·6	48·4	6·5	13·7	2·4	79	147·2	49·0	62·3	59·3	6·5	16·6	0·482	5·5	wP:wP,sN: ssP
25	..	29·461	66·6	49·3	17·3	54·2	− 7·7	51·2	48·3	5·9	11·8	1·4	80	139·0	46·0	61·8	58·3	3·4	16·6	0·848	3·8	sP, ssN : vP, vN
26	In Equator	29·588	65·3	47·0	18·3	55·5	− 6·5	52·9	50·4	5·1	10·3	2·1	84	113·0	43·0	61·3	57·8	2·3	16·5	0·088	10·0	sP:wN,mP: mP
27	First Qr.	29·695	68·2	51·0	17·2	60·9	− 1·1	57·1	53·9	7·0	11·7	2·4	78	125·0	47·9	61·3	57·8	5·2	16·5	0·000	11·0	mP
28	..	29·671	72·7	52·6	20·1	61·4	− 0·5	56·9	53·0	8·4	17·1	2·5	74	159·5	48·6	61·8	59·1	5·7	16·5	0·000	7·8	mP : wP, wN : sP
29	..	29·819	69·2	51·0	18·2	58·6	− 3·2	54·0	49·9	8·7	15·7	1·8	73	152·0	47·0	61·5	58·3	11·0	16·5	0·000	8·0	sP : mP : sP
30	..	29·873	71·2	50·2	21·0	59·2	− 2·5	54·0	49·3	9·9	18·0	2·2	70	143·8	46·9	62·3	59·1	12·3	16·5	0·014	12·5	sP:wN, wP: sP, mN
Means	..	29·641	67·0	49·6	17·4	57·0	− 2·7	53·6	50·5	6·6	13·6	1·7	79·0	132·6	45·5	61·1	58·1	4·7	16·5	Sum 4·288	6·5	..
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	21	22

The results apply to the civil day, excepting those in Columns 16 and 17, which refer to the 24 hours ending 9h a.m. of the day against which the readings are placed.

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 results on June 9 and 10 for Evaporation Temperature, depend partly on values inferred from eye-observations, on account of accidental loss of photographic register.

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 29in·641, being 0in·187 *lower* than the average for the 20 years, 1854–1873.

TEMPERATURE OF THE AIR.

The highest in the month was 72°·7 on June 14 and 28; the lowest in the month was 41°·3 on June 4; and the range was 31°·4.
The mean of all the highest daily readings in the month was 67°·0, being 4°·2 *lower* than the average for the 38 years, 1841–1878.
The mean of all the lowest daily readings in the month was 49°·6, being 0°·4 *lower* than the average for the 38 years, 1841–1878.
The mean daily range was 17°·4, being 3°·8 *less* than the average for the 38 years, 1841–1878.
The mean for the month was 57°·0, being 2°·7 *lower* than the average for the 20 years, 1849–1868.

MONTH and DAY, 1879.	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.
			lbs.	lbs.	lbs.	miles.		
June 1	SW	SW	5·0	0·0	0·6	438	p.-cl : 9, cu.-s, hy.-sh	8,cu.-s,ci.-cu: 10, r : 9, cu.-s, s, r
2	WSW : SW	SW : S	8·5	0·0	0·2	258	10 : 10, shs.-r, w	10, r : 10, c.-r
3	S : NW : W	N:NNW:WSW	1·4	0·0	0·0	204	10, oc.-r : 10, oc.-r	10, oc.-r : 9, cu.-s, oc.-shs
4	WSW	SW	2·5	0·0	0·1	281	p.-cl : 8, cu.-s, ci.-cu, ci	7,ci.-cu,cu.-s: v, slt.-r : 4, ci.-s
5	SW : S : SE	E	1·3	0·0	0·1	193	p.-cl : 9, ci, ci.-s, ci.-cu	7, cu, ci.-cu, ci.-s : 10, r
6	ENE : ESE : SSW	SSW : SW	1·2	0·0	0·0	236	10, r : 10	8, cu.-s, ci.-cu : 6, cu.-s, ci.-cu
7	SW : SSE	SE : ESE : SW	0·3	0·0	0·0	159	p.-cl : 10, r	10, oc.-r : 10, c.-r : 10, r
8	SSW	SSW : S	2·7	0·0	0·2	275	10 : 10	9,cu.-s,ci.-cu,n,hy.-shs: 9,cu.-s,ci.-cu,shs.-r
9	SSW	SSW : S	3·3	0·0	0·3	311	10 : 10, shs.-r	9,cu.-s,ci.-cu,shs.-r: 1, ci.-cu
10	SW	SSW : SSE	0·4	0·0	0·0	172	0 : 7, cu.-s, ci.-cu	6, cu.-s, ci.-cu : 0
11	SE : E	SE : SSW	0·6	0·0	0·0	166	v : 10, r	10, oc.-r : v, r : 0
12	SSW : SW	SW : SSW : S	3·8	0·0	0·4	311	v : 7,cu.-s,ci.-cu,ci,shs.-r	8,cu.-s,ci.-cu,ci,shs.-r: 7, cu.-s, ci.-cu
13	WSW : NW	SW : WSW	0·0	0·0	0·0	145	p.-cl : 8, cu.-s, ci.-cu, glm	7, cu.-s, ci.-cu, glm, t: 10, th.-r
14	ENE : SE : SW	SSW : S	0·7	0·0	0·0	157	v : 7, ci.-s, ci.-cu	5, ci.-cu, cu.-s, ci.-s: 10
15	SW : S	SSW	2·0	0·0	0·1	208	10 : 10, r	10, oc.-r : v, sc, ci, th.-cl
16	SE : ENE : E	SSW : SW	3·8	0·0	0·3	274	v : 10, fq.-r	10, r : v : 3,cu.-s,ci.-s
17	SW : SSW	SW : WSW	1·4	0·0	0·0	231	p.-cl : 10	6, cu.-s, ci.-cu, ci.-s: 2, ci.-cu, ci.-s
18	W : WNW	WNW : WSW	1·4	0·0	0·1	272	v : 10	7, cu.-s, ci.-cu, slt.-h: 5, cu.-s, ci.-cu
19	SW	SSW : SSE	1·6	0·0	0·1	241	p.-cl : 6, cu.-s, ci.-cu, ci	9, cu.-s, ci.-cu : 10, r
20	SSE : SW : WSW	SW : SSW	1·6	0·0	0·1	272	10, fq.-r : 7, cu.-s, ci.-cu, r	9,ci.-s,ci,cu.-s,ci.-cu: 4, cu.-s, ci.-cu
21	SSW	SSW : SW	16·5	0·0	1·2	436	v : 10, r	10, c.-r, w : 10, st.-w : 9
22	WSW	W : WSW	4·7	0·0	0·7	462	v : 9, cu.-s, ci.-cu	10 : v, ci, ci.-cu
23	SW	SW : S	1·0	0·0	0·0	240	p.-cl : 10	9, cu.-s, ci.-cu, ci : 8, ci.-cu, ci.-s, oc.-r
24	S : SW	WSW : SW : SSW	4·3	0·0	0·1	264	10, r : v, cu.-s, r	v,ci.-cu,fq.-shs,t.-sm,hl: v, cu.-s, ci.-s, t
25	SSW : SW	WSW : WNW	2·1	0·0	0·0	240	10, r : 10, c.-r	7, hy.-r : v, t : 0
26	SW : S	SW	3·6	0·0	0·5	384	0 : 10, fq.-r	10 : v : 10
27	SSW	SSW : S	3·2	0·0	0·4	392	p.-cl : 6, cu.-s, ci.-cu, ci, sc	9,cu.-s,ci.-cu,ci.-s,th.-r: 3, th.-cl
28	SSW : SW	SW	3·5	0·0	0·6	379	p.-cl, m.-r : 10	5, ci, ci.-cu, ci.-s : 0
29	SSW	SSW : SW	2·3	0·0	0·3	373	v : 10,th.-cl,cu.-s,so.-ha	v, cu.-s, ci.-cu, ci.-s: 1, ci.-cu
30	SW : WSW	SW : SSW : SSE	1·8	0·0	0·2	329	0 : 4, cu.-s	5,cu.-s,ci.-cu : so.-ha : 6, cu.-s, ci
Means	...	...	..	..	0·2	277		
Number of Column for Reference.	23	24	25	26	27	28	29	30

The mean *Temperature of Evaporation* for the month was 53°·6, being 1°·6 *lower* than the average for the 20 years, 1849–1868.
The mean *Temperature of the Dew Point* for the month was 50°·5, being 0°·7 *lower* than the average for the 20 years, 1849–1868.
The mean *Degree of Humidity* for the month was 79·0, being 5·7 *greater* than the average for the 20 years, 1849–1868.
The mean *Elastic Force of Vapour* for the month was 0in·367, being 0in·010 *less* 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·1 *less* than the average for the 20 years, 1849–1868.
The mean *Weight of a Cubic Foot of Air* for the month was 531 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 7·7.
The mean proportion of *Sunshine* for the month (constant sunshine being represented by 1) was 0·28. The maximum daily amount of *Sunshine* was 13·5 hours on June 10.
The highest reading of the *Solar Radiation Thermometer* was 159°·5 on June 28; and the lowest reading of the *Terrestrial Radiation Thermometer* was 35°·8 on June 5.
The mean daily distribution of *Ozone* was, for the 12 hours ending 9 a.m., 3·5; for the 6 hours ending 3 p.m., 1·4; and for the 6 hours ending 9 p.m., 1·6.
The *Proportions of Wind* referred to the cardinal points were N. 1, E. 3, S. 15, and W. 10. One day was calm.
The *Greatest Pressure of the Wind* in the month was 16lbs·5 on the square foot on June 21. The mean daily *Horizontal Movement of the Air* for the month was 277 miles; the greatest daily value was 462 miles on June 22; and the least daily value 145 miles on June 13.
Rain fell on 20 days in the month, amounting to 4in·288, as measured in the simple cylinder gauge partly sunk below the ground; being 2in·302 *greater* than the average fall for the 38 years, 1841–1878.

MONTH and DAY, 1879.	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 of Mean 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 Daily Value.	Greatest of 24 Hourly Values.	Least of 24 Hourly Values.	Degree of Humidity (Saturation = 100).	TEMPERATURE. Highest in the Sun's Rays as shown by a Self-Registering Maximum Thermometer with blackened bulb in vacuo placed on the Grass.	Lowest on the Grass as shown by a Self-Registering Minimum Thermometer.	Of the Water of the Thames off Greenwich. Highest.	Of the Water of the Thames off Greenwich. Lowest.	Daily Duration of Sunshine.	Sun above Horizon.	Rain collected in a Gauge whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°	°	°	hours.	hours.	in.		
July 1	Perigee	29·339	67·1	50·5	16·6	56·8	− 4·8	54·8	53·0	3·8	9·3	1·3	87	117·4	46·0	62·3	58·8	2·9	16·5	0·498	11·3	vP, vN : sP
2	Greatest Declination S.	29·403	66·1	50·0	16·1	55·3	− 6·2	51·8	48·4	6·9	14·4	1·8	78	144·3	45·6	63·3	60·1	6·0	16·5	0·378	7·2	mP:vP,wN: sP
3	Full	29·335	59·5	49·9	9·6	53·6	− 7·8	52·5	51·4	2·2	4·0	0·4	92	87·0	47·5	62·8	58·8	0·0	16·4	0·629	5·0	sP : vN, sP
4	..	29·514	65·0	48·4	16·6	55·2	− 6·2	51·9	48·7	6·5	14·2	2·1	79	133·5	44·9	62·5	58·3	7·4	16·4	0·108	1·5	sP, sN : vP, vN
5	..	29·694	65·9	48·6	17·3	55·4	− 6·1	51·6	48·0	7·4	17·8	1·0	77	135·0	45·0	60·8	57·8	7·2	16·4	0·103	0·0	mP: vN,wP
6	..	29·764	64·8	47·9	16·9	55·8	− 5·9	53·1	50·6	5·2	13·5	0·8	83	109·3	42·3	60·8	57·5	2·8	16·4	0·090	0·7	sP
7	..	29·543	72·0	51·5	20·5	60·5	− 1·4	57·6	55·1	5·4	13·3	0·4	83	136·8	46·5	60·3	57·3	4·0	16·3	0·140	3·7	mP
8	..	29·338	61·9	49·5	12·4	55·4	− 6·8	52·0	48·7	6·7	9·3	3·2	79	118·2	44·3	61·3	58·8	1·5	16·3	0·036	8·0	mP : wP : ssN, mP
9	In Equator	29·333	62·3	51·0	11·3	55·6	− 6·9	52·2	49·0	6·6	13·5	1·4	79	140·6	47·5	61·3	58·3	3·1	16·3	0·233	4·5	sN, mP : mP, sN
10	..	29·614	62·7	51·0	11·7	56·2	− 6·5	52·3	48·6	7·6	13·3	3·0	76	116·8	47·2	61·3	58·3	1·1	16·3	0·005	0·0	vP:wN,mP
11	Last Qr.	29·794	62·1	46·3	15·8	54·8	− 8·1	50·8	47·0	7·8	12·3	2·7	75	124·8	40·0	60·8	57·3	3·8	16·2	0·000	1·5	sP,wN : vP
12	..	29·601	63·5	52·0	11·5	56·2	− 6·9	53·8	51·5	4·7	10·6	0·6	85	119·8	48·4	60·5	56·8	0·6	16·2	0·070	11·2	sP: mP
13	Apogee	29·351	66·5	50·1	16·4	57·3	− 6·0	54·6	52·1	5·2	12·8	0·4	83	144·0	45·9	60·3	56·3	5·7	16·2	0·082	13·7	mP, wN : mP
14	..	29·389	64·1	53·7	10·4	56·4	− 7·0	54·3	52·3	4·1	9·9	0·4	86	108·8	50·0	61·3	58·3	0·4	16·1	0·161	4·5	mP, wN : vP, vN
15	..	29·614	65·3	53·2	12·1	58·0	− 5·4	55·7	53·6	4·4	9·9	0·4	85	106·0	47·0	61·3	59·1	0·5	16·1	0·000	0·0	wP,wN: vP
16	Greatest Declination N.	29·726	64·6	50·8	13·8	57·3	− 6·2	54·9	52·8	4·5	8·7	1·0	85	132·2	43·5	61·1	59·5	0·4	16·1	0·000	1·0	mP: sP
17	..	29·684	65·4	53·3	12·1	59·1	− 4·4	56·9	54·9	4·2	8·6	1·2	87	134·3	49·5	61·3	59·5	0·2	16·0	0·000	0·0	sP : vP
18	..	29·851	67·5	54·5	13·0	60·0	− 3·4	57·2	54·8	5·2	9·2	1·6	83	132·3	51·9	62·3	60·1	3·4	16·0	0·000	2·2	vP
19	New	29·812	72·9	53·3	19·6	60·9	− 2·4	58·0	55·5	5·4	11·9	1·0	83	158·8	51·3	62·3	60·3	1·9	16·0	0·000	3·8	sP: wP : sP
20	..	29·341	68·1	53·5	14·6	57·7	− 5·5	55·9	54·3	3·4	11·0	0·8	88	140·6	53·0	62·3	60·3	1·0	15·9	0·700	11·5	wP, wN : vP, mN
21	..	29·253	58·8	53·4	5·4	55·9	− 7·1	54·4	53·0	2·9	5·3	1·4	90	83·2	52·8	62·1	60·1	0·0	15·9	0·328	4·5	wP, wN : wP, mN
22	..	29·474	62·4	52·5	9·9	56·4	− 6·5	54·1	51·9	4·5	9·9	0·4	85	105·8	48·3	61·3	59·3	0·0	15·8	0·033	0·0	wP : 0 : mP
23	In Equator	29·845	68·9	54·0	14·9	59·1	− 3·7	56·3	53·8	5·3	11·0	2·9	83	121·5	51·0	61·3	59·3	2·9	15·8	0·000	0·0	mP : 0 : wP
24	..	29·892	73·6	50·6	23·0	60·7	− 2·0	56·6	53·1	7·6	17·5	2·0	76	156·0	46·0	60·8	58·3	6·2	15·7	0·025	2·0	o : vP
25	..	29·932	69·2	49·0	20·2	57·7	− 5·0	54·4	51·4	6·3	13·3	1·0	80	151·7	43·0	61·8	59·3	5·0	15·7	0·000	0·0	sP : vP
26	First Qr.	29·815	65·5	49·2	16·3	56·2	− 6·5	53·9	51·7	4·5	8·2	0·8	85	124·3	44·4	62·3	60·1	0·5	15·7	0·005	2·0	vP
27	..	29·896	70·7	49·0	21·7	59·2	− 3·4	55·6	52·4	6·8	14·9	0·0	79	132·0	43·0	62·3	59·8	6·3	15·6	0·000	4·5	wP : ssP : mP
28	Perigee	29·987	74·3	55·2	19·1	63·7	+ 1·1	60·4	57·7	6·0	11·7	1·7	81	121·3	52·3	62·5	59·8	3·3	15·6	0·000	1·5	mP: wP
29	Greatest Declination S.	29·879	78·5	54·8	23·7	65·8	+ 3·2	62·2	59·2	6·6	13·9	0·2	80	149·7	51·0	62·8	60·3	11·1	15·5	0·000	1·0	mP: wP
30	..	29·751	80·6	56·1	24·5	67·1	+ 4·5	62·9	59·5	7·6	17·9	0·4	77	144·2	52·1	63·8	61·1	8·8	15·5	0·000	0·0	mP
31	..	29·729	74·3	60·0	14·3	64·4	+ 1·8	62·1	60·2	4·2	12·1	1·1	86	126·2	58·5	65·3	62·3	1·3	15·4	0·099	2·3	mP
Means	..	29·629	67·2	51·7	15·5	58·2	− 4·4	55·3	52·7	5·5	11·7	1·2	82·4	127·6	47·7	61·8	59·1	3·2	16·0	Sum 3·723	3·5	..
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	21	22

The results apply to the civil day, excepting those in Columns 16 and 17, which refer to the 24 hours ending 9h a.m. of the day against which the readings are placed.

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 29in·629, being 0in·180 *lower* than the average for the 20 years, 1854–1873.

TEMPERATURE OF THE AIR.

The highest in the month was 80°·6 on July 30; the lowest in the month was 46°·3 on July 11; and the range was 34°·3.
The mean of all the highest daily readings in the month was 67°·2, being 7°·2 *lower* than the average for the 38 years, 1841–1878.
The mean of all the lowest daily readings in the month was 51°·7, being 1°·5 *lower* than the average for the 38 years, 1841–1878.
The mean daily range was 15°·5, being 5°·7 *less* than the average for the 38 years, 1841–1878.
The mean for the month was 58°·2, being 4°·4 *lower* than the average for the 20 years, 1849–1868.

MONTH and DAY, 1879.	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.
			lbs.	lbs.	lbs.	miles.		
July 1	SSE: S: SSW	SW: WSW	11·5	0·0	1·1	482	v, r : 10, c.-r, st.-w	9, cu.-s, ci.-s, r: v : 2, ci.-cu
2	WSW	SW: SSW	6·9	0·0	1·1	512	p.-cl, w : 8, cu.-s, ci.-cu, ci, w	8, cu.-s,ci.-cu,cu,shs.-r,l, t : 4, cu.-s,ci.-cu,lu.-ha
3	SSW: S: SSE	W: NNW: WSW	1·3	0·0	0·1	254	10, th.-r : 10, th.-r	10, hy.-r, glm: 10, oc.-th.-r : 2, cu.-s
4	WSW: W	W: WSW	6·0	0·0	1·1	494	p.-cl : 10, shs.-r, w	7,cu.-s,ci.-cu,th.-cl,shs.-r,w: v, shs.-r, w: 5,cu.-s,ci.-cu
5	WSW: WNW	W: WNW: WSW	5·4	0·0	0·9	428	p.-cl : 10, oc.-r	v,cu.-s,ci.-cu,oc.-r,w: 6, cu.-s, ci.-cu, r
6	WSW: W	WSW: SW	0·5	0·0	0·0	250	v : 8	10, r : 10, r
7	SW	SW	4·0	0·0	0·7	430	10, r : 9, cu.-s, ci.-cu, oc.-shs	9, cu.-s : 8, cu.-s
8	SW	SW	7·0	0·0	1·7	559	v : 10, oc.-slt.-r, w	10, oc.-r, w : v, shs.-r : 3, cu.-s
9	WSW: W	W	5·3	0·0	1·5	587	p.-cl, r : 10, shs.-r	9,cu.-s,ci.-cu,slt.-r,w: 9, cu.-s, ci.-cu, r
10	W: NW	NW: WNW	2·4	0·0	0·2	393	10 : 10, r	10 : 5, cu.-s, ci.-cu, ci
11	W: WSW: WNW	W: SW: S	0·8	0·0	0·0	247	v : 10	10 : 10
12	SSW: SSE	SSW: SSE	0·1	0·0	0·0	196	10 : 10	10, r : 10, oc.-r
13	SW: SSW	SSW	1·6	0·0	0·1	294	10, r : v, oc.-shs	8, cu.-s,ci.-cu,cu,sh.-r : v, cu.-s, ci.-cu
14	SW	SW: SSW	0·9	0·0	0·0	253	p.-cl : 10	10, cu.-s, cu, ci.-cu, r: 10, r
15	SW: N	N: NNE	0·0	0·0	0·0	190	10 : 10, th.-r	10 : 7, cu.-s, ci.-cu
16	NE: E	SE: SSW	0·0	0·0	0·0	115	p.-cl : 10	10 : 10
17	ESE: E	E	0·0	0·0	0·0	148	10 : 10	10, r : 9, cu.-s, ci.-cu, m
18	NE: NNE: ENE	ENE: E: ESE	0·0	0·0	0·0	194	p.-cl : 5, ci.-cu, ci	10 : 8, cu.-s, ci.-cu
19	ENE: SE	SSW	0·1	0·0	0·0	151	p.-cl : 8, ci.-cu, ci	10, slt.-r, t : 10
20	SSW	SW: W	22·0	0·0	1·1	525	10, r : 10, oc.-th.-r, w	vv, l, t, oc.-shs, st.-w: 10, r
21	W	W: WNW	11·0	0·0	1·5	639	10, st.-w : 10, fq.-r, st.-w	10, fq.-r : 10, fq.-r
22	NW: N	NNW	4·5	0·0	0·2	419	10, r : 10	10, r : 10, shs.-r
23	N: NNW: NW	SW: S	0·5	0·0	0·0	233	10 : 10	9, cu.-s, ci.-cu : 3, ci.-cu
24	SW	W	1·4	0·0	0·1	313	v, r : 10	5, cu.-s, ci.-cu : 5, ci.-s, ci.-cu, cu.-s
25	WSW	WSW: SW	0·2	0·0	0·0	220	0 : 5, cu.-s, ci	10 : v : 3, cu.-s, ci
26	WSW	SW: WSW	0·0	0·0	0·0	158	0 : 10, slt.-r	10, oc.-slt.-r : 10, oc.-shs : 10
27	WSW: W	WSW	0·0	0·0	0·0	241	p.-cl : 5, cu, slt.-h	7,cu.-s,ci.-cu,th.-cl : 10
28	WSW	WSW: SW: SSW	0·5	0·0	0·0	276	10 : 10	10 : v : 1, cu.-s
29	SSW: SE	SE: E	0·4	0·0	0·0	154	0 : 6, cu.-s, ci.-cu	5, ci.-cu, cu.-s : 1, ci.-s
30	E: SW: W	SW	0·3	0·0	0·0	215	p.-cl : 8, ci.-cu	4, ci.-cu, ci, cu.-s : 10
31	SW: SSW: SE	S: SW	0·0	0·0	0·0	177	10, r : 10, th.-cl, r	10, r : v,cu.-s,ci.-cu: 6,cu.-s,ci.-cu
Means	...	...	..	..	0·4	314		
Number of Column for Reference.	23	24	25	26	27	28	29	30

The mean *Temperature of Evaporation* for the month was 55°·3, being 2°·4 *lower* than
The mean *Temperature of the Dew Point* for the month was 52°·7, being 1°·0 *lower* than
The mean *Degree of Humidity* for the month was 82·4, being 9·4 *greater* than
The mean *Elastic Force of Vapour* for the month was $0^{in}\cdot399$, being $0^{in}\cdot014$ *less* than
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was $4^{grs}\cdot4$, being $0^{gr}\cdot2$ *less* than
The mean *Weight of a Cubic Foot of Air* for the month was 529 grains, being 1 grain *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 8·5.
The mean proportion of *Sunshine* for the month (constant sunshine being represented by 1) was 0·20. The maximum daily amount of *Sunshine* was 11·1 hours on July 29.
The highest reading of the *Solar Radiation Thermometer* was 158°·8 on July 19; and the lowest reading of the *Terrestrial Radiation Thermometer* was 40°·0 on July 11.
The mean daily distribution of *Ozone* was, for the 12 hours ending 9 a.m., 2·2; for the 6 hours ending 3 p.m., 0·6; and for the 6 hours ending 9 p.m., 0·7.
The *Proportions of Wind* referred to the cardinal points were N. 4, E. 3, S. 10, and W. 14.
The *Greatest Pressure of the Wind* in the month was $22^{lbs}\cdot0$ on the square foot on July 20. The mean daily *Horizontal Movement of the Air* for the month was 314 miles; the greatest daily value was 639 miles on July 21; and the least daily value 115 miles on July 16.
Rain fell on 19 days in the month, amounting to $3^{in}\cdot723$, as measured in the simple cylinder gauge partly sunk below the ground; being $1^{in}\cdot354$ *greater* than the average fall for the 38 years, 1841–1878.

