RESULTS

OF THE

MAGNETICAL AND METEOROLOGICAL

OBSERVATIONS

MADE AT

THE ROYAL OBSERVATORY, GREENWICH,

1870.

(EXTRACTED FROM THE GREENWICH OBSERVATIONS, 1870.)

INDEX.

INDEX.

INDEX.

INDEX.

INDEX.

INDEX.

INDEX.

INDEX.

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79

GREENWICH MAGNETICAL AND METEOROLOGICAL OBSERVATIONS, 1870.

INTRODUCTION.

§ 1. *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, and 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. The meridional magnet, for observations of absolute declination and 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 magnet is in a position about 10 inches north of the former position of the declination-magnet; 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, which is in the same vertical with the upper magnet, 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 narrow chink 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 of the lower magnet; the skein of silk, which supports the lower magnet, passes through a hole in one of the slates. Upon the tops of the three piers rest the feet of the original wooden stand carrying the suspension of the upper magnet.

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 narrow chink is fixed) carries 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.

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 narrow chink through which passes the light of the photographic lamp.

To the theodolite-pier are fixed telescopes for eye-observation of the bifilar and vertical-force magnetometers.

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-west corner of the western arm, and partially beneath the staircase, was placed, until 1870, May 8, 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 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 § 13 below). The self-registering apparatus is now transferred to the south-eastern corner of the eastern arm.

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.

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.

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 wires to the electrometers; the electrometers, &c., are planted in the window-seat at the north-end of the ante-room.

The apparatus for naphthalizing the gas used in the photographic registration was formerly fixed in a corner of the ante-room, but is now (1870) mounted in a small detached zinc-built room, erected in 1863, near the west side of the ante-room. No naphthalizing process, however, has been in use since the year 1865.

In 1863, a range of seven rooms, usually called the Magnetic Offices, was erected near the southern fence of the grounds. Since the summer of 1863, observations of Dip and Deflexion have been made in the westernmost of these rooms.

At the distance of 28 feet south (magnetic) from the south-east angle of the southern arm is a square shed about $10^{ft}\ 6^{in}$ square, supported by four posts at the height 8 feet, with an adjustible opening at the center of the top. 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.

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 reads 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 a 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 10½ 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 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. 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 the 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 top of the upright piece carries a brass frame with two pulleys, whose axes are E. and W.: one of these pulleys projects beyond the north side of the principal upright, and from it depends the suspension skein: the other pulley projects on the south side: the suspension skein, being brought from the magnet up to the north pulley, is carried over it and over the south pulley, and thence downwards to a small windlass, carried by the lower part of the moveable upright. The height of the two pulleys above the floor is about 11 ft. 3¾ in., and the height of the magnet is about 2 ft. 10 in.; the length of the metal carrier which bears the magnet is 1 ft. 3 in.; so that the length of the free suspending skein is about 7 ft. 2¾ in.

The magnet was made by Meyerstein, of Göttingen: it is a bar 2 feet long, 1½ inch broad, and about ¼ 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 screws in a double square hook which constitutes the lower part of the magnet-carrier. This lower part turns stiffly by a vertical axis with index in a graduated horizontal circle (usually called the torsion-circle) attached to the upper part. The upper part of the magnet-carrier is simply hooked into the skein.

The suspending skein was originally of silk fibre, in the state in which it is first prepared by silk manufacturers for further operations; namely, when seven or more fibres from the cocoon are united by juxtaposition only (without twist) to form a single thread. The skein was 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 finally 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.

Upon the magnet there slide two 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 in the night, and by a reflector in 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 contain within itself 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 was, 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 magnet-carrier was connected with a 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.

1862, December 26. The theodolite was clamped, so that the transit-axis was at right angles to the astronomical 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 four 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 $0''\cdot3$ nearly.

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

On 1862, December 26, observations were made, giving for the value of one revolution of the micrometer 1′. 33″·85. On 1865, December 27, 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 was placed in different positions, and the telescope of the theodolite was then turned till the micrometer wire bisected the cross. The result of ten comparisons of theodolite-readings with large values and with small values of the micrometer-reading was, that one revolution = 1′. 34″·8. This is used through the year 1870.

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

1869, December 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 20 double observations was 100^{r}·084. This value is used throughout the year 1870.

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 to the upper declination-magnet.

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

The details applying to the 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 in 1865 seemed to show that the correction is now 36″·9. No numerical correction has been applied.

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

1869, December 28. The magnet was made to rest entirely 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 20 double observations was, that in the ordinary position of the glass 19″·7 is to be added to all readings.

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

1869, December 28. 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. Seven pairs of observations were taken. The mean half excess of reading with collimator above, (its usual position) over that with collimator below was 25′. 54″·4. The value used in the reductions for 1870 is 25′. 25″·7 (the mean of the results for the five years 1866–1870).

8. Effect of the damper.

In the volume for 1841 observations are exhibited shewing 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 1865. 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	24s·508
Mean of times when damper was removed	23s·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 deflexion 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 shew 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 in the reduction of the observations of the upper declination-magnet, the micrometer-head of the theodolite-telescope being East.

		° ′ ″
Micrometer equivalent for reading for line of collimation, 100r·084	—	2. 38. 8·0
Correction for the plane glass in front of the box, in its usual position......	+	19·7
The collimator above the magnet. Correction for error of collimation ...	—	25. 25·7
Constant to be used in the reduction of the observations......................	—	3. 3. 14·0

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

On 1868, January 22, it was found to be 30s·60; on March 19, 30s·56; on December 30, 30s·50; and on 1869, November 13, 30s·50.

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 silk skein now in use, the proportion was found, on 1865, January 31, $\frac{1}{214}$; on February 17, $\frac{1}{227}$; on April 27, $\frac{1}{207}$; on December 27, $\frac{1}{230}$; and on 1869, December 29, $\frac{1}{262}$.

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

The error of the 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″·0526. The azimuth-reading is then corrected by this 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 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 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 $A_{''}$ = seconds of arc in star's azimuth,

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

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

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

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

Observations for determining the theodolite readings corresponding to the astronomical meridian were made on the following days in 1870:—January 14, 26; February 10, 24; March 5; April 1, 5, 14, 18; May 9, 12, 14, 16, 18, 19, 21, 25; June 1, 14, 21; July 12, 15, 23; August 11, 29, 31; October 10, 11, 14; November 12, 17; December 14, 24. 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, illuminated by a reflector of sky-light in the day and by a lamp at night,) have been taken about twenty times at nearly equal intervals through the year.

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 above) 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 cross of the magnetometer is seen; and during the vibration of the magnet, this cross is seen 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. 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 beforehand. Chronometer M'Cabe 649 has usually been employed for observation.

If the magnet is 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 therefore the same as the time of vibration of the magnet, and the mean of all the times is the same as the Greenwich pre-arranged 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.

Till 1866, January 23, the magnet was usually in a state of vibration; but, since the introduction of the water-damper on that day, the number of instances of vibration has been very small. When it is found to be quite 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, 30^s being nearly the time of a single vibration. (The lower magnet, furnished with the copper damper, never exhibits any troublesome vibrations.)

The adopted result is converted into arc, supposing $1^r = 1'.\ 34''\cdot 8$, and the quantity thus deduced is added to the mean of the vernier-readings, from which is subtracted 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, a cylinder is provided, whose material is ebonite, and which is very accurately turned in the lathe. 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 are both made to 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 the reading of the 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-work, or rather chronometer-work, regulated by either duplex-escapement or chronometer-escapement. For two of the cylinders, which revolve in 24 hours, and for the thermometer-cylinder which revolves in 50 hours, the axis is placed in 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 only, the connexion is made by toothed wheels. For the horizontal cylinders, the plane of the chronometer work is vertical; for the vertical cylinders, it is horizontal.

Three of the cylinders are $11\frac{1}{2}$ inches high, $14\frac{1}{4}$ inches in circumference; that for the thermometers is 10 inches high, and 19 inches in circumference.

Each cylinder 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 photographic paper; the moisture on the paper usually agglutinates its overlapping ends with sufficient firmness; the glass tube is then slipped over it, and the cylinder thus loaded 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 light, by which the trace of each instrument is made, originates in a lamp, formerly of camphine, but, since 1849, of coal gas, sometimes charged with the vapour of coal-naphtha. Before the flame of the lamp is placed a metallic plate, with a small aperture about $0^{in}\cdot3$ high and $0^{in}\cdot1$ broad, independent of the lamp, and supported (for the magnetometers) by a part of the stone capping of the brick pier which carries the magnet; or (for the earth-current apparatus and thermometers) by the upper platform of the braced frame which carries the rest of the apparatus. The following arrangements are for the purpose of 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 of either galvanometer, or with the rise or fall of the mercury of the barometer or of either thermometer.

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 above mentioned 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 of 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 in the vertical direction, and is at the same time slightly curved. To diminish the length there is placed near the cylinder a plano-convex cylindrical lens of glass, with its axis 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 shines through a small aperture 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 sheet of light.

The spot of light (for the magnets, the earth-currents, and the barometer) 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 is turned round. Consequently, when the paper is unwrapped from its cylindrical form, 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, and the barometer, 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.

Every part of the cylinder-apparatus for the declination and horizontal force, except those on which the spots of light fall, is covered with a double case of blackened zinc, having a slit for each moveable spot of light and a hole for the invariable spot; and every part of the path of the photographic light is protected by blackened zinc tubes from the admixture of extraneous light. The cylinder-apparatus for the thermometers is protected in the same manner, except that the whole space including the gas-light is enclosed in a zinc case, blackened internally. The earth-current apparatus is enclosed in a mahogany case, similarly blackened.

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 photographic sheet (except where one end, in the cylindrical arrangement, laps over the other) corresponds to the known time of revolution of the cylinder. A scale being prepared beforehand, whose value for the time of revolution corresponds to the circumference of the cylinder, and the scale-reading for the registered time of interruption of light being applied to the foot of the ordinate corresponding to that interruption, the divisions of hours and minutes may be 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.

In the present year (1870), an opening has been made in the chimney of each of the lamps of the concave mirror; and the light in each instance falls upon the cylindrical lens, and produces a dark line upon the photographic paper. An apparatus of clock-work, specially arranged by Messrs. E. Dent and Co. for this purpose, uncovers simultaneously the chimney-holes in all the lamps about 2½ minutes before each hour, and covers them all simultaneously about 2½ minutes after each hour. In this manner a good series of hour-lines in the direction of the ordinates is formed. The system of cutting off the trace by hand is still retained, as giving means of correcting any error in the clock, &c.; the correction thus found will be common to all the hour-lines. The accuracy of the time-registers has been much increased by this arrangement.

§ 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, 1½ inch broad, ¼ 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. 4¾ in. As the height of the magnet above the floor is 2 ft. 10½ in., and the length of the magnet frame is 1 ft. 3 in., there remains 6 ft. 3¼ in. of free suspending skein.

On 1870, July 5, the skein, which had been in use from 1865, January 30, gave way. On July 7 a new skein was mounted; from July 7 to July 9 experiments were made for freeing it from torsion; and on July 9 the photographic registers were restored in their usual form.

One of the revolving cylinders 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 about $11^{ft.}\ 0^{in.}\cdot 1$, 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 pasteboard is prepared, (for which a glass scale is now 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 above), 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 will be laid down without difficulty a new line, parallel to that 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 declination-magnet, 2 feet long, $1\frac{1}{2}$ inch broad, and about $\frac{1}{4}$ inch thick. For its support (as is mentioned above), 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, 2½ 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 S. 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 $11^{ft.} 8^{in.} 5$; that of the pulleys of the magnet-carrier is $4^{ft.} 2^{in.} 5$; 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 part 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. 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 from the plane-mirror to the scale meets it at the division 51 nearly; the distance from the center of the plane-mirror to the scale is $7^{ft.} 6^{in.} \cdot 8$.

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 usually 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 W., but in any westerly direction between N. and S.), 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, are 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 therefore the magnet will not take the same position as before. 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 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 be different from what it was. 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 from 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.

The following table exhibits the elements of one of the determinations made for 1870:—

1869. Day.	The Marked end of the Magnet. West. Torsion-Circle Reading.	West. Scale Reading.	West. Difference of Scale Readings for 1° of Torsion.	West. Mean of the Times of Vibration.	East. Torsion-Circle Reading.	East. Scale Reading.	East. Difference of Scale Readings for 1° of Torsion.	East. Mean of the Times of Vibration.
	°	div.	div.	s	°	div.	div.	s
Dec. 31					222	17·32		20·00
	140	11·59		21·42	223	24·76	7·44	20·02
	141	21·22	9·63	21·24	224	31·89	7·13	20·16
	142	30·03	8·81	21·12	225	39·04	7·15	20·28
	143	38·49	8·46	21·02	226	46·80	7·76	20·40
	144	46·60	8·11	20·78	227	54·96	8·16	20·52
	145	54·82	8·22	20·64	228	62·59	7·63	20·70
	146	63·21	8·39	20·48	229	70·81	8·22	20·88
	147	71·88	8·67	20·42	230	79·59	8·78	21·04
	148	79·06	7·18	20·30	231	87·89	8·30	21·20
	149	87·42	8·36	20·16	232	96·48	8·59	21·46

The times of vibration and scale readings were sensibly the same, when the torsion-circle read 145°. 30′, marked end West, and 227°. 30′, marked end East, differing 82°. 0′. Half this difference, or 41°. 0′, is the angle of torsion when the magnet is transverse to the meridian.

The mean of several similar determinations gave 40°. 55′·0; and this value was adopted in the reduction of observations through the year 1870.

The reading adopted for the torsion-circle, marked end of magnet west, was 145°. 30′ through 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 $7^{\text{ft.}}\ 6^{\text{in.}}\ 84$, and that the length of $30^{\text{div.}}\cdot85$ 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 one division of the scale, 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 of the last article, the value is found to be 0·00247025 through the year 1870.

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 volumes for 1841, 1842, 1843, 1844, 1845. The effect was to increase the readings by $0^{div}\cdot487$. On mounting a new vertical-force-magnet in 1848, similar experiments were made, and the resulting number was $0^{div}\cdot45$. 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.

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 N. at the distance 4 feet S. of the unmarked end of the horizontal-force-magnet, deflecting the magnet through $1^{div.}$ of the scale, and the scale-readings were observed with the damper in its usual place and 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 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 in the Reduction of 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 magnetic south of the deflexion-apparatus used in the operation for ascertaining the absolute measure of horizontal magnetic force. 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.

* By inadvertence in printing the Introduction 1847, the letter t has been used in two different senses.

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 " marked end E 25 " " W	"	61·3	"		0·400836
17 " marked end E 16 " " W	"	90·3	"		0·400579

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

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

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—

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

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 $t = 97^\circ{\cdot}3$. 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.

I insert here (although not applying to the observations of the present volume) the results of a similar examination of the Old Vertical Force Magnet, which was in use to the end of 1863. 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—

$$0{\cdot}280526 \times \left\{1 - 0{\cdot}00088607 \times (t - 32) + 0{\cdot}0000045594 \times (t - 32)^2\right\}$$

The expression found in 1847 for the law of force was—

$$\left\{1 - 0{\cdot}00015816 \times (t - 32) - 0{\cdot}000001172 \times (t - 32)^2\right\}$$

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 $t = 159^\circ{\cdot}0$. 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 induced me 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 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 H.F. 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 H.F. corresponding to a change of 1° of Temperature (in Parts of the whole Horizontal Force).
	°	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				
7	49·3	61·62	10·0	0·71	·001725	·000172
9	56·7	61·05	7·4	0·57	·001385	·000187
10	58·9	60·91				
11	51·3	61·71	7·6	0·80	·001943	·000256
12	59·3	61·18	8·0	0·53	·001288	·000161

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

RESULTS OF TEMPERATURE EXPERIMENTS UPON THE H.F. MAGNET MARKED END WEST—*continued.*

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 H.F. corresponding to a change of 1° of Temperature (in Parts of the whole Horizontal Force).
		°	div.	°	div.		
January	13	59·5	61·26	5·6	0·16	0·000389	0·000070
	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 H.F. 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 H.F. corresponding to a change of 1° of Temperature (in Parts of the whole Horizontal Force).
		°	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 I think them deserving of great confidence. Still I have thought it 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 pages *xviii* and *xix*, 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 the same as that for the observation of declination. The first observation is made by the observer applying his eye to the telescope 40^s before that time, and, if the magnet is in a state of vibration, he observes the next four extreme points of vibration of the scale, and the mean of these is adopted in the same manner as for the declination-observations; but if it is at rest, then at 10^s before the pre-arranged time, he notes the division of the scale bisected by the wire; and 10^s after the pre-arranged time he notes whether the same division continues bisected, and if it does, that reading is adopted as the result.

The number of instances when the magnet was observed in a state of vibration during the year 1870 is very small.

Outside the double box is suspended a thermometer which is read on every day except Sundays, at 21^h, 22^h, 23^h, 0^h, 1^h, 2^h, 3^h, and 9^h. Occasional observations have been taken at other hours. Self-registering maximum and minimum thermometers placed outside the box were read twice every day, but in consequence of the very small diurnal range of temperature, their readings are not printed in the volume.

§ 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 $0^{in.}\cdot 3$ high, and $0^{in.}\cdot 01$ 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 1870 the adopted value of variation of horizontal force for one degree of angular motion of the magnet is $\sin 1^\circ \times \text{cotan } 40^\circ.55' = 0{\cdot}020137$; and the movement of the spot of light for 0·01 part of the whole horizontal force is 2·330 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 $1^{\text{ft.}}\ 6^{\text{in.}}$; 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 E. The axis of vibration is as nearly as possible N. and S. 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 $2^{ft.}\ 10^{in.}\cdot 6$. 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, in a space separated from the rest by a thin partition, the magnet can vibrate 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. 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 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, the horizontal-force-magnet, and the iron affixed to the electrometer pole, on the vertical-force-magnet.

The experiments applying to the magnets are given in the volumes for 1840–1841 to 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.

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

In the year 1870, vibrations of the vertical-force-magnet were observed on 164 different days, and with readings of various divisions of the scale. The mean time of vibration adopted for the year was $16^{s}\cdot21$.

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

1868, December 31. The magnet with all its apparatus was suspended from a tripod in Magnetic Office, No. 5, 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 $=16^{s}\cdot3192$. This number is used through the year 1870.

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 $=\frac{12}{30\cdot85}$ inches. Hence the angle which one division subtends, as seen from the mirror, is $7'.\ 11''\cdot19$; 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 $3'.\ 35''\cdot60$.

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 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 1870, T' was assumed = 16^s·319, T = 16^s·21, dip = 67°. 52′. 25″. From these numbers, the change of the vertical force, in terms of the whole vertical force, corresponding to one division of the scale, is found = 0·0005411.

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

The new 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 *xxiii* to *xxv*. 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 18 „ „ W	at mean temperature	36·6	Fahrenheit, gave	0·172352
33 „ marked end E 29 „ „ W	„	62·2	„	0·171657
26 „ marked end E 27 „ „ W	„	93·3	„	0·171389

From these it appeared that 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 V.F. 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	·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	·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	·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 I conceive that there can 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 connexion 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 great change of position may be produced by a small change of temperature. 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 1870.

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 other two magnets. 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 places at four extreme vibrations; and the mean of these is taken as for the horizontal-force-magnet. But if the magnet is at rest, then at one-half time of vibration before the arranged time, and at an equal interval after the arranged time, the division of the scale is noted; if there is a slight difference, the mean is taken.

The number of instances in 1870 in which the magnet was found in a state of vibration is very small.

Outside the box is placed a thermometer, which is read on every day except Sundays, at the hours 21^h, 22^h, 23^h, 0^h, 1^h, 2^h, 3^h, and 9^h. Occasional readings of the thermometer are also taken at other hours.

A maximum and a minimum thermometer have also been read twice daily; but the results are not printed.

§ 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 $0^{in}\cdot 3$ in length and $0^{in}\cdot 01$ 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 turned by watchwork 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 with a small cylindrical lens, for tracing a photographic base-line upon the cylinder of paper, similar to that for the cylinder of the declination and horizontal-force magnets.

The scale for the ordinates of the photographic curve of the 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 $\frac{\text{disturbing force}}{\text{whole vertical force}} = 0{\cdot}01$, gives value of division = $200{\cdot}36 \times \text{tan. dip.} \times \left(\frac{T}{T'}\right)^2 \times 0{\cdot}01$. The value of the ordinate of the photographic curve for $\frac{\text{disturbing force}}{\text{whole vertical force}} = 0{\cdot}01$, thus obtained, is, for the year 1870, = 4·862 inches. With this value, the pasteboard scales, used for measuring the photographic ordinates, have been prepared.

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

The instrument with which the greater number of the dips in the year 1870 have been observed, is that which, for distinction, is called Airy's instrument. 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 needles. 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 Lieut.-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 5½ inches on each side of the axis. Each of these projecting arms originally had a long opening, or slot, about 1 inch wide, extending from the neighbourhood of the center-work nearly to the end of the arm. Through this opening the tube of a microscope passed, in a direction parallel to the axis of the needle, and was firmly fixed by a shoulder-bearing on one side of the arm, and a circular nut, working in a thread cut upon the microscope-tube, on the other side of the arm. The microscope could thus be fixed at any distance from the central axis, within the limits of the length of the projecting arm. In 1863, between February 24 and May 11, the slot for a single moveable microscope on each side was changed for 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 each part of this there was originally a sliding eye-socket carrying the eye-glass. In 1863, at the time mentioned above, the slotted arm and moveable eye-socket were changed for an arm with 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 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 are, I think, superior to any that I have seen 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, and in these slots or openings there slide small frames carrying prismatic glass reflectors, each of which can turn on an axis, 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 in radial distance; the other two were intended for sending light past the ends of the needle through the microscopes, and therefore required adjustment on change of needle and corresponding change of position of microscopes. In 1863 these were changed for fixed reflectors, 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, and each of these is adjusted, by turning on its axis, 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, C_1, D_1, B_2, C_2, D_2.