MONTH and DAY, 1879.	Phases of the Moon.	BAROMETER. Mean of 24 Hourly Values (corrected and reduced to 32° Fahrenheit).	TEMPERATURE. Of the Air. Highest.	TEMPERATURE. Of the Air. Lowest.	TEMPERATURE. Of the Air. Daily Range.	TEMPERATURE. Of the Air. Mean of 24 Hourly Values.	TEMPERATURE. Of the Air. Excess of Mean above Average of 20 Years.	TEMPERATURE. Of Evaporation. Mean of 24 Hourly Values.	TEMPERATURE. Of the Dew Point. Deduced Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Greatest of 24 Hourly Values.	Difference between the Air Temperature and Dew Point Temperature. Least of 24 Hourly Values.	Degree of Humidity (Saturation = 100).	TEMPERATURE. Highest in the Sun's Rays as shown by a Self-Registering Maximum Thermometer with blackened bulb in vacuo placed on the Grass.	TEMPERATURE. Lowest on the Grass as shown by a Self-Registering Minimum Thermometer.	TEMPERATURE. Of the Water of the Thames off Greenwich. Highest.	TEMPERATURE. Of the Water of the Thames off Greenwich. Lowest.	Daily Duration of Sunshine.	Sun above Horizon.	Rain collected in a Gauge whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°	°	°	hours.	hours.	in.		
Aug. 1	..	29·747	77·4	54·0	23·4	63·9	+ 1·3	60·8	58·2	5·7	14·1	0·4	82	143·2	49·0	66·3	62·8	4·0	15·3	0·158	0·7	wP: mP
2	Full	29·937	71·2	50·2	21·0	60·7	— 2·0	55·7	51·4	9·3	17·5	2·8	71	140·2	45·2	66·3	62·8	10·3	15·3	0·002	0·8	sP: vP, sN
3	..	29·724	75·8	57·4	18·4	63·3	+ 0·6	61·4	59·8	3·5	9·0	1·1	89	106·3	54·7	64·8	62·3	0·9	15·2	0·089	7·8	sN, sP: wP
4	..	29·806	70·1	54·0	16·1	62·0	— 0·7	59·0	56·4	5·6	12·6	1·3	82	139·3	49·2	66·3	64·1	2·4	15·2	0·007	5·2	wP: mP
5	In Equator	29·726	67·9	51·8	16·1	58·7	— 4·0	56·0	53·6	5·1	12·1	0·2	83	119·6	49·3	65·8	63·8	2·1	15·1	0·093	8·0	mP: mP, wN
6	..	29·607	68·4	50·8	17·6	57·6	— 5·1	54·9	52·5	5·1	11·9	0·4	83	142·0	48·4	65·3	62·3	6·6	15·1	0·207	10·0	sP: ssN, sP
7	..	29·690	68·1	52·2	15·9	57·7	— 5·0	55·0	52·6	5·1	14·0	0·0	83	137·2	48·2	65·3	61·8	4·6	15·0	0·097	6·2	mP: vP: sP
8	..	29·683	68·2	54·3	13·9	59·4	— 3·3	57·8	56·4	3·0	7·2	0·0	90	117·3	54·3	64·3	61·3	0·2	15·0	0·009	0·0	vP: vP: mP
9	Apogee	29·753	64·3	51·0	13·3	57·0	— 5·7	52·9	49·1	7·9	17·1	0·0	74	131·8	47·0	63·8	61·5	6·1	14·9	0·000	0·0	vP
10	Last Qr.	29·848	72·9	45·9	27·0	59·0	— 3·7	54·9	51·2	7·8	15·8	0·8	75	125·0	43·0	63·8	61·1	9·0	14·9	0·000	3·0	ssP: mP
11	..	29·837	73·0	56·2	16·8	63·0	+ 0·3	60·0	57·5	5·5	10·3	2·9	82	130·4	54·0	63·3	60·3	0·8	14·8	0·000	1·5	sP
12	Greatest Declination N.	29·773	72·8	55·0	17·8	62·9	+ 0·3	59·3	56·2	6·7	18·5	0·6	79	140·2	51·8	63·8	60·3	12·1	14·7	0·000	9·2	mP: sP: sP
13	..	29·691	77·9	53·0	24·9	65·2	+ 2·7	61·2	57·9	7·3	20·7	0·2	78	133·7	46·5	64·3	61·3	3·1	14·7	0·002	4·2	sP: mP: sP
14	..	29·846	77·0	59·6	17·4	65·9	+ 3·5	62·6	59·9	6·0	13·6	1·3	81	128·7	56·2	65·3	62·3	3·5	14·6	0·003	0·5	mP, wN: mP
15	..	29·759	79·7	59·1	20·6	65·3	+ 3·0	61·7	58·7	6·6	15·8	0·9	80	150·0	56·0	65·3	62·3	7·9	14·6	0·000	2·0	mP: sP
16	..	29·492	67·6	52·0	15·6	59·6	— 2·5	57·0	54·7	4·9	10·1	1·1	84	107·5	50·0	66·1	63·1	2·0	14·5	0·034	6·8	mP: mP, wN: mP
17	New	29·385	55·4	50·3	5·1	53·5	— 8·4	52·5	51·5	2·0	4·6	0·6	93	70·0	47·3	66·3	63·8	0·0	14·4	0·510	6·8	mP: vN: wP
18	..	29·508	70·8	51·8	19·0	57·8	— 4·0	55·4	53·2	4·6	11·7	0·0	85	139·1	51·2	65·3	62·3	6·2	14·4	0·190	3·0	wN, wP: mP: mP
19	In Equator	29·646	65·4	49·9	15·5	57·7	— 3·9	57·0	56·4	1·3	4·4	0·0	96	92·3	44·0	63·8	61·8	0·0	14·3	0·333	1·2	mP: wN, mP: vP
20	..	29·538	67·0	56·4	10·6	62·8	+ 1·4	61·9	61·2	1·6	4·5	0·2	95	87·5	56·0	63·8	61·3	0·0	14·3	0·562	6·5	wP
21	..	29·506	69·3	57·7	11·6	63·1	+ 1·8	62·0	61·1	2·0	5·2	0·6	93	105·4	53·9	63·5	61·1	0·5	14·2	0·198	4·0	mP: vP, vN: mP
22	Perigee	29·565	69·8	54·9	14·9	60·6	— 0·7	56·9	53·7	6·9	16·7	0·4	78	148·5	48·0	63·5	60·7	10·8	14·1	0·023	13·2	mP: sP
23	..	29·638	64·4	54·8	9·6	59·2	— 2·0	58·7	58·3	0·9	1·9	0·4	97	86·3	50·6	63·3	60·8	0·0	14·1	1·167	10·0	mP: sN, wP: mP
24	First Qr.	29·791	72·5	53·1	19·4	61·2	+ 0·1	57·9	55·0	6·2	16·0	0·2	80	130·0	50·6	63·3	60·8	7·4	14·0	0·000	1·5	mP: sP
25	..	29·637	70·3	54·6	15·7	60·1	— 0·9	56·8	53·9	6·2	19·4	0·9	80	138·4	50·0	63·3	61·1	5·8	13·9	0·155	9·0	mP: mN, mP: mP
26	Greatest Declination S.	29·549	63·3	52·8	10·5	56·7	— 4·2	54·3	52·1	4·6	11·8	0·6	85	113·3	47·2	64·1	61·5	4·2	13·9	0·393	13·2	mP: vN: mP
27	..	29·462	62·3	52·2	10·1	58·6	— 2·2	57·3	56·1	2·5	4·4	1·3	91	87·0	48·9	63·8	61·3	0·0	13·8	0·323	15·0	mP: wP
28	..	29·369	66·1	55·0	11·1	60·1	— 0·6	58·3	56·7	3·4	6·8	1·3	89	113·0	51·2	63·1	60·3	2·6	13·8	0·479	11·8	wP, wN: mP
29	..	29·591	67·9	51·8	16·1	59·0	— 1·6	55·7	52·7	6·3	11·7	1·2	80	121·3	46·0	61·5	59·3	4·1	13·7	0·160	8·8	wP: mP: mN, sP
30	..	29·793	69·9	48·0	21·9	57·2	— 3·2	53·6	50·3	6·9	16·9	1·4	78	138·8	41·0	61·5	59·3	10·3	13·7	0·000	8·5	mP
31	Full	29·930	66·2	44·0	22·2	55·9	— 4·4	51·4	47·1	8·8	17·6	1·3	73	137·3	41·0	61·1	58·3	11·6	13·6	0·000	3·2	wP: mP: sP
Means	..	29·672	69·4	53·0	16·4	60·2	— 1·7	57·4	55·0	5·1	12·1	0·8	83·5	122·6	49·3	64·2	61·5	4·5	14·5	Sum 5·194	5·9	..
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	21	22

The results apply to the civil day, excepting those in Columns 16 and 17, which refer to the 24 hours ending 9^{h} a.m. of the day against which the readings are placed.

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 amount of Sunshine on August 6 was in part estimated, on account of accidental loss of register.

The mean reading of the *Barometer* for the month was $29^{\text{in}}\cdot672$, being $0^{\text{in}}\cdot127$ *lower* than the average for the 20 years, 1854–1873.

TEMPERATURE OF THE AIR.

The highest in the month was 79°·7 on August 15; the lowest in the month was 44°·0 on August 31; and the range was 35°·7.
The mean of all the highest daily readings in the month was 69°·4, being 3°·7 *lower* than the average for the 38 years, 1841–1878.
The mean of all the lowest daily readings in the month was 53°·0, being 0°·2 *lower* than the average for the 38 years, 1841–1878.
The mean daily range was 16°·4, being 3°·5 *less* than the average for the 38 years, 1841–1878.
The mean for the month was 60°·2, being 1°·7 *lower* than the average for the 20 years, 1849–1868.

MONTH and DAY, 1879.	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.
			lbs.	lbs.	lbs.	miles.		
Aug. 1	S : SW	SW : N : NNE	0·3	0·0	0·0	241	10, r : 10, r	8, ci.-cu, cu.-s : 4, ci.-s, cu.-s, ci
2	NNE : NE : E	E : NE	3·0	0·0	0·2	303	1 : 2, ci	4, ci.-cu, ci, so.-ha : 10, r, l
3	NE : N : E	SE : SW	3·7	0·0	0·2	301	10, r, l, t : 10, m.-r	10, m.-r : 10, l
4	SW	WSW : W : SSW	2·4	0·0	0·0	239	10 : 10, oc.-th.-r	9, cu.-s, ci.-cu : 3, ci.-s
5	S : SW	S : SSW	0·6	0·0	0·0	265	p.-cl : 6, ci.-cu, ci.-s, ci	9, cu.-s, ci.-cu : 10, r
6	SW	SW	2·8	0·0	0·2	386	v : 6, cu.-s, ci.-cu, shs.-r	5, cu.-s, t, shs.-r : 6, cu.-s, ci.-cu
7	SW : WSW	WSW : SW : SSW	2·5	0·0	0·3	367	0 : v	8, cu.-s, ci.-cu : 10, oc.-shs
8	NE : SW	SW	0·0	0·0	0·0	114	10 : 10	10 : 10, th.-r
9	WSW : N : NNW	NW : WSW	1·5	0·0	0·0	235	10, slt.-r : v	8, cu.-s, ci.-cu : v, cu.-s
10	WSW : Calm : NNE	Variable	0·0	0·0	0·0	87	0 : 0, h	1, ci.-s, ci, h : v, cu.-s, ci.-cu
11	ENE	ESE : E	0·0	0·0	0·0	151	p.-cl : 10	10 : v, d
12	E	E	1·4	0·0	0·1	254	0, d : 0	1, ci : 4, ci.-s, ci
13	E : SE	SE : SW	1·8	0·0	0·0	142	p.-cl : v, ci	10, oc.-r : 10, r
14	WSW	NNW : N : NNE	0·0	0·0	0·0	110	p.-cl : v, h	10 : 10
15	E : SE	SSW	0·0	0·0	0·0	158	p.-cl : 5, ci.-cu	6,ci.-cu,ci,ci.-s,so.-ha : 6, th.-cl
16	SSW : SSE	SW : SSW	1·6	0·0	0·0	217	p.-cl : 10, oc.-r	10, oc.-r : v : 4,ci.-cu,cu.-s,l
17	S : SW : WSW	WSW	3·3	0·0	0·7	410	p.-cl : 10, r	10, c.-r : 10, r
18	WSW : W	WSW : SW	1·2	0·0	0·1	291	10, fq.-r : 10	9, cu.-s, ci.-cu : v, ci.-cu
19	SW	SSW : SW : S	0·0	0·0	0·0	126	v : 10, fq.-r	10, fq.-r : 10, c.-r
20	S : SW	SSW	4·0	0·0	0·2	380	10, c.-r : 10, c.-r	10, fq.-r : 10, oc.-slt.-r : 8
21	SSW : SSE	SSE : SW	1·5	0·0	0·0	181	p.-cl : 10, fq.-r, t	10, oc.-r, l, t : v : 10, r
22	SSW : SW	SW : SSW	8·2	0·0	1·3	470	p.-cl : v,cu.-s,ci.-cu,w,sh.-r	4, cu.-s, ci.-cu, w : 1, ci.-cu
23	SSW : SSE : ESE	SSW : SW : N	0·0	0·0	0·0	158	10, r : 10, c.-r	10, c.-r : 10, oc.-slt.-r : 10, r
24	NNW : WSW	WSW : SSW	0·1	0·0	0·0	179	p.-cl : 3, ci.-s, m	7, th.-cl, h : 2, ci.-cu
25	SSW : SW	WSW : SW	3·6	0·0	0·6	436	10, li.-shs : 7,cu.-s,ci.-cu,oc.-shs	5, cu.-s, ci.-cu : 0
26	SW : WSW	WSW : SW	7·0	0·0	0·7	488	p.-cl : 4,cu.-s,ci.-cu,shs.-r,w	10,cu.-s,ci.-cu,fq.-hy.-shs,w : 10
27	SW : SSW : S	SW	19·0	0·0	1·5	527	10, r : 10, c.-r, w	10, r, st.-w : 10, r, st.-w : 10, w
28	SW	SW	8·5	0·0	0·9	508	10 : 10, hy.-r	9, r : 0, w
29	SW : WSW	SW	11·5	0·0	2·1	531	0, w : v, w	9,cu.-s,ci.-cu,sc,w,r : shs.-r : 8,ci.-cu,cu.-s,th.-cl
30	WSW	SW : SSW	3·8	0·0	0·0	263	v : 1, ci.-s, ci.-cu	2, ci.-cu : 0
31	SW : WSW	W : WNW : SW	2·6	0·0	0·3	327	th.-cl : 4, ci, ci.-cu	6, cu.-s, ci.-cu : 1, ci, m
Means	...	...	..	..	0·3	285		
Number of Column for Reference.	23	24	25	26	27	28	29	30

The mean *Temperature of Evaporation* for the month was 57°·4, being 0°·5 *lower* than
The mean *Temperature of the Dew Point* for the month was 55°·0, being 0°·6 *higher* than
The mean *Degree of Humidity* for the month was 83·5, being 7·0 *greater* than
The mean *Elastic Force of Vapour* for the month was $0^{\text{in}}\cdot433$, being $0^{\text{in}}\cdot009$ *greater* than
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was $4^{\text{grs}}\cdot8$, being $0^{\text{gr}}\cdot1$ *greater* than
The mean *Weight of a Cubic Foot of Air* for the month was 527 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 7·2.

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

The highest reading of the *Solar Radiation Thermometer* was 150°·0 on August 15; and the lowest reading of the *Terrestrial Radiation Thermometer* was 41°·0 on August 30 and 31.

The mean daily distribution of *Ozone* was, for the 12 hours ending 9 a.m., 3·4; for the 6 hours ending 3 p.m., 1·3; and for the 6 hours ending 9 p.m., 1·2.

The *Proportions of Wind* referred to the cardinal points were N. 3, E. 4, S. 13, and W. 11.

The *Greatest Pressure of the Wind* in the month was $19^{\text{lbs}}\cdot0$ on the square foot on August 27. The mean daily *Horizontal Movement of the Air* for the month was 285 miles; the greatest daily value was 531 miles on August 29; and the least daily value 87 miles on August 10.

Rain fell on 20 days in the month, amounting to $5^{\text{in}}\cdot194$, as measured in the simple cylinder gauge partly sunk below the ground; being $2^{\text{in}}\cdot772$ *greater* than the average fall for the 38 years, 1841–1878.

MONTH and DAY, 1879.	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 of Mean 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 Daily Value.	Greatest of 24 Hourly Values.	Least of 24 Hourly Values.	Degree of Humidity (Saturation = 100).	TEMPERATURE. Highest in the Sun's Rays as shown by a Self-Registering Maximum Thermometer with blackened bulb in vacuo placed on the Grass.	Lowest on the Grass as shown by a Self-Registering Minimum Thermometer.	Of the Water of the Thames off Greenwich. Highest.	Of the Water of the Thames off Greenwich. Lowest.	Daily Duration of Sunshine.	Sun above Horizon.	Rain collected in a Gauge whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°	°	°	hours.	hours.	in.		
Sept. 1	In Equator	30·265	67·2	39·5	27·7	53·2	− 6·9	48·6	44·0	9·2	19·4	0·2	71	136·7	36·8	61·1	58·3	11·3	13·5	0·000	2·0	sP : mP
2	..	30·231	70·1	41·1	29·0	55·2	− 4·8	50·9	46·8	8·4	16·7	1·3	73	137·2	39·6	61·3	58·3	7·3	13·4	0·000	1·0	mP : mP : sP
3	..	30·017	73·4	46·8	26·6	57·9	− 1·9	52·9	48·4	9·5	20·3	1·9	71	141·4	40·7	61·3	58·1	11·0	13·4	0·000	3·0	mP
4	..	29·935	69·1	46·6	22·5	56·3	− 3·4	54·0	51·8	4·5	10·4	0·0	85	133·8	41·0	61·3	57·8	3·4	13·3	0·000	0·0	sP
5	..	29·826	66·1	53·1	13·0	58·0	− 1·5	56·1	54·4	3·6	8·5	0·4	88	129·5	49·0	61·5	57·8	0·5	13·2	0·009	0·0	mP
6	Apogee	29·603	69·9	55·1	14·8	60·6	+ 1·3	59·2	58·0	2·6	6·8	0·2	92	100·0	55·1	61·7	59·1	0·4	13·2	0·010	0·8	sP : mP
7	..	29·462	65·3	52·6	12·7	59·3	+ 0·3	57·3	55·5	3·8	8·7	0·0	88	103·2	49·0	61·8	59·3	1·8	13·1	0·012	9·3	mP : wP
8	Last Qr.	29·499	67·1	48·1	19·0	56·7	− 2·1	53·2	49·9	6·8	13·3	2·0	78	134·0	43·0	61·8	59·3	8·2	13·0	0·062	10·5	wP : sP
9	Greatest Declination N.	29·427	64·4	51·8	12·6	56·2	− 2·3	53·4	50·8	5·4	11·2	1·2	82	125·8	46·9	62·5	59·8	3·2	13·0	0·173	8·5	wP : mP, mN : mN, vP
10	..	29·791	64·3	47·8	16·5	54·9	− 3·4	51·4	48·0	6·9	13·1	2·1	78	115·8	44·0	61·3	58·8	6·3	12·9	0·000	0·0	mP : vP : vP
11	..	29·805	64·7	49·2	15·5	56·6	− 1·5	53·9	51·4	5·2	9·1	2·4	83	115·2	44·0	61·3	58·3	0·9	12·9	0·000	1·5	mP : mP
12	..	29·552	64·1	56·1	8·0	59·0	+ 1·0	56·8	54·8	4·2	8·1	0·4	87	93·0	51·3	60·3	57·8	0·0	12·8	0·118	15·2	wP : mP, wN
13	..	29·534	69·2	53·0	16·2	59·4	+ 1·6	57·5	55·8	3·6	10·8	0·4	89	127·9	50·7	60·3	57·8	1·4	12·7	0·358	7·2	sP : mP : mN, vP
14	..	29·654	65·7	48·3	17·4	57·0	− 0·6	54·8	52·8	4·2	12·4	0·0	86	122·6	43·0	61·8	59·3	5·6	12·7	0·190	0·0	wN, sP : mP
15	..	29·823	67·0	46·1	20·9	55·2	− 2·2	53·0	50·9	4·3	14·4	0·0	86	134·5	40·0	60·3	59·8	7·3	12·6	0·000	0·0	ssP : mP
16	In Equator: New.	29·810	66·2	50·5	15·7	57·5	+ 0·2	54·7	52·2	5·3	12·1	1·2	83	132·9	42·9	59·3	57·8	3·3	12·6	0·000	2·0	wP : mP : vP
17	..	29·763	64·1	55·9	8·2	59·5	+ 2·4	58·2	57·1	2·4	4·9	0·4	92	80·0	53·5	58·3	56·3	0·0	12·5	0·069	0·0	wP, wN : mP
18	Perigee	29·785	65·5	57·0	8·5	59·0	+ 2·1	58·3	57·7	1·3	4·2	0·2	96	114·0	57·0	58·3	56·3	0·1	12·4	0·032	0·0	vP : wP, wN : mP
19	..	29·942	69·0	53·8	15·2	60·0	+ 3·2	58·2	56·6	3·4	8·8	0·2	89	114·2	48·5	58·8	56·3	0·2	12·3	0·000	0·0	wP : sP
20	..	29·927	69·0	53·8	15·2	58·7	+ 2·1	56·5	54·5	4·2	10·8	0·0	86	120·0	47·3	58·3	54·8	2·6	12·3	0·000	0·0	wP : sP
21	..	29·836	65·1	52·1	13·0	56·1	− 0·3	53·5	51·1	5·0	11·2	1·6	83	115·0	47·1	60·8	58·8	0·7	12·2	0·000	0·0	mP : sP
22	Greatest Dec. S. : F. Qr.	29·720	62·7	46·7	16·0	53·7	− 2·5	49·6	45·6	8·1	19·0	1·3	74	122·8	41·9	60·3	59·8	7·3	12·2	0·000	1·5	sP : vP, wN : sP
23	..	29·417	61·3	49·0	12·3	54·8	− 1·3	53·2	51·6	3·2	7·8	0·2	89	77·4	46·8	58·3	56·8	0·0	12·1	0·746	4·5	vP, vN : vP, sN
24	..	29·343	62·4	46·2	16·2	52·0	− 3·9	50·0	48·0	4·0	11·4	0·6	86	119·0	43·5	59·3	57·3	3·1	12·0	0·706	0·0	ssP, vN : mP : ssP
25	..	29·938	60·7	39·5	21·2	50·3	− 5·5	46·7	42·9	7·4	16·3	1·1	77	117·8	36·0	58·3	56·8	9·4	11·9	0·000	0·0	ssP : ssP
26	..	30·140	65·5	43·9	21·6	53·4	− 2·3	50·0	46·6	6·8	16·4	1·1	78	124·4	40·1	57·8	56·3	9·8	11·9	0·000	0·0	sP : ssP
27	..	30·115	62·3	44·0	18·3	52·8	− 2·7	49·4	46·0	6·8	17·7	1·3	78	127·2	41·0	57·3	55·3	7·9	11·8	0·000	1·7	sP
28	..	29·959	63·0	47·5	15·5	55·8	+ 0·4	52·2	48·8	7·0	14·1	0·8	78	99·3	43·0	56·8	55·3	2·3	11·7	0·210	3·8	mP : sP : vP, wN
29	In Equator	29·934	58·0	51·8	6·2	54·6	− 0·6	53·1	51·6	3·0	7·2	0·6	89	81·0	50·0	57·8	55·3	0·0	11·7	0·179	4·5	mN, sP : ssP
30	Full	29·953	63·0	50·9	12·1	55·4	+ 0·5	53·5	51·7	3·7	8·9	0·6	88	109·3	50·6	57·3	55·3	1·2	11·6	0·000	4·7	sP : mP : sP
Means	..	29·800	65·5	49·3	16·3	56·3	− 1·2	53·7	51·2	5·1	11·8	0·8	83·4	116·8	45·4	59·9	57·6	3·9	12·6	Sum 2·874	2·7	..
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	21	22

The results apply to the civil day, excepting those in Columns 16 and 17, which refer to the 24 hours ending 9^h a.m. of the day against which the readings are placed.

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 result on September 28 for the Barometer, depends partly on values inferred from eye-observations, on account of accidental loss of photographic register.

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 $29^{\text{in}}\cdot800$, being $0^{\text{in}}\cdot013$ *higher* than the average for the 20 years, 1854–1873.

TEMPERATURE OF THE AIR.

The highest in the month was $73°\cdot4$ on September 3; the lowest in the month was $39°\cdot5$ on September 1 and 25; and the range was $33°\cdot9$.

The mean of all the highest daily readings in the month was $65°\cdot5$, being $2°\cdot1$ *lower* than the average for the 38 years, 1841–1878.

The mean of all the lowest daily readings in the month was $49°\cdot3$, being $0°\cdot2$ *higher* than the average for the 38 years, 1841–1878.

The mean daily range was $16°\cdot3$, being $2°\cdot2$ *less* than the average for the 38 years, 1841–1878.

The mean for the month was $56°\cdot3$, being $1°\cdot2$ *lower* than the average for the 20 years, 1849–1868.

MONTH and DAY, 1879.	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.
			lbs.	lbs.	lbs.	miles.		
Sept. 1	SW : Calm : NE	SE : S	0·0	0·0	0·0	110	0 : 0	1, ci.-cu : 0
2	SSW : SW	SW : SSW	1·2	0·0	0·0	229	p.-cl : 10, th.-cl, so.-ha	3, ci.-s : 0
3	SW	WSW : SW	0·5	0·0	0·0	277	0 : 0	0 : 0
4	WSW : NNE	ENE : E	0·2	0·0	0·0	153	0 : ci.-s, slt.-f	10 : 10 : 8,cu.-s,ci.-cu
5	NE : ENE	E : ENE : NE	0·6	0·0	0·0	178	10 : 10, th.-r	10 : 10
6	NNE	NE : SE : S	0·0	0·0	0·0	62	10 : 10	9, r, so.-ha : 10
7	SSW : SSE : S	S : SSE : SW	3·0	0·0	0·3	277	p.-cl : 9, cu.-s, ci.-s, ci	10, shs.-r : v, ci.-s
8	SW : SSW	SSW : S	2·7	0·0	0·1	286	p.-cl : 7, cu.-s, hy.-r	8, cu.-s, ci.-cu, th.-cl : 0
9	SSW : SW	SW : WSW	10·2	0·0	1·2	486	v : 10, oc.-slt.-r, w	8,cu.-s,ci.-cu,shs.-r,w: 8,cu.-s,ci.-cu,shs.-r
10	WSW : WNW	NW : WSW	0·9	0·0	0·1	293	p.-cl : 9	7, cu.-s, ci.-cu : v
11	WSW : SW	SW	3·8	0·0	0·2	294	p.-cl : 7, cu.-s, ci.-cu, sc	10, th.-r : v : 10
12	SSW	SSW	3·0	0·0	0·4	411	10 : 10, slt.-r	10, th.-r : 10, fq.-th.-r : 10, r
13	SW	S	0·1	0·0	0·0	129	10, slt.-r : 8, ci, ci.-s, cu.-s	8,ci,ci.-cu,cu.-s,ci.-s: 10, hy.-r : 10, r
14	WSW : N	NE : Calm	0·4	0·0	0·0	169	10, r : 10	5, cu.-s, ci.-cu : 0
15	Calm : NE	ENE : ESE	0·0	0·0	0·0	101	0 : 0, f	1, cu, ci.-cu : 0 : v
16	NE	ENE : NE	2·4	0·0	0·1	267	10 : v	6,ci.-cu,ci,cu.-s,th.-r: 10, l
17	NE : ENE	E : ESE	0·0	0·0	0·0	165	10, r : 10, r	10, r : 10, th.-r : 10, l
18	E : NE	Calm	0·0	0·0	0·0	47	10, slt.-r : 10, th.-r	10, glm, slt.-r : 10, glm
19	Calm : NE	N : NE : SE	0·0	0·0	0·0	84	10 : 10	10 : v : 0
20	SSE : S : SW	SW : WSW	0·0	0·0	0·0	185	p.-cl : 10, th.-r	9,cu.-s,ci.-cu: v : 10
21	SW : WSW	SW : SSW	0·0	0·0	0·0	233	10 : 10, th.-cl, so.-ha	8, th.-cl, ci : 10
22	WSW : W	W : SW : S	1·4	0·0	0·0	280	p.-cl : v, ci	5, cu.-s, ci.-cu : 4, th.-cl
23	SSW	SW : WSW : ESE	3·3	0·0	0·4	319	v : 10, r	10, oc.-r : 10, r : 10, hy.-r
24	ENE : N : W : SW	SSW	3·3	0·0	0·2	311	10, hy.-r : 10, slt.-r	8,ci.-cu,cu.-s,n,t: 9, shs.-r : v, cu.-s
25	WNW : W : WSW	WSW : SW	2·2	0·0	0·1	309	p.-cl : th.-cl	1, cu : 0
26	SW : WSW	WSW	0·3	0·0	0·0	221	0 : 0	3, ci.-cu : 7, cu.-s, ci.-cu, slt.-r
27	WSW : NNE	N : NE : SSE	0·0	0·0	0·0	139	v : 1, th.-cl	1, ci, ci.-cu : 1, ci.-cu, m, slt.-f
28	S : SSW	SSW	1·4	0·0	0·1	297	9 : 9, cu.-s, ci.-cu, so.-ha	10, th.-cl, so.-ha : 10, r
29	SSW : N	NNE : NE : ENE	0·3	0·0	0·0	204	10, r : 10, oc.-th.-r	10 : v : 10
30	ENE : SE	SSE : SE	0·0	0·0	0·0	150	p.-cl : 6, cu.-s, ci.-cu, th.-cl	9,cu.-s,ci.-cu,ci: 10 : 10
Means	...	...	..	..	0·1	222		
Number of Column for Reference.	23	24	25	26	27	28	29	30

The mean *Temperature of Evaporation* for the month was 53°·7, being 0°·6 *lower* than
The mean *Temperature of the Dew Point* for the month was 51°·2, being 0°·2 *lower* than
The mean *Degree of Humidity* for the month was 83·4, being 3·3 *greater* than
The mean *Elastic Force of Vapour* for the month was 0in·377, being 0in·002 *less* than
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was 4grs·2, being *the same as*
The mean *Weight of a Cubic Foot of Air* for the month was 534 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 6·7.

The mean proportion of *Sunshine* for the month (constant sunshine being represented by 1) was 0·31. The maximum daily amount of *Sunshine* was 11·3 hours on September 1.

The highest reading of the *Solar Radiation Thermometer* was 141°·4 on September 3; and the lowest reading of the *Terrestrial Radiation Thermometer* was 36°·0 on September 25.

The mean daily distribution of *Ozone* was, for the 12 hours ending 9 a.m., 1·5; for the 6 hours ending 3 p.m., 0·8; and for the 6 hours ending 9 p.m., 0·4.

The *Proportions of Wind* referred to the cardinal points were N. 4, E. 6, S. 10, and W. 8. Two days were calm.

The *Greatest Pressure of the Wind* in the month was 10lbs·2 on the square foot on September 9. The mean daily *Horizontal Movement of the Air* for the month was 222 miles; the greatest daily value was 486 miles on September 9; and the least daily value 47 miles on September 18.

Rain fell on 14 days in the month, amounting to 2in·874, as measured in the simple cylinder gauge partly sunk below the ground; being 0in·640 *greater* than the average fall for the 38 years, 1841–1878.