In discussing carefully the observations taken with this instrument (as well as with other dip-instruments), great trouble was 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 under my instructions by Mr. Simms; and it 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 Dip Instrument and all the needles are examined, at the close of each year and at other times if thought desirable, by Mr. Simms.

Besides this instrument, which is the property of the Royal Observatory, two dip-instruments of the Kew pattern were also used in 1870. One by Dover was used several times in the month of January; the other by Simms was occasionally used from January to October.

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

In the spring of 1861, a Unifilar Instrument, similar in all respects (as is understood) to those used in and issued by the Kew Observatory, was procured by the courteous application of Sir E. 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 (for which I am indebted to the kindness of Balfour Stewart, Esq.), was mounted at the Royal Observatory. Observations with this instrument commenced on 1861, June 11, and were continued through the year; and, after some slight modifications of its verniers, it is still maintained in use (1870).

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 E. or W. 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 by the Kew Observatory have received the strictest attention.

The following is the explanation of the method of reduction.

The distance of the centers of the deflected and deflecting magnet being known, it is supposed (from observations made at Kew, of which the details have not reached me) that the magnetism of the deflecting magnet is so altered by induction that the following multipliers 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

$$0\cdot000131261\,(t_0-35)+0\cdot000000259\,(t_0-35)^2$$

A_1 is $\frac{1}{2}(\text{distance})^3 \times$ sine deflection, corrected by the two last-mentioned quantities, for distance 1 foot; A_2 is the similar expression for distance 1·3 foot; A'_2 is $\frac{A_2}{(1\cdot3)^2}$; P is $\frac{A_1-A_2}{A_1-A'_2}$. A mean value of P is adopted from various observations; then $\frac{m}{X}=A_1\times\left(1-\frac{P}{1}\right)$ for smaller distance, or $=A_2\times\left(1-\frac{P}{1\cdot69}\right)$ for larger distance. The mean of these is usually 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. $\pi^2 K$ furnished by Mr. 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 $= \frac{\pi^2 K}{T^2}$. From the combination of this value of mX with the former value of $\frac{m}{X}$, m and X are immediately found.

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 has, to the year 1857, been 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 $=$ 9·6637805, 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.

§ 11. *Explanation of the Tables of Reductions of the Magnetic Observations (excluding the days of great Magnetic Disturbance).*

The Indications, on which the reductions of this section and the next are founded, are derived entirely from the measures of the ordinates of the Photographic Curves.

The first step taken was 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 1870, the following days, sixteen in number, were selected by Mr. Glaisher as exhibiting practically the same amount of irregularity which he had considered as defining the class of Days of Great Disturbance in the Memoirs to which I have alluded:—

February 1, 11, March 21, April 5, May 20, August 19, 20, September 3, 24, 25, 26, October 14, 24, 25, November 8, December 17.

These days being separated, the photographic sheets for the remaining days were thus treated. 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. The methods of forming from these the various tables of this section require no special explanation.

The temperature of the Magnetometers was maintained in so great uniformity through each day that no apprehension is entertained of the slightest appreciable error in the diurnal inequalities of horizontal force and vertical force, as a consequence of the omission of temperature-correction. But it was impossible to maintain perfect uniformity of temperature through all the seasons. I have, therefore, exhibited, in the Tables of Mean Force in each month, the mean temperature of the month. It will be borne in mind, therefore, that the numbers exhibited are *not* corrected for temperature, but require the correction corresponding to the printed mean temperatures.

§ 12. *Explanation of the Tables of Indications of Magnetometers on sixteen days of Great Magnetic Disturbance.*

Telescope-observations of the Magnetometers have usually been made four times every day, except on Sundays, on which days two or three observations only have been taken; but, though these observations are employed in forming the base lines on the photographic sheets, their immediate results are not necessarily given in the Tables.

For each photographic record, a new base-line, representing a convenient reading in round numbers of the element to which it applies, has been drawn on the sheet. Then the Assistant, who is charged with the translation of the curve-ordinates into numbers, remarks the salient points of the curve, or the points which if connected by straight lines would produce a polygon not sensibly differing from the photographic curve; to each of these he applies the scale of pasteboard or glass proper for the element under consideration; the base of the scale determines the time on the time-scale, and the reading of the scale for the point of the photographic curve gives the quantity which is to be added to the value for the new base-line. The ordinate-reading so formed is printed without alteration in the Tables. It is particularly to be remarked that the indications for horizontal force and vertical force are *not corrected for temperature.*

In preceding years, allusion has been made to the occasional dislocations of the curve of Vertical Force. No instance of such dislocation has presented itself in 1870. It is believed that these dislocations were produced by bringing a magnet into the proximity (though not very close) of the magnetometer; and this supposed cause of error has, in late years, been carefully avoided.

§ 13. *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; 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 $15\frac{3}{8}$ 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 course 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 photographic self-registering apparatus (to be shortly described). From it they were led up the electrometer mast to a height exceeding 50 feet, and thence they were 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 can 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 upon the telegraph poles. One wire branched off at the junction with the North Kent Railway to Dartford, the other at the junction with the Croydon Branch Railway to Croydon. At both places their connexion with earth was made by soldering to water-pipes, as at the Royal Observatory.

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 by a circuitous course 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.

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 galvanic coil, exactly as in the ordinary speaking telegraph (supposed to be laid horizontally); these coils being respectively in the courses of the two long wires. 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.

The carrier of each magnet carries also 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 (with axes vertical before the pencil reaches the mirror, and with axes 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 base-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, of which the first is printed in the Philosophical Transactions, 1868.

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

§ 14. *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 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 $0^{in.}05$.

The vernier subdivides the scale divisions to $0^{in.}002$; 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.

The tube is $0^{in.}565$ in diameter; the correction for the effect of capillary attraction is therefore only $+ 0^{in.}002$. The cistern is of glass.

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 weekly.

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 is applied in the printed observations commencing with 1866, August 30.

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 *Phil. Trans.*, 1831; the elevation of the cistern above the brass piece inserted in a stone in the transit-room (to which Mr. Lloyd refers) being $5^{ft}.2^{in}$.

The barometer has been read at 21^h, 0^h, 3^h, 9^h (astronomical), on every day, excepting on Sundays, and on Good Friday and Christmas Day, on which days fewer observations have been taken. Every reading has been reduced to the reading which would have been obtained at the temperature 32° of the mercury and 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. 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 Mr. Glaisher's paper in the *Philosophical Transactions*, 1848, Part I, Table I, page 127.

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

§ 15. *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 partly immersed in the quicksilver of the lower extremity is partially supported by a counterpoise acting on a light lever (which turns on delicate pivots), so that the wire supporting the float is constantly stretched, leaving a definite part of the weight of the float to be supported by the quicksilver. This lever is lengthened to carry a vertical plate of opaque mica with a small aperture, 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 hole the light of a lamp, collected by a cylindrical lens, shines upon the photographic paper.

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. Results of the indications are printed in the *Maxima and Minima of the Barometer*, near the end of the Meteorological Results.

§ 16. *Thermometers for ordinary Observation of the Temperature of the Air and 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 (magnetic) of the S.S.E. angle of the south arm of the Magnetic Observatory; in 1863 it was moved to a position about 35 feet south (astronomical) of the south 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.

The dry and wet-bulb thermometers are attached to the outside, and near the center of the vertical board; the maximum and minimum thermometers for air 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; their bulbs are about 4 feet above the ground and projecting from 2 inches to 3 inches below the horizontal board. 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 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. Mr. Glaisher's thermometer has been adopted as the standard of reference for all the thermometers used in the Royal Observatory since 1840.

The Dry-Bulb Thermometer is by Newman. The corrections required for its readings, as found by comparison with the standard above-mentioned, are as follows:—

Between 8° and 11°	subtract	0°.4
12 and 19		0.5
20 and 24		0.6
25 and 30		0.7
31 and 37		0.8
38 and 44		0.9
45 and 52		1.0
53 and 59		1.1
60 and 64		1.2
65 and 68		1.3
69 and 71		1.4
72 and 74		1.5
75 and 77		1.6
78 and 79		1.7
80 and 82		1.8
83 and 84		1.9
85 and 86		2.0
87 and 90		2.1
91 and 95		2.2
96 and 100		2.3
101 and 104		2.4

The wet-bulb thermometer is by Negretti and Zambra, and is in every respect similar to the dry-bulb thermometer. The corrections required to the readings of this thermometer are—

Between 32° and 49°		0°.0
50 and 81	add	0.2
82 and 91		0.0
92 and 105	subtract	0.2

Dry-bulb and wet-bulb thermometers, with pea-bulbs and porcelain scales, Negretti and Zambra 1179, are also mounted on the roof of the library, 4 feet above the leads and 22 feet above the ground. No corrections for index error are applied to the readings of these thermometers.

On 1869, September 30, dry-bulb and wet-bulb thermometers were mounted on the roof of the cabinet containing the registering mechanism of Robinson's Anemometer, but below the revolving cups, at the height 4 feet above the flat roof and 50 feet above the ground. No corrections for index errors are applied to their readings.

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 numbers given above. They are not printed in the present volume.

The dew-point has been inferred exclusively from the simultaneous observations of the dry-bulb and wet-bulb thermometers, by multiplying the difference between the readings of these thermometers by a factor peculiar to the temperature of the air, and subtracting the product from the reading of the dry-bulb thermometer.

These factors have been 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. (See Glaisher's Hygrometrical Tables, 5th Edition). The following table exhibits the result of the entire comparison; it has been used in forming the dew-points in the present volume.

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		

The maximum self-registering thermometer is a mercurial thermometer, of the construction invented by Messrs. Negretti and Zambra. There is a small detached piece of glass in the tube, just above a bent part of the tube (near the bulb), through which the piece of glass cannot pass down. The column of mercury in rising lifts the glass up and passes freely; but in descending it is unable to pass the glass, and the lower mass of mercury descends, leaving a vacant space below the glass, and leaving a portion of the mercury above it. The piece of glass operates as an efficient valve. The corrections to the readings of this thermometer are as follows:—

Between 32° and	54°	subtract	0°·3
54 and	72		0·2
72 and	80		0·1
80 and	93		0·0
93 and	96	add	0·1
96 and	99		0·2
99 and	102		0·4

There is a similar thermometer for the maximum wet-bulb reading (Negretti and Zambra No. 7537): no corrections have been applied to its readings.

The minimum self-registering thermometers are alcohol thermometers, of the construction known as Rutherford's. 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 which gives the minimum temperature of the air require no correction.

The minimum wet-bulb thermometer (Negretti and Zambra, No. 3627) is also free from sensible error.