MONTH and DAY, 1879.	Phases of the Moon.	BAROMETER. Mean of 24 Hourly Values (corrected and reduced to 32° Fahrenheit).	TEMPERATURE. Of the Air. Highest.	TEMPERATURE. Of the Air. Lowest.	TEMPERATURE. Of the Air. Daily Range.	TEMPERATURE. Of the Air. Mean of 24 Hourly Values.	TEMPERATURE. Of the Air. Excess of Mean above Average of 20 Years.	TEMPERATURE. Of Evaporation. Mean of 24 Hourly Values.	TEMPERATURE. Of the Dew Point. Deduced Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Greatest of 24 Hourly Values.	Difference between the Air Temperature and Dew Point Temperature. Least of 24 Hourly Values.	Degree of Humidity (Saturation = 100).	TEMPERATURE. Highest in the Sun's Rays as shown by a Self-Registering Maximum Thermometer with blackened bulb in vacuo placed on the Grass.	TEMPERATURE. Lowest on the Grass as shown by a Self-Registering Minimum Thermometer.	TEMPERATURE. Of the Water of the Thames off Greenwich. Highest.	TEMPERATURE. Of the Water of the Thames off Greenwich. Lowest.	Daily Duration of Sunshine.	Sun above Horizon.	Rain collected in a Gauge whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°	°	°	hours.	hours.	in.		
Oct. 1	..	29·638	63·8	47·6	16·2	56·6	+ 1·9	55·3	54·1	2·5	5·9	0·4	91	82·2	45·0	57·3	54·8	0·4	11·6	0·196	5·3	vP, wN : sP
2	..	29·749	59·4	44·8	14·6	51·0	− 3·4	48·4	45·7	5·3	11·6	0·4	82	105·1	41·5	57·8	55·3	4·5	11·5	0·024	0·0	vP : ssP
3	..	29·982	59·7	41·0	18·7	50·5	− 3·5	48·0	45·4	5·1	13·3	0·2	83	113·0	37·0	57·5	54·8	4·6	11·4	0·000	1·3	sP
4	Apogee	30·058	67·8	50·3	17·5	56·4	+ 2·7	53·8	51·4	5·0	11·7	0·4	83	111·2	46·0	56·8	54·3	6·5	11·4	0·000	9·7	mP : vP : sP
5	..	30·117	62·1	49·0	13·1	55·6	+ 2·2	54·5	53·5	2·1	8·2	0·0	93	75·6	44·9	57·1	53·3	0·0	11·3	0·000	1·0	mP : mP
6	Greatest Declination N.	30·171	65·3	49·5	15·8	55·8	+ 2·8	54·4	53·1	2·7	12·2	0·0	91	119·2	43·5	56·8	54·3	5·6	11·2	0·000	3·0	mP : sP
7	..	30·237	64·3	47·1	17·2	55·1	+ 2·4	53·1	51·2	3·9	11·9	0·0	87	124·5	43·9	56·3	54·3	6·4	11·2	0·000	0·0	sP : ssP
8	Last Qr.	30·323	55·4	49·1	6·3	51·9	− 0·6	50·7	49·5	2·4	5·0	0·0	92	67·3	43·2	56·3	54·3	0·0	11·1	0·000	0·0	mP : vP : sP
9	..	30·302	53·4	41·5	11·9	49·4	− 2·9	47·9	46·3	3·1	4·8	0·0	90	75·4	38·2	56·8	54·3	0·0	11·0	0·000	0·0	mP : vP : ssP
10	..	30·277	58·8	37·3	21·5	47·3	− 4·8	46·3	45·2	2·1	8·2	0·0	93	102·0	35·1	56·3	54·1	1·6	11·0	0·000	0·0	ssP : sP : ssP
11	..	30·342	55·4	41·0	14·4	46·7	− 5·2	46·5	46·3	0·4	3·8	0·0	99	68·8	38·1	56·1	53·8	0·8	10·9	0·000	0·0	ssP : vP, wN
12	..	30·359	49·8	43·0	6·8	46·0	− 5·7	46·0	46·0	0·0	1·7	0·0	100	64·0	39·5	55·5	52·8	0·0	10·9	0·000	0·0	ssP : sP
13	In Equator	30·224	50·6	43·0	7·6	46·4	− 5·2	46·4	46·4	0·0	1·3	0·0	100	56·8	43·0	55·3	51·8	0·0	10·8	0·002	0·0	sP : wP : mP
14	..	29·992	52·6	43·5	9·1	48·5	− 2·9	47·7	46·8	1·7	3·2	0·0	94	56·9	40·0	54·3	51·3	0·0	10·7	0·010	0·0	wP : mP : vP
15	New	29·986	48·2	36·4	11·8	41·7	− 9·6	39·7	37·2	4·5	12·2	0·2	85	96·8	32·0	53·8	50·8	4·3	10·7	0·000	0·0	sP : mP : ssP
16	Perigee	30·037	50·3	33·7	16·6	40·4	− 10·8	38·1	35·1	5·3	12·0	0·0	82	105·8	29·2	53·3	49·3	6·7	10·6	0·000	0·0	ssP : sP : ssP
17	..	29·722	56·4	34·0	22·4	47·5	− 3·6	44·7	41·6	5·9	9·6	0·3	81	93·2	29·5	53·3	49·3	0·7	10·5	0·000	0·0	sP : vP : sP
18	..	29·756	50·8	40·7	10·1	46·3	− 4·7	43·1	39·5	6·8	14·7	1·3	78	86·1	34·8	53·1	48·8	5·7	10·5	0·007	1·0	mP : vP : ssP
19	Greatest Declination S.	29·433	60·5	46·0	14·5	55·6	+ 4·8	54·4	53·3	2·3	4·9	0·0	92	73·2	44·7	52·3	48·3	0·0	10·4	0·165	8·0	wP : mP
20	..	29·273	54·1	42·1	12·0	48·6	− 2·0	45·6	42·4	6·2	13·2	2·3	79	97·8	36·0	51·8	48·3	4·1	10·3	0·010	3·0	wN, mP : sP
21	..	29·692	49·7	37·8	11·9	44·3	− 6·1	42·2	39·7	4·6	11·3	0·0	84	76·5	29·9	52·1	49·3	1·6	10·3	0·000	0·0	mP : vP : vP
22	First Qr.	29·804	52·8	38·3	14·5	48·1	− 2·0	47·7	47·3	0·8	3·6	0·0	97	58·8	31·0	52·8	50·3	0·0	10·2	0·019	0·0	mP : wP
23	..	29·846	55·1	52·0	3·1	52·8	+ 3·1	52·0	51·2	1·6	3·4	0·0	94	61·0	50·0	52·8	50·8	0·0	10·2	0·007	0·0	wP : sP : wP
24	..	29·644	60·3	49·0	11·3	55·1	+ 5·7	54·6	54·1	1·0	4·8	0·0	97	95·2	47·0	52·8	50·8	0·3	10·1	0·065	0·0	wP
25	..	29·601	53·9	36·5	17·4	46·8	− 2·3	45·3	43·6	3·2	11·6	0·0	89	100·4	34·5	52·8	50·8	4·6	10·0	0·210	0·0	wP, wN : sP : ssP
26	In Equator	29·845	54·2	33·1	21·1	43·8	− 5·0	42·5	40·9	2·9	11·4	0·0	90	99·0	30·9	..	..	6·0	10·0	0·007	0·0	ssP : sP : mP
27	..	29·969	57·9	41·7	16·2	50·1	+ 1·6	49·3	48·4	1·7	6·6	0·0	94	101·0	35·0	..	..	2·3	9·9	0·000	0·0	mP : sP
28	..	30·065	52·1	46·2	5·9	48·9	+ 0·7	47·3	45·5	3·4	5·6	0·6	89	65·7	45·0	..	..	0·0	9·8	0·000	0·0	sP
29	..	30·010	47·8	45·0	2·8	46·4	− 1·5	46·0	45·6	0·8	2·7	0·0	97	55·1	44·2	..	..	0·0	9·8	0·039	0·0	vP
30	Full	30·047	51·1	47·7	3·4	48·9	+ 1·3	46·8	44·5	4·4	7·0	2·1	85	58·2	46·0	..	..	0·0	9·7	0·000	1·3	vP : mP : vP
31	Apogee	30·008	48·6	44·5	4·1	46·7	− 0·6	44·0	40·9	5·8	8·0	2·4	81	58·0	43·3	..	..	0·0	9·7	0·000	3·7	mP : sP
Means	..	29·952	55·6	43·0	12·6	49·3	− 1·7	47·8	46·2	3·1	7·9	0·3	89·4	84·0	39·4	54·8 (25 days)	52·0 (25 days)	2·2	10·6	Sum 0·761	1·2	..
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	21	22

The results apply to the civil day, excepting those in Columns 16 and 17, which refer to the 24 hours ending 9^h a.m. of the day against which the readings are placed.

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 discontinued on October 26.

The mean reading of the *Barometer* for the month was $29^{in}\cdot952$, being $0^{in}\cdot232$ *higher* than the average for the 20 years, 1854–1873.

TEMPERATURE OF THE AIR.

The highest in the month was 67°·8 on October 4; the lowest in the month was 33°·1 on October 26; and the range was 34°·7.
The mean of all the highest daily readings in the month was 55°·6, being 2°·8 *lower* than the average for the 38 years, 1841–1878.
The mean of all the lowest daily readings in the month was 43°·0, being 0°·7 *lower* than the average for the 38 years, 1841–1878.
The mean daily range was 12°·6, being 2°·1 *less* than the average for the 38 years, 1841–1878.
The mean for the month was 49°·3, being 1°·7 *lower* than the average for the 20 years, 1849–1868.

MONTH and DAY, 1879.	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.
			lbs.	lbs.	lbs.	miles.		
Oct. 1	SE : S : SW	WSW : SW	3·2	0·0	0·1	303	10, r : 10, oc.-r	v, ci.-cu, ci, cu.-s : 0
2	SW : SSW	WSW	4·8	0·0	0·4	358	0, hy.-d : 9, cu.-s, ci.-cu	v, shs.-r : 10
3	WSW : SW	SW	1·9	0·0	0·3	391	0 : 2, ci.-cu, th.-cl	9, th.-cl, ci.-cu, ci : 0, d
4	SW : W	WSW : NW : SSW	1·8	0·0	0·2	291	0, d : 1, ci.-cu	5, ci, ci.-cu : 6, cu.-s, ci.-cu, f
5	Calm : SSE	SE : E	0·0	0·0	0·0	114	p.-cl : 10	10 : f
6	ESE : E : ENE	E : ENE	0·4	0·0	0·0	202	m : 10, slt.-m	2, ci.-cu, ci : 0, hy.-d, f
7	NE : ENE	ENE : ESE : E	0·0	0·0	0·0	145	p.-cl : 4, ci.-cu, ci	2, ci.-cu : 0, hy.-d, f
8	NE	NE : ENE	0·0	0·0	0·0	195	10, f : 10, th.-r	10 : 10
9	NE : NNE	NNE : Calm	0·0	0·0	0·0	129	10 : 10, th.-r	10 : v, ci.-cu
10	WSW : NNE	NE : ENE	0·0	0·0	0·0	108	0, f, d : f	8, cu.-s, ci.-cu, th.-cl : 0, d
11	Calm	Calm : WSW : SW	0·0	0·0	0·0	55	0, tk.-f : 0, tk.-f	0, f : 0, tk.-f
12	Calm	E : NE	0·0	0·0	0·0	32	tk.-f : tk.-f	10, f : 10, slt.-f
13	SSE : WSW : WNW	W : WSW	0·0	0·0	0·0	125	10 : 10, f	10, slt.-f : 10, slt.-f, slt.-r
14	WSW : NNW	W : WSW : N	3·7	0·0	0·1	259	10 : 10, f	10 : 10, r
15	N	N : NNW	2·9	0·0	0·3	320	10 : v	5, cu.-s, ci.-cu, ci : 0
16	NNW : N	N : NNW : SW	1·7	0·0	0·1	269	p.-cl : v, ci.-s, th.-cl	v, ci.-cu, cu.-s : 3, cu.-s, f, ho.-fr
17	SW : WSW	W : NW	3·3	0·0	0·6	452	p.-cl : 10, w	10, cu.-s, sh.-r : 10
18	NNW : NW	NW : W : S : SSW	1·8	0·0	0·0	301	p.-cl : th.-cl	7, ci.-cu, cu.-s, ci.-s : 10, slt.-r
19	SSW : SW : WSW	SW : WSW	9·3	0·0	1·2	575	10 : 10, r, w	10, fq.-r, w : v, w, r
20	WSW : W	WNW : W	5·0	0·0	0·7	497	10, r : 6, cu, w	v, cu.-s, ci.-cu, sh.-r : 0, slt.-f
21	W : NW	NW : W : WSW	0·9	0·0	0·0	247	p.-cl : 4, th.-cl	8, cu.-s, ci.-cu : 0, f
22	WSW : SW	SW : WSW	0·0	0·0	0·0	177	p.-cl, f : 10, f, m.-r	10, m.-r : 10, oc.-m.-r, slt.-f
23	WSW : WNW	WSW : SW : SSW	0·0	0·0	0·0	168	10 : 10, slt.-f	10 : 10, th.-r
24	SSW : SW	SSW	0·4	0·0	0·0	248	10 : 10	10, oc.-r : 10, r
25	NW : W : WSW	WSW : S	0·0	0·0	0·0	211	10, r : 7, cu.-s, ci.-cu, r	6, cu.-s, ci.-cu : 0, m : 0, d, f
26	ENE	E : ENE	0·3	0·0	0·0	160	0, f : 0, slt.-f	v, ci.-cu : 10, shs.-r : 0
27	ENE : E	ENE	1·6	0·0	0·0	234	v : 10	7, ci, ci.-cu, cu.-s : 9, sc
28	ENE	ENE	0·8	0·0	0·0	287	10 : 10	10 : 10, slt.-r
29	NE	NE : ENE	1·1	0·0	0·1	344	10 : 10, th.-r	10, th.-r : 10, th.-r
30	ENE	ENE	2·9	0·0	0·2	363	10 : 10	10 : 10, oc.-th.-r
31	ENE : E	ENE	1·9	0·0	0·1	287	10 : 10	10 : 10
Means	...	...	..	..	0·1	253		
Number of Column for Reference.	23	24	25	26	27	28	29	30

The mean *Temperature of Evaporation* for the month was 47°·8, being 1°·1 *lower* than
The mean *Temperature of the Dew Point* for the month was 46°·2, being 0°·6 *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 $0^{in}\cdot313$, being $0^{in}\cdot008$ *less* than
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was $3^{grs}\cdot6$, being *the same as*
The mean *Weight of a Cubic Foot of Air* for the month was 545 grains, being 6 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 7·1.

The mean proportion of *Sunshine* for the month (constant sunshine being represented by 1) was 0·21. The maximum daily amount of *Sunshine* was 6·7 hours on October 16.

The highest reading of the *Solar Radiation Thermometer* was 124°·5 on October 7; and the lowest reading of the *Terrestrial Radiation Thermometer* was 29°·2 on October 16.

The mean daily distribution of *Ozone* was, for the 12 hours ending 9 a.m., 0·9; for the 6 hours ending 3 p.m., 0·2; and for the 6 hours ending 9 p.m., 0·1.

The *Proportions of Wind* referred to the cardinal points were N. 7, E. 8, S. 6, and W. 8. Two days were calm.

The *Greatest Pressure of the Wind* in the month was $9^{lbs}\cdot3$ on the square foot on October 19. The mean daily *Horizontal Movement of the Air* for the month was 253 miles; the greatest daily value was 575 miles on October 19; and the least daily value 32 miles on October 12.

Rain fell on 12 days in the month, amounting to $0^{in}\cdot761$, as measured in the simple cylinder gauge partly sunk below the ground; being $2^{in}\cdot111$ *less* than the average fall for the 38 years, 1841–1878.

MONTH and DAY, 1879.	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 of Mean 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 Daily Value.	Greatest of 24 Hourly Values.	Least of 24 Hourly Values.	Degree of Humidity (Saturation = 100).	TEMPERATURE. Highest in the Sun's Rays as shown by a Self-Registering Maximum Thermometer with blackened bulb in vacuo placed on the Grass.	Lowest on the Grass as shown by a Self-Registering Minimum Thermometer.	Of the Water of the Thames off Greenwich. Highest.	Of the Water of the Thames off Greenwich. Lowest.	Daily Duration of Sunshine.	Sun above Horizon.	Rain collected in a Gauge whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°			hours.	hours.	in.		
Nov. 1	..	29·881	46·0	36·3	9·7	43·5	− 3·5	41·4	38·9	4·6	9·2	2·4	84	53·1	33·0	..	..	0·0	9·6	0·013	0·0	sP: vP, wN
2	Greatest Declination N.	30·010	43·7	32·3	11·4	38·1	− 8·6	36·0	33·2	4·9	8·8	2·0	82	71·2	29·0	..	..	2·7	9·5	0·000	0·0	sP
3	..	30·200	48·1	36·3	11·8	42·2	− 4·2	40·9	39·3	2·9	7·4	0·7	89	62·0	29·2	..	..	0·0	9·5	0·014	0·0	sP: vP: ssP
4	..	30·362	46·9	44·2	2·7	45·3	− 0·7	43·2	40·8	4·5	6·5	0·2	85	54·8	42·2	..	..	0·0	9·4	0·000	0·0	sP: vP: sP
5	..	30·341	50·3	39·0	11·3	45·5	− 0·1	42·8	39·7	5·8	9·6	2·4	80	72·0	31·6	..	..	2·7	9·4	0·000	0·0	vP: vP, wN: ssP
6	..	30·330	50·3	37·7	12·6	43·9	− 1·3	42·0	39·7	4·2	9·2	0·0	85	73·4	32·4	..	..	0·0	9·3	0·000	0·0	ssP: vP
7	Last Qr.	30·395	52·8	35·4	17·4	44·2	− 0·5	42·9	41·4	2·8	7·6	0·0	90	67·0	30·1	..	..	1·8	9·2	0·000	0·0	sP: ssP
8	..	30·395	47·4	35·5	11·9	43·1	− 1·2	42·2	41·1	2·0	4·2	0·0	93	51·3	30·7	..	..	0·0	9·2	0·000	0·0	ssP
9	In Equator	30·206	49·9	42·3	7·6	46·6	+ 2·8	44·7	42·6	4·0	7·8	0·8	87	54·5	39·3	..	..	0·0	9·1	0·000	0·0	sP: sP: ssP
10	..	30·004	50·4	42·5	7·9	45·5	+ 2·1	44·2	42·7	2·8	6·6	1·1	90	58·0	39·1	..	..	0·0	9·1	0·008	0·0	sP: vP, wN: vP
11	..	29·861	46·2	41·4	4·8	43·9	+ 0·9	41·4	38·5	5·4	9·0	3·1	81	57·0	37·0	..	..	0·0	9·0	0·005	0·0	ssP: sP: sN, sP
12	..	29·715	46·9	37·0	9·9	42·6	0·0	38·5	33·5	9·1	15·6	3·7	71	63·5	30·0	..	..	2·4	9·0	0·000	0·0	sP: vP, wN: vP
13	..	29·966	45·7	33·2	12·5	38·5	− 3·8	35·1	30·5	8·0	14·3	3·6	73	74·0	26·5	..	..	4·3	8·9	0·000	0·0	sP: vP: ssP
14	New: Perigee	30·138	42·1	26·8	15·3	34·0	− 8·0	32·6	30·1	3·9	9·4	0·0	85	76·1	20·3	..	..	3·7	8·9	0·000	0·0	ssP
15	Greatest Declination S.	30·259	41·8	23·1	18·7	31·6	−10·2	29·5	24·4	7·2	16·3	0·0	73	73·9	16·0	..	..	2·9	8·8	0·000	0·0	ssP: ssP, wN
16	..	30·236	40·5	21·0	19·5	31·4	−10·2	30·0	26·5	4·9	9·0	0·0	81	53·0	17·0	..	..	0·0	8·8	0·000	0·0	ssP: ssP: mP
17	..	30·083	50·0	40·1	9·9	44·4	+ 2·9	42·7	40·7	3·7	4·6	1·9	87	52·7	36·2	..	..	0·0	8·7	0·000	0·0	mP: vP
18	..	30·088	54·6	41·4	13·2	49·2	+ 7·7	47·3	45·2	4·0	9·6	1·4	87	80·3	31·8	..	..	5·3	8·7	0·000	0·0	sP: vP: ssP
19	..	30·145	47·1	36·1	11·0	41·5	+ 0·1	40·1	38·3	3·2	8·4	0·2	88	87·8	30·4	..	..	2·9	8·6	0·005	0·0	vP: sP
20	First Qr.	29·925	38·3	31·3	7·0	33·7	− 7·6	32·8	31·2	2·5	6·5	0·0	89	57·0	28·8	..	..	0·1	8·6	0·148	0·0	vP, mN: vP
21	..	29·672	34·9	30·8	4·1	32·1	− 9·1	31·8	31·1	1·0	6·7	0·0	96	51·8	29·8	..	..	0·2	8·5	0·372	0·0	vP, ssN: sP: ssN, ssP
22	In Equator	29·790	32·5	28·0	4·5	30·6	−10·5	30·5	30·2	0·4	1·6	0·0	98	36·0	18·3	..	..	0·0	8·5	0·148	0·0	vP, vN: mP
23	..	29·846	37·8	22·0	15·8	29·6	−11·4	29·4	28·8	0·8	9·7	0·0	96	52·0	19·0	..	..	3·1	8·4	0·000	0·0	sP: ssP: ssP
24	..	29·892	35·8	26·1	9·7	33·5	− 7·5	33·4	33·2	0·3	2·7	0·0	98	42·4	26·1	..	..	0·0	8·4	0·122	0·0	vP: vP: ssN
25	..	30·035	38·9	31·7	7·2	34·9	− 6·0	34·5	33·8	1·1	4·6	0·0	96	60·3	29·0	..	..	3·9	8·3	0·042	0·0	ssP: ssP: vP, wN
26	..	29·986	35·4	32·0	3·4	33·0	− 7·8	31·8	29·4	3·6	6·2	0·0	86	44·3	29·2	..	..	0·0	8·3	0·019	0·0	sP: wP: wP
27	Apogee	29·925	37·3	29·2	8·1	33·5	− 7·3	32·8	31·5	2·0	3·6	0·0	92	57·0	25·0	..	..	1·0	8·2	0·010	0·0	wP
28	Full	29·908	41·2	29·0	12·2	35·0	− 5·9	33·3	30·5	4·5	9·9	0·0	83	69·6	24·4	..	..	2·2	8·2	0·000	0·0	wP
29	Greatest Declination N.	29·789	38·1	29·4	8·7	33·6	− 7·4	32·8	31·4	2·2	4·1	0·0	91	63·7	23·0	..	..	1·4	8·2	0·000	0·0	mP: ssP
30	..	29·665	33·4	26·9	6·5	30·1	−11·1	28·6	24·0	6·1	11·1	2·2	76	49·1	22·7	..	..	2·6	8·1	0·000	0·0	ssP: ssP
Means	..	30·035	43·5	33·3	10·2	38·5	− 4·2	37·0	34·7	3·7	8·0	0·9	86·4	60·6	28·6	..	..	1·4	8·8	Sum 0·906	0·0	..
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	21	22

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 results on November 28 and 29 for the Barometer, and on November 14, 28, and 29 for Air and Evaporation Temperatures, depend partly on values inferred from eye-observations, on account of accidental loss of photographic register.

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

No observations of the temperature of the water of the Thames were made during this month.

The mean reading of the *Barometer* for the month was $30^{in}\cdot035$, being $0^{in}\cdot264$ *higher* than the average for the 20 years, 1854–1873.

TEMPERATURE OF THE AIR.

The highest in the month was $54^{\circ}\cdot6$ on November 18; the lowest in the month was $21^{\circ}\cdot0$ on November 16; and the range was $33^{\circ}\cdot6$.
The mean of all the highest daily readings in the month was $43^{\circ}\cdot5$, being $5^{\circ}\cdot3$ *lower* than the average for the 38 years, 1841–1878.
The mean of all the lowest daily readings in the month was $33^{\circ}\cdot3$, being $4^{\circ}\cdot1$ *lower* than the average for the 38 years, 1841–1878.
The mean daily range was $10^{\circ}\cdot2$, being $1^{\circ}\cdot3$ *less* than the average for the 38 years, 1841–1878.
The mean for the month was $38^{\circ}\cdot5$, being $4^{\circ}\cdot2$ *lower* than the average for the 20 years, 1849–1868.

MONTH and DAY, 1879.	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.
			lbs.	lbs.	lbs.	miles.		
Nov. 1	NE : N	N	3·2	0·0	0·2	225	10 : 10, th.-r	10 : 10, oc.-th.-r
2	N	N	3·8	0·0	0·9	407	p.-cl, sc : 8, cu.-s, ci.-cu, w	7, cu.-s, ci.-cu, w : 0
3	NNW	N	0·7	0·0	0·0	239	p.-cl : 10, th.-r	10 : 10, slt.-r : 10
4	N : NNW	N : NW : WSW	0·0	0·0	0·0	172	10 : 10	10 : 10, glm, th.-r : 10
5	WSW : W	WNW : WSW	0·2	0·0	0·0	247	10 : 10	5, cu.-s, ci.-cu : 0 : 0, slt.-f
6	WSW	WNW	1·2	0·0	0·1	337	p.-cl : 10, th.-cl, so.-ha	9, th.-cl : 10 : 0
7	NW : WSW : N	N : SSW : WSW	0·0	0·0	0·0	142	p.-cl : 8, th.-cl, f, so.-ha	8, ci.-cu, ci, th.-cl, so.-ha : 0, f
8	SW : Calm	SW : S	0·0	0·0	0·0	108	tk.-f : 10, f	10, f : 10, f
9	S	SSW : S : SSE	0·0	0·0	0·0	127	10 : 10	10 : 10
10	SSE : WSW	WSW : N : NNE	0·3	0·0	0·0	182	10 : 10, slt.-f, th.-r	10, th.-r, gt.-glm : 10
11	N : SW	SW : WSW	2·7	0·0	0·2	327	10 : 10	10, th.-cl : sh.-r : 0
12	WSW : W : WNW	NW : WNW	5·4	0·0	1·4	597	0, w : 8, cu.-s, ci.-cu, st.-w	7, cu.-s, ci.-cu, st.-w : 0 : 0
13	NW : WNW	NNW	4·5	0·0	0·7	372	0, ho.-fr : 3, ci, slt.-h	1, ci.-cu, cu.-s, w : 0
14	NNW : WSW : N	N : NNE	0·4	0·0	0·0	193	0, ho.-fr : 0, f, ho.-fr	2, ci.-cu, ci : 0, ho.-fr
15	NNE : NNW : Calm	NE : NNE : SW	0·0	0·0	0·0	87	0, ho.-fr : 0, f, ho.-fr	v, ci.-cu : 0, f, ho.-fr
16	SW	WSW	0·0	0·0	0·0	232	ho.-fr : 10, sl	10 : 10
17	WSW	WSW : W	1·9	0·0	0·1	346	10 : 10, m	10 : 10
18	W : NNW : N	N : NNW : NNE	0·5	0·0	0·0	253	p.-cl : 6, cu.-s, ci.-cu, ci	5, cu.-s, ci.-cu, ci : 0, f
19	NNE : NE	ENE : NE	1·2	0·0	0·1	308	10, th.-r : 10	4, ci.-cu, cu.-s : v : 10
20	NE : NNE	NE : NNE	1·3	0·0	0·1	375	10 : 10, sn	10, sn : 10, sn : 10
21	NE : Calm : SSE	ESE : E : SE	0·4	0·0	0·0	177	10 : 10, sn	9, cu.-s, ci.-cu, th.-cl : 10, sn
22	S : SW : Calm	WSW : SW	0·0	0·0	0·0	107	10 : 10, sn, tk.-f	10, f, gt.-glm : 0, lu.-ha
23	WSW	SW : Calm	0·0	0·0	0·0	105	0, ho.-fr : 0, f, ho.-fr	0, slt.-f : v, tk.-f : 7, th.-cl, tk.-f
24	Calm : NE	NE	0·0	0·0	0·0	99	10, slt.-f : 10, f, oc.-th.-r, sl	10 : 10, fq.-r : 10, r
25	NE : ENE	ENE	0·2	0·0	0·0	207	10, r : 8, cu.-s, ci.-cu	v, ci.-cu : 10, fr.-r, sl : 10, fr.-r, sl, sn
26	ENE : NE	NNE	1·2	0·0	0·0	302	10, sl : 10, oc.-sn	10, oc.-sn : 10, oc.-sn
27	NNE : N	NE : E	0·1	0·0	0·0	187	p.-cl : v, cu.-s, ci.-cu, th.-cl	7, th.-cl, ci.-cu, cu.-s : v, th.-cl, slt.-sn
28	ENE : NE	NNE : N	0·7	0·0	0·0	214	0, ho.-fr : 7, cu.-s, ci.-cu	v, ci.-cu, ci : v, ci.-cu, cu
29	N	N : NNW	0·8	0·0	0·0	205	v, ho.-fr : v, th.-cl	9, cu.-s, ci.-cu : v, ci.-s, s : 1, sc, ho.-fr
30	NNW : NW	NNW	1·0	0·0	0·1	294	p.-cl, ho.-fr : 4, ci.-cu, cu.-s, slt.-f, slt.-sn	v, ci.-cu, ci : 10 : v, ci.-cu, cu.-s
Means	...	...	..	..	0·1	239		
Number of Column for Reference.	23	24	25	26	27	28	29	30

The mean *Temperature of Evaporation* for the month was 37°·0, being 4°·2 *lower* than
The mean *Temperature of the Dew Point* for the month was 34°·7, being 4°·6 *lower* than
The mean *Degree of Humidity* for the month was 86·4, being 0·9 *less* than
The mean *Elastic Force of Vapour* for the month was $0^{in}\cdot201$, being $0^{in}\cdot039$ *less* than
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was $2^{grs}\cdot4$, being $0^{gr}\cdot4$ *less* than
The mean *Weight of a Cubic Foot of Air* for the month was 559 grains, being 10 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 6·9.

The mean proportion of *Sunshine* for the month (constant sunshine being represented by 1) was 0·16. The maximum daily amount of *Sunshine* was 5·3 hours on November 18.

The highest reading of the *Solar Radiation Thermometer* was 87°·8 on November 19; and the lowest reading of the *Terrestrial Radiation Thermometer* was 16°·0 on November 15.

The mean daily distribution of *Ozone* was, for the 12 hours ending 9 a.m., 0·0; for the 6 hours ending 3 p.m., 0·0; and for the 6 hours ending 9 p.m., 0·0.

The *Proportions of Wind* referred to the cardinal points were N. 13, E. 4, S. 4, and W. 8. One day was calm.

The *Greatest Pressure of the Wind* in the month was $5^{lbs}\cdot4$ on the square foot on November 12. The mean daily *Horizontal Movement of the Air* for the month was 239 miles; the greatest daily value was 597 miles on November 12; and the least daily value 87 miles on November 15.

Rain fell on 12 days in the month, amounting to $0^{in}\cdot906$, as measured in the simple cylinder gauge partly sunk below the ground; being $1^{in}\cdot362$ *less* than the average fall for the 38 years, 1841–1878.

MONTH and DAY, 1879.	Phases of the Moon.	BAROMETER. Mean of 24 Hourly Values (corrected and reduced to 32° Fahrenheit).	TEMPERATURE. Of the Air. Highest.	TEMPERATURE. Of the Air. Lowest.	TEMPERATURE. Of the Air. Daily Range.	TEMPERATURE. Of the Air. Mean of 24 Hourly Values.	TEMPERATURE. Of the Air. Excess of Mean above Average of 20 Years.	TEMPERATURE. Of Evaporation. Mean of 24 Hourly Values.	TEMPERATURE. Of the Dew Point. Deduced Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Mean Daily Value.	Difference between the Air Temperature and Dew Point Temperature. Greatest of 24 Hourly Values.	Difference between the Air Temperature and Dew Point Temperature. Least of 24 Hourly Values.	Degree of Humidity (Saturation = 100).	TEMPERATURE. Highest in the Sun's Rays as shown by a Self-Registering Maximum Thermometer with blackened bulb in vacuo placed on the Grass.	TEMPERATURE. Lowest on the Grass as shown by a Self-Registering Minimum Thermometer.	TEMPERATURE. Of the Water of the Thames off Greenwich. Highest.	TEMPERATURE. Of the Water of the Thames off Greenwich. Lowest.	Daily Duration of Sunshine.	Sun above Horizon.	Rain collected in a Gauge whose receiving surface is 5 inches above the Ground.	Daily Amount of Ozone.	Electricity.
		in.	°	°	°	°	°	°	°	°	°	°		°	°			hours.	hours.	in.		
Dec. 1	..	29·580	32·4	23·6	8·8	29·1	−12·4	28·0	24·1	5·0	8·8	2·2	81	45·0	20·4	..	..	0·0	8·1	0·044	0·0	vP : ssP : vP, mN
2	..	29·751	31·9	14·1	17·8	24·3	−17·5	22·9	14·9	9·4	13·9	0·0	65	72·7	14·0	..	..	5·0	8·1	0·000	0·0	ssP : ssP
3	..	29·652	31·3	18·0	13·3	24·6	−17·5	23·4	16·7	7·9	13·2	0·0	70	68·8	18·0	..	..	3·0	8·0	0·000	0·8	ssP
4	..	29·402	33·1	23·1	10·0	26·5	−15·9	24·4	14·4	12·1	16·3	6·8	58	72·0	21·9	..	..	1·7	8·0	0·000	2·2	sP
5	..	29·464	33·0	23·1	9·9	28·0	−14·6	26·3	19·3	8·7	17·0	3·1	68	49·3	22·3	..	..	1·0	8·0	0·075	0·0	sP : vP, wN
6	Last Qr.	29·828	33·6	18·4	15·2	28·7	−14·0	27·5	23·0	5·7	11·8	0·3	78	55·0	18·4	..	..	5·6	8·0	0·000	0·0	vP, vN : ssP : ssP
7	In Equator	30·291	31·3	13·7	17·6	23·6	−19·2	22·8	18·0	5·6	7·6	0·0	77	41·0	13·7	..	..	0·4	7·9	0·002	0·0	ssP : —
8	..	30·314	36·6	29·0	7·6	33·3	− 9·5	31·9	29·2	4·1	7·5	0·0	85	45·1	28·2	..	..	0·5	7·9	0·029	0·0	sP : ssP
9	..	30·399	35·2	26·3	8·9	31·7	−11·1	30·6	28·0	3·7	6·7	0·0	85	53·0	25·9	..	..	1·8	7·9	0·008	0·0	sP : ssP
10	..	30·306	36·7	28·5	8·2	33·9	− 8·8	33·0	31·4	2·5	4·7	0·0	90	40·8	28·5	..	..	0·0	7·9	0·006	0·0	sP : sN, ssP : ssP
11	..	30·419	33·7	20·0	13·7	27·7	−14·8	27·2	25·1	2·6	7·0	0·0	90	53·2	20·0	..	..	2·1	7·8	0·000	0·0	ssP : vvP
12	Perigee	30·490	36·2	32·2	4·0	34·0	− 8·2	32·7	30·4	3·6	4·2	2·0	87	37·0	30·4	..	..	0·0	7·8	0·003	0·0	ssP
13	Greatest Dec. S.: New.	30·559	37·1	30·9	6·2	34·7	− 7·1	33·9	32·6	2·1	5·0	0·5	92	39·5	27·8	..	..	0·0	7·8	0·000	0·0	sP : vP : ssP
14	..	30·390	39·4	32·1	7·3	37·5	− 4·0	35·6	33·0	4·5	5·5	2·0	84	42·1	31·6	..	..	0·0	7·8	0·000	0·0	ssP
15	..	30·295	41·1	38·2	2·9	39·4	− 1·7	38·4	37·1	2·3	3·7	0·2	92	44·2	37·2	..	..	0·0	7·8	0·000	0·0	ssP : vP
16	..	30·316	38·2	22·5	15·7	30·7	−10·1	30·4	29·6	1·1	4·5	0·0	95	56·5	22·5	..	..	2·2	7·8	0·000	0·0	vP : sP : vP
17	..	30·402	28·5	23·5	5·0	26·3	−14·2	26·1	25·1	1·2	4·0	0·0	95	31·8	23·5	..	..	0·0	7·7	0·000	0·0	wP
18	..	30·424	37·8	27·5	10·3	32·2	− 8·0	31·6	30·3	1·9	6·2	0·0	93	43·0	22·0	..	..	0·1	7·7	0·000	0·0	vP : ssP
19	In Equator	30·437	34·5	29·0	5·5	32·3	− 7·7	31·8	30·7	1·6	4·1	0·0	94	44·0	22·0	..	..	0·0	7·7	0·013	1·5	sP : vvP : vvP
20	First Qr.	30·324	34·3	28·0	6·3	32·0	− 7·8	31·3	29·7	2·3	4·2	0·0	91	38·6	28·0	..	..	0·0	7·7	0·000	4·5	sP : ssP : ssP
21	..	30·200	31·7	24·3	7·4	27·8	−11·8	27·6	26·8	1·0	3·1	0·0	96	38·3	24·3	..	..	0·0	7·7	0·000	0·0	ssP : —
22	..	30·361	42·5	27·6	14·9	36·7	− 2·7	35·9	34·8	1·9	6·2	0·0	93	46·0	26·2	..	..	0·0	7·7	0·032	0·0	vP, mN : ssP
23	..	30·561	36·2	26·2	10·0	31·3	− 8·0	31·1	30·6	0·7	5·7	0·0	97	44·1	25·0	..	..	0·0	7·7	0·004	0·0	ssP : ssP : vP
24	..	30·274	40·0	22·0	18·0	32·1	− 7·2	31·2	29·1	3·0	6·2	0·0	88	65·8	21·1	..	..	2·6	7·7	0·000	0·0	vP : ssP
25	Apogee	30·396	40·1	28·8	11·3	33·5	− 5·7	33·2	32·6	0·9	3·0	0·0	96	41·2	28·8	..	..	0·0	7·7	0·000	0·0	ssP
26	..	30·337	31·2	26·5	4·7	29·4	− 9·7	29·2	28·5	0·9	2·2	0·0	96	37·9	26·5	..	..	0·0	7·8	0·000	0·0	ssP
27	Greatest Declination N.	30·217	40·0	25·1	14·9	29·2	− 9·8	28·4	25·6	3·6	8·0	0·0	86	43·5	25·1	..	..	0·0	7·8	0·000	1·8	sP
28	Full	29·908	52·1	40·0	12·1	46·5	+ 7·7	45·0	43·3	3·2	8·0	0·0	88	52·1	37·5	..	..	0·0	7·8	0·032	6·5	wP
29	..	29·783	52·1	37·7	14·4	46·5	+ 7·8	43·7	40·5	6·0	9·0	4·0	80	83·2	35·5	..	..	1·8	7·8	0·002	7·8	wP : mP
30	..	29·637	44·0	35·7	8·3	38·6	+10·1	35·8	32·1	6·5	10·1	2·8	78	75·3	32·2	..	..	0·6	7·8	0·215	5·5	mP : vP, wN : mP
31	..	29·594	52·6	35·2	17·4	45·4	+ 7·1	43·5	41·3	4·1	8·4	2·1	86	52·6	31·8	..	..	0·0	7·8	0·187	1·8	sP : wN, wP
Means	..	30·139	37·4	26·8	10·6	32·5	− 8·3	31·4	28·6	3·9	7·3	0·8	85·6	50·1	25·5	..	..	0·9	7·8	Sum 0·652	1·1	..
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	21	22

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 result on December 29 for Evaporation Temperature, depends partly on values inferred from eye-observations, on account of accidental loss of photographic register.

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

No observations of the temperature of the water of the Thames were made during this month.

The mean reading of the *Barometer* for the month was 30in·139, being 0in·348 *higher* than the average for the 20 years, 1854–1873.

TEMPERATURE OF THE AIR.

The highest in the month was 52°·6 on December 31; the lowest in the month was 13°·7 on December 7; and the range was 38°·9.
The mean of all the highest daily readings in the month was 37°·4, being 7°·1 *lower* than the average for the 38 years, 1841–1878.
The mean of all the lowest daily readings in the month was 26°·8, being 8°·4 *lower* than the average for the 38 years, 1841–1878.
The mean daily range was 10°·6, being 1°·3 *greater* than the average for the 38 years, 1841–1878.
The mean for the month was 32°·5, being 8°·3 *lower* than the average for the 20 years, 1849–1868.

MONTH and DAY, 1879.	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.
			lbs.	lbs.	lbs.	miles.		
Dec. 1	NW : WSW	ENE : NE	1·4	0·0	0·1	269	p.-cl : 6, cu.-s, ci.-cu, f, sn	10, sn : v, oc.-sn
2	ENE : S : SSE	S	0·0	0·0	0·0	166	0 : 1, th.-cl	2, ci, ci.-s : 4, ci.-s
3	S: Calm : ENE : ESE	E : ESE	1·8	0·0	0·0	196	0, ho.-fr : v,ci,ci.-s,slt.-f,ho.-fr	1, ci, th.-cl : 0, lu.-ha
4	E : ENE	ENE : NE	7·0	0·0	1·0	513	0 : 10, w, so.-ha	7,cu.-s,ci.-cu,ci.-s,w,slt.-sn,so.-ha,mock-sun : 10, w
5	NNE : NNW	SW	6·0	0·0	0·3	292	p.-cl : 3, ci, ci.-cu, slt.-sn, f	9,ci.-cu,cu.-s,oc.-sn : 10, sn
6	NE : ENE	N : NNE	0·0	0·0	0·0	144	p.-cl : 0, m	0, m : 0, f, ho.-fr
7	SW	SW : WSW	0·0	0·0	0·0	148	0, f, ho.-fr : 0, f	v, tk.-f, slt.-sn : 10, f
8	WSW : N : NNW	N : NE : E	0·5	0·0	0·0	212	10, sn : 10	9,cu.-s,ci.-cu : 0 : vv
9	SSE : SSW	SW	0·0	0·0	0·0	167	v : 10	9, cu.-s, ci.-cu : 10, sn, sl
10	WSW : N	NE	0·0	0·0	0·0	173	10 : 10, th.-r, f, glm	v, cu.-s, ci.-cu, th.-r : 0, ho.-fr
11	N : SW	WSW	0·0	0·0	0·0	140	0, ho.-fr : tk.-f	0, slt.-f : 0, slt.-f : 10, f
12	WSW	W : NW : N	0·0	0·0	0·0	125	10 : 10, f	v, f : 10, f, slt.-r : v
13	NNE : S : Calm	WSW : SSW	0·0	0·0	0·0	85	10 : 10, f	10, th.-r : v : 10
14	SW	WSW	0·0	0·0	0·0	189	10 : 10	10 : 10
15	WSW : SW	SW : SSW : SE	0·0	0·0	0·0	123	10 : 10	10 : 10, f, slt.-r : 10, tk.-f
16	E : SE	NE : S : SW	0·0	0·0	0·0	75	10 : 10, slt.-f	0, f : 0, tk.-f : tk.-f
17	W : NW : N	NNE	0·0	0·0	0·0	92	10, tk.-f : 10, tk.-f	10, f : tk.-f, ho.-fr
18	NNE : NE	ENE : NE : NNE	0·1	0·0	0·0	169	10 : 10	9,cu.-s,ci.-cu : v, tk.-f : 0, f, ho.-fr
19	NE	NE : ENE	0·4	0·0	0·0	259	v, ho.-fr : 4, ci, th.-cl, slt.-h, ho.-fr	10 : 10, th.-r : 10, th.-r
20	ENE : E	ESE	0·3	0·0	0·0	201	10 : 10	10 : 10
21	SE : SW	SW : Calm : SE	0·0	0·0	0·0	60	10 : 10, slt.-f	10, slt.-f : 10, tk.-f
22	S : SE : SW	N : SW	0·0	0·0	0·0	123	10 : 10, oc.-th.-r, f	v, th.-r, f : 0, slt.-h : 0,tk.-f,ho.-fr
23	S : SW	SSW : SE	0·0	0·0	0·0	69	p.-cl : 10, slt.-f, th.-r	10 : 10, th.-cl, f, ho.-fr
24	Calm	WSW	0·1	0·0	0·0	173	p.-cl : v, th.-cl, f	v,li.-cl,slt.-f : v, ci.-s : 10
25	Calm	E	0·0	0·0	0·0	53	10, f : tk.-f	tk.-f : tk.-f
26	E : ESE	ESE	0·0	0·0	0·0	107	10, ho.-fr : 10, oc.-th.-r	10 : 10, th.-cl
27	SE : S : SSW	SSE : S	1·9	0·0	0·1	216	10, ho.-fr : 10, ho.-fr	9, ci.-s,cu.-s : lu.-ha : 10
28	SSW : SW	SW	7·0	0·1	1·9	696	10, th.-r, w : 10, fq.-th.-r, w	10, th.-r : 8, sc, li.-cl, w
29	WSW	SW : WSW	5·0	0·0	0·9	544	p.-cl, cu.-s : 2, ci, ci.-s	7,cu.-s,ci.-cu : v, slt.-r : 8, ci.-cu
30	SW : SSW	WSW	9·0	0·0	1·9	705	p.-cl : 8, th.-cl, hy.-r, g	10,sc,t.-sm,gt.-glm,hy.-r,hl,st.-w:v,r,slt.-sn,w : 0, w
31	SSW : SW	WSW	8·5	0·0	1·9	658	p.-cl : 10, fq.-r, st.-w	10, c.-r, st.-w : 10, c.-r,st.-w : 10, oc.-r, w
Means	...	...	..	..	0·3	230		
Number of Column for Reference.	23	24	25	26	27	28	29	30

The mean *Temperature of Evaporation* for the month was 31°·4, being 7°·9 *lower* than
The mean *Temperature of the Dew Point* for the month was 28°·6, being 8°·8 *lower* than
The mean *Degree of Humidity* for the month was 85·6, being 2·2 *less* than
The mean *Elastic Force of Vapour* for the month was 0in·157, being 0in·067 *less* than
The mean *Weight of Vapour in a Cubic Foot of Air* for the month was 1gr·9, being 0gr·7 *less* than
The mean *Weight of a Cubic Foot of Air* for the month was 568 grains, being 17 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 7·6.

The mean proportion of *Sunshine* for the month (constant sunshine being represented by 1) was 0·12. The maximum daily amount of *Sunshine* was 5·6 hours on December 6.

The highest reading of the *Solar Radiation Thermometer* was 83°·2 on December 29; and the lowest reading of the *Terrestrial Radiation Thermometer* was 13°·7 on December 7.

The mean daily distribution of *Ozone* was, for the 12 hours ending 9 a.m., 0·9; for the 6 hours ending 3 p.m., 0·2; and for the 6 hours ending 9 p.m., 0·0.

The *Proportions of Wind* referred to the cardinal points were N. 6, E. 7, S. 8, and W. 7. Three days were calm.

The *Greatest Pressure of the Wind* in the month was 9lbs·0 on the square foot on December 30. The mean daily *Horizontal Movement of the Air* for the month was 230 miles; the greatest daily value was 705 miles on December 30; and the least daily value 53 miles on December 25.

Rain fell on 10 days in the month, amounting to 0in·652, as measured in the simple cylinder gauge partly sunk below the ground; being 1in·135 *less* than the average fall for the 38 years, 1841–1878.

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

MAXIMA.			MINIMA.			MAXIMA.			MINIMA.		
Approximate Greenwich Mean Solar Time, 1879.		Reading.	Approximate Greenwich Mean Solar Time, 1879.		Reading.	Approximate Greenwich Mean Solar Time, 1879.		Reading.	Approximate Greenwich Mean Solar Time, 1879.		Reading.
	d h m	in.		d h m	in.		d h m	in.		d h m	in.
January	1. 0. 0	29·669	January	1. 9. 0	29·322	April	10. 23. 0	29·937	April	15. 17. 0	29·315
	2. 3. 0	29·951		2. 21. 0	29·164		18. 11. 0	29·785		20. 3. 0	29·205
	5. 23. 45	30·085		8. 1. 20	29·410		21. 18. 40	29·430		23. 4. 0	29·293
	8. 20. 0	29·886		10. 17. 0:	29·399		24. 14. 30	29·975		26. 16. 0	29·440
	12. 8. 0	30·054		12. 18. 40	29·884		28. 23. 0	30·165	May	1. 0. 30:	29·956
	13. 11. 30	30·030		14. 16. 0	29·387	May	4. 10. 30	30·358		7. 3. 0	29·830
	17. 0. 0	30·085		18. 1. 20	29·790		7. 12. 30:	29·913		8. 23. 10	29·555
	19. 9. 0	30·209		21. 3. 0	29·744		12. 10. 0	30·017		14. 1. 50	29·610
	27. 8. 30	30·265		28. 17. 20	30·052		16. 9. 0	29·993		18. 2. 30	29·433
	30. 21. 20	30·140	February	3. 0. 0	29·407		20. 22. 0	29·985		22. 14. 20	29·877
February	4. 14. 10	29·897		6. 2. 0	29·320		23. 19. 20	30·060		27. 13. 30	29·380
	6. 13. 55	29·491		7. 9. 25	29·092		28. 1. 0	29·472		28. 15. 0	29·368
	8. 7. 0	29·415		10. 7. 0	28·670		29. 23. 40	29·677	June	1. 3. 0	29·412
	12. 10. 15	29·752		13. 15. 0	29·295	June	2. 2. 0	29·540		2. 18. 0	29·245
	14. 22. 0	29·443		15. 18. 30:	28·896		4. 11. 0	29·766		5. 16. 20	29·495
	16. 8. 30	28·965		17. 3. 30	28·814		6. 10. 0	29·623		7. 7. 30	29·408
	18. 23. 20	29·301		20. 3. 20	28·896		10. 11. 30	29·905		11. 3. 40	29·772
	20. 12. 0	29·016		20. 19. 0	28·918		13. 9. 0	29·990		16. 0. 50	29·310
	24. 14. 0	29·860		25. 3. 30	29·761		18. 21. 10	29·756		19. 17. 0	29·565
	26. 9. 0	29·945		28. 3. 15	29·535		20. 11. 20	29·754		21. 5. 20	29·483
March	1. 21. 0	30·020	March	2. 23. 0	29·724		22. 10. 30:	29·800		25. 0. 0	29·403
	3. 20. 0	29·945		5. 11. 0	29·790		25. 19. 0	29·635		26. 2. 0	29·520
	7. 17. 30	30·447		10. 16. 0	30·017		27. 2. 0	29·714		27. 16. 30	29·595
	11. 0. 0	30·210		12. 3. 30	29·730		29. 20. 0	29·910	July	1. 3. 40	29·190
	12. 23. 20	30·214		15. 15. 30:	29·480	July	2. 5. 5	29·482		3. 1. 40	29·224
	16. 23. 0	29·955		19. 3. 0	29·544		5. 21. 5	29·796		8. 4. 50	29·253
	20. 22. 25	29·684		21. 18. 30:	29·562		11. 3. 0	29·813		13. 5. 0	29·320
	23. 10. 0	29·710		27. 4. 0	29·382		15. 11. 30	29·765		16. 17. 0	29·632
	28. 8. 0	29·612		28. 16. 40	29·473		18. 10. 0	29·901		20. 8. 40	29·130
	29. 11. 30	29·660	April	2. 15. 50	29·378		24. 20. 0	29·953		26. 6. 0	29·760
April	4. 9. 0	29·706		6. 20. 0:	28·790		27. 23. 0	30·005		29. 14. 30	29·692

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

MAXIMA.			MINIMA.		
Approximate Greenwich Mean Solar Time, 1879.		Reading.	Approximate Greenwich Mean Solar Time, 1879.		Reading.
	d h m	in.		d h m	in.
July	30. 8. 20	29·810	July	31. 16. 45	29·658
August	1. 20. 0	29·975	August	2. 17. 40	29·672
	4. 10. 50	29·889		5. 16. 0	29·569
	7. 8. 30	29·722		8. 13. 40	29·641
	10. 12. 0	29·867		12. 22. 0	29·655
	14. 9. 0	29·885		16. 19. 0	29·304
	18. 21. 30	29·685		21. 5. 25	29·423
	22. 12. 0	29·693		23. 5. 0	29·575
	24. 0. 0	29·853		26. 0. 0	29·486
	26. 12. 20	29·640		27. 5. 50	29·295
September	1. 8. 50	30·325	September	7. 4. 45	29·386
	7. 19. 0	29·550		8. 17. 0	29·340
	10. 10. 20	29·903		12. 12. 0	29·500
	14. 21. 20	29·850		17. 17. 0	29·740
	19. 11. 20	29·993		21. 15. 0	29·676
	22. 0. 0	29·753		23. 16. 40	29·110
	25. 21. 0	30·167		28. 16. 0	29·851
	29. 10. 35	30·029		30. 22. 30	29·511
October	8. 10. 0	30·354	October	9. 17. 0	30·249
	11. 22. 35	30·391		14. 8. 25	29·869
	15. 23. 0	30·070		17. 2. 0	29·587
	18. 1. 0	29·812		19. 18. 30	29·190

MAXIMA.			MINIMA.		
Approximate Greenwich Mean Solar Time, 1879.		Reading.	Approximate Greenwich Mean Solar Time, 1879.		Reading.
	d h m	in.		d h m	in.
October	22. 22. 30	29·889	October	24. 11. 20	29·494
	27. 22. 50	30·100		29. 2. 10	29·989
	29. 21. 0	30·068	November	1. 2. 0	29·827
November	3. 23. 0	30·394		6. 4. 45	30·282
	7. 12. 45	30·457		9. 17. 30	29·948
	10. 10. 30	30·074		11. 14. 10	29·565
	15. 11. 0	30·306		17. 12. 50	29·980
	18. 11. 0	30·180		21. 9. 30	29·644
	22. 20. 55	29·884		23. 14. 30	29·803
	24. 22. 50	30·065		27. 1. 0	29·891
	27. 12. 30	29·987	December	1. 1. 0	29·485
December	1. 22. 20	29·797		4. 11. 30:	29·330
	4. 22. 40	29·555		5. 11. 0	29·424
	6. 22. 20	30·337		7. 16. 30	30·252
	8. 13. 20	30·453		9. 17. 30	30·262
	12. 23. 30	30·602		15. 2. 0	30·276
	19. 0. 0	30·470		21. 14. 0	30·153
	22. 22. 20	30·635		24. 2. 0	30·230
	24. 22. 30	30·435		29. 5. 0	29·705
	29. 14. 0	29·876		30. 1. 35	29·417
	30. 14. 40	29·737		31. 2. 20	29·465

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 symbol : denoting that the reading has been sensibly the same through a period of more than one hour. The readings from January 1, $0^h. 0^m$, to January 2, $21^h. 0^m$, and that at February 3, $0^h. 0^m$, are taken from the eye-observations, on account of temporary interruption of the photographic registration.

ABSOLUTE MAXIMA AND MINIMA READINGS OF THE BAROMETER for each Month in the YEAR 1879.
[Extracted from the preceding Table.]

1879, MONTH.	Readings of the Barometer.		Range of Reading in each Month.
	Maxima.	Minima.	
	in.	in.	in.
January	30·265	29·164	1·101
February	29·945	28·670	1·275
March	30·447	29·382	1·065
April	30·165	28·790	1·375
May	30·358	29·368	0·990
June	29·990	29·245	0·745
July	30·005	29·130	0·875
August	29·975	29·295	0·680
September	30·325	29·110	1·215
October	30·391	29·190	1·201
November	30·457	29·565	0·892
December	30·635	29·330	1·305

The highest reading in the year was 30in·635 on December 23. The lowest reading in the year was 28in·670 on February 10.
The range of reading in the year was 1in·965.

MONTHLY RESULTS of METEOROLOGICAL ELEMENTS for the YEAR 1879.

1879, MONTH.	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 Daily Range.	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 ..	29·853	50·5	19·4	31·1	35·1	28·0	7·1	31·8	− 6·9	30·7	27·1	82·5
February..	29·369	52·8	24·5	28·3	42·6	34·3	8·3	38·3	− 1·4	37·0	34·8	87·4
March	29·808	63·7	28·6	35·1	49·0	34·8	14·2	41·2	− 0·3	38·8	35·6	80·6
April	29·519	60·8	27·7	33·1	52·6	36·3	16·3	43·5	− 4·0	40·8	37·6	80·1
May	29·833	70·6	30·0	40·6	58·4	40·1	18·3	48·6	− 4·5	44·8	40·6	74·1
June	29·641	72·7	41·3	31·4	67·0	49·6	17·4	57·0	− 2·7	53·6	50·5	79·0
July	29·629	80·6	46·3	34·3	67·2	51·7	15·5	58·2	− 4·4	55·3	52·7	82·4
August ...	29·672	79·7	44·0	35·7	69·4	53·0	16·4	60·2	− 1·7	57·4	55·0	83·5
September.	29·800	73·4	39·5	33·9	65·5	49·3	16·3	56·3	− 1·2	53·7	51·2	83·4
October ...	29·952	67·8	33·1	34·7	55·6	43·0	12·6	49·3	− 1·7	47·8	46·2	89·4
November .	30·035	54·6	21·0	33·6	43·5	33·3	10·2	38·5	− 4·2	37·0	34·7	86·4
December .	30·139	52·6	13·7	38·9	37·4	26·8	10·6	32·5	− 8·3	31·4	28·6	85·6
Means	29·771	Highest. 80·6	Lowest. 13·7	Annual Range. 66·9	53·6	40·0	13·6	46·3	− 3·4	44·0	41·2	82·9

1879, MONTH.	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.	Rain. Amount collected in a Gauge 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 ...	0·148	1·8	563	2·5	7·8	12	2·586	25	222	219	60	36	80	56	28	18	0·27	283
February..	0·202	2·4	547	3·0	8·8	21	3·815	93	64	101	60	68	196	65	21	4	0·28	303
March	0·208	2·4	552	2·4	6·8	14	0·603	68	156	87	32	75	224	67	16	19	0·42	316
April	0·225	2·6	544	4·3	7·9	16	2·599	143	125	79	70	108	113	47	26	9	0·14	229
May	0·253	2·9	544	4·7	7·0	15	3·361	149	119	53	50	90	180	48	47	8	0·18	260
June	0·367	4·1	531	6·5	7·7	20	4·288	7	6	36	35	169	389	41	24	13	0·22	277
July	0·399	4·4	529	3·5	8·5	19	3·723	42	18	49	40	83	284	176	43	9	0·37	314
August ...	0·433	4·8	527	5·9	7·2	20	5·194	38	33	72	28	129	331	86	15	12	0·30	285
September.	0·377	4·2	534	2·7	6·7	14	2·874	33	108	61	39	108	250	66	3	52	0·11	222
October ...	0·313	3·6	545	1·2	7·1	12	0·761	60	138	106	23	44	168	100	55	50	0·14	253
November .	0·201	2·4	559	0·0	6·9	12	0·906	212	125	31	13	42	104	92	83	18	0·13	239
December .	0·157	1·9	568	1·1	7·6	10	0·652	65	87	95	60	77	198	79	20	63	0·26	230
Sums	..	..	..	..	..	185	31·362	935	1201	989	510	1029	2517	923	381	275	..	..
Means	0·274	3·1	545	3·1	7·5	..	..	..	..	..	..	..	..	..	..	..	0·24	268

The greatest recorded pressure of the wind on the square foot in the year was 22 lbs. on July 20.
The greatest recorded daily horizontal movement of the air „ „ 705 miles on December 30.
The least recorded daily horizontal movement of the air „ „ 32 miles on October 12.