The mean daily values of dry thermometer in the printed columns are found by combining two results derived from different sources. The first and simpler result is the mean of the maximum and minimum, corrected by a small quantity depending on the month, given in Table III. of Mr. Glaisher's paper in the *Philosophical Transactions*, 1848, page 130. The second result is formed by taking the means of the four eye-observations at 21^h, 0^h, 3^h, 9^h, and applying a correction thus investigated. The daily range being found by taking the difference between the maximum and minimum, this daily range is multiplied by the mean of the factors in Table IV. of Mr. Glaisher's paper before mentioned corresponding to the hours of observation; the application of this correction to the mean of the eye-observations gives the second result. (It is evident that this process is applicable to any number of eye-observations.) These two results are then combined to form a mean, weights being given proportional to the number of observations contributing to each result.

For the mean daily value of dew point, the usual process is,—by observing the difference between dry and wet thermometers, and by use of the table of factors printed in page *xlvii* above, to form the difference between air-temperature and dew point at each of the hours of reading; to take the mean of the deduced dew-points; and to apply a correction which is the mean of the corrections in Mr. Glaisher's Table VIII. for the several hours of observation. Sometimes, however, the following process is used. The correction for diurnal range applicable to the mean of the eye-observations of the dry thermometer having been found (as is described above), this correction is multiplied by a fraction, whose numerator is the mean of corrections to wet bulb thermometer in Table VII. for the hours of observations, and whose denominator is the mean of corrections to dry thermometer in Table II. for the same hours; and thus a correction is found which is applied to the mean of the eye-observations of wet bulb thermometer, to form the mean wet bulb for the day. Then by use of the mean dry bulb reading for the day and the mean wet bulb reading for the day and the table of factors above, the mean dew point for the day is formed.

§ 17. *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 a 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 one of the thermometers is covered with muslin throughout its whole length, which is kept moist by means of capillary passage of water along cotton wicks leading to 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 be 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; and at the decades of the degrees, and also at 32°, 52°, and 72°, a coarser wire is placed. 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. The light in its passage is 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.

The cylinder revolves in 48 hours; the daily photographic traces of the two thermometers are thus simultaneously registered on opposite sides of the cylinder without 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.

§ 18. *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; 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 9^h a.m., noon, 3^h p.m., and occasionally at 9^h p.m.; the highest of these readings is adopted as the maximum for the day.

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, made by Negretti and Zambra. Its graduation is correct, and the numbers inserted in the table are those read from the scale without alteration. It is read every day at 9^h a.m., and occasionally at 9^h p.m.

§ 19. *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 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 $2^{in.}$, $1^{in.}1$, $0^{in.}9$, and $0^{in.}55$; 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. Their ranges are now, respectively, 44° to 62°·5, and 39°·2 to 69°·5.

In subsequent years it was found that the amount of fluid removed was somewhat too great, for now at the lower end of the scale the 6-foot thermometer sometimes falls below the limit of its scale or 44°; and the 3-foot thermometer below 39°·0; in which cases the alcohol sinks 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; now, they are generally complete at high temperatures, and are at times defective at low temperatures. The two combined, however, will enable us to complete all readings.

These thermometers are read once a day, at noon, and the readings appear in the printed volumes as read from their scales without correction.

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.

§ 20. *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 by Messrs. Negretti and Zambra, and are observed every day at 9^h a.m.

A strong wooden trunk is firmly fixed to the side of the Dreadnought Hospital Ship, about 5 feet in length, and closed at the bottom; 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 regular observations were made under the superintendence of the Medical Officers of the Ship till April 12. On April 13 the thermometers were withdrawn, in consequence of the Dreadnought ceasing to be used as a hospital ship; and from that day to the end of the year no observations were made.

No readings were taken on January 2, February 19, 26, March 6, 7, 21, and April 7.

The index-error corrections to these thermometers were:—

For the maximum thermometer,	subtract 1°·6
For the minimum thermometer,	subtract 0·6

§ 21. *Osler's Anemometer.*

This anemometer 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 of the ancient part of the Observatory, gives motion by a pinion upon the spindle to a rack-work carrying a pencil. This 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 first adjustment for azimuth was obtained by observing from a certain point the time of passage of a star behind the vane-shaft, and computing from that observation the azimuth; then on a calm day drawing the vane by a cord to that position, and adjusting the rack, &c., so that the pencil position on the sheet corresponded to that azimuth.

This construction originally arranged by Mr. Osler was in use till the middle of 1866, when the following modifications were made in it by Mr. Browning:—

The vane-shaft was made to bear upon anti-friction-rollers running in a cup of oil. For elucidation of the following description of the apparatus which it carries, I refer to Figure 3 on the engraving at the end of the Introduction to the volume of 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 small weight on a cord running over a pulley.

The surface 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 is remarked that the pressures of wind per square foot appear generally greater than formerly.

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 § 23.

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

§ 22. *Robinson's Anemometer.*

In the latter part of the year 1866, a new instrument, on the principles described by Dr. Robinson in the Transactions of the Royal Irish Academy, vol. xxii., adapted to give a continuous record of the velocity of the wind, was mounted by Mr. Browning, of which the principal parts are represented in Figures 1 and 2 of the engraving in the Introduction 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 one 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 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 confirming in a very high degree the accuracy of the theory.

§ 23. *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 increases, until 0·24 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 then shorten and raise the receiver. The ascent and descent 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 trace sensibly straight.

The scale of the printed paper was adjusted by repeatedly filling the water-vessel until it emptied itself, then weighing the water, and thus ascertaining its bulk, and dividing this bulk by the area of the surface of the rain receiver.

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 $4\frac{1}{2}$ inches above the ground, and 193 feet $2\frac{1}{2}$ inches above the mean level of the sea. It is a simple cylinder gauge, 8 inches in diameter and about $50\frac{1}{4}$ square inches in area. The height of the cylinder is $13\frac{1}{2}$ 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, $\frac{1}{5}$ of an inch in diameter, and $1\frac{1}{2}$ inch in length; $\frac{3}{4}$ of an inch of this tube is slightly curved, and the remaining $\frac{3}{4}$ 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 top of the Library; it is a funnel, whose top has a diameter of 6 inches; its exposed area is $28\frac{1}{4}$ square inches nearly. The receiving surface of the gauge is 22 feet 4 inches above the ground, and 177 feet 2 inches above the mean level of the sea.

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 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. Sometimes, when the escapement has obviously failed, the water which has descended to the lower cistern has again been passed through the gauge, in order to enable an assistant to observe the indication of the dial-plates without fear of an imperfection in the machinery escaping notice. 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 cylinders are sunk about 8 inches in the ground.

All these gauges, except No. 7, are read at 22^h daily; in addition, Crosley's gauge and No. 8 are read daily at 9^h p.m., and No. 7 at the end of each month only, to check the summation of the daily readings of No. 8. All are read at midnight of the last day of each month.

Gauges Nos. 1, 2, 3, 5, 8 were made by Messrs. Negretti and Zambra; No. 4 by Troughton; No. 6 by Watkins and Hill; and No. 7 is an old gauge.

§ 24. *Electrical Apparatus.*

The electrical apparatus consists of two parts, namely, the Moveable Apparatus, which is connected with a pole nearly 80 feet high planted 7 feet North and 2 feet East of the north-east angle of the north arm of the Magnetic Observatory (as extended in 1862); and the Fixed Apparatus, which is mounted in a projecting window in the ante-room of the Magnetic Observatory.

On the top of the pole is fixed a projecting cap, to which are fastened the ends of two iron rods, which terminate in a pit sunk in the ground, and are kept in tension by attached weights. These rods are to guide the moveable apparatus in its ascents and descents. Near the bottom of the pole is fixed a windlass; the rope upon which it acts passes over a pulley in the cap, and is used to raise the moveable apparatus, which when raised to the top is suspended on a hook.

The moveable apparatus consists of the following parts:—A plank in a nearly vertical position is attached to perforated iron bars, which slide upon the iron rods. On the upper part of this plank is a cubical box. The box incloses a stout pillar of glass, having a conical hollow in its lower part. In the bottom of the box there is a large hole through which a cone of copper passes into the conical hollow of the glass pillar. In the lower part of the box a gas-lamp is placed, by the flame of which the copper cone and the lower part of the glass pillar are kept in a state of warmth. A copper wire is fastened round the glass pillar; its end is carried to a similar glass pillar, warmed in the same manner, near the north-western turret of the Octagon room; by this wire, whose length is about 400 feet, the atmospheric electricity is collected. To this wire, near the box, is attached another copper wire (now covered with gutta percha) 0·1 inch in diameter, and about 73 feet long, at the end of which is a hook; a loaded brass lever connected with the fixed apparatus presses upon this hook, and thus keeps the wire in a state of tension, and at the same time establishes the electrical communication between the long horizontal wire and the fixed apparatus.

The fixed apparatus consists of these parts:—A glass bar, nearly 3 feet long, and thickest at its middle, is supported in a horizontal position, its ends being fixed in pieces of wood projecting downwards from the roof of the projecting window. Near to each end is placed a small gas-lamp, whose chimney encircles the glass, and whose heat keeps the glass in a state of warmth proper for insulation. A brass collar surrounds the center of the glass bar; it carries one brass rod, projecting vertically upwards through a hole in the roof of the window-recess, to which rod are attached a small metallic umbrella and the loaded lever above-mentioned; and it carries another rod projecting vertically downwards, to which is attached a horizontal brass tube in an East and West direction. On the North and South sides of this tube there project four horizontal rods, through the ends of which there pass vertical rods, which can be fixed by screws at any elevation; these are placed in connexion with the electrometers, which rest on the window seat.

The electrometers during the year 1870 consisted of two Volta's Electrometers, denoted by Nos. 1 and 2; a Henley's Electrometer; a Ronalds' Spark Measurer; a Dry-pile Apparatus; and a Galvanometer.

Volta 1 and Volta 2 are of the same construction; each is furnished with a pair of straws 2 Paris inches in length; those of the latter being much heavier than those of the former: each instrument is furnished with a graduated ivory scale, whose radius is 2 Paris inches, and it is graduated into half Paris lines. In the original construction of these instruments it was intended that each division of No. 2 should correspond to five of No. 1: the actual relation between them has not yet been determined by observations at the Royal Observatory. The straws are suspended by hooks of fine copper wire to the suspension-piece, and they are separated by an interval of half a line.

Henley's Electrometer is supported on the West end of the large horizontal tube by means of a vertical rod fixed in it. On each side of the upper part of this rod is affixed a semicircular plate of ivory, whose circumference is graduated; at the centers of these ivory plates two pieces of brass are fixed, which are drilled to receive fine steel pivots, carrying a brass axis, into which the index or pendulum is inserted; the pendulum terminates with a pith ball. The relation between the graduations of this instrument and those of the other electrometers has not been determined. This instrument has seldom been affected till Volta 2 has risen to above 100 divisions of its scale.

The spark measurer consists of a vertical sliding rod terminated by a brass ball, which ball can be brought into contact with one of the vertical rods before referred to, also terminating in a ball; and it can be moved from it or towards it by means of a lever, with a wooden handle. During the operation of separating the balls, an index runs along a graduated scale, and exhibits the distance between the balls, and this distance measures the length of the spark.