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

Hour, Greenwich Mean Solar Time (Civil reckoning).	1879. January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Yearly Means.
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
Midnight	29·896	29·388	29·817	29·518	29·848	29·646	29·640	29·674	29·804	29·959	30·046	30·141	29·781
1h. a.m.	29·890	29·383	29·816	29·514	29·842	29·641	29·634	29·671	29·799	29·957	30·041	30·142	29·778
2 "	29·891	29·381	29·812	29·509	29·835	29·639	29·629	29·666	29·795	29·951	30·041	30·141	29·774
3 "	29·889	29·373	29·804	29·507	29·830	29·635	29·626	29·662	29·789	29·945	30·037	30·140	29·770
4 "	29·884	29·366	29·802	29·503	29·830	29·634	29·623	29·659	29·786	29·944	30·034	30·138	29·767
5 "	29·879	29·365	29·803	29·504	29·834	29·637	29·625	29·661	29·786	29·943	30·033	30·137	29·767
6 "	29·881	29·363	29·808	29·511	29·838	29·638	29·627	29·664	29·794	29·944	30·033	30·141	29·770
7 "	29·884	29·364	29·812	29·518	29·841	29·641	29·629	29·669	29·803	29·953	30·037	30·143	29·774
8 "	29·889	29·370	29·819	29·520	29·843	29·644	29·632	29·671	29·811	29·958	30·043	30·148	29·779
9 "	29·893	29·373	29·822	29·523	29·841	29·644	29·631	29·672	29·817	29·960	30·046	30·153	29·781
10 "	29·897	29·376	29·825	29·524	29·839	29·644	29·630	29·672	29·817	29·962	30·050	30·158	29·783
11 "	29·900	29·375	29·823	29·522	29·837	29·641	29·631	29·671	29·813	29·959	30·048	30·154	29·781
Noon	29·894	29·368	29·818	29·520	29·836	29·640	29·627	29·671	29·810	29·954	30·038	30·148	29·777
1h. p.m.	29·888	29·362	29·807	29·519	29·832	29·637	29·625	29·670	29·804	29·945	30·029	30·134	29·771
2 "	29·883	29·355	29·800	29·514	29·829	29·636	29·625	29·669	29·798	29·940	30·022	30·125	29·766
3 "	29·886	29·352	29·793	29·511	29·824	29·635	29·621	29·667	29·793	29·938	30·019	30·126	29·764
4 "	29·887	29·354	29·789	29·512	29·820	29·634	29·619	29·665	29·790	29·938	30·021	30·127	29·763
5 "	29·891	29·360	29·790	29·515	29·817	29·633	29·619	29·663	29·789	29·943	30·024	30·130	29·765
6 "	29·896	29·366	29·796	29·521	29·819	29·637	29·621	29·666	29·791	29·952	30·031	30·131	29·769
7 "	29·901	29·368	29·801	29·529	29·822	29·641	29·625	29·674	29·797	29·954	30·032	30·134	29·773
8 "	29·905	29·368	29·806	29·536	29·828	29·645	29·632	29·684	29·803	29·959	30·033	30·137	29·778
9 "	29·902	29·373	29·811	29·538	29·834	29·657	29·639	29·691	29·803	29·965	30·036	30·138	29·782
10 "	29·903	29·375	29·813	29·539	29·834	29·658	29·642	29·693	29·802	29·965	30·036	30·139	29·783
11 "	29·902	29·373	29·814	29·539	29·834	29·658	29·641	29·693	29·799	29·966	30·036	30·142	29·783
Means	29·892	29·369	29·808	29·519	29·833	29·641	29·629	29·672	29·800	29·952	30·035	30·139	29·774
Number of Days employed.	27	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 Mean Solar Time (Civil reckoning).	1879. January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Yearly Means.
	°	°	°	°	°	°	°	°	°	°	°	°	°
Midnight	32·8	35·3	38·5	40·4	44·0	52·6	54·4	56·4	52·9	47·1	37·3	31·4	43·6
1h. a.m.	32·8	35·2	38·3	40·0	43·6	52·3	53·9	56·1	52·7	46·9	37·2	31·4	43·4
2 "	33·1	34·8	37·9	39·4	43·1	52·1	53·7	55·9	52·4	46·5	37·0	31·1	43·1
3 "	33·1	34·4	37·8	39·0	42·6	51·9	53·5	55·7	52·2	46·6	36·9	30·8	42·9
4 "	32·9	34·3	37·4	38·8	42·3	51·7	53·2	55·6	52·0	46·6	36·6	30·8	42·7
5 "	32·5	34·1	37·3	38·9	42·7	52·2	53·6	55·6	51·8	46·7	36·4	30·9	42·7
6 "	32·5	34·1	37·2	39·1	43·9	53·7	54·6	56·2	51·9	46·8	36·4	30·9	43·1
7 "	32·6	34·2	37·3	40·5	46·3	55·5	56·1	57·7	52·6	47·0	36·4	31·0	43·9
8 "	32·5	34·4	38·3	42·3	48·5	57·3	58·1	59·9	54·9	47·9	36·7	31·1	45·2
9 "	33·5	35·2	40·1	44·2	50·9	59·0	59·5	62·0	57·3	49·5	37·5	31·6	46·7
10 "	34·4	36·6	42·1	46·0	52·4	59·5	60·8	63·5	59·2	51·1	38·7	32·6	48·1
11 "	35·2	38·2	44·3	47·9	53·3	61·0	61·8	64·8	60·9	52·8	40·2	33·4	49·5
Noon	35·7	39·1	45·9	48·6	53·8	61·7	62·6	65·2	62·3	53·7	41·5	34·6	50·4
1h. p.m.	35·5	39·2	46·8	49·3	54·3	62·5	63·3	65·7	63·1	54·0	42·0	35·3	50·9
2 "	35·4	39·2	47·1	49·5	54·3	62·7	63·9	65·9	63·1	54·1	42·4	35·5	51·1
3 "	34·5	39·2	46·8	48·7	54·5	62·6	63·8	66·2	62·5	53·5	41·6	34·9	50·7
4 "	33·5	38·5	46·3	47·9	54·4	62·2	63·3	65·0	61·3	52·5	40·6	34·1	50·0
5 "	32·7	37·7	44·9	47·1	53·5	61·4	62·5	64·1	59·6	51·2	39·8	33·6	49·0
6 "	32·3	37·5	43·3	45·7	52·0	60·2	60·9	62·4	57·5	50·0	39·7	33·0	47·9
7 "	31·5	36·7	42·2	44·2	50·5	58·8	59·3	60·6	55·7	49·2	38·9	32·4	46·7
8 "	31·2	36·3	41·1	42·8	48·3	56·4	57·5	58·9	54·7	48·3	38·3	32·3	45·5
9 "	30·7	36·1	40·1	41·7	46·8	54·8	56·3	57·7	53·9	47·8	37·6	32·1	44·6
10 "	30·3	35·9	39·6	41·1	45·7	53·8	55·8	57·1	53·5	47·4	37·3	31·9	44·1
11 "	30·0	35·7	39·2	40·7	45·0	53·2	55·1	56·4	53·2	47·1	37·1	32·2	43·7
Means	33·0	36·3	41·2	43·5	48·6	57·0	58·2	60·2	56·3	49·3	38·5	32·5	46·2
Number of Days employed.	8	16	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 Mean Solar Time (Civil reckoning).	1879. January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Yearly Means.
Midnight	31·8°	34·5°	37·3°	39·1°	42·1°	51·1°	52·9°	55·2°	51·6°	46·5°	36·4°	30·4°	42·4°
1h. a.m.	31·8	34·3	37·0	38·8	41·8	50·9	52·6	55·1	51·6	46·2	36·3	30·5	42·2
2 „	31·9	33·9	36·9	38·4	41·5	50·6	52·4	55·0	51·2	45·9	36·1	30·2	42·0
3 „	31·9	33·7	36·8	38·0	41·3	50·6	52·2	54·8	51·2	45·9	36·0	29·9	41·9
4 „	32·1	33·5	36·5	37·9	41·0	50·5	52·0	54·7	51·0	45·8	35·7	30·1	41·7
5 „	31·8	33·3	36·4	38·0	41·4	50·8	52·5	54·6	50·9	46·1	35·4	30·1	41·8
6 „	31·6	33·4	36·3	38·3	42·3	52·0	53·1	55·0	51·0	46·0	35·4	30·0	42·0
7 „	31·9	33·3	36·2	39·4	43·9	53·2	54·3	56·1	51·7	46·1	35·5	30·2	42·7
8 „	31·8	33·5	37·0	40·6	45·2	54·4	55·4	57·3	53·1	46·9	35·7	30·3	43·4
9 „	32·4	34·2	38·1	41·8	46·4	55·0	56·1	58·5	54·7	48·0	36·4	30·7	44·4
10 „	33·5	35·1	39·4	42·6	47·1	55·0	56·9	59·3	55·9	49·1	37·3	31·5	45·2
11 „	33·8	36·0	40·8	43·6	47·5	56·1	57·4	60·1	56·7	50·1	38·3	32·4	46·1
Noon	33·9	36·7	41·6	43·8	47·9	56·4	58·1	60·3	57·1	50·5	38·9	33·3	46·5
1h. p.m.	33·7	36·9	42·1	43·8	48·0	56·7	58·5	60·5	57·4	50·7	39·2	33·9	46·8
2 „	33·5	36·9	42·1	44·0	48·0	56·7	58·7	60·7	57·5	50·7	39·3	33·9	46·8
3 „	33·0	36·8	41·9	43·5	48·0	56·5	58·6	60·7	56·9	50·4	38·9	33·6	46·6
4 „	32·1	36·3	41·6	42·9	47·8	56·1	58·2	60·3	56·4	49·9	38·4	32·9	46·1
5 „	31·6	35·9	40·8	42·6	47·4	55·8	57·7	59·7	55·5	49·2	37·9	32·5	45·5
6 „	31·3	35·7	40·1	42·0	46·6	55·1	56·9	58·8	54·3	48·6	37·7	31·8	44·9
7 „	30·7	35·5	39·4	41·2	45·8	54·4	56·1	57·6	53·3	48·1	37·3	31·4	44·2
8 „	30·3	35·3	38·6	40·4	44·7	53·3	55·0	56·7	52·8	47·6	36·7	31·3	43·6
9 „	29·7	35·1	38·1	39·9	43·9	52·5	54·4	55·9	52·3	46·9	36·4	31·2	43·0
10 „	29·3	35·0	37·8	39·5	43·3	51·9	54·1	55·5	52·0	46·6	36·1	31·0	42·7
11 „	29·1	34·9	37·6	39·2	42·9	51·6	53·6	55·1	51·8	46·5	36·0	31·1	42·5
Means	31·9	35·0	38·8	40·8	44·8	53·6	55·3	57·4	53·7	47·8	37·0	31·4	44·0
Number of Days employed.	8	16	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 Mean Solar Time (Civil reckoning).	1879. January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Yearly Means.
Midnight	29·8°	33·3°	35·7°	37·4°	39·8°	49·6°	51·4°	54·1°	50·3°	45·8°	35·2°	28·0°	40·9°
1h. a.m.	29·8	32·9	35·2	37·2	39·7	49·5	51·3	54·2	50·5	45·4	35·1	28·3	40·8
2 „	29·5	32·5	35·5	37·1	39·6	49·1	51·1	54·2	50·0	45·2	34·8	27·8	40·5
3 „	29·5	32·6	35·4	36·7	39·7	49·3	50·9	54·0	50·2	45·1	34·7	27·5	40·5
4 „	30·5	32·1	35·3	36·7	39·4	49·3	50·8	53·9	50·0	44·9	34·5	28·2	40·5
5 „	30·3	31·9	35·2	36·8	39·8	49·4	51·4	53·7	50·0	45·4	34·0	27·9	40·5
6 „	29·7	32·1	35·0	37·3	40·4	50·3	51·6	53·9	50·1	45·1	34·0	27·5	40·6
7 „	30·4	31·7	34·7	38·0	41·2	51·0	52·6	54·7	50·8	45·1	34·2	28·0	41·0
8 „	30·3	32·0	35·2	38·5	41·6	51·8	53·0	55·0	51·3	45·8	34·3	28·2	41·4
9 „	30·4	32·6	35·5	39·0	41·7	51·4	53·1	55·5	52·4	46·4	34·9	28·5	41·8
10 „	32·0	32·9	36·1	38·7	41·7	51·0	53·6	55·8	53·0	47·0	35·4	29·2	42·2
11 „	31·6	33·0	36·7	38·9	41·7	51·9	53·6	56·2	53·1	47·4	35·9	30·5	42·5
Noon	31·1	33·5	36·7	38·6	42·1	51·9	54·3	56·3	52·7	47·4	35·7	31·1	42·6
1h. p.m.	30·9	33·9	36·8	37·9	41·9	51·7	54·5	56·2	52·6	47·5	35·7	31·7	42·6
2 „	30·5	33·9	36·5	38·1	41·9	51·6	54·3	56·4	52·8	47·4	35·5	31·5	42·5
3 „	30·5	33·7	36·4	37·9	41·7	51·3	54·2	56·3	52·1	47·3	35·6	31·5	42·4
4 „	29·5	33·3	36·3	37·4	41·4	50·8	53·9	56·4	52·2	47·3	35·6	30·8	42·1
5 „	29·3	33·4	36·1	37·6	41·4	51·0	53·6	56·0	51·9	47·1	35·4	30·5	41·9
6 „	29·1	33·2	36·3	37·7	41·1	50·6	53·5	55·7	51·4	47·1	35·1	29·4	41·7
7 „	28·7	33·8	36·0	37·7	40·9	50·4	53·2	55·0	51·1	46·9	35·2	29·2	41·5
8 „	28·0	33·9	35·5	37·5	40·8	50·4	52·7	54·7	51·0	46·8	34·5	29·1	41·2
9 „	26·9	33·6	35·5	37·6	40·6	50·3	52·6	54·3	50·7	45·9	34·8	29·1	41·0
10 „	26·3	33·6	35·5	37·5	40·6	50·1	52·5	54·1	50·5	45·7	34·4	28·9	40·8
11 „	26·3	33·7	35·5	37·3	40·5	50·0	52·1	53·9	50·4	45·8	34·5	28·6	40·7
Means	29·6	33·0	35·8	37·7	40·9	50·6	52·7	55·0	51·3	46·3	35·0	29·2	41·4

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

Hour, Greenwich Mean Solar Time (Civil reckoning).	1879. January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Yearly Means.
Midnight	89	92	90	90	85	90	90	92	91	96	92	87	90
1h. a.m.	89	91	89	90	86	90	91	93	93	95	92	88	91
2 "	87	91	92	92	87	90	91	94	92	96	92	87	91
3 "	87	93	92	92	90	91	91	94	93	95	92	87	91
4 "	91	92	92	93	90	92	92	94	93	94	92	90	92
5 "	91	91	92	93	90	90	92	93	94	96	91	88	92
6 "	89	92	92	94	87	88	90	92	94	94	91	87	91
7 "	92	90	90	91	82	86	88	89	94	94	92	88	90
8 "	91	90	89	87	77	82	83	84	87	93	91	88	87
9 "	88	90	84	81	71	76	80	80	84	90	90	88	84
10 "	90	87	80	77	68	74	77	76	80	86	89	87	81
11 "	86	82	74	71	65	73	75	74	76	82	85	89	78
Noon	84	81	71	68	64	70	75	73	71	79	80	87	75
1h. p.m.	83	82	69	65	63	68	73	72	69	78	79	87	74
2 "	82	82	67	65	63	67	72	72	69	78	77	85	73
3 "	84	81	68	67	62	67	72	71	70	79	80	87	74
4 "	85	82	69	67	61	67	72	74	73	83	83	88	75
5 "	87	85	71	70	63	69	73	75	76	86	85	88	77
6 "	88	85	76	74	66	70	77	79	80	90	84	86	80
7 "	89	89	79	77	70	74	81	83	85	92	87	88	83
8 "	87	91	81	82	75	80	84	86	87	95	87	88	85
9 "	85	91	84	85	80	84	88	88	89	94	90	88	87
10 "	84	92	86	87	83	87	89	89	89	94	90	88	88
11 "	85	93	87	88	84	89	90	91	90	96	90	86	89
Means	87	88	82	81	75	80	83	84	84	90	88	87	84

TOTAL AMOUNT of SUNSHINE registered in each HOUR of the DAY in each MONTH, as derived from the Records of CAMPBELL'S SELF-REGISTERING INSTRUMENT, for the YEAR 1879.

1879, Month.	Registered Duration of Sunshine in the Hour ending 6h. a.m.	7h. a.m.	8h. a.m.	9h. a.m.	10h. a.m.	11h. a.m.	Noon.	1h. p.m.	2h. p.m.	3h. p.m.	4h. p.m.	5h. p.m.	6h. p.m.	7h. p.m.	8h. p.m.	Total registered Duration of Sunshine in each Month.	Corresponding aggregate Period during which the Sun was above Horizon.	Mean Altitude of the Sun at Noon.
	h	h	h	h	h	h	h	h	h	h	h	h	h	h	h	h	h	°
January	..	..	..	..	3·1	3·4	3·0	3·0	0·9	0·8	0·6	..	..	..	..	14·8	259·1	18
February	..	..	0·2	2·5	4·8	6·2	4·8	4·2	3·9	3·7	1·2	0·2	..	..	..	31·7	277·9	26
March	..	..	3·8	7·5	10·0	12·5	12·1	12·4	10·9	9·3	8·4	3·6	0·5	..	..	91·0	366·9	37
April	..	1·3	4·8	6·8	6·7	9·3	8·2	9·2	8·3	7·1	5·4	4·7	2·7	0·1	..	74·6	414·9	48
May	2·5	8·9	10·4	10·3	12·4	12·6	11·5	10·2	9·8	9·0	12·1	11·4	9·9	4·6	..	135·6	482·1	57
June	5·2	8·7	9·6	12·0	9·3	9·2	13·2	14·0	12·3	12·3	10·6	10·0	10·7	4·4	0·4	141·9	494·5	62
July	2·0	6·4	9·1	7·7	6·2	6·5	7·0	6·1	8·8	9·2	9·1	11·2	8·0	2·0	..	99·3	496·8	60
August	0·8	8·1	11·2	14·0	13·2	14·2	12·0	11·0	10·9	13·7	11·5	10·1	8·0	0·4	..	139·1	449·1	52
September	..	1·7	5·9	9·7	10·8	11·4	12·3	13·8	14·0	11·8	11·6	9·8	3·7	..	..	116·5	376·9	41
October	..	..	0·8	3·7	7·5	9·2	10·5	9·2	9·9	10·2	4·8	0·9	..	..	..	66·7	328·7	30
November	..	..	..	0·1	1·5	6·2	7·5	9·8	8·8	8·3	1·0	..	..	..	..	43·2	264·4	20
December	..	..	..	0·1	1·2	3·7	6·4	6·9	7·1	2·8	0·2	..	..	..	..	28·4	242·7	16

The hours are reckoned from apparent noon.

The total registered duration of sunshine during the year was 982·8 hours; the corresponding aggregate period during which the Sun was above the horizon was 4454·0 hours; the mean proportion for the year (constant sunshine =1) was therefore 0·221.

(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.

1879.												
Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
1	53·07	52·02	50·88	49·85	49·15	48·80	48·85	49·52	50·37	51·24	51·88	52·05
2	53·00	52·00	50·85	49·83	49·13	48·80	48·87	49·53	50·43	51·27	51·87	52·05
3	53·00	51·96	50·80	49·80	49·12	48·78	48·87	49·56	50·44	51·29	51·90	52·05
4	52·95	51·92	50·76	49·79	49·10	48·78	48·89	49·57	50·47	51·33	51·93	52·05
5	52·93	51·88	50·73	49·75	49·09	48·78	48·92	49·60	50·50	51·35	51·94	52·04
6	52·88	51·88	50·68	49·72	49·07	48·76	48·93	49·63	50·53	51·37	51·95	52·05
7	52·87	51·84	50·66	49·71	49·05	48·76	48·95	49·64	50·55	51·41	51·97	52·03
8	52·83	51·81	50·62	49·68	49·03	48·76	48·95	49·67	50·58	51·42	51·97	52·04
9	52·81	51·76	50·58	49·65	49·03	48·75	48·97	49·70	50·62	51·44	51·97	52·04
10	52·76	51·73	50·54	49·62	49·00	48·75	49·00	49·72	50·68	51·46	52·00	52·04
11	52·73	51·67	50·52	49·58	49·00	48·75	49·02	49·76	50·67	51·48	52·00	52·02
12	52·68	51·62	50·47	49·56	48·99	48·76	49·07	49·77	50·70	51·50	52·01	52·02
13	52·71	51·58	50·42	49·55	48·98	48·75	49·06	49·81	50·73	51·53	52·01	52·02
14	52·67	51·54	50·38	49·50	48·95	48·75	49·07	49·85	50·75	51·54	52·01	52·01
15	52·68	51·48	50·37	49·50	48·96	48·72	49·10	49·87	50·78	51·55	52·01	52·00
16	52·58	51·44	50·33	49·45	48·94	48·76	49·13	49·87	50·81	51·57	52·02	51·97
17	52·56	51·38	50·30	49·46	48·94	48·75	49·13	49·88	50·84	51·61	52·05	51·98
18	52·53	51·34	50·29	49·42	48·91	48·76	49·17	49·93	50·86	51·63	52·07	51·96
19	52·48	51·31	50·25	49·40	48·93	48·77	49·20	49·96	50·90	51·66	52·06	51·95
20	52·44	51·26	50·20	49·35	48·93	48·78	49·20	49·99	50·93	51·67	52·03	51·94
21	52·40	51·21	50·16	49·36	48·90	48·78	49·22	50·01	50·95	51·68	52·04	51·93
22	52·37	51·17	50·12	49·33	48·90	48·78	49·24	50·05	50·97	51·72	52·04	51·92
23	52·34	51·13	50·09	49·30	48·87	48·79	49·27	50·07	51·00	51·73	52·05	51·90
24	52·30	51·08	50·05	49·28	48·87	48·80	49·30	50·11	51·02	51·76	52·06	51·86
25	52·27	51·04	50·02	49·27	48·86	48·81	49·33	50·15	51·05	51·76	52·07	51·85
26	52·25	51·00	49·99	49·25	48·86	48·82	49·34	50·16	51·10	51·78	52·06	51·83
27	52·21	50·96	49·98	49·22	48·85	48·83	49·37	50·20	51·13	51·82	52·06	51·81
28	52·17	50·92	49·94	49·21	48·84	48·84	49·41	50·23	51·16	51·82	52·07	51·83
29	52·14		49·94	49·18	48·84	48·85	49·43	50·28	51·17	51·82	52·07	51·81
30	52·10		49·91	49·17	48·82	48·85	49·45	50·31	51·21	51·84	52·06	51·77
31	52·06		49·87		48·83		49·47	50·34		51·86		51·77
Means.	52·57	51·50	50·35	49·49	48·96	48·78	49·13	49·89	50·80	51·58	52·01	51·95

The mean of the twelve monthly values is 50°·58.

(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.

1879.												
Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
1	50·08	47·13	45·80	45·68	46·08	47·43	50·19	52·48	54·79	55·27	54·38	52·10
2	49·87	47·08	45·78	45·69	46·10	47·50	50·32	52·50	54·81	55·28	54·30	51·98
3	49·76	47·12	45·77	45·68	46·11	47·54	50·39	52·58	54·84	55·27	54·27	51·88
4	49·40	47·00	45·70	45·68	46·16	47·68	50·60	52·63	54·84	55·28	54·22	51·77
5	49·30	46·95	45·69	45·68	46·20	47·74	50·70	52·68	54·81	55·26	54·20	51·63
6	49·20	46·89	45·64	45·67	46·20	47·83	50·80	52·75	54·84	55·26	54·13	51·52
7	49·12	46·83	45·68	45·69	46·24	47·92	50·90	52·80	54·87	55·24	54·10	51·39
8	49·09	46·81	45·62	45·70	46·29	48·03	50·97	52·90	54·86	55·18	54·00	51·33

(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.*

1879.												
Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
9	49·02	46·60	45·60	45·68	46·35	48·10	51·03	52·92	54·87	55·17	53·98	51·20
10	48·96	46·51	45·59	45·68	46·35	48·20	51·10	53·03	54·87	55·13	53·91	51·09
11	48·90	46·24	45·58	45·69	46·44	48·26	51·16	53·14	54·90	55·12	53·82	50·92
12	48·82	46·12	45·57	45·70	46·42	48·36	51·22	53·21	54·91	55·10	53·77	50·81
13	48·82	46·08	45·51	45·77	46·50	48·42	51·25	53·30	54·97	55·08	53·70	50·70
14	48·78	46·05	45·52	45·75	46·52	48·51	51·37	53·37	54·93	55·08	53·60	50·59
15	48·67	45·98	45·56	45·80	46·58	48·56	51·41	53·44	54·96	55·02	53·50	50·46
16	48·60	45·95	45·51	45·79	46·60	48·69	51·48	53·46	55·00	55·03	53·43	50·30
17	48·51	45·90	45·51	45·87	46·66	48·78	51·53	53·47	54·99	55·06	53·41	50·16
18	48·45	45·90	45·52	45·87	46·68	48·86	51·60	53·57	55·02	55·00	53·39	50·03
19	48·33	45·90	45·56	45·88	46·73	48·96	51·69	53·64	55·05	55·03	53·27	49·90
20	48·25	45·90	45·52	45·83	46·77	49·07	51·70	53·71	55·06	54·97	53·14	49·80
21	48·15	45·88	45·52	45·93	46·80	49·12	51·77	53·79	55·05	54·91	53·05	49·64
22	48·09	45·88	45·62	45·92	46·88	49·20	51·83	53·88	55·08	54·89	52·97	49·56
23	47·99	45·89	45·56	45·94	46·87	49·31	51·92	53·90	55·07	54·88	52·94	49·41
24	47·89	45·88	45·55	45·98	46·95	49·42	52·02	54·14	55·09	54·86	52·79	49·31
25	47·80	45·88	45·55	45·97	46·96	49·51	52·09	54·35	55·12	54·77	52·71	49·19
26	47·78	45·87	45·58	46·00	47·02	49·69	52·12	54·37	55·20	54·71	52·60	49·08
27	47·67	45·88	45·62	46·00	47·08	49·85	52·20	54·43	55·20	54·69	52·51	48·98
28	47·57	45·82	45·60	46·00	47·13	49·98	52·28	54·57	55·23	54·61	52·42	48·89
29	47·49		45·66	46·02	47·20	50·05	52·33	54·77	55·21	54·54	52·32	48·78
30	47·43		45·64	46·08	47·29	50·12	52·40	54·79	55·27	54·51	52·21	48·67
31	47·33		45·68		47·37		52·41	54·79		54·45		48·57
Means.	48·55	46·28	45·61	45·82	46·63	48·69	51·44	53·53	54·99	54·99	53·43	50·31

The mean of the twelve monthly values is 50°·02.

(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.

1879.												
Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
1	45·28	43·00*	43·35*	44·40	46·58	50·39	54·86	56·89	58·90	57·73	54·32	48·78
2	45·19	42·95*	43·30*	44·49	46·69	50·49	54·99	57·08	58·83	57·66	54·20	48·57
3	44·90	42·90*	43·25*	44·60	46·79	50·70	55·20	57·25	58·78	57·61	54·11	48·36
4	45·09	42·85*	43·25*	44·73	46·83	50·97	55·70	57·43	58·68	57·58	54·00	48·11
5	45·24	42·80*	43·25*	44·83	46·90	51·06	55·68	57·58	58·58	57·50	53·85	47·88
6	45·30	42·75*	43·30*	44·92	46·96	51·10	55·63	57·72	58·56	57·40	53·67	47·62
7	45·32	42·70*	43·35*	45·06	47·04	51·20	55·64	57·82	58·50	57·31	53·51	47·38
8	45·28	42·70*	43·40*	45·18	47·18	51·57	55·60	57·90	58·49	57·21	53·31	47·18
9	45·14	42·75*	43·45*	45·28	47·33	51·69	55·57	57·90	58·47	57·18	53·18	46·92
10	45·02	42·80*	43·50*	45·40	47·38	51·83	55·61	57·97	58·43	57·14	53·00	46·70
11	44·90	42·85*	43·55*	45·60	47·43	51·97	55·64	58·04	58·43	57·10	52·83	46·49
12	44·72	42·95*	43·60	45·73	47·47	52·13	55·68	58·06	58·39	57·01	52·70	46·29
13	44·60	43·05*	43·70	45·87	47·48	52·30	55·65	58·10	58·37	56·92	52·59	46·10
14	44·45	43·20*	43·83	45·84	47·50	52·50	55·66	58·17	58·28	56·80	52·44	45·90
15	44·30	43·40*	43·98	45·82	47·57	52·60	55·69	58·24	58·27	56·61	52·28	45·75

(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.*

1879.												
Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
16	44·17	43·58	44·01	45·75	47·63	52·78	55·70	58·27	58·30	56·49	52·09	45·58
17	44·02	43·62	44·08	45·73	47·80	52·98	55·76	58·28	58·26	56·38	51·90	45·44
18	43·97	43·78	44·12	45·70	47·88	53·14	55·82	58·48	58·28	56·13	51·65	45·31
19	43·90	43·83	44·23	45·70	47·98	53·32	55·93	58·57	58·30	55·98	51·33	45·20
20	43·85	43·82	44·29	45·66	48·09	53·52	55·90	58·61	58·28	55·73	51·09	45·10
21	43·75	43·80	44·40	45·67	48·20	53·61	56·04	58·76	58·29	55·52	50·91	44·98
22	43·69	43·76	44·51	45·68	48·39	53·80	56·24	58·80	58·28	55·40	50·77	44·85
23	43·52	43·72	44·68	45·71	48·51	53·96	56·33	58·85	58·28	55·29	50·60	44·73
24	43·50	43·62	44·78	45·77	48·78	54·09	56·40	58·90	58·30	55·18	50·39	44·64
25	43·40*	43·67	44·81	45·81	48·99	54·23	56·39	58·95	58·30	54·98	50·18	44·54
26	43·35*	43·60*	44·80	45·91	49·19	54·68	56·37	59·01	58·31	54·87	49·91	44·46
27	43·30*	43·50*	44·77	46·00	49·38	54·72	56·44	59·10	58·18	54·81	49·68	44·38
28	43·25*	43·40*	44·62	46·12	49·53	54·69	56·53	59·24	58·03	54·71	49·42	44·30
29	43·15*		44·53	46·28	49·80	54·68	56·58	59·29	57·90	54·60	49·20	44·20
30	43·10*		44·42	46·46	50·05	54·72	56·67	59·18	57·82	54·53	48·99	44·17
31	43·05*		44·41		50·30		56·70	59·02		54·43		44·13
Means.	44·25	43·26	43·98	45·52	47·99	52·71	55·89	58·31	58·37	56·25	51·94	45·94
The mean of the twelve monthly values is 50°·37.												

The symbol * indicates that the reading was estimated in consequence of the fluid having gone out of range of the scale.

(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.

1879.												
Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
1	42·09	37·41	39·06	42·69	46·35	52·25	57·88	60·88	59·90	57·60	52·02	42·72
2	42·60	37·34	39·50	43·12	46·38	52·40	58·19	61·12	59·74	57·60	51·75	42·29
3	41·80	37·38	39·63	43·42	46·18	52·62	58·10	61·18	59·68	57·40	51·21	41·89
4	41·40	37·35	39·70	43·61	46·11	52·69	58·00	61·30	59·66	57·01	50·68	41·47
5	41·14	37·38	39·79	43·60	46·46	52·54	57·63	61·30	59·60	56·90	50·42	41·08
6	40·74	37·41	40·35	43·87	46·92	52·79	57·48	61·10	59·65	57·01	50·30	40·73
7	40·30	37·97	40·89	44·22	47·30	53·33	57·43	60·80	59·72	57·17	50·03	40·43
8	39·99	38·70	40·99	44·68	47·12	53·90	57·60	60·60	59·79	57·22	49·71	40·18
9	39·60	39·47	40·96	45·10	46·89	54·48	57·70	60·48	59·51	57·19	49·51	39·99
10	39·36	40·38	41·20	45·38	46·71	54·70	57·62	60·44	59·30	56·92	49·47	39·80
11	39·10	41·53	41·60	45·32	46·58	54·83	57·43	60·39	59·12	56·48	49·42	39·62
12	38·80	41·79	42·00	44·88	46·51	55·10	57·26	60·62	59·03	56·01	49·38	39·51
13	38·57	41·78	42·19	44·33	46·73	55·18	57·20	61·00	59·19	55·58	49·12	39·40
14	38·40	41·69	42·20	43·89	47·14	55·30	57·33	61·26	59·10	55·24	48·57	39·30
15	38·42	41·78	42·01	43·70	47·63	55·53	57·51	61·44	59·30	54·90	47·83	39·30
16	38·80	41·81	42·00	43·70	47·78	55·98	57·68	61·58	59·29	54·49	47·03	39·33
17	38·81	41·75	42·30	43·93	47·73	56·30	57·80	61·61	59·27	53·90	46·31	39·46
18	38·70	41·52	42·53	43·78	47·80	56·50	57·93	61·37	59·40	53·32	46·18	39·32
19	38·58	41·12	42·69	43·66	48·14	56·70	58·20	60·90	59·48	53·19	46·43	39·18
20	38·45	40·83	43·02	43·62	48·68	56·83	58·44	60·89	59·48	53·20	46·58	39·10

(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.*

1879.												
Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
21	38·30	40·71	43·46	43·99	49·29	56·91	58·56	60·84	59·50	53·21	46·32	39·06
22	38·22	40·40	43·67	44·10	49·94	57·00	58·43	60·92	59·46	52·90	45·80	38·94
23	38·08	40·03	43·52	44·17	50·44	56·88	58·10	61·08	59·24	52·53	45·28	39·00
24	37·90	39·71	42·98	44·51	50·73	56·80	58·21	61·02	58·83	52·66	44·76	39·00
25	37·80	39·40	42·35	44·90	50·72	56·90	58·31	60·88	58·41	52·87	44·32	38·90
26	37·76	39·14	41·79	45·18	51·06	56·80	58·50	60·90	58·03	52·97	44·00	38·90
27	37·67	39·01	41·43	45·57	51·06	56·76	58·60	60·74	57·74	52·63	43·78	38·90
28	37·61	38·81	41·18	46·03	51·10	56·88	58·66	60·41	57·70	52·49	43·50	38·79
29	37·54		41·18	46·30	51·54	57·28	59·02	60·33	57·54	52·43	43·30	39·10
30	37·51		41·58	46·33	51·92	57·68	59·64	60·20	57·61	52·37	43·10	39·83
31	37·50		42·16		52·03		60·24	60·01		52·18		40·10
Means.	39·08	39·77	41·61	44·39	48·42	55·33	58·09	60·89	59·11	54·76	47·54	39·83
The mean of the twelve monthly values is 49°·07.												

(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.

1879.												
Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
1	45·3	32·3	39·5	45·2	45·9	54·8	59·7	65·0	56·8	57·7	48·1	34·0
2	38·0	34·0	37·2	44·1	44·8	54·1	58·9	63·0	57·3	55·6	44·5	32·0
3	39·0	35·7	38·9	43·0	44·3	54·1	58·0	63·6	58·2	53·2	44·5	32·0
4	36·7	34·0	38·5	43·0	45·5	52·7	57·0	63·8	59·0	55·6	46·5	32·9
5	35·2	34·2	43·0	45·5	48·2	54·8	57·1	62·0	59·1	56·7	46·9	31·7
6	33·0	39·0	41·9	46·3	43·3	56·2	57·2	60·9	60·2	57·3	45·2	33·0
7	34·1	41·8	40·2	47·8	45·2	58·5	59·2	60·2	60·4	57·4	48·0	29·8
8	33·2	42·2	39·0	48·2	44·7	58·0	59·0	61·7	58·3	56·0	44·8	33·5
9	33·5	45·0	41·0	47·2	47·0	58·0	57·6	59·8	58·0	55·0	46·8	33·7
10	32·0	45·3	42·0	46·2	44·1	57·9	57·4	59·5	57·0	52·1	47·0	34·0
11	31·6	45·0	43·6	41·0	45·8	58·4	56·3	63·3	58·1	51·9	45·9	31·2
12	31·0	41·8	43·4	40·2	48·1	57·9	58·1	63·6	59·1	51·0	45·1	33·8
13	35·3	41·0	40·0	40·7	49·9	57·6	58·3	64·2	59·7	51·0	42·0	34·1
14	37·0	42·8	39·2	41·1	50·6	59·0	58·4	64·4	59·0	51·3	39·3	35·0
15	38·1	41·4	41·3	42·3	48·3	60·4	58·7	64·9	58·0	49·0	36·1	36·7
16	35·1	41·0	44·1	42·3	47·4	59·7	59·3	64·3	59·2	46·9	35·9	35·2
17	34·4	39·0	42·4	42·0	49·0	59·8	60·0	59·3	60·0	48·7	41·0	32·0
18	35·0	37·7	43·2	41·6	50·0	58·7	60·7	59·1	60·2	48·7	46·0	34·7
19	35·0	38·3	45·3	42·2	51·3	59·8	62·7	60·8	60·2	52·3	44·3	33·9
20	33·2	38·2	45·7	44·0	53·2	60·7	60·0	61·9	60·0	51·1	39·6	34·8
21	32·6	36·9	44·0	43·2	54·8	59·0	57·8	62·4	59·0	48·0	38·0	32·5
22	32·8	35·7	41·2	43·0	55·7	58·0	57·7	60·9	57·2	48·3	37·0	35·8
23	32·0	35·4	38·8	45·7	52·6	58·0	57·9	60·3	57·8	51·1	35·2	35·0
24	32·8	34·2	36·4	46·3	52·2	58·7	59·9	60·4	55·8	53·2	36·9	33·3
25	33·0	35·0	36·3	46·0	53·8	56·0	60·5	61·4	53·5	51·5	37·9	35·8

(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.*

1879.												
Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
26	33·8	35·0	32·9	47·4	52·5	56·5	59·5	60·0	54·4	48·2	36·0	33·9
27	34·2	35·2	37·8	48·0	53·2	59·3	59·1	59·0	55·3	50·5	36·8	32·8
28	33·3	38·8	37·0	47·3	52·8	60·3	62·5	60·2	56·6	50·7	37·0	39·5
29	33·6		43·0	46·1	53·0	60·4	63·7	59·5	56·3	49·1	37·2	42·0
30	33·8		44·0	46·7	54·0	60·6	65·7	58·3	56·9	49·7	34·9	39·8
31	33·1		45·3		55·0		65·8	58·2		49·2		40·6
Means.	34·5	38·4	40·8	44·5	49·6	57·9	59·5	61·5	58·0	51·9	41·5	34·5

The mean of the twelve monthly values is 47°·72.

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

1879.												
Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
1	47·8	30·0	42·0	51·1	50·0	60·4	57·9	72·0	63·0	62·2	46·0	31·0
2	32·2	37·5	43·0	50·0	47·8	58·4	62·9	70·2	66·3	58·7	42·6	30·9
3	43·8	37·7	44·3	47·7	51·3	56·3	59·2	67·7	68·8	59·0	44·9	31·2
4	33·3	35·0	46·9	53·7	52·1	60·2	60·1	67·3	67·0	64·8	46·7	32·9
5	33·2	35·7	51·7	52·0	60·0	66·1	60·0	66·0	62·5	61·2	49·2	28·7
6	27·7	47·8	45·8	49·7	48·5	63·8	61·3	66·0	65·4	64·2	47·9	32·0
7	35·7	48·7	45·9	54·9	44·9	64·0	66·6	65·8	63·4	63·6	50·0	22·8
8	33·0	47·4	48·0	54·9	45·6	64·8	60·6	67·8	63·4	55·8	45·3	36·0
9	32·6	51·3	52·8	52·8	51·8	61·5	58·6	61·8	61·4	54·9	48·8	34·4
10	28·7	49·1	46·2	46·5	47·0	67·0	59·6	66·1	60·3	53·0	49·0	35·3
11	26·7	49·0	46·5	39·3	46·8	61·1	57·0	72·7	62·8	51·7	44·9	29·2
12	32·0	43·0	51·1	40·2	57·0	61·2	61·8	72·7	63·3	49·2	45·3	34·0
13	44·4	41·8	41·0	44·0	59·0	63·0	61·0	73·4	66·8	49·3	44·3	35·8
14	44·0	47·1	38·4	43·0	52·2	68·2	60·9	73·0	60·0	50·9	40·0	38·1
15	41·0	40·0	47·8	52·4	47·0	63·6	61·9	73·3	62·3	46·0	33·8	40·7
16	35·2	41·2	50·8	41·0	49·1	61·2	64·0	66·3	66·0	49·3	33·4	35·5
17	33·0	37·8	43·0	45·2	55·6	66·0	63·4	54·8	62·2	55·2	44·8	25·8
18	33·9	37·8	52·1	45·7	53·5	61·4	67·2	62·2	64·0	49·0	52·5	32·7
19	34·8	41·0	57·8	48·6	59·3	64·7	71·8	63·8	65·6	59·3	45·8	34·0
20	30·8	40·9	52·4	46·2	65·0	66·9	62·0	66·1	64·0	53·3	34·3	34·1
21	29·0	37·1	44·0	42·2	62·0	57·2	57·7	68·2	61·9	48·3	33·7	27·0
22	30·2	36·8	36·2	46·1	61·3	59·4	60·2	65·6	60·0	51·6	33·6	42·0
23	29·0	33·8	34·3	50·5	51·6	63·0	61·2	59·7	59·0	54·0	32·3	35·8
24	31·0	36·0	32·0	50·9	62·9	58·7	67·2	64·1	58·2	59·2	34·8	32·1
25	32·0	36·5	33·8	56·0	55·0	58·0	67·2	62·0	57·2	51·7	38·0	34·9
26	33·8	34·6	35·5	55·8	57·3	56·5	62·2	60·8	63·0	51·4	32·8	31·5
27	34·7	37·3	39·8	53·8	58·8	61·4	66·8	60·4	60·2	55·8	35·2	30·1
28	32·1	44·8	41·7	49·6	59·3	68·1	73·8	62·6	63·1	51·3	38·0	47·1
29	33·3		55·8	51·9	56·9	66·2	74·9	63·8	56·5	47·0	37·6	48·4
30	32·2		53·1	51·6	59·9	68·0	77·2	64·1	61·0	50·4	32·7	41·0
31	31·2		54·3		60·7		69·8	62·2		48·3		48·1
Means.	33·9	40·6	45·4	48·9	54·5	62·5	63·7	65·9	62·6	54·2	41·3	34·6

The mean of the twelve monthly values is 50°·68.

ABSTRACT of the CHANGES of the DIRECTION of the WIND, as derived from the Records of OSLER'S ANEMOMETER.

1879, Month.	Direction of the Wind. At beginning of Month.	Direction of the Wind. At end of Month.	Apparent Motion.	Times of Shifts of the Recording Pencil.	Amount of Motion.	Monthly Excess of Motion. Direct.	Monthly Excess of Motion. Retrograde.
			°	d h m	°	°	°
January..	W.S.W.	E.S.E.	+225	6. 10. 10	− 360		
				7. 0. 5	− 360		
				13. 21. 10	− 360		1215
				16. 2. 50	− 360		
				16. 22. 0	+ 360		
				17. 0. 10	− 360		
February.	E.S.E.	N.	−112½	5. 22. 0	+ 360		
				14. 9. 10	− 360		
				15. 22. 0	+ 360	247½	
				18. 9. 20	+ 360		
				20. 22. 0	− 360		
March ...	N.	S.	−180	1. 22. 0	+ 360		
				7. 21. 0	− 360		
				14. 0. 10	+ 360	540	
				18. 8. 40	− 360		
				18. 21. 0	+ 720		
April	S.	E.S.E.	+292½	1. 22. 0	+ 360		
				2. 22. 0	+ 360		
				6. 7. 40	− 360		
				11. 21. 10	+ 360		
				13. 7. 15	− 360		
				15. 2. 50	− 360		
				17. 2. 50	− 360		
				18. 22. 0	+ 360	292½	
				19. 8. 35	− 720		
				20. 21. 0	+ 360		
				22. 2. 50	+ 360		
				22. 22. 0	− 360		
				23. 2. 50	+ 360		
				26. 22. 0	− 360		
				29. 8. 30	+ 360		
May	E.S.E.	S.S.W.	−270	5. 21. 20	+ 360		
				10. 0. 10	− 360		
				10. 1. 50	− 360		
				10. 2. 50	− 360		
				10. 9. 50	+ 360		
				12. 22. 0	+ 360		
				16. 21. 15	+ 360		
				17. 0. 10	+ 360		
				17. 22. 0	− 360	1890	
				18. 7. 30	+ 360		
				19. 8. 40	+ 360		
				19. 21. 15	− 360		
				20. 0. 10	+ 360		
				20. 8. 30	+ 720		
				24. 1. 40	+ 360		
				25. 7. 15	+ 360		
May—*cont.*			−270	26. 22. 0	− 360		
				30. 9. 15	− 360		
				31. 0. 30	+ 360		
June.....	S.S.W.	S.S.E.	+315	2. 8. 40	− 360		
				4. 21. 10	− 360		
				5. 0. 10	− 360		
				5. 22. 0	+ 360		
				6. 22. 0	− 360		
				7. 22. 0	+ 360		
				10. 22. 0	− 360		765
				11. 8. 30	+ 360		
				13. 4. 40	− 720		
				14. 1. 55	+ 360		
				15. 22. 0	− 360		
				16. 2. 45	+ 360		
				26. 2. 55	+ 360		
				30. 9. 30	− 360		
July.....	S.S.E.	S.S.E.	−360	0. 21. 10	+ 360		
				1. 0. 30	+ 360		
				19. 0. 20	+ 720		
				19. 1. 40	+ 360	2520	
				28. 21. 10	+ 720		
				29. 2. 40	+ 360		
				30. 22. 0	− 360		
				31. 2. 50	+ 360		
August...	S.S.E.	S.W.	+ 67½	3. 10. 30	+ 360		
				6. 0. 10	+ 360		
				9. 1. 50	− 360		
				9. 22. 0	− 360		
				10. 7. 40	+ 360		
				10. 22. 0	− 360	787½	
				12. 22. 0	+ 360		
				14. 22. 0	+ 360		
				21. 0. 10	− 720		
				21. 3. 0	+ 720		
				22. 22. 0	− 360		
				23. 0. 10	+ 360		
September	S.W.	S.E.	− 90	1. 0. 15	+ 720		
				1. 2. 50	− 360		
				1. 8. 40	+ 360		
				4. 0. 20	− 360		
				6. 8. 40	+ 360		
				13. 8. 45	+ 360		
				14. 21. 15	+ 720		
				15. 2. 55	− 360	2430	
				18. 8. 30	+ 360		
				19. 8. 30	+ 360		

The sign + implies that the change in the direction of the wind has taken place in the order N., E., S., W., N., &c., or in *direct* motion; the sign − implies that the change has taken place in the order N., W., S., E., N., &c., or in *retrograde* motion.

The times of shifts of the recording pencil, as given above, refer to the shifts made by hand, when, by the turning of the vane, the trace tends to travel or has travelled out of range.

ABSTRACT of the CHANGES of the DIRECTION of the WIND, as derived from the Records of OSLER'S ANEMOMETER—*concluded*.

1879, Month.	Direction of the Wind. At beginning of Month.	Direction of the Wind. At end of Month.	Apparent Motion.	Times of Shifts of the Recording Pencil.	Amount of Motion.	Monthly Excess of Motion. Direct.	Monthly Excess of Motion. Retrograde.
			°	d h m	°	°	°
Sept.—*cont.*			− 90	22.22. 0	+ 360		
				23.21.15	− 360		
				24. 0.15	− 360		
				27.22. 0	+ 360		
				29.22. 0	+ 360		
October ..	S.E.	N.E.	+270	5.22. 0	− 360		
				9.21.10	+ 720		
				11.22. 0	+ 360		
				21. 3. 0	− 360	270	
				25.22. 0	− 360		
				26. 0.10	+ 360		
				26.22. 0	− 360		
November	N.E.	N.N.W.	− 67½	7. 8.50	+ 360		
				10. 8.20	+ 360		
				14.21.20	+ 360		
				14.22. 0	+ 360		
				15. 9.50	+ 360	2092½	
Nov.—*cont.*			− 67½	16. 8.10	− 360		
				20.22. 0	+ 360		
				22. 0.30	− 360		
				23.21.10	+ 360		
				24.21.15	+ 360		
December	N.N.W.	W.S.W.	− 90	6.10. 0	+ 360		
				8.22. 0	+ 360		
				12.22. 0	+ 360		
				15.22. 0	− 360		
				16. 0.15	+ 360		
				16. 9.40	+ 360		
				20.22. 0	+ 360	2070	
				21. 7.35	− 360		
				21.21.10	+ 360		
				22. 8.40	+ 360		
				23.21. 0	− 360		
				24.22. 0	+ 720		
				26.21.10	− 360		

The sign + implies that the change in the direction of the wind has taken place in the order N., E., S., W., N., &c., or in *direct* motion; the sign − implies that the change has taken place in the order N., W., S., E., N., &c., or in *retrograde* motion.

The times of shifts of the recording pencil, as given above, refer to the shifts made by hand, when, by the turning of the vane, the trace tends to travel or has travelled out of range.

The whole excess of direct motion for the year was 1160°.

The revolution-counter which is attached to the vertical spindle of the vane, whose readings increase with change of direction of the wind in *direct* motion, and decrease with change of direction in *retrograde* motion, gave the following readings :—

	revs.
On 1878, December $31^d. 12^h$	85·2
On 1879, December $31^d. 12^h$	116·2

Implying an excess of direct motion, during the year, of 31·0 revolutions, or 1160°.

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	1879.												Mean for the Year.
	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
h	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.
1 a.m.	11·7	11·9	11·5	8·1	9·0	9·3	11·5	10·6	7·9	9·3	9·4	10·4	10·0
2 a.m.	11·9	11·8	11·1	8·0	8·9	8·8	11·1	10·0	8·5	9·5	9·1	8·8	9·8
3 a.m.	10·9	10·9	10·8	7·0	9·2	8·3	10·8	9·2	8·0	8·6	9·0	8·7	9·3
4 a.m.	11·8	11·3	11·0	7·5	8·7	8·9	10·7	9·3	7·8	9·0	8·4	8·4	9·4
5 a.m.	11·5	11·2	11·4	8·1	8·9	8·8	11·1	9·8	7·7	9·3	7·9	7·6	9·4
6 a.m.	12·4	10·6	11·3	7·9	9·4	8·5	11·5	9·3	7·8	9·3	8·0	8·1	9·5
7 a.m.	11·8	11·8	11·7	7·9	9·5	9·1	11·7	9·8	7·3	9·8	8·1	8·4	9·7
8 a.m.	11·5	12·1	11·8	8·8	10·9	10·0	13·6	10·9	8·2	9·6	9·0	8·1	10·4
9 a.m.	11·4	12·4	13·3	9·2	11·4	11·9	14·3	12·1	8·9	10·7	9·4	8·8	11·1
10 a.m.	12·9	13·1	14·9	10·3	12·7	13·3	15·0	13·9	10·1	11·6	9·8	8·6	12·2
11 a.m.	13·5	13·8	15·3	10·4	12·2	14·1	14·2	14·3	9·9	11·7	9·8	8·6	12·3
Noon.	13·3	14·4	15·9	10·8	12·4	15·1	14·3	13·8	11·3	12·6	10·8	9·5	12·9
1 p.m.	13·1	15·2	16·4	12·2	12·7	15·5	15·6	14·2	12·5	13·4	11·8	10·3	13·6
2 p.m.	12·7	14·6	16·0	12·4	13·5	15·8	15·8	14·1	12·1	13·0	12·1	10·5	13·6
3 p.m.	12·1	13·9	16·8	12·7	13·4	15·9	16·2	14·6	11·9	13·3	12·3	9·5	13·5
4 p.m.	11·9	13·7	16·3	12·4	13·6	14·6	15·4	14·5	12·0	12·4	11·1	9·3	13·1
5 p.m.	11·6	12·8	14·5	11·8	12·1	13·6	15·4	13·5	10·5	10·9	10·7	10·0	12·3
6 p.m.	11·2	12·3	13·2	10·7	11·5	13·6	14·0	12·6	9·5	9·9	10·6	10·6	11·6
7 p.m.	11·2	12·7	12·8	9·7	11·4	12·7	13·1	12·2	8·8	9·7	10·7	11·0	11·3
8 p.m.	11·1	12·9	12·7	9·3	10·2	11·2	12·7	12·3	8·8	10·4	11·1	11·2	11·2
9 p.m.	11·2	13·0	12·6	9·0	9·2	9·8	11·5	11·4	8·2	10·1	10·7	11·5	10·7
10 p.m.	10·7	12·6	11·5	9·2	9·9	9·2	12·0	11·4	7·8	10·1	9·7	10·5	10·4
11 p.m.	11·2	12·1	11·7	8·3	9·8	9·5	11·5	11·0	8·3	9·5	9·8	10·6	10·3
Midnight.	10·4	11·8	11·2	8·1	9·1	9·1	11·5	10·5	8·4	9·3	9·6	11·2	10·0
Means	11·8	12·6	13·2	9·6	10·8	11·5	13·1	11·9	9·3	10·5	10·0	9·6	11·2
Greatest Hourly Measures -	39	38	38	31	33	31	36	33	29	33	34	41	..
Least Hourly Measures -	0	1	1	0	0	0	0	0	0	0	0	0	..

MEAN ELECTRICAL POTENTIAL of the ATMOSPHERE, derived from THOMSON'S ELECTROMETER, for each CIVIL DAY, as deduced from TWENTY-FOUR HOURLY MEASURES of ORDINATES of the Photographic Register on that DAY.

(The scale employed is arbitrary; the zero reading is 10·00, and numbers greater than 10·00 indicate positive potential.)

1879.

Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d												
1	..	..	10·25	10·18	..	9·95	10·02	..	10·30	10·25	10·24	10·46
2	..	..	10·56	10·31	..	9·90	10·21	10·21	10·24	10·36	10·38	10·66
3	..	..	10·30	10·03	..	9·98	10·09	10·09	10·29	10·42	10·39	10·63
4	..	..	10·45	10·34	..	10·23	10·09	10·12	..	10·23	10·35	10·41
5	..	..	10·26	10·34	..	10·26	9·97	10·18	..	10·26	10·29	10·31
6	..	..	10·36	10·03	..	10·06	10·30	10·16	10·23	10·24	10·41	10·46
7	..	..	10·47	10·05	..	9·99	10·14	10·25	10·13	10·38	10·47	..
8	..	..	10·48	10·14	..	10·20	10·12	10·20	10·13	10·30	10·56	..
9	..	10·00	10·57	10·11	..	10·20	10·12	10·19	10·08	10·36	10·44	10·53
10	..	10·00	10·42	10·06	..	10·34	10·17	10·33	10·28	10·48	10·38	10·36
11	..	10·12	10·19	10·31	..	10·11	10·24	10·29	10·29	10·37	10·46	10·63
12	..	10·23	..	10·24	..	10·11	10·23	10·33	10·11	10·46	10·29	10·63
13	..	10·08	10·24	10·23	10·20	9·96	10·19	10·30	10·24	10·27	10·40	10·47
14	..	10·22	10·03	9·99	10·04	10·14	10·09	10·09	10·22	10·20	10·62	10·64
15	..	10·26	10·24	10·16	9·95	10·11	10·18	10·24	10·31	10·37	10·53	10·52
16	..	10·00	10·38	..	10·09	10·09	10·22	10·22	10·18	10·48	10·49	10·27
17	..	10·25	..	..	10·11	10·18	10·26	10·00	10·13	10·28	10·19	..
18	..	10·18	..	..	10·10	10·17	10·20	10·06	10·10	10·30	10·41	..
19	..	10·14	..	..	10·12	10·24	10·23	10·22	10·12	10·12	10·41	10·55
20	..	10·15	..	..	10·11	10·12	10·10	10·04	10·13	10·26	10·26	10·51
21	..	10·33	..	..	10·25	10·05	10·01	10·07	10·28	10·21	10·24	..
22	..	10·58	..	..	10·21	10·25	10·07	10·24	10·23	10·18	10·24	10·49
23	..	10·39	10·12	..	10·07	10·29	10·08	10·02	9·99	10·14	10·58	10·61
24	..	10·52	10·12	..	10·22	10·24	..	10·25	10·29	10·09	9·97	10·60
25	..	10·42	10·11	..	10·13	9·90	10·23	10·17	10·39	10·27	10·49	10·62
26	..	10·36	10·19	..	10·17	10·24	10·14	10·15	10·42	10·43	10·13	10·67
27	..	10·63	10·36	..	9·98	10·22	10·22	10·09	10·40	10·24	10·03	10·47
28	..	10·50	10·38	..	10·01	10·19	10·15	10·08	10·30	10·30	..	10·06
29	..		10·15	..	10·09	10·27	..	10·18	10·27	10·19	..	10·15
30	..		10·27	..	..	10·23	..	10·21	10·31	10·22	10·61	10·24
31	..		10·28		..		..	10·23		10·29		10·14
Means -	..	10·27	10·30	10·17	10·11	10·14	10·15	10·17	10·23	10·29	10·37	10·46

The mean of the eleven monthly values is 10·242.