The electrometers and the spark measurer were originally constructed under the superintendence of Francis Ronalds, Esq., but have since received small alterations.

The dry-pile apparatus was made by Watkins and Hill; it is placed in connexion with the brass bar by a system of wires and brass rods. The indicator, which vibrates between the two poles, is a small piece of gold leaf. This instrument is very delicate, and it indicates at once the quality of the electricity. When the inclination of the gold leaf is such that it is directed towards the top of either pile, it remains there as long as the quantity of electricity continues the same or becomes greater: the position is sometimes expressed in the notes by the words "as far as possible." The angle which the gold leaf makes with the vertical at this time is about 40°.

The galvanometer was made by Gourjon of Paris, and consists of an astatic needle, composed of two large sewing needles, suspended by a split silk fibre, one of the needles of the pair vibrating within a ring formed by 2,400 coils of fine copper wire. The connexions of the two portions of wire forming these 2,400 coils are so arranged that it is possible to use a single system of 1,200 coils of single wire, or a system of 1,200 coils of double wire, or a system of 2,400 coils of single wire: in practice the last has always been used. A small ball communicating by a wire with one end of the coils is placed in contact at pleasure with the electric conductor, and a wire leading from the other end of the coil communicates with the earth. An adjustible circular card, graduated to degrees, is placed immediately below the upper needle; the numeration of its divisions proceeds in both directions from a zero. One of these directions is distinguished by the letter A, and the other by the letter B; and the nature of the indication represented by the deflection of the needle towards A or towards B will be ascertained from the following experiment. A voltaic battery being formed by means of a silver coin and a copper coin, having a piece of blotting paper moistened with saliva between them: when the copper touches the small ball, and the wire which usually communicates with the earth is made to touch the silver, the needle turns towards A; when the silver touches the small ball, and the wire is made to touch the copper, the needle turns towards B.

§ 25. *Explanation of the Tables of Meteorological Observations.*

The mean daily value of the difference between dew-point temperature and air-temperature is the difference between the two numbers in the sixth and seventh columns. The Greatest and Least are the greatest and least among the differences corresponding to the times of observation in the civil day, or they are found from the absolute maxima and minima, as determined by comparing the observations of the self-registering wet-bulb thermometers with those of the self-registering dry-bulb thermometers.

The difference between the mean temperature for the day and the mean for the same day of the year on an average of fifty years, is found by comparison with a table of results deduced by Mr. Glaisher from fifty years' observations, made at the Royal Observatory, ending 1863.

Little explanation of the results deduced from Osler's Anemometer appears to be necessary. It may be understood generally that the greatest pressure occurred in gusts of short duration.

To 1867, October 31, the indication of Robinson's Anemometer was read off every day at 22^h (10^h A.M.), and the difference between consecutive readings was entered opposite to the civil day on which the first reading was taken. From 1867, November 1, the daily values have been extracted from the sheets of the continuous record, applying to the interval from midnight to midnight, and are entered opposite to the civil day to which each value belongs.

The daily register of rain is given for each civil day ending at midnight. This applies to the Cylinder Rain-gauge partly sunk in the ground, described above as the "eighth."

For understanding the divisions of time under the heads of Electricity and Weather, the following remarks are necessary:—The day is divided by columns into two parts (from midnight to noon, and from noon to midnight), and each of these parts is roughly 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.

METEOROLOGICAL NOTATION.

The following is the explanation of the notation employed for record of electrical observations, it being premised that the quality of the Electricity is always to be supposed positive when no indication of quality is given :—

g cur.	denotes	*galvanic currents*
m	...	*moderate*
N	...	*negative*
P	...	*positive*
s	denotes	*strong*
sp	...	*sparks*
v	...	*variable*
w	...	*weak*

The duplication of the letter denotes an intensity of the modification described, thus, s s is very strong; v v, very variable.

The Clouds and Weather are described generally by Howard's Nomenclature; the figure denotes the proportion of sky covered by clouds, the whole sky being represented by 10. The notation is as follows:

a	denotes	*aurora borealis*
ci	...	*cirrus*
ci-cu	...	*cirro-cumulus*
ci-s	...	*cirro-stratus*
cu	...	*cumulus*
cu-s	...	*cumulo-stratus*
d	...	*dew*
h-d	...	*heavy dew*
f	...	*fog*
sl-f	...	*slight fog*
th-f	...	*thick fog*
fr	...	*frost*
g	...	*gale*
h-g	...	*heavy gale*
glm	...	*gloom*
gt-glm	..	*great gloom*
h-fr	...	*hoar frost*
h	...	*haze*
hl	...	*hail*
so-ha	...	*solar halo*
l	...	*lightning*
li-cl	...	*light clouds*
lu-co	...	*lunar corona*
lu-ha	...	*lunar halo*
m	...	*meteor*
ms	...	*meteors*
mt	...	*mist*
n	denotes	*nimbus*
r	...	*rain*
th-r	...	*thin rain*
oc-r	...	*occasional rain*
oc-th-r	...	*occasional thin rain*
fr-r	...	*frozen rain*
h-r	...	*heavy rain*
shs-r	...	*showers of rain*
c-r	...	*continued rain*
c-h-r	...	*continued heavy rain*
m-r	...	*misty rain*
fr-m-r	...	*frequent misty rain*
oc-m-r	...	*occasional misty rain*
sl-r	...	*slight rain*
h-shs	...	*heavy showers*
fr-shs	...	*frequent showers*
fr-h-shs	...	*frequent heavy showers*
li-shs	...	*light showers*
oc-shs	...	*occasional showers*
oc-h-shs	...	*occasional heavy showers*
sq	...	*squall*
sqs	...	*squalls*
fr-sqs	...	*frequent squalls*
h-sqs	...	*heavy squalls*
fr-h-sqs	...	*frequent heavy squalls*
oc-sqs	...	*occasional squalls*
sc	...	*scud*

li-sc denotes	*light scud*	t-s denotes	*thunder storm*
sl ...	*sleet*	th-cl ...	*thin clouds*
sn ...	*snow*	v ...	*variable*
oc-sn ...	*occasional snow*	vv ...	*very variable*
sl-sn ...	*slight snow*	w ...	*wind*
s ...	*stratus*	st-w ...	*strong wind*
t ...	*thunder*		

The foot-notes show the means and extremes of readings, and their departure in each month from average values, as found from the preceding Twenty-nine Years' Observations; those relating to Humidity have been calculated from the Fifth Edition of Glaisher's Hygrometrical Tables.

§ 26. *Observations of Luminous Meteors.*

In arranging for the observations of meteors, the directions circulated by the Committee of the British Association have received the most careful attention. The observers have been educated in the knowledge of the principal stars by observations of the stars themselves, and by means of globes and maps. The general instruction to all observers has been, to look out for meteors on every clear night; but the observer specially appointed for the evening's duties has been more particularly charged with this observation.

On the nights specially mentioned in the directions of the British Association Committee, greater attention was given to the sky, and the observations of meteors were made more systematically. The principal nights are, January 2 and 10; February 6; March 1; April 19; May 18; June 6 and 20; July 17, 20, and 29; August 3, August 7–13; September 10; October 1 and 23; November 9–14, November 19, 28, and 30; December 8–14, especially December 11. A more extended list of days has been published by the British Association Committee.

Special arrangements were made in the August period for observing till the morning; and in the November period for observing through the night, one or two observers being on duty till midnight, and then all the observers till daybreak. The observers were so stationed as to command different views of the sky, to secure observation of all the meteors which might present themselves, and to guard against the observation of the same meteor by different observers.

The observers in the year 1870 were Mr. Nash, Mr. Wright, Mr. Schultz, Mr. Marriott, Mr. W. Bishop, and Mr. W. Barber. Their observations are distinguished by the initials N., W., S., M., W. B., and B., respectively.

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

Mr. Glaisher has drawn up the following account of the Chemical Processes employed in the Photographic Operations for the self-registration of the Magnetical and Meteorological Indications.

CHEMICAL PREPARATION AND TREATMENT OF THE PHOTOGRAPHIC PAPER FOR PRIMARIES.

The paper used in 1870 is principally furnished by Hollingsworth and Towgood; it is strong and of even texture, and is prepared expressly 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 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 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 grains 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 as before upon a board somewhat smaller than itself, and (by means of a glass rod, as before,) its surface is wetted with 50 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 waters; 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 placed between sheets of blotting-paper, and is pressed.

CHEMICAL PREPARATION AND TREATMENT OF THE PHOTOGRAPHIC PAPER FOR SECONDARIES.

Before taking a Secondary, the Primary is examined to ascertain whether the tint of the photographic curve is sufficiently dark. If it is not, the Primary is laid, face downwards, upon a desk of transparent plate-glass, below which is a large silvered plane mirror, so placed that the light from the sky is reflected upwards through the transparent glass and through the Primary; and the photographic curve is seen from the upper side or back with perfect distinctness. An assistant then darkens the back of the photographic curve by the application of sepia; the original photograph being untouched.

The paper used for the Secondaries is made by Rive; it is a strong wove paper, of tolerably even texture, thin, but able to bear a great deal of wear.

First Operation.—Preliminary Preparation of the Paper.

The chemical solution required for this purpose is as follows:—

Two grains of Chloride of Ammonium are dissolved in one ounce of distilled water. A sufficient quantity of this solution is placed in a flat-bottomed porcelain dish, and sheets of paper, one by one, are plunged within it; care being taken that no air bubbles remain between the paper and the solution; this may be prevented by slight pressure over the sheet by means of a bent glass rod. When a few sheets are thus immersed, they are turned over, and are taken out and hung to dry. Any number of sheets may thus be prepared.

An equally good result is obtained, by spreading over one side by means of a glass rod, as in the preparation of the Primaries, a solution of Chloride of Ammonium made by dissolving five grains of the chloride in one ounce of distilled water.

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

The solution required for this purpose is as follows:—

To a filtered solution of Nitrate of Silver (made by dissolving 50 grains of Crystallized Nitrate of Silver in one ounce of distilled water) some strong solution of Ammonia is added; the whole becomes at first of a dark brown colour, but when a sufficient quantity of Ammonia is added the solution becomes perfectly clear; a few crystals of Nitrate of Silver are then added till the solution is a little dull, forming "Ammoniacal Nitrate of Silver"; it is then ready for use.

The following operation is performed in a room illuminated by yellow light:—

By means of a glass rod this solution is spread over the paper, whilst pinned on a board; the paper is dried before a fire, and is then in a fit state to be used for producing a Secondary.

Third Operation.—Formation of the Photographic Copy.

A sheet of the paper so prepared is placed in a printing frame with its prepared side upwards, upon a bed of blotting paper resting upon a sheet of plate-glass; the Primary is then placed on the paper with its own face downwards; and as it is necessary, for obtaining a correct copy of the Primary, that it should be in close contact with the prepared surface, a second sheet of plate-glass is placed over it, and the two are pressed together by clamps and screws. The whole is then exposed to the light (the Primary to be copied being above the paper on which the copy is to be made). The time required to produce a copy depends, in a great measure, upon the thickness of the paper on which the Primary is made, and on the actinic quality of the light; a period of five minutes in a bright sunshine, or one hour in clear daylight, is generally sufficient.