MONTHLY MEAN ELECTRICAL POTENTIAL of the ATMOSPHERE, derived from THOMSON'S ELECTROMETER, at every HOUR of the DAY, as deduced from the PHOTOGRAPHIC RECORDS.

(The scale employed is arbitrary; the zero reading is 10·00, and numbers greater than 10·00 indicate positive potential.)

Hour, Greenwich Mean Solar Time (Civil reckoning).	1879.												Yearly Means (11 Months).
	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
Midnight	..	10·22	10·30	10·22	10·12	10·20	10·22	10·24	10·23	10·29	10·42	10·47	10·266
1h. a.m.	..	10·09	10·28	10·24	10·12	10·17	10·24	10·19	10·20	10·26	10·38	10·48	10·241
2 "	..	10·07	10·26	10·22	10·09	10·14	10·22	10·19	10·17	10·27	10·41	10·46	10·227
3 "	..	10·16	10·30	10·23	10·09	10·14	10·21	10·17	10·16	10·26	10·40	10·43	10·232
4 "	..	10·20	10·30	10·23	10·08	10·13	10·14	10·19	10·14	10·26	10·39	10·43	10·226
5 "	..	10·20	10·27	10·27	10·12	10·11	10·17	10·17	10·18	10·26	10·42	10·41	10·235
6 "	..	10·23	10·32	10·27	10·14	10·13	10·14	10·18	10·21	10·26	10·45	10·43	10·251
7 "	..	10·22	10·37	10·27	10·18	10·11	10·20	10·20	10·24	10·26	10·39	10·47	10·265
8 "	..	10·27	10·41	10·25	10·19	10·12	10·19	10·19	10·26	10·26	10·41	10·47	10·275
9 "	..	10·29	10·37	10·20	10·17	10·14	10·14	10·15	10·22	10·28	10·36	10·41	10·248
10 "	..	10·32	10·33	10·12	10·05	10·13	10·09	10·12	10·21	10·31	10·35	10·41	10·222
11 "	..	10·32	10·30	10·11	10·08	10·10	10·01	10·09	10·21	10·29	10·34	10·46	10·210
Noon	..	10·27	10·24	10·14	10·05	10·09	10·06	10·12	10·21	10·27	10·30	10·45	10·200
1h. p.m.	..	10·26	10·22	10·08	10·08	10·14	10·08	10·14	10·19	10·27	10·29	10·50	10·205
2 "	..	10·25	10·23	10·04	10·01	10·11	10·11	10·15	10·20	10·28	10·34	10·51	10·203
3 "	..	10·31	10·20	9·99	10·06	10·14	10·11	10·09	10·22	10·25	10·30	10·50	10·197
4 "	..	10·27	10·21	10·05	10·09	10·14	10·13	10·10	10·25	10·28	10·36	10·51	10·217
5 "	..	10·33	10·25	10·07	10·09	10·07	10·11	10·16	10·27	10·32	10·35	10·51	10·230
6 "	..	10·37	10·28	10·13	10·13	10·13	10·09	10·17	10·25	10·34	10·34	10·50	10·248
7 "	..	10·37	10·31	10·17	10·16	10·07	10·13	10·19	10·26	10·35	10·35	10·48	10·258
8 "	..	10·39	10·35	10·23	10·17	10·19	10·18	10·22	10·31	10·33	10·39	10·50	10·296
9 "	..	10·39	10·36	10·22	10·14	10·19	10·17	10·26	10·31	10·32	10·34	10·46	10·287
10 "	..	10·34	10·37	10·09	10·09	10·25	10·24	10·25	10·30	10·33	10·35	10·45	10·278
11 "	..	10·28	10·37	10·22	10·13	10·23	10·24	10·25	10·24	10·32	10·36	10·44	10·280
Means -	..	10·27	10·30	10·17	10·11	10·14	10·15	10·17	10·23	10·29	10·37	10·46	10·242
Number of Days employed -	..	20	24	15	17	30	27	30	28	31	28	26	..

AMOUNT OF RAIN COLLECTED IN EACH MONTH OF THE YEAR 1879.

1879, MONTH.	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.	Crosley's.	Gauge partly sunk in the Ground, read daily.	Gauge partly sunk in the Ground, read monthly.	On the "Royalist" Police Ship.
		in.	in.	in.	in.	in.	in.	in.	in.	in.
January......	12	1·709	1·907	2·029	2·092	2·479	2·490	2·586	2·444	1·801
February.....	21	1·913	2·438	3·120	3·567	3·576	3·945	3·815	3·620	3·529
March	14	0·230	0·370	0·474	0·438	0·563	0·635	0·603	0·570	0·451
April........	16	1·580	1·872	2·119	2·240	2·539	2·730	2·599	2·450	2·069
May.........	15	2·208	2·350	2·748	3·017	3·304	3·685	3·361	3·338	2·579
June.........	20	3·157	3·415	3·717	4·013	4·228	4·815	4·288	4·024	3·013
July.........	19	2·109	2·184	2·663	3·395	3·551	3·930	3·723	3·570	2·475
August	20	3·370	3·617	4·288	4·825	5·016	5·725	5·194	4·950	4·260
September....	14	2·226	2·237	2·522	2·721	2·853	3·235	2·874	2·745	2·329
October......	12	0·345	0·338	0·503	0·651	0·705	0·800	0·761	0·700	0·504
November	12	(0·362)	(0·571)	0·666	0·591	0·918	0·935	0·906	0·860	0·518
December	10	(0·152)	(0·193)	0·443	0·554	0·626	0·560	0·652	0·670	0·599
Sums.....	185	19·361	21·492	25·292	28·104	30·358	33·485	31·362	29·941	24·127

The heights of the receiving surfaces are as follows:

	Above the Mean Level of the Sea. Ft.	In.	Above the Ground. Ft.	In.
The Two Gauges at Osler's Anemometer	205	6	50	8
Gauge on the Roof of the Octagon Room	193	2	38	4
Gauge on the Roof of the Magnetic Observatory	176	7	21	9
Gauge on the Roof of the Photographic Thermometer Shed.......	164	10	10	0
Crosley's Gauge	156	6	1	8
The Two Gauges partly sunk in the Ground	155	3	0	5
	Above Level of Water. Ft.	In.	Above Deck. Ft.	In.
Gauge on the "Royalist" Police Ship, moored in Blackwall Reach until October 19, and afterwards in the West India Dock......	17	0	8	8

The gauge on the roof of the Magnetic Observatory has been substituted for that formerly placed on the roof of the Library, which was in some degree overshadowed by the dome of the Great Equatoreal. The elevation of the new gauge is a few inches less than that of the old gauge.

During the months of November and December the two Osler gauges were greatly overshadowed by a scaffold erected round the vane of Osler's Anemometer during alterations and repairs of the wind-pressure apparatus. The results for both gauges are probably in each month too small.

The Police Ship "Royalist" was removed from Blackwall Reach into the West India Dock on October 19 for repair, and remained in dock until the end of the year. The exposure of the gauge in the latter position was not quite so good as in the river.

ROYAL OBSERVATORY, GREENWICH.

OBSERVATIONS

OF

LUMINOUS METEORS.

1879.

Month and Day, 1879.		Greenwich Mean Solar 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		°	
January	8	11.45. 0	N.	> 1	White	< 1	. . .	12	1
January	15	10. 1. 7	S., P.	2	Bluish-white	0·5	None	..	2
January	16	10.30. 0	G.	1	Blue	2	Fine	..	3
May	25	9.54.	S.	Venus × 3	Yellow	1	Fine	..	4
July	29	10.28.24	G.	2	Blue	0·6	Slight	9	5
August	6	9.45.55	H.	2	Bluish-white	0·5	None	..	6
	,,	9.53.35	H.	1	Bluish-white	..	Slight	..	7
	,,	10. 3. 0	H.	2	White	..	None	..	8
	,,	10. 8.35	H.	Jupiter	Red	2	Fine train 1 sec., showing colours, first green, afterwards red.	..	9
	,,	10.41.15	H.	1	Red	1	None	..	10
August	9	10.23. 5	G.	2	Bluish-white	0·5	Slight	12	11
	,,	10.25.	S.	2	Bluish-white	0·2	None	..	12
	,,	10.43.38	G., H.	2	Bluish-white	0·5	Slight	22	13
	,,	10.45.14	G., P.	2	Blue	0·8	Train	15	14
	,,	10.58.10	H.	2	Bluish-white	0·5	None	..	15
	,,	10.59.53	P.	1	Bluish-white	1	Train	10	16
	,,	11. 8. 0	H.	2	White	0·5	Slight	..	17
	,,	11.11. 3	G.	1	Red	0·6	Fine	9	18
	,,	11.15.58	G.	2	Bluish-white	0·4	None	8	19
	,,	11.17.20	H.	2	Bluish-white	1	Slight	..	20
	,,	11.25.35	H.	4	Bluish-white	0·2	None	..	21
	,,	11.31.10	H.	1	White	1	. . .	..	22
	,,	11.31.10	H.	1	Yellowish	1	. . .	..	23
	,,	11.31.24	G.	1	Blue	0·4	Slight	20	24
	,,	11.39.23	E., G.	3	Bluish-white	0·3	. . .	..	25
	,,	11.48.25	H.	2	Bluish-white	1	Slight	..	26
	,,	11.58.38	G.	2	Blue	0·4	Slight	10	27
	,,	12. 4. 8	P.	2	White	0·3	. . .	8	28
	,,	12.20.38	G.	1	Bluish-white	0·6	. . .	10	29
	,,	12.33.28	G.	Jupiter	Blue	0·8	Fine	12	30
	,,	13. 0. 0	G.	2	Yellow	0·6	Train	7	31
	,,	13. 5.38	G.	Mars × 2	Reddish	0·7	None	10	32
August	10	11.24.	S.	1	Blue	..	Slight	..	33
	,,	11.34.	E., H.	Jupiter	Yellow	..	. . .	..	34
	,,	11.42.13	H.	1	Bluish-white	..	. . .	..	35
	,,	11.57. 3	E., H.	1	Yellow	..	. . .	2	36
August	11	10.41.25	H., S.	> 1	Blue	1	Fine	20	37
	,,	10.50.30	S.	1	White	1	. . .	..	38
	,,	10.50.36	S., P.	1	Bluish-white	0·5	Fine	10	39
	,,	10.52.43	H.	2	Bluish-white	..	Slight	..	40
	,,	10.54.23	S.	2	Bluish-white	0·5	None	..	41
	,,	10.56. 0	N.	1	White	1	Train	15	42
	,,	11. 0.53	P.	1	Bluish	0·4	Slight	..	43
	,,	11. 2. 3	S.	2	Bluish-white	0·2	Slight	..	44
	,,	11. 2.43	N.	1	Bluish-white	..	Fine	..	45
	,,	11. 5. 5	H.	3	Bluish-white	0·5	. . .	5	46
	,,	11. 7.38	S.	2	Blue	0·5	None	..	47
	,,	11.10.11	N.	2	Bluish-white	0·8	Fine	10	48
	,,	11.11.49	H.	2	Bluish-white	0·5	. . .	..	49
	,,	11.14.33	S.	1	Bluish-white	0·5	Slight	..	50
	,,	11.14.55	N., H.	2	Bluish-white	0·5	None	7	51
	,,	11.17.48	P.	2	Blue	0·5	Fine	8	52
	,,	11.19. 6	N.	2	White	0·4	None	4	53

August 7 and 8. Sky cloudy.
August 9. The sky was generally cloudy throughout.
August 10. Generally cloudy; at midnight the sky became overcast.

No. for Reference.	Path of Meteor through the Stars.
1	From direction of α Orionis disappeared at a point about 35° vertically below the Pleiades.
2	From near δ Ursæ Majoris passed about 3° to right of α Draconis.
3	From slightly below γ Orionis, passed across ε Orionis, and disappeared a little above κ Orionis.
4	Appeared about 2° above and a little to right of α Lyræ, passed exactly over β Lyræ, and disappeared about 5° to left of α Aquilæ.
5	Appeared near γ Boötis and disappeared a little above Arcturus.
6	Shot from λ Andromedæ towards γ Cassiopeiæ.
7	From direction of β Cassiopeiæ passed about 3° to left of ι and β Cephei.
8	Appeared about 10° to left of Polaris and moved towards α Ursæ Majoris.
9	Appeared about 5° below α Cassiopeiæ, moved towards β Pegasi, and disappeared about half-way between these two stars. Meteor seemed to throw off sparks.
10	Shot from a point a little to right of ο Ursæ Majoris and disappeared near θ Ursæ Majoris.
11	Appeared near α Pegasi and disappeared a little above α Aquarii.
12	From about 2° above and a little to right of α Lyræ passed nearly midway between δ and β Lyræ.
13	Shot from a little to right of α Ophiuchi and disappeared a little above η Ophiuchi.
14	Appeared a little below Polaris and disappeared a little above α Ursæ Majoris.
15	Appeared about 2° below Polaris and disappeared near β Ursæ Minoris.
16	Shot from θ Cephei to a little below τ Draconis.
17	Appeared near β Andromedæ, shot across δ Andromedæ, and disappeared a few degrees below α Andromedæ.
18	Moved from α Aquilæ towards η Aquilæ.
19	Appeared near α Coronæ and disappeared a short distance below ε Boötis.
20	Shot from a point about 5° to right of α Andromedæ and disappeared near γ Pegasi.
21	From B. A. C. 1448 (Camelopardalus) to B. A. C. 2722 (Camelopardalus).
22	From ε Persei towards Capella.
23	From about midway between Capella and ε Persei; fell perpendicularly.
24	Appeared near α Persei and disappeared near Capella.
25	Shot from about midway between β Andromedæ and Saturn towards Saturn.
26	Appeared at a point about 10° from γ Cephei and shot across γ and β Cephei.
27	Appeared a little above Polaris and disappeared about 10° below Polaris.
28	Moved from 72 Cassiopeiæ towards Polaris.
29	Moved from Polaris towards β Ursæ Minoris.
30	Appeared near β Pegasi and disappeared near ε Pegasi.
31	From Capella towards β Aurigæ.
32	Moved from about 2° below the Moon towards Mars (observed through cloud).
33	From near ο Cygni towards ν Cygni, disappeared behind a cloud.
34	Passed through points about 5° above and 10° to right of Saturn (observed between clouds).
35	Shot from near β Persei across α Persei.
36	From ε Aurigæ moved perpendicularly downwards.
37	Appeared near α Trianguli and passed across η Piscium towards Saturn.
38	From near λ Draconis passed between γ and δ Ursæ Majoris.
39	From γ Ursæ Majoris passed about 4° to right of χ Ursæ Majoris.
40	Appeared near δ Persei, disappeared near β Persei.
41	From a little to right of θ Boötis disappeared a little to left of λ Boötis.
42	From direction of α Trianguli passed midway between γ Pegasi and Saturn.
43	From β Boötis disappeared about 2° to left of ε Boötis.
44	From between η and β Pegasi moved towards ε Pegasi.
45	From direction of β Pegasi passed across ε Pegasi.
46	From γ Cygni towards β Cygni.
47	From about 2° above and a little to left of γ Delphini, disappeared near β Aquilæ.
48	From direction of α Trianguli passed (at center of path) about 5° above Saturn.
49	From μ Andromedæ to δ Andromedæ.
50	From β Aquilæ to near δ Aquilæ.
51	From a point near γ Piscium to Jupiter.
52	Shot from η Ursæ Minoris to η Draconis.
53	From direction of ι Pegasi passed midway between β and η Pegasi.

Month and Day. 1879.		Greenwich Mean Solar 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		°	
August	11	11. 20. 42	N.	1	Bluish-white	0·7	Train	8	1
„		11. 22. 4	N.	1	White	0·8	Train	12	2
„		11. 22. 23	S.	Jupiter	Blue	1	Fine	..	3
„		11. 23. 33	H.	Jupiter × 2	Red	2	Splendid; 1^s	20	4
„		11. 26. 3	S.	1	Bluish-white	0·5	None	..	5
„		11. 30. 6	N., P.	3	White	0·3	None	4	6
„		11. 31. 58	N., P.	1	Bluish-white	0·5	Fine	7	7
„		11. 32. 58	H.	1	Bluish-white	..	..	1	8
„		11. 33. 43	H.	1	Bluish-white	..	..	1	9
„		11. 34. 8	P.	1	White	0·5	Fine	6	10
„		11. 34. 56	N.	2	White	0·5	Train	10	11
„		11. 36. 8	H.	2	Bluish-white	1	Slight	..	12
„		11. 37. 38	P.	2	Yellowish	0·4	Slight	8	13
„		11. 39. 3	H.	1	Blue	1	Fine	..	14
„		11. 41. 56	S.	1	Bluish-white	0·5	None	..	15
„		11. 51. 25	N., H.	1	Bluish-white	0·5	Fine	10	16
„		11. 52. 22	S.	> 1	Bluish-white	1	None	..	17
„		11. 53. 53	N., H.	> 1	Bluish-white	0·4	Fine	..	18
„		11. 56. 49	P.	2	Bluish-white	0·4	Slight	..	19
„		11. 57. 13	N., H.	1	Bluish-white	..	Slight	..	20
„		11. 58. 13	N.	2	White	0·3	Slight	5	21
„		12. 3. 28	S.	1	Bluish-white	0·5	Slight	..	22
„		12. 9. 13	H.	1	Bluish-white	..	Slight	20	23
„		12. 9. 13	H.	2	Bluish-white	..	..	..	24
„		12. 11. 13	H., S.	1	Bluish-white	2	Very fine	..	25
„		12. 14. 33	H.	2	Bluish-white	..	Broad	2	26
„		12. 17. 16	S.	Jupiter	Yellow	1	Very fine	10	27
„		12. 18. 23	N.	2	White	0·4	Slight	8	28
„		12. 19. 13	S.	2	Bluish-white	0·5	None	..	29
„		12. 19. 58	P.	3	Bluish	..	Slight	..	30
„		12. 20. 23	H.	> 1	Blue	1	Splendid; $0^s.5$	..	31
„		12. 22. 28	N., H., S., P.	1	Bluish-white	0·2	Train	3	32
„		12. 22. 43	H., S.	Mars × 2	. . .	2	Fine; 4^s	..	33
„		12. 24. 28	N.	2	White	0·4	Slight	5	34
„		12. 24. 38	H.	Mars	Blue	2	Train; 1^s	..	35
„		12. 27. 22	P.	2	Green	..	Slight	16	36
„		12. 31. 28	N., S.	1	Bluish-white	0·5	Fine	3	37
„		12. 33. 20	H.	1	Bluish-white	1	..	..	38
„		12. 34. 8	H.	1	Bluish-white	1	Slight	..	39
„		12. 36. 48	S.	1	Bluish-white	0·5	None	..	40
„		12. 39. 28	N., H.	2	White	0·7	Train	15	41
„		12. 40. 58	H.	1	Blue	1	..	..	42
„		12. 41. 24	S.	2	Bluish-white	0·2	Slight	..	43
„		12. 42. 53	H.	1	Bluish-white	..	Fine	5	44
„		12. 45. 33	N., S.	1	Bluish-white	1	Train	10	45
„		12. 46. 46	N.	3	White	0·4	Slight	5	46
„		12. 48. 8	P.	2	Bluish	..	Slight	5	47
„		12. 48. 39	N.	> 1	White	0·9	Fine	15	48
„		12. 52. 38	H.	1	Bluish-white	..	Slight	..	49
„		12. 57. 13	H.	1	Bluish-white	..	Slight	..	50
„		12. 57. 53	N., H.	1	Bluish-white	1	Fine	15	51
„		12. 59. 50	N.	2	Bluish-white	0·5	Slight	8	52
„		13. 1. 54	H.	1	Bluish-white	..	Fine	30	53
„		13. 7. 35	N.	1	Bluish-white	0·5	Train	6	54
„		13. 8. 9	H.	< 1	Blue	..	Slight	..	55
„		13. 12. 54	H.	2	Bluish-white	0·5	..	..	56
„		13. 12. 54	P.	2	Blue	0·3	Slight	..	57
„		13. 12. 56	H.	2	Bluish-white	0·5	..	..	58
„		13. 12. 59	P.	3	Bluish-white	..	None	..	59
„		13. 18. 17	N.	2	Bluish-white	0·5	Slight	7	60
„		13. 23. 34	N., P.	> 1	Bluish-white	0·3	Fine; 2^s	4	61
„		13. 25. 2	H.	1	Yellowish	1	Fine	..	62
„		13. 26. 29	H.	1	Blue	1	Slight	..	63

No. for Reference.	Path of Meteor through the Stars.
1	From direction of α Pegasi passed across ε Pegasi.
2	From direction of a point midway between α Andromedæ and γ Pegasi to a point 5° to right of Saturn.
3	From near η Pegasi disappeared about 5° below α Pegasi.
4	From a point about 5° to left of Capella shot across β Aurigæ.
5	From between γ and ε Capricorni towards ζ Capricorni.
6	Passed across ι Piscium, moving from direction of γ Pegasi.
7	Passed across ψ Aquarii to δ Aquarii.
8	Appeared near γ Persei (very little motion).
9	Appeared near ε Cassiopeiæ, moving towards 46 Cassiopeiæ (very little motion).
10	From σ Cassiopeiæ passed between λ and κ Andromedæ.
11	From direction of ζ Cygni passed a few degrees above α Delphini and across β Aquilæ.
12	Shot across ε Cassiopeiæ towards β Cephei.
13	From direction of Polaris disappeared between κ and λ Draconis.
14	Passed nearly midway between α and β Cephei and θ and η Cephei.
15	Moved on path parallel to line joining β and ε Cassiopeiæ and 5° above those stars.
16	Directed from β Andromedæ, passed midway between α Andromedæ and γ Pegasi.
17	Appeared about 3° above and a little to left of Mars and disappeared about 6° below that planet.
18	From direction of ε Arietis passed midway between α Arietis and Mars.
19	From θ Piscium passed between λ and κ Piscium.
20	From a point between γ and ζ Aquilæ passed midway between δ Aquilæ and θ Serpentis.
21	From direction of γ Pegasi disappeared nearly at Jupiter.
22	From near ζ Persei disappeared a little to left and about 2° below the Pleiades.
23	From a point about midway between γ and α Pegasi towards Jupiter.
24	From about midway between γ and α Pegasi fell perpendicularly.
25	From about 5° below γ Andromedæ disappeared near β Andromedæ.
26	From about 5° to left of Capella towards β Aurigæ.
27	From near Capella towards β Aurigæ.
28	From direction of α Andromedæ passed 3° above α and ζ Pegasi.
29	From about 2° to left of ξ Andromedæ to near β Andromedæ.
30	From direction of β Cassiopeiæ disappeared between 8 and λ Andromedæ.
31	From a point a few degrees from α Andromedæ passed across α Pegasi and a few degrees beyond.
32	Passed about 3° to right of the Pleiades, moving from direction of β Persei.
33	From a point about 10° to right of the Pleiades and disappeared about 20° below and 5° to left of Mars.
34	Passed midway between β Persei and δ Trianguli, moving from direction of γ Persei.
35	From β Persei moved across ε Arietis and disappeared about 10° above Mars.
36	Shot from 54 Andromedæ and disappeared about 3° to right of β Andromedæ.
37	Passed across α Camelopardali, moving from direction of γ Persei.
38	From β Andromedæ moved across φ Andromedæ towards ε Cassiopeiæ.
39	From near β Pegasi towards a point between γ Pegasi and α Andromedæ.
40	From between β and η Pegasi towards γ Delphini.
41	From α Arietis towards Saturn.
42	Appeared near γ Pegasi and disappeared near Jupiter.
43	From Capella to near θ Aurigæ.
44	From direction of γ Andromedæ to a point about midway between β Andromedæ and β Trianguli.
45	From about 8° below and 2° to left of Saturn to near η Ceti.
46	Passed across ι Ceti, moving from direction of Saturn.
47	From δ Ursæ Minoris disappeared about 5° below Polaris.
48	From direction of β Pegasi passed across ε Pegasi and disappeared a few degrees beyond.
49	Shot from ε Arietis parallel to a line joining α and β Arietis.
50	From Jupiter towards δ Capricorni.
51	Passed midway between ε Pegasi and β Aquilæ and about 5° to left of θ Aquilæ.
52	Passed across ψ Aquarii, moving from direction of a point midway between α and γ Pegasi.
53	From α Pegasi passed across θ Pegasi.
54	Passed across δ and γ Lyræ.
55	From a point about 5° to right of α Lyræ shot across π and ζ Herculis.
56	From κ Lyræ to ν Herculis.
57	From α Arietis disappeared about 3° above β and γ Arietis.
58	From κ Lyræ to near ν Herculis.
59	Appeared near β Trianguli and disappeared near α Trianguli.
60	Passed between ψ Aquarii and Jupiter and slightly to right of δ Aquarii.
61	From near η Persei moved in direction of a point between 51 and γ Andromedæ.
62	Moved from a point about 5° above Jupiter and disappeared near a point between β Aquarii and δ Capricorni.
63	Shot from θ Pegasi towards β Aquarii.