Fourth Operation.—Fixing the Photographic Secondary.

When an impression has been thus obtained, it is necessary that the undecomposed Salts of Silver remaining in the paper be removed.

For this purpose the Secondary is at once plunged into water and well washed on both sides, passing a camel-hair brush over every part of it; it is then plunged into a solution of Hyposulphite of Soda (made by dissolving two or three ounces of the Hyposulphite in a pint of water), and is left through a period varying from half an hour to an hour. It is then removed, and washed in plain water several times; and running water is allowed to pass over it for twenty-four hours.

The sheets are then placed within the folds of drying cloths, till nearly dry, and finally between sheets of blotting paper.

The process of obtaining a Tertiary from a Secondary is in every respect the same as that of obtaining a Secondary from a Primary.

§ 28. *Personal Establishment.*

The personal establishment during the year 1870 has consisted of James Glaisher, Esq., F.R.S., Superintendent of the Magnetical and Meteorological Department, and Mr. William Carpenter Nash, Assistant.

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

Royal Observatory, Greenwich,
1871, November 10.

G. B. AIRY.

ROYAL OBSERVATORY, GREENWICH.

RESULTS

OF

MAGNETICAL OBSERVATIONS.

1870.

ROYAL OBSERVATORY, GREENWICH.

REDUCTION

OF THE

MAGNETIC OBSERVATIONS

(EXCLUDING THE DAYS OF GREAT MAGNETIC DISTURBANCE).

1870.

TABLE I.—MEAN WESTERLY 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.

1870.

Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	19°	19°	19°	19°	19°	19°	19°	19°	19°	19°	19°	19°
d	′	′	′	′	′	′	′	′	′	′	′	′
1	57·3	..	54·4	55·7	54·9	53·0	..	..	51·8	52·8	51·1	49·9
2	..	56·2	56·4	55·1	55·4	53·3	..	53·4	50·7	51·1	51·0	50·1
3	57·6	56·8	56·3	55·6	54·8	53·1	..	52·2	..	51·5	50·8	50·1
4	56·8	57·3	56·3	55·5	55·3	..	..	50·9	50·7	51·2	50·5	49·7
5	57·0	56·5	58·3	..	54·1	53·2	..	51·4	51·3	51·1	51·3	50·4
6	..	55·9	56·8	54·9	54·1	52·2	..	53·2	50·4	51·8	51·8	49·8
7	56·9	56·4	55·6	56·0	54·5	53·3	..	..	51·9	50·7	51·4	49·9
8	..	56·7	58·3	55·0	54·7	53·8	..	51·4	51·3	51·2	..	49·5
9	57·7	57·5	56·3	55·9	53·9	53·7	..	51·2	51·5	51·4	51·5	50·6
10	57·7	..	56·8	54·3	54·4	53·6	..	51·8	50·9	52·3	51·2	49·1
11	57·1	..	56·5	56·1	54·1	51·8	52·7	51·2	51·0	50·4	49·5	50·6
12	58·0	59·1	56·1	56·5	53·9	52·9	52·9	55·0	50·9	50·5	49·1	50·4
13	57·4	56·4	56·0	55·3	53·8	52·7	52·9	53·8	51·9	50·7	50·9	50·6
14	56·7	..	54·7	55·1	54·0	53·0	52·5	52·6	50·8	..	50·0	50·2
15	56·8	56·4	55·9	55·2	54·1	51·7	52·2	..	50·8	51·4	50·8	50·0
16	56·6	56·5	55·8	55·0	54·3	52·7	53·3	51·2	52·4	50·1	50·4	54·6
17	56·8	57·3	56·6	55·9	54·2	52·7	52·8	49·8	51·1	50·6	50·2	..
18	57·0	56·1	56·6	54·0	54·7	50·9	53·1	51·3	50·6	50·9	49·9	50·6
19	56·3	55·1	54·8	51·3	53·0	52·6	52·2	..	50·0	50·9	50·8	49·0
20	56·6	56·5	54·3	51·7	..	52·7	52·2	..	52·1	50·6	50·5	49·5
21	58·2	56·2	..	53·8	54·8	51·9	52·4	51·5	51·4	50·7	50·0	48·7
22	57·2	56·5	56·3	53·0	53·1	51·6	52·0	50·4	51·5	51·0	48·1	49·5
23	56·5	56·0	54·7	52·9	52·6	52·8	51·6	52·0	52·7	50·5	50·5	49·3
24	56·8	56·8	54·1	52·4	52·5	51·3	52·3	49·8	..	..	50·3	48·9
25	56·9	56·3	53·2	52·9	53·4	52·8	52·7	50·9	..	..	50·0	50·0
26	57·4	55·8	53·3	55·0	52·1	53·4	51·5	51·0	..	49·7	49·6	48·9
27	57·6	54·2	54·5	53·1	51·0	52·7	52·5	51·2	51·1	49·4	50·4	49·7
28	56·8	56·6	55·6	52·7	54·2	52·2	53·4	50·6	50·7	49·4	50·1	50·1
29	55·5		55·3	54·8	52·7	53·1	51·9	50·6	51·6	51·2	49·9	50·3
30	54·3		54·1	54·1	54·4	..	52·8	51·0	52·7	51·8	49·7	47·7
31	56·4		53·8		53·5		51·6	51·6		50·5		47·2

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.

1870.

Hour, Greenwich Mean Solar Time.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	19°	19°	19°	19°	19°	19°	19°	19°	19°	19°	19°	19°
h	′	′	′	′	′	′	′	′	′	′	′	′
0	60·5	61·0	62·7	61·7	60·8	58·8	58·9	59·3	59·8	56·5	55·8	52·4
1	61·5	62·2	64·6	64·4	62·8	60·4	61·0	60·7	60·4	58·2	56·6	53·9
2	61·2	62·2	64·2	64·0	62·8	60·8	61·2	60·2	59·1	57·9	56·3	53·9
3	60·2	61·2	62·7	61·3	60·6	59·6	59·5	58·2	56·2	56·6	55·2	53·2
4	59·3	59·4	59·8	58·8	58·7	57·9	57·2	55·5	53·4	54·3	54·1	52·6
5	59·0	57·9	57·8	56·5	56·4	55·7	55·1	53·1	51·8	52·9	53·5	51·9
6	58·0	57·2	56·7	55·0	54·4	54·2	53·2	51·5	50·7	51·8	53·0	51·6
7	57·1	56·9	55·7	54·3	54·0	53·7	52·4	51·2	50·0	51·2	51·5	50·3
8	56·8	55·9	55·0	54·4	53·7	53·2	52·3	51·1	50·3	50·2	50·3	49·1
9	55·1	54·3	54·2	54·2	53·4	52·5	52·4	50·3	50·0	50·0	49·0	48·2
10	54·1	53·5	53·4	53·6	53·1	52·5	52·6	50·6	48·9	49·5	47·1	47·3
11	54·4	53·3	52·6	52·2	52·8	51·5	52·2	49·8	48·8	49·1	46·5	47·3
12	54·4	54·1	52·2	51·3	52·5	51·1	51·8	49·3	49·0	48·9	47·2	47·4
13	54·5	54·3	51·5	51·9	52·5	50·7	50·9	49·0	48·9	48·5	47·5	47·9
14	54·8	54·6	52·0	51·8	51·6	50·4	50·4	49·3	48·9	48·5	47·7	48·2
15	55·0	54·7	52·0	51·0	51·4	50·5	49·9	49·2	48·7	48·4	47·7	48·3
16	55·3	54·6	52·6	50·8	51·2	49·5	49·3	48·9	48·4	48·7	48·1	48·3
17	55·4	54·3	52·5	50·9	49·9	47·9	47·7	47·8	48·2	49·2	48·4	48·8
18	55·7	54·6	52·5	50·7	48·0	46·2	45·7	46·6	48·2	49·0	48·3	48·8
19	55·8	54·4	52·1	49·2	46·9	46·1	45·1	45·1	47·1	48·4	48·1	48·8
20	55·8	53·9	51·2	48·4	46·9	46·2	45·4	45·9	46·9	46·6	47·4	48·4
21	56·0	54·3	51·9	49·4	49·2	47·7	47·6	48·3	48·7	46·1	47·5	48·6
22	57·2	56·2	54·9	52·9	52·6	51·4	50·9	51·9	52·2	48·2	49·7	49·6
23	58·9	58·8	59·2	57·6	57·0	55·9	55·5	56·2	56·5	52·6	52·5	51·2

TABLE III.

1870. Month.	MEAN WESTERLY DECLINATION of the MAGNET IN EACH MONTH, as deduced from the Mean of the MEAN HOURLY DETERMINATIONS in each MONTH (Table II.).	MONTHLY MEANS of all the Actual DIURNAL RANGES of the WESTERN DECLINATION, as deduced from the Twenty-four Hourly Measures of each day.
	° ′	′
January	19. 56·9	11·4
February	19. 56·4	12·3
March	19. 55·6	16·9
April	19. 54·4	18·6
May	19. 53·9	17·3
June	19. 52·7	16·7
July	19. 52·4	16·9
August	19. 51·6	17·3
September	19. 51·3	16·9
October	19. 50·9	13·9
November	19. 50·4	13·0
December	19. 49·8	9·5
Mean	19. 53·0	15·1

TABLE IV.—MEAN HORIZONTAL MAGNETIC FORCE (diminished by a Constant 0·8600 nearly) on each ASTRONOMICAL DAY, as deduced from the MEAN of TWENTY-FOUR HOURLY MEASURES of ORDINATES of the PHOTOGRAPHIC REGISTER on that DAY.

1870.

Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d												
1	0·1488	..	0·1504	0·1485	0·1499	0·1504	0·1505	0·1475	0·1490	0·1473	0·1496	0·1501
2	..	0·1494	·1508	·1483	·1494	·1509	·1507	·1475	·1488	·1479	·1494	·1507
3	·1457	·1504	·1509	·1480	·1498	·1509	·1512	·1472	..	·1488	·1499	·1509
4	·1473	·1501	·1503	·1485	·1496	..	·1516	·1479	·1476	·1494	·1497	·1510
5	·1480	·1500	·1500	..	..	·1508	·1518	·1476	·1483	·1491	·1497	·1501
6	·1491	·1494	·1493	·1473	·1498	·1507	·1509	·1469	·1486	·1497	·1491	·1501
7	·1490	·1493	·1503	·1471	·1503	·1505	·1496	..	·1471	·1498	·1490	·1505
8	..	·1498	·1495	·1477	·1499	·1496	·1500	·1484	·1488	·1496	..	·1504
9	·1479	·1483	·1493	·1482	·1500	·1499	·1503	·1481	·1497	·1498	·1472	·1506
10	·1485	..	·1492	·1479	·1502	·1500	·1505	·1491	·1494	·1496	·1483	·1491
11	·1491	..	·1491	·1494	·1503	·1504	·1501	·1489	·1499	·1491	·1480	·1491
12	·1497	·1475	·1491	·1492	·1493	·1490	·1479	·1487	·1507	·1495	·1484	·1498
13	·1498	·1483	·1490	·1489	·1499	·1489	·1482	·1491	·1502	·1497	·1493	·1503
14	·1503	..	·1491	·1484	·1496	·1491	·1481	·1495	·1501	..	·1486	·1496
15	·1505	·1494	·1496	·1489	·1488	·1490	·1485	·1491	·1500	·1472	·1487	·1496
16	·1508	·1500	·1507	·1475	·1484	·1486	·1487	·1498	·1497	·1486	·1488	·1478
17	·1506	·1500	·1505	·1485	·1482	·1489	·1488	·1495	·1496	·1490	·1480	..
18	·1500	·1500	·1503	·1478	·1480	·1490	·1491	·1501	·1496	·1489	·1479	·1480
19	·1499	·1507	·1497	·1472	·1479	·1491	·1481	..	·1493	·1487	·1457	·1492
20	·1496	·1505	·1493	..	..	·1491	·1481	..	·1496	·1475	·1479	·1499
21	·1497	·1503	..	·1485	·1466	·1492	·1481	·1468	·1487	·1479	·1492	·1501
22	·1494	·1492	·1473	·1488	·1478	·1495	·1474	·1479	·1488	·1488	·1494	·1494
23	·1492	·1493	·1484	·1489	·1483	·1495	·1482	·1489	·1486	·1488	·1492	·1502
24	·1497	·1498	·1490	·1484	·1485	·1505	·1480	·1483	..	..	·1500	·1502
25	·1499	·1503	·1481	·1486	·1489	·1498	·1477	·1483	..	..	·1500	·1498
26	·1491	·1502	·1485	·1486	·1492	·1507	·1478	·1484	..	·1466	·1502	·1500
27	·1481	..	·1496	·1487	·1486	·1503	·1477	·1494	·1466	·1476	·1499	·1500
28	·1486	·1511	·1482	·1481	·1486	·1509	·1464	·1483	·1467	·1479	·1501	·1505
29	·1489		·1491	·1486	·1495	·1503	·1476	·1484	·1479	·1487	·1499	·1496
30	·1485		·1490	·1494	·1498	·1496	·1475	·1486	·1482	·1492	·1502	·1509
31	·1499		·1489		·1503		·1477	·1489		·1496		..

TABLE V.—MEAN MONTHLY DETERMINATION of the HORIZONTAL MAGNETIC FORCE (diminished by a Constant 0·8600 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.

1870.

Hour, Greenwich Mean Solar Time.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
h 0	0·1484	0·1484	0·1478	0·1461	0·1474	0·1480	0·1473	0·1467	0·1474	0·1468	0·1477	0·1492
1	·1490	·1491	·1484	·1468	·1481	·1487	·1480	·1475	·1478	·1474	·1480	·1494
2	·1491	·1495	·1489	·1476	·1488	·1498	·1487	·1481	·1483	·1480	·1485	·1495
3	·1492	·1497	·1495	·1482	·1493	·1505	·1492	·1486	·1488	·1485	·1489	·1497
4	·1492	·1498	·1498	·1488	·1500	·1509	·1497	·1490	·1494	·1490	·1492	·1499
5	·1494	·1498	·1503	·1495	·1506	·1514	·1500	·1495	·1497	·1492	·1493	·1499
6	·1495	·1500	·1503	·1494	·1508	·1516	·1502	·1497	·1499	·1495	·1495	·1500
7	·1496	·1502	·1504	·1493	·1509	·1516	·1503	·1498	·1502	·1493	·1495	·1500
8	·1494	·1504	·1504	·1494	·1506	·1513	·1502	·1497	·1500	·1493	·1495	·1501
9	·1491	·1500	·1501	·1493	·1502	·1508	·1498	·1495	·1498	·1492	·1495	·1500
10	·1491	·1500	·1501	·1494	·1499	·1505	·1496	·1495	·1498	·1493	·1492	·1500
11	·1490	·1500	·1500	·1493	·1498	·1502	·1496	·1494	·1497	·1494	·1492	·1499
12	·1489	·1499	·1498	·1490	·1497	·1502	·1495	·1494	·1496	·1494	·1493	·1499
13	·1491	·1499	·1497	·1489	·1496	·1502	·1494	·1492	·1496	·1493	·1493	·1500
14	·1491	·1499	·1497	·1490	·1496	·1503	·1494	·1491	·1496	·1493	·1493	·1500
15	·1493	·1498	·1497	·1490	·1495	·1502	·1494	·1492	·1496	·1494	·1495	·1501
16	·1494	·1500	·1498	·1487	·1495	·1503	·1494	·1491	·1495	·1494	·1496	·1503
17	·1496	·1501	·1497	·1487	·1494	·1503	·1493	·1490	·1493	·1495	·1497	·1504
18	·1495	·1501	·1497	·1487	·1490	·1497	·1490	·1485	·1490	·1495	·1497	·1505
19	·1494	·1499	·1494	·1485	·1484	·1489	·1484	·1477	·1484	·1491	·1495	·1503
20	·1492	·1495	·1489	·1477	·1477	·1483	·1477	·1469	·1476	·1485	·1490	·1501
21	·1489	·1489	·1483	·1468	·1472	·1477	·1470	·1463	·1468	·1475	·1482	·1497
22	·1486	·1485	·1477	·1460	·1470	·1474	·1466	·1460	·1466	·1469	·1477	·1492
23	·1483	·1483	·1474	·1459	·1472	·1476	·1468	·1462	·1468	·1467	·1475	·1491

The Thermometer on the box inclosing the Horizontal Force Magnetometer was read generally nine times every day. The means of the readings taken for the same nominal hour through each month show no sensible Mean Diurnal Inequality of Temperature.

TABLE VI.

1870.

Month.	MEAN HORIZONTAL MAGNETIC FORCE (diminished by a Constant 0·8600 nearly) IN EACH MONTH, as deduced from the Mean of the MEAN HOURLY DETERMINATIONS in each MONTH (Table V.), uncorrected for Temperature.	Mean Temperature.
January	0·1491	60°·8
February	·1497	60·5
March	·1494	61·2
April	·1483	61·4
May	·1492	62·0
June	·1499	65·8
July	·1489	67·9
August	·1485	66·7
September	·1489	65·2
October	·1487	64·2
November	·1490	63·8
December	·1499	63·1

TABLE VII.—MEAN VERTICAL MAGNETIC FORCE (diminished by a Constant 0·9600 nearly) on each ASTRONOMICAL DAY, as deduced from the MEAN of TWENTY-FOUR HOURLY MEASURES of ORDINATES of the PHOTOGRAPHIC REGISTER on that DAY.

1870.

Days of the Month.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d												
1	0·0358	..	0·0346	0·0326	0·0311	0·0320	0·0295	0·0339	0·0287	0·0271	0·0247	0·0217
2	·0351	0·0351	·0345	·0330	·0313	·0329	·0299	·0321	·0296	·0274	·0248	·0220
3	·0365	·0349	·0337	·0327	·0318	·0336	·0300	·0314	..	·0278	·0240	·0215
4	·0362	·0345	·0335	·0328	·0321	..	·0325	·0317	·0285	·0264	·0242	·0213
5	·0356	·0341	·0339	..	·0320	·0323	·0329	·0314	·0295	·0258	·0250	·0217
6	·0355	·0339	·0339	·0337	·0322	·0316	·0317	·0311	·0277	·0250	·0242	·0219
7	·0365	·0347	·0336	·0338	·0315	·0321	·0318	·0303	·0269	·0259	·0242	·0208
8	·0360	..	·0341	·0342	·0310	·0337	·0332	·0313	·0267	·0266	..	·0211
9	·0361	..	·0333	·0332	·0303	·0326	·0338	·0313	·0278	·0238	·0235	·0213
10	·0362	..	·0331	·0330	·0304	·0316	·0333	·0306	·0267	·0246	·0230	·0209
11	·0357	..	·0333	·0328	·0310	·0323	·0333	·0308	·0266	·0251	·0234	·0209
12	·0354	..	·0328	·0326	·0311	·0331	·0323	·0314	·0269	·0258	·0225	·0219
13	·0361	..	·0331	·0338	·0312	..	·0325	·0308	·0270	·0266	·0223	·0223
14	·0356	·0326	·0330	·0336	·0314	·0339	·0323	·0302	·0262	..	·0230	·0222
15	·0356	·0341	·0331	·0321	·0315	·0338	·0328	·0299	·0259	·0253	·0228	·0215
16	·0357	·0346	·0334	·0330	·0316	·0353	·0327	·0297	·0267	·0261	·0230	·0222
17	·0354	·0342	·0340	·0326	·0312	·0335	·0320	·0290	·0275	·0247	·0238	..
18	·0351	·0350	·0334	·0327	·0326	·0338	·0323	·0295	·0278	·0252	·0237	·0213
19	·0348	·0337	·0337	·0340	·0327	·0350	·0341	..	·0264	·0249	·0244	·0218
20	·0351	·0338	·0337	·0350	..	·0349	·0342	..	·0263	·0254	·0240	·0207
21	·0348	·0332	..	·0342	·0341	·0353	·0342	·0278	·0278	·0266	·0232	·0197
22	·0350	·0344	·0333	·0329	·0330	·0358	·0336	·0281	·0270	·0266	·0228	·0196
23	·0347	·0347	·0341	·0317	·0318	·0329	·0331	·0285	·0263	·0249	·0235	·0197
24	·0349	·0343	·0340	·0326	·0321	·0305	·0335	·0283	..	..	·0235	·0187
25	·0344	·0341	·0335	·0330	·0318	·0307	·0336	·0282	..	..	·0236	·0198
26	·0344	·0344	·0336	·0322	·0326	·0316	·0331	·0273	..	·0252	·0232	·0207
27	·0343	..	·0334	·0318	·0317	·0311	·0324	·0277	·0281	·0250	·0228	·0216
28	·0341	·0348	·0339	·0320	·0321	·0306	·0307	·0282	·0286	·0252	·0229	·0217
29	·0345		·0334	·0319	·0324	·0311	..	·0265	·0282	·0261	·0227	·0226
30	·0342		·0336	·0316	·0329	·0304	·0318	·0267	·0272	·0253	·0217	·0205
31	·0342		·0335		·0323		·0332	·0274		·0251		·0202

TABLE VIII.—MEAN MONTHLY DETERMINATION of the VERTICAL MAGNETIC FORCE (diminished by a Constant 0·9600 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.

1870.