Month and Day, 1879.	Greenwich Mean Solar 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		°	
August 11	13. 34. 4	P.	2	Bluish	. .	Slight	. .	1
"	13. 34. 44	N.	2	Bluish-white	0·7	Train	9	2
"	13. 35. 39	N., H.	1	Yellowish	0·5	Slight	. .	3
"	13. 35. 52	N., H.	3	Bluish-white	0·4	None	5	4
"	13. 46. 4	N., H.	1	Bluish-white	0·5	. . .	. .	5
"	13. 46. 22	P.	1	Bluish-white	. .	Fine	10	6
"	13. 48. 19	N., H.	2	Bluish-white	. .	. . .	. .	7
"	13. 50. 19	N.	3	Bluish-white	0·5	Slight	10	8
"	13. 51. 44	P.	2	Yellowish	. .	None	. .	9
"	13. 52. 24	H.	1	Blue	0·5	. . .	. .	10
"	13. 52. 25	H.	2	Bluish-white	. .	. . .	. .	11
"	14. 1. 44	N.	2	White	0·5	Train	8	12
"	14. 4. 37	N.	2	Bluish-white	0·7	Slight	10	13
"	14. 5. 39	N., H.	2	Bluish-white	0·5	. . .	20	14
"	14. 6. 54	N., H.	2	Bluish-white	0·5	Train	7	15
"	14. 8. 7	H.	Mars	Bluish-white	2	Fine; 1s	. .	16
"	14. 11. 7	H.	> 1	Bluish-white	1	Fine	. .	17
"	14. 12. 22	P.	1	White	. .	Slight	. .	18
"	14. 13. 24	N., H., P.	1	Bluish-white	3	Very long & enduring	25 to 30	19
"	14. 23. 4	N., H.	1	Bluish-white	1	Train	12	20
"	14. 23. 34	P.	1	Blue	. .	Fine	30	21
"	14. 23. 39	H.	2	Bluish-white	. .	. . .	. .	22
"	14. 25. 17	H.	. .	. . .	. .	. . .	. .	23
"	14. 27. 16	N., H.	1	Bluish-white	0·5	Train	8	24
"	14. 27. 18	N., H.	2	Bluish-white	0·7	Slight	10	25
"	14. 28. 49	P.	1	White	. .	Slight	. .	26
"	14. 31. 41	N., P.	1	Bluish-white	0·5	Slight	8	27
"	14. 33. 4	N.	1	Bluish-white	0·8	Fine	15	28
"	14. 36. 29	H.	2	Bluish-white	0·5	Slight	. .	29
"	14. 36. 49	N.	1	Bluish-white	0·5	Train	8	30
"	14. 37. 59	P.	2	Blue	0·4	Slight	10	31
"	14. 40. 59	H.	1	Bluish-white	0·5	Slight	10	32
"	14. 41. 1	H.	1	Bluish-white	. .	None	5	33
"	14. 46. 5	H.	1	Blue	. .	Slight	. .	34
"	14. 46. 14	P.	1	Bluish-white	1	Fine	. .	35
"	14. 49. 4	N.	1	Bluish-white	0·8	Train	12	36
"	14. 50. 19	N., H.	2	Bluish-white	. .	Slight	9	37
"	14. 51. 37	H.	2	Red	0·5	. . .	. .	38
"	14. 52. 49	N., H., P.	> 1	Bluish-white	. .	Slight	. .	39
"	14. 52. 59	P.	2	Bluish-white	0·3	Slight	. .	40
"	15. 2. 17	N., P.	1	Bluish-white	0·5	Train	. .	41
"	15. 3. 37	N., H.	1	Bluish-white	. .	None	. .	42
"	15. 4. 37	N.	1	Bluish-white	. .	Fine	10	43
"	15. 8. 59	N., H.	2	Bluish-white	. .	Slight	. .	44
"	15. 9. 4	N., H.	1	. . .	. .	. . .	. .	45
"	15. 9. 19	N., H.	1	Bluish-white	0·7	Train	12	46
"	15. 12. 59	P.	1	Bluish-white	0·5	Fine	. .	47
August 12	9. 9. 0	S.	1	Blue	0·5	Train	10	48
"	10. 14. 0	S.	1	Bluish-white	0·5	None	. .	49
"	10. 15. 43	G.	2	Bluish-white	0·8	Slight	10	50
"	10. 24. 23	G.	1	Bluish	0·5	None	11	51
"	10. 28. 3	G.	2	Bluish-white	0·6	Fine	9	52
"	10. 35. 3	G.	2	Bluish-white	0·7	Slight	12	53
"	10. 36. 23	G.	2	Bluish-white	0·5	Fine	9	54
"	10. 39. 53	G.	1	Bluish-white	0·6	None	6	55
"	10. 45. 43	H.	2	Bluish-white	0·5	None	5	56
"	10. 53. 3	H.	2	Red	0·2	. . .	. .	57
"	11. 2. 8	H.	1	Bluish-white	0·5	. . .	10	58
"	11. 2. 48	H.	2	Bluish-white	. .	. . .	. .	59
"	11. 2. 55	G.	1	Bluish-white	0·5	Slight	22	60
"	11. 15. 33	H.	1	Bluish-white	1	Fine	20	61
"	11. 16. 31	G.	2	Bluish-white	0·6	None	12	62

No. for Reference.	Path of Meteor through the Stars.
1	Shot from η Draconis and disappeared about 4° below θ Draconis.
2	Passed across Mars, moving towards γ Ceti.
3	Appeared a few degrees to left of Capella and shot across β Aurigæ.
4	Moved on a path parallel to ε and ζ Persei and about 2° to left.
5	Passed across Saturn towards η Ceti.
6	From about 8° below Saturn disappeared midway between η and θ Ceti.
7	Moving from direction of α Piscium passed across γ and α Ceti.
8	Passed across γ Aquarii, moving from direction of γ Pegasi.
9	Shot from δ Herculis and disappeared about 4° above α Herculis.
10	From β Ursæ Minoris towards ι Draconis.
11	Appeared near Polaris and disappeared near β Ursæ Minoris.
12	From direction of β Arietis passed midway between θ and η Ceti.
13	From β Trianguli across α Arietis.
14	From a point about 10° to right of η Pegasi moved on a path parallel to line joining ε Pegasi and β Aquarii.
15	Moved parallel to a line joining γ and β Cygni and about 3° to right.
16	From β Pegasi across μ Pegasi towards θ Pegasi.
17	From β Pegasi across α Pegasi.
18	From direction of α Cassiopeiæ passed across α Andromedæ.
19	Passed between α and β Cassiopeiæ to α Camelopardali.
20	From a point about 5° below α Aquilæ moved on line of prolongation of line joining α Delphini and α Aquilæ.
21	Passed across ζ Cygni towards α Aquilæ.
22	From α Cygni passed between γ and δ Cygni.
23	From α Andromedæ passed midway between α and γ Pegasi.
24	Passed midway between β Cygni and γ Lyræ.
25	Passed about 2° to left of β Cygni and about 2° to right of ζ Aquilæ.
26	From ο Cygni disappeared about 5° below δ Cygni.
27	Passed across ξ and ν Draconis and some degrees beyond.
28	Passed across ι to α Cephei.
29	From a point about 10° to right of Saturn moved towards β Ceti.
30	From direction of α Camelopardali fell nearly perpendicularly, passing a few degrees to the right of ο Ursæ Majoris.
31	Appeared near ξ Cephei and disappeared near δ Draconis.
32	Passed across ζ Cygni towards α Delphini.
33	Moved across ζ Cygni to a point about 10° to right of α Delphini.
34	From a point a few degrees above β Draconis passed midway between β and γ Draconis.
35	From α Cygni passed midway between γ and ξ Draconis.
36	From direction of η Pegasi towards γ Aquarii.
37	From a point a few degrees to left of β Pegasi passed between α and ζ Pegasi.
38	From γ Draconis to a point about 2° below α Lyræ.
39	From direction of α Cassiopeiæ across α Cephei.
40	From δ Cygni passed about 3° to left of α Lyræ.
41	From direction of a point midway between δ and ε Ursæ Majoris fell at right angles to a line joining those stars.
42	Appeared about 5° above and 3° to left of ε Ursæ Majoris and fell perpendicularly.
43	Passed a few degrees to left of α Ursæ Majoris and across γ Ursæ Majoris.
44	From near Polaris fell towards β Ursæ Minoris.
45	From Polaris towards β Cephei.
46	From between Polaris and β Ursæ Minoris moved in direction of α Ursæ Majoris.
47	From direction of a point a few degrees above γ Andromedæ to a point about 4° to right of δ Andromedæ.
48	From near ε Cassiopeiæ towards π Cassiopeiæ.
49	From near α Lyræ towards β Lyræ.
50	From δ towards β Herculis.
51	Appeared near β Boötis and disappeared near ε Boötis.
52	From β Pegasi towards α Pegasi.
53	Appeared near ε Ursæ Majoris, passed across ζ Ursæ Majoris, and disappeared a little above η Ursæ Majoris.
54	Appeared near α Coronæ and disappeared near ε Boötis.
55	From α Ursæ Majoris to β Ursæ Majoris.
56	From a point about midway between Arcturus and ε Boötis towards ζ Boötis.
57	From direction of η Ursæ Majoris towards Arcturus.
58	From a point between α Ophiuchi and δ Herculis, moving from direction of α Lyræ.
59	From a point 10° to right of γ Aquilæ across ζ Aquilæ.
60	From δ Ursæ Majoris to α Canum Venaticorum.
61	Passed between γ and α Aquilæ and across δ Aquilæ.
62	Appeared near α Aquilæ, passed across γ Aquilæ, and disappeared near β Sagittæ.

Month and Day, 1879.		Greenwich Mean Solar 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		°	
August	12	11. 22. 48	H.	2	Bluish-white	0·5	None	5	1
	„	11. 25. 43	G.	1	Bluish	0·5	Slight	12	2
	„	11. 26. 3	H.	3	Bluish-white	0·5	..	..	3
	„	11. 30. 0	N.	> 1	Bluish-white	1	Train	15	4
	„	11. 35. 48	G.	1	Bluish-white	0·6	Slight	7	5
	„	11. 36. 38	H.	1	Bluish-white	0·5	Slight	10	6
	„	11. 40. 8	G.	2	Bluish-white	0·7	Fine	8	7
	„	11. 42. 41	G.	1	Blue	0·6	None	9	8
	„	11. 47. 23	H.	1	Bluish-white	1	Slight	20	9
	„	11. 48. 8	G.	3	Bluish-white	0·5	None	12	10
	„	11. 53. 13	G.	2	Bluish-white	0·7	None	14	11
	„	11. 55. 3	H.	> 1	Reddish	0·2	..	5	12
	„	12. 6. 18	H.	2	Reddish	0·5	None	5	13
	„	12. 8. 23	G.	1	Bluish-white	0·6	Slight	10	14
	„	12. 26. 3	G.	2	Bluish-white	0·7	Slight	7	15
	„	12. 35. 13	G.	1	Bluish white	0·8	Fine	25	16
	„	12. 40. 13	G.	1	Reddish	0·7	Fine	..	17
	„	12. 47. 43	G.	2	Bluish-white	0·5	None	10	18
	„	12. 54. 28	G.	1	Bluish-white	0·7	Fine	20	19
	„	12. 59. 13	G.	2	Bluish-white	0·6	Slight	10	20
	„	13. 3. 13	G.	2	Bluish-white	0·5	Slight	12	21
	„	13. 7. 47	G.	2	Bluish-white	0·7	Slight	6	22
	„	13. 15. 3	G.	1	Bluish-white	0·6	Fine	8	23
	„	13. 19. 28	G.	2	Yellowish	0·5	None	9	24
	„	13. 27. 43	G.	2	Bluish-white	0·6	None	30	25
	„	13. 34. 53	G.	2	Bluish-white	0·5	Train	8	26
	„	13. 39. 43	G.	2	Yellowish	0·6	Train	5	27
	„	13. 49. 33	G.	1	Reddish	0·8	Fine	14	28
	„	13. 52. 8	G.	2	Bluish-white	0·6	None	8	29
	„	13. 59. 44	G.	1	Bluish-white	0·5	Slight	6	30
	„	14. 3. 44	G.	1	Bluish	0·8	Train	7	31
	„	14. 8. 34	G.	1	Red	0·6	Train	8	32
	„	14. 13. 34	G.	1	Bluish-white	0·7	Train	10	33
	„	14. 23. 34	G.	1	Bluish-white	0·7	Train	9	34
	„	14. 37. 44	G.	1	Bluish-white	0·6	Slight	9	35
	„	14. 57. 34	G.	1	Bluish-white	0·8	Fine	12	36
	„	15. 4. 44	G.	1	Bluish-white	0·9	Fine	8	37
August	16	10. 45.	H.	> 1	Bluish-white	4	Fine	..	38
August	20	10. 29.	H.	2	Bluish-white	0·5	None	20	39
August	21	9. 15.	S.	1	Bluish-white	0·5	None	10	40
August	25	10. 45.	H.	> 1	Bluish-white	1	Fine	20	41
September	10	8. 34.	S.	Jupiter	Blue	0·8	None	15	42
	„	9. 36.	P.	2	Bluish-white	0·5	None	..	43
September	14	9. 40.	H., S.	> Jupiter	Bluish	2	Splendid; 30^s	20	44
October	1	10. 9. 12	G.	1	Bluish-white	0·8	Slight	9	45
	„	10. 29. 17	G.	2	Bluish-white	0·7	None	6	46
	„	10. 37. 37	G.	2	Bluish-white	0·6	Fine	9	47
	„	10. 44. 17	G.	1	Bluish-white	1	Slight	8	48
	„	11. 8. 57	G.	1	Bluish-white	0·8	None	11	49
	„	11. 14. 17	G.	2	Bluish-white	0·7	Fine	5	50
	„	11. 19. 7	G.	2	Bluish-white	1	None	15	51
October	3	9. 47. 29	S.	2	Bluish-white	0·5	Slight	18	52
	„	11. 24. 41	H., S.	1	Bluish-white	0·5	Fine	30	53
	„	11. 28. 8	S.	2	White	Momentary	None	..	54
	„	11. 34. 18	S.	2	Bluish-white	0·5	Slight	..	55

August 12. Sky partially cloudy.

August 13. Cloudy throughout, with the exception of a few breaks about midnight.

No. for Reference.	Path of Meteor through the Stars.
1	From a point 5° to left of η Ursæ Majoris fell downwards.
2	From a little above ε Boötis towards Arcturus.
3	From γ Aquilæ to a point midway between δ and ζ Aquilæ.
4	Moved on path parallel to a line joining α and β Cygni, but about 7° to right of those stars.
5	From θ Persei towards γ Andromedæ.
6	From direction of Polaris shot across β Ursæ Minoris.
7	From α Ursæ Majoris towards γ Ursæ Majoris.
8	Appeared near β Cassiopeiæ, passed about 2° to right of γ Cassiopeiæ, and disappeared near δ Cassiopeiæ.
9	From direction of α Arietis passed between β and γ Andromedæ.
10	Appeared near Polaris and disappeared near β Ursæ Minoris.
11	From α Persei towards Capella.
12	From direction of α Lyræ passed across π Herculis.
13	From a point midway between η Ursæ Majoris and λ Boötis downwards.
14	From β Ursæ Minoris towards α Draconis.
15	From Capella towards β Aurigæ.
16	From Saturn towards Mars (stars not visible).
17	Appeared near β Persei and disappeared near α Andromedæ.
18	From α Ursæ Majoris towards γ Ursæ Majoris.
19	From β Persei towards Capella.
20	Appeared near α Cygni and disappeared near δ Cygni.
21	From α Aquilæ crossed γ Aquilæ towards β Sagittæ.
22	From α Cassiopeiæ towards δ Cassiopeiæ.
23	From Capella to near β Tauri.
24	Appeared near β Persei and disappeared near α Persei.
25	Appeared a little below α Persei, passed about 3° to left of Capella, and disappeared near β Aurigæ.
26	From α Cephei towards β Cephei.
27	Appeared near β Cassiopeiæ and disappeared near γ Cassiopeiæ.
28	From near η Herculis passed across ζ Herculis towards β Herculis.
29	From α Cephei towards β Cephei.
30	Appeared near β Andromedæ and moved towards α Trianguli.
31	From α Lyræ towards μ Herculis.
32	Appeared about 3° to left of Capella and disappeared near π Aurigæ.
33	Appeared near β Ursæ Minoris and disappeared near α Draconis.
34	From β Ursæ Majoris to γ Ursæ Majoris.
35	From α Draconis towards ζ Ursæ Majoris.
36	From near Polaris to β Ursæ Minoris.
37	Appeared near Capella and disappeared near β Aurigæ.
38	Shot from ζ Aquilæ at right angles to line joining γ and ζ Aquilæ towards horizon.
39	Appeared near Polaris, travelled towards α Persei.
40	From a little to right of ε Cassiopeiæ towards γ Andromedæ.
41	Passed between κ and λ Draconis towards ε Ursæ Majoris.
42	From direction of π Herculis towards δ Herculis.
43	From ε Cygni disappeared about 2° to right of υ Cygni.
44	Passed between α and δ Persei towards a point about 10° below Polaris. Mr. A. Pead describes the path as "from α Persei through a point between α and β Camelopardali."
45	From α Ursæ Majoris towards γ Ursæ Majoris.
46	Shot from Capella towards β Aurigæ.
47	Appeared near ε Ursæ Majoris and disappeared near η Ursæ Majoris.
48	From near γ Ursæ Minoris towards ι Draconis.
49	Appeared a little below Polaris and disappeared near η Draconis.
50	From near ε Pegasi towards α Pegasi.
51	Appeared near Polaris and disappeared a little above α Ursæ Majoris.
52	From near β Cassiopeiæ towards a point 2° to right of δ Draconis.
53	From direction of a point about 10° above Polaris passed across δ Draconis.
54	From near ι Cephei towards α Cephei.
55	From near α Cygni towards γ Cygni.

Month and Day, 1879.	Greenwich Mean Solar 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		°	
October 15	11. 55.	N.	3	White	0·2	. . .	2	1
„	11. 57.	N.	3	White	0·2	. . .	3	2
October 16	9. 50. 10	G.	1	Bluish-white	0·8	Slight	15	3
„	10. 20. 15	G.	2	Bluish-white	0·6	None	7	4
„	10. 25. 10	G.	3	Bluish-white	0·6	None	4	5
„	10. 45. 0	G.	2	Bluish-white	0·7	Fine	20	6
October 20	8. 9. 35	N.	1	Bluish-white	0·8	Train	15	7
„	8. 56. 30	N.	1	Bluish-white	0·5	Train	8	8
„	9. 17. 6	H.	3	Bluish-white	0·5	None	..	9
„	9. 27. 46	H.	3	Bluish-white	..	None	6	10
„	9. 44. 6	H.	2	Bluish-white	1	. . .	30	11
„	10. 26.	S.	2	Blue	Rapid	. . .	..	12
October 21	9. 19. 10	S.	2	Bluish-white	0·5	Slight	8	13
„	9. 25. 54	S.	3	Bluish-white	0·2	. . .	10	14
„	9. 35. 12	S.	1	Bluish-white	0·5	None	..	15
November 6	8. 45.	H.	1	White	2	None	30	16
November 7	8. 22. 30	S.	1	Bluish-white	0·8	Fine	12	17
November 11	9. 35.	S.	2	White	1·0	Slight	15	18
„	10. 45. ±	Several Observers.	Very bright	. . .	..	. . .	..	19
November 12	11. 30. 20	G.	1	Bluish-white	1·0	Slight	10	20
„	11. 49. 0	G.	1	Bluish-white	0·7	None	9	21
„	12. 0. 10	G.	1	Bluish-white	1·0	Fine	12	22
„	12. 8. 0	G.	2	Bluish	1·5	None	24	23
„	12. 15. 0	G.	1	Bluish-white	0·6	None	6	24
„	12. 25. 10	G.	1	Bluish-white	1·3	None	15	25
„	12. 32. 20	G.	2	Bluish-white	0·8	None	12	26
„	12. 50. 0	G.	1	Bluish	1·0	None	20	27
„	13. 15. 0	G.	2	Bluish-white	0·8	None	5	28
„	13. 55.	G.	2	Bluish-white	1·0	Slight	10	29
„	13. 55.	G.	2	Bluish-white	1·0	Slight	10	30
„	13. 55.	G.	3	Bluish-white	1·0	Slight	10	31
November 13	11. 5.	S.	2	Bluish-white	0·5	None	10	32
„	11. 29. 48	S.	1	White	1·0	None	15	33
„	11. 36. 43	S.	2	Bluish-white	0·8	None	20	34
„	11. 39. 58	S.	2	Bluish-white	0·5	Slight	..	35
„	11. 54. 4	S.	2	Bluish-white	0·5	None	5	36
„	12. 9. 46	S.	1	Blue	0·5	None	6	37
„	12. 18. 16	S.	2	Bluish-white	0·8	Slight	..	38
„	12. 26. 4	S.	1	White	1·0	Train	30	39
„	12. 37. 23	S.	At commencement 1st mag. but diminishing at center of path to 2nd mag.	Red	4·5	Fine	Very long	40
„	13. 1. 41	S.	1	Blue	1·5	Fine	40	41
„	13. 10. 38	S.	2	Bluish-white	0·5	None	10	42
„	13. 39. 40	S.	2	Bluish-white	0·5	Slight	12	43
„	13. 42. 43	S.	3	Bluish-white	0·4	None	10	44
„	13. 55. 25	S.	1	Bluish-white	0·8	None	15	45
„	14. 12. 38	S.	1	Bluish-white	..	. . .	15	46
„	14. 20. 56	S.	2	Bluish	0·5	Fine	..	47
„	14. 27. 28	S.	2	Bluish-white	0·8	None	12	48
„	14. 34. 5	S.	3	Bluish-white	0·5	None	10	49
„	14. 43. 36	S.	2	Bluish-white	0·8	None	8	50
November 14	11. 59. 46	H.	2	Bluish-white	..	. . .	10	51
„	12. 3. 31	H.	3	White	0·2	. . .	30	52

No. for Reference.	Path of Meteor through the Stars.
1	From direction of η Piscium, appeared at a point nearly midway between α Arietis and γ Ceti.
2	From near λ Arietis passed across α Arietis.
3	Appeared about 5° below γ Cassiopeiæ, moved towards Polaris.
4	Appeared near β Persei and disappeared near γ Persei.
5	From near α Cassiopeiæ towards β Cassiopeiæ.
6	From Aldebaran towards β Persei.
7	Passed midway between Capella and α Persei and at right angles to line joining Capella and β Persei.
8	Passed about 1° or 2° to left of α Ursæ Majoris and about 4° to left of β Ursæ Majoris.
9	From a point about 5° to left of α Persei moved towards λ Persei.
10	From γ Andromedæ towards α Arietis.
11	From direction of α Ceti passed about 10° below Saturn.
12	From near α Cassiopeiæ passed across β Cassiopeiæ.
13	From near α Cassiopeiæ passed about 2° above γ Cassiopeiæ.
14	From a point nearly midway between ζ and ι Cephei towards α Cephei.
15	From about 5° above α Andromedæ towards β Pegasi.
16	Appeared near the Pleiades and travelled towards β Aurigæ.
17	From direction of Mars passed across γ and β Trianguli.
18	From near β Ursæ Minoris towards α Ursæ Majoris.
19	Dropped perpendicularly from Mars (communicated by the Astronomer Royal).
20	Shot from γ Geminorum and disappeared near α Canis Minoris.
21	From direction of β Canis Majoris towards γ Geminorum.
22	Appeared slightly below α Orionis and disappeared a little above κ Orionis.
23	Shot from Aldebaran towards α Ceti.
24	Appeared near α Ursæ Majoris and disappeared near ε Ursæ Majoris.
25	Shot from α Persei towards ζ Persei.
26	Shot from a little below α Ursæ Majoris towards a little above ε Ursæ Majoris.
27	From γ Andromedæ towards α Andromedæ.
28	From β to α Trianguli.
29, 30, 31	Passed from about midway between α and γ Orionis towards γ Eridani (all visible together).
32	From nearly midway between Capella and β Aurigæ disappeared a little beyond δ Aurigæ.
33	From near α Draconis passed about 5° above ι Draconis.
34	From about 3° below α Draconis passed nearly over η Draconis.
35	From direction of β Orionis passed a little below ε Leporis.
36	From Piazzi, Hour V., No. 335, passed between 42 and 43 Camelopardali.
37	From Procyon towards β Canis Minoris.
38	From near ι Ursæ Majoris towards α Ursæ Majoris.
39	From direction of ζ Orionis passed close to ε Leporis.
40	From near κ Orionis disappeared a little above γ Pegasi.
41	From near Mars towards γ Pegasi.
42	From about 4° to left of κ Orionis disappeared near β Canis Majoris.
43	From β Eridani towards a point about 5° below γ Eridani.
44	From near β Eridani towards a point about 5° below γ Eridani.
45	From ζ Geminorum passed across κ Geminorum.
46	From a little above α Orionis disappeared a little beyond γ Geminorum.
47	From Aldebaran towards ξ Tauri.
48	From direction of α Lyncis towards α Ursæ Majoris.
49	From Rigel in direction of 53 Eridani.
50	Passed across γ and α Cassiopeiæ.
51	From a point a few degrees above Aldebaran towards λ Tauri.
52	Passed about 2° above α Ceti and across γ Ceti.

Month and Day, 1879.		Greenwich Mean Solar 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		°	
November	14	12. 30. 41	H.	3	Bluish-white	0·4	None	10	1
	„	12. 45. 26	H.	1	Bluish-white	1	None	15	2
	„	12. 46. 6	H.	Mars	Bluish-white	1	Fine	20	3
	„	12. 54. 1	H.	2	Bluish-white	0·8	. . .	10	4
	„	12. 54. 41	H.	. .	. . .	. .	Fine	. .	5
	„	13. 3. 51	H.	3	Bluish-white	0·4	None	5	6
	„	13. 14. 1	H.	1	Blue	0·5	Fine	20	7
	„	13. 37. 46	H.	2	Bluish-white	2	Train	. .	8
	„	13. 38. 16	H.	1	White	0·2	Train	. .	9
	„	13. 42. 31	H.	2	Bluish-white	0·4	None	5	10
	„	13. 46. 21	H.	>1	White	1	Fine	20	11
	„	13. 55. 21	H.	Mars	Bluish-white	1	Very fine	20	12
	„	13. 54. 6	H.	2	Bluish-white	0·5	None	. .	13
	„	13. 57. 16	H.	1	Bluish-white	0·5	Fine	. .	14
	„	14. 6. 6	H.	2	Bluish-white	0·4	. . .	5	15
	„	14. 9. 41	H.	4	White	. .	None	5	16
	„	14. 13. 21	H.	2	Bluish-white	. .	Slight	5	17
	„	14. 13. 26	H.	3	Bluish-white	. .	. . .	2	18
	„	14. 18. 51	H.	1st Mag., increasing to Mars × 2.	Bluish-white	1	Fine	30	19
	„	14. 23. 6	H.	1	Bluish-white	1	Train	10	20
	„	14. 30. 1	H.	2	Bluish-white	0·5	. . .	20	21
	„	14. 40. 51	H.	1	Bluish-white	1	Train	40	22
	„	14. 49. 51	H.	1	Bluish-white	0·5	Train	10	23
	„	14. 58. 41	H.	2	Bluish-white	0·5	Slight	. .	24
	„	15. 2. 31	H.	3	White	0·2	None	10	25
	„	15. 6. 21	H.	2	Bluish-white	0·5	None	10	26
	„	15. 8. 56	H.	4	. . .	0·2	None	. .	27
	„	15. 14. 51	H.	Increased to Mars × 2.	. . .	2	Fine	. .	28
	„	15. 21. 31	H.	1	Bluish-white	2	Train	. .	29
	„	15. 26. 31	H.	1	Bluish-white	0·5	Train	20	30
November	18	8. 48.	G.	2	Bluish	0·6	Slight	8	31
December	8	9. 25. 0	G.	1	Bluish-white	1	Slight	9	32
	„	9. 28. 15	G.	1	Bluish-white	1·5	Fine	. .	33
	„	9. 37. 0	G.	3	Bluish-white	0·6	None	8	34
December	10	8. 20. ±	H.	1	Bluish-white	0·5	None	. .	35
	„	9. 52. 25	H.	2	Bluish-white	1	Slight	30	36
December	12	9. 27. 6	S.	2	White	. .	None	15	37
	„	9. 31. 30	S.	1	Bluish-white	0·5	None	10	38
	„	9. 33. 12	S.	1	Bluish-white	0·5	None	18	39
	„	9. 40. 33	S.	>1	Bluish-white	0·8	None	20	40
	„	9. 59. 26	S.	2	Bluish-white	0·4	None	15	41
	„	10. 10. 26	S.	Mars	Blue	1·0	Slight	25	42

Careful watch was maintained for the expected Biela's comet meteors. On November 26 the sky was cloudy; on November 27 the sky was generally clear; no meteors were, however, at any time seen. On November 28 the sky was partially clear, but no meteors were seen. The Moon was near to full, so that, in any case, only very bright meteors would have been visible.

No. for Reference.	Path of Meteor through the Stars.
1	Shot across λ Ursæ Majoris in direction of α Lyncis.
2	Appeared near Procyon, travelled towards ε Hydræ (slightly curved path).
3	From direction of Regulus disappeared at a point about 5° below Sirius.
4	From a point about 5° below Procyon towards κ Orionis.
5	From a point between μ and ζ Leonis towards ε Hydræ.
6	From direction of ζ Leonis shot between ζ and ε Hydræ.
7	From β Cancri through a point a few degrees below Procyon.
8	From a point a few degrees from α Orionis shot between Procyon and β Canis Minoris.
9	From β Canis Minoris towards β Cancri.
10	Shot between β and γ Ursæ Majoris from direction of λ Ursæ Majoris.
11	From direction of α Canum Venaticorum passed between γ and λ Boötis.
12	Shot from ψ Ursæ Majoris across γ Ursæ Majoris.
13	From β Ursæ Majoris across a point about 2° below α Ursæ Majoris.
14	From β Cassiopeiæ across λ Andromedæ.
15	From a point 10° above α Canum Venaticorum towards λ Boötis.
16	From direction of α Lyncis to μ Ursæ Majoris.
17	From a point a little below Regulus towards δ Leonis.
18	From Regulus towards horizon.
19	From ζ Hydræ towards Sirius.
20	From direction of a point about midway between ζ and η Ursæ Majoris across ι Draconis.
21	From a point about 10° to right of α Lyncis towards ε Leonis.
22	From direction of Aldebaran across δ Persei.
23	From direction of η Ursæ Majoris disappeared near β Draconis.
24	From direction of β Aurigæ across γ Geminorum.
25	From η Ursæ Majoris across κ Boötis.
26	From λ Ursæ Majoris across μ Ursæ Majoris.
27	From direction of β and γ Ursæ Majoris downwards.
28	From near θ Leonis moved towards Arcturus (Meteor burst).
29	Appeared near λ Ursæ Majoris, shot across μ Ursæ Majoris.
30	From Polaris towards β Cassiopeiæ.
31	Moved from Mars towards the Pleiades.
32	From β Geminorum towards β Tauri.
33	Shot from γ Geminorum, passed about midway between α and γ Orionis, and disappeared near γ Eridani.
34	From near Capella towards γ Andromedæ.
35	From direction of γ Orionis moved towards ν Eridani.
36	From direction of a point a few degrees above Castor moved towards θ Ursæ Majoris.
37	Appeared about 2° above β Cassiopeiæ and passed upwards parallel to line joining β and ε Cassiopeiæ.
38	From near β Aurigæ towards a point about 5° below Polaris.
39	From near β Cassiopeiæ towards π Pegasi.
40	From about 2° to left of Mars passed about 2° to right of γ Ceti.
41	From near α Cassiopeiæ towards β Pegasi.
42	From near ζ Persei in direction of α Arietis.