Hour. Greenwich Mean Solar Time.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
h												
0	0·0349	0·0337	0·0331	0·0323	0·0311	0·0321	0·0317	0·0291	0·0268	0·0251	0·0229	0·0206
1	·0351	·0338	·0333	·0325	·0314	·0325	·0321	·0295	·0271	·0253	·0231	·0207
2	·0351	·0339	·0336	·0329	·0317	·0328	·0324	·0298	·0274	·0254	·0233	·0208
3	·0352	·0341	·0337	·0332	·0320	·0331	·0328	·0302	·0277	·0256	·0234	·0209
4	·0352	·0341	·0339	·0335	·0323	·0334	·0331	·0304	·0280	·0258	·0235	·0210
5	·0354	·0342	·0340	·0337	·0326	·0337	·0334	·0306	·0282	·0260	·0236	·0211
6	·0357	·0344	·0340	·0338	·0327	·0340	·0336	·0306	·0281	·0261	·0238	·0213
7	·0358	·0345	·0339	·0337	·0327	·0340	·0336	·0306	·0280	·0262	·0240	·0215
8	·0358	·0346	·0338	·0335	·0326	·0339	·0336	·0305	·0280	·0262	·0241	·0215
9	·0358	·0345	·0337	·0334	·0325	·0339	·0335	·0304	·0278	·0262	·0240	·0215
10	·0357	·0345	·0337	·0333	·0324	·0336	·0333	·0302	·0277	·0261	·0240	·0215
11	·0356	·0344	·0337	·0332	·0323	·0334	·0331	·0300	·0276	·0261	·0240	·0215
12	·0355	·0344	·0337	·0332	·0322	·0332	·0329	·0298	·0276	·0260	·0239	·0215
13	·0355	·0345	·0337	·0331	·0320	·0329	·0327	·0297	·0275	·0259	·0238	·0214
14	·0354	·0345	·0337	·0330	·0319	·0327	·0325	·0296	·0274	·0258	·0236	·0214
15	·0352	·0344	·0336	·0328	·0317	·0325	·0323	·0294	·0273	·0257	·0234	·0213
16	·0351	·0344	·0336	·0327	·0316	·0323	·0321	·0293	·0271	·0256	·0233	·0212
17	·0350	·0343	·0336	·0326	·0315	·0322	·0319	·0292	·0271	·0256	·0232	·0211
18	·0350	·0343	·0336	·0325	·0314	·0321	·0318	·0291	·0271	·0255	·0231	·0210
19	·0350	·0343	·0336	·0325	·0313	·0319	·0317	·0290	·0270	·0255	·0231	·0210
20	·0350	·0343	·0336	·0324	·0312	·0318	·0316	·0289	·0269	·0255	·0231	·0209
21	·0348	·0342	·0334	·0323	·0310	·0317	·0315	·0288	·0268	·0254	·0231	·0209
22	·0348	·0339	·0332	·0321	·0309	·0317	·0315	·0287	·0266	·0251	·0229	·0208
23	·0348	·0338	·0330	·0320	·0308	·0317	·0315	·0287	·0266	·0249	·0228	·0206

The Thermometer on the box inclosing the Vertical Force Magnetometer was read generally nine times every day. The means of the readings taken for the same nominal hour through each month show no sensible Mean Diurnal Inequality of Temperature.

TABLE IX.

1870.

Month.	MEAN VERTICAL MAGNETIC FORCE (diminished by a Constant 0·9600 nearly) in EACH MONTH, as deduced from the Mean of the MEAN HOURLY DETERMINATIONS in each Month (Table VIII.), uncorrected for Temperature.	Mean Temperature.
January	0·0353	60·8°
February	·0342	60·4
March	·0336	61·3
April	·0329	62·1
May	·0318	62·3
June	·0328	66·0
July	·0325	68·2
August	·0297	66·8
September	·0274	64·5
October	·0257	63·3
November	·0235	62·6
December	·0211	61·1

TABLE X.—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 1870.

January to December.

Hour, Greenwich Mean Solar Time.	Declination.	Horizontal Force.	Vertical Force.
h 0	′ + 5·99	− 0·00153	− 0·00059
1	+ 7·53	− 94	− 34
2	+ 7·29	− 39	− 12
3	+ 5·68	+ 5	+ 12
4	+ 3·73	+ 43	+ 31
5	+ 2·11	+ 76	+ 50
6	+ 0·92	+ 91	+ 63
7	+ 0·17	+ 97	+ 67
8	− 0·33	+ 90	+ 63
9	− 1·06	+ 65	+ 56
10	− 1·67	+ 57	+ 46
11	− 2·15	+ 50	+ 37
12	− 2·26	+ 43	+ 28
13	− 2·35	+ 39	+ 18
14	− 2·34	+ 40	+ 8
15	− 2·46	+ 43	− 7
16	− 2·55	+ 46	− 18
17	− 2·94	+ 46	− 27
18	− 3·50	+ 28	− 33
19	− 4·10	− 13	− 38
20	− 4·44	− 70	− 44
21	− 3·42	− 135	− 55
22	− 0·72	− 178	− 69
23	+ 2·97	− 181	− 77

ROYAL OBSERVATORY, GREENWICH.

INDICATIONS

OF

MAGNETOMETERS

ON SIXTEEN DAYS OF GREAT MAGNETIC DISTURBANCE.

1870.

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
Feb. 1		Feb. 1		Feb. 1		Feb. 1		
h m	° ′ ″	h m		h m		h m	°	°
0. 0	20. 4. 20	0. 0	·1463	0. 0	·03440	0. 0	60·8	61·1
0. 8	20. 0. 20	0. 4	·1461	0. 21	·03466	1. 0	60·9	61·0
0. 15	19. 59. 5	0. 7	·1461	0. 26	·03477	2. 0	61·0	61·2
0. 27	56. 30	0. 18	·1469	0. 30	·03473	3. 0	61·0	61·4
0. 31	58. 0	0. 23	·1468	0. 32	·03480	7. 0	61·1	61·5
0. 34	56. 0	0. 30	·1478	0. 43	·03470	9. 0	61·1	61·1
0. 41	58. 15	0. 33	·1484	0. 49	·03483	21. 0	61·4	61·3
0. 50	56. 30	0. 38	·1477	1. 15	·03478	22. 0	61·2	61·0
0. 53	59. 0	0. 41	·1491	1. 24	·03487	23. 0	61·2	61·4
0. 57	19. 58. 30	0. 49	·1482	1. 30	·03486			
1. 4	20. 1. 45	0. 51	·1489	1. 58	·03520			
1. 10	2. 30	1. 0	·1498	2. 9	·03520			
1. 17	2. 25	1. 5	·1494	2. 16	·03538			
1. 23	0. 55	1. 9	·1496	2. 19	·03534			
1. 30	3. 55	1. 16	·1491	2. 26	·03559			
1. 32	3. 10	1. 22	·1485	2. 31	·03555			
1. 37	3. 0	1. 32	·1490	2. 39	·03562			
1. 42	4. 0	1. 40	·1484	2. 44	·03558			
1. 54	4. 0	1. 43	·1486	2. 49	·03572			
2. 7	6. 20	1. 47	·1481	3. 12	·03601			
2. 18	4. 20	1. 51	·1484	3. 19	·03618			
2. 20	6. 0	1. 55	·1480	3. 24	·03627			
2. 28	4. 45	1. 59	·1483	3. 27	·03623			
2. 35	8. 15	2. 6	·1487	3. 33	·03654			
2. 41	6. 40	2. 12	·1482	3. 38	·03640			
2. 47	8. 5	2. 16	·1477	3. 49	·03666			
2. 52	7. 55	2. 20	·1482	3. 57	·03678			
2. 54	9. 40	2. 26	·1475	4. 0	·03672			
3. 0	11. 0	2. 29	·1479	4. 16	·03696			
3. 6	8. 40	2. 31	·1474	4. 21	·03694			
3. 14	7. 25	2. 37	·1484	4. 40	·03719			
3. 23	4. 45	2. 41	·1477	4. 46	·03706			
3. 27	6. 30	2. 46	·1484	4. 50	·03725			
3. 30	5. 55	2. 50	·1478	5. 2	·03820			
3. 33	6. 45	2. 52	·1475	5. 10	·03851			
3. 38	6. 10	2. 57	·1478	5. 14	·03920			
3. 44	10. 20	3. 5	·1471	5. 20	·03880			
3. 53	6. 25	3. 15	·1481	5. 21	·03887			
3. 55	6. 45	3. 18	·1479	5. 26	·03700			
4. 2	5. 30	3. 26	·1490	5. 32	·03740			
4. 10	4. 0	3. 31	·1499	5. 38	·03720			
4. 17	4. 55	3. 35	·1498	5. 41	·03724			
4. 22	2. 35	3. 38	·1507	5. 44	·03716			
4. 24	20. 3. 5	3. 42	·1512	5. 47	·03720			
4. 32	19. 59. 0	3. 51	·1488	5. 52	·03700			
4. 35	20. 0. 25	3. 56	·1493	6. 0	·03718			
4. 44	0. 55	4. 2	·1495	6. 2	·03701			
4. 50	5. 0	4. 6	·1492	6. 9	·03708			
4. 57	12. 40	4. 13	·1495	6. 26	·03667			
5. 1	10. 35	4. 20	·1491	6. 40	·03690			
5. 7	13. 25	4. 26	·1486	6. 46	·03720			
5. 15	20. 1. 40	4. 33	·1491	6. 51	·03720			
5. 22	19. 57. 20	4. 45	·1495	7. 2	·03694			
5. 27	53. 40	4. 51	·1502	7. 7	·03698			
5. 30	19. 43. 0	4. 54	·1496	7. 12	·03747			
5. 37	20. 13. 40	4. 57	·1498	7. 21	·03740			
5. 44	19. 40. 20	5. 0	·1483	7. 29	·03709			
5. 50	47. 25	5. 5	·1488	7. 32	·03745			

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
Feb. 1		Feb. 1		Feb. 1				
h m	° ′ ″	h m		h m		h m	°	°
5. 58	19. 49. 55	5. 8	·1491	7. 42	·03700			
6. 2	47. 5	5. 12	·1479	7. 44	·03694			
6. 10	52. 0	5. 17	·1482	8. 2	·03710			
6. 15	43. 5	5. 20	·1487	8. 7	·03690			
6. 23	50. 30	5. 25	·1503	8. 17	·03639			
6. 29	19. 49. 50	5. 28	·1482	8. 22	·03692			
6. 36	20. 0. 25	5. 30	·1501	8. 26	·03718			
6. 41	3. 40	5. 32	·1525	8. 31	·03660			
6. 48	1. 10	5. 34	·1528	8. 37	·03623			
6. 50	2. 55	5. 39	·1437	8. 43	·03540			
6. 57	0. 0	5. 43	·1431	8. 48	·03550			
7. 1	3. 0	5. 48	·1460	9. 2	·03462			
7. 6	2. 0	5. 51	·1463	9. 13	·03445			
7. 12	20. 4. 15	5. 55	·1454	9. 29	·03347			
7. 20	19. 57. 0	5. 57	·1457	9. 32	·03270			
7. 30	20. 5. 5	6. 3	·1446	9. 37	·03304			
7. 33	2. 15	6. 10	·1460	9. 39	·03260			
7. 40	20. 1. 5	6. 14	·1436	9. 42	·03283			
7. 50	19. 58. 45	6. 18	·1456	9. 46	·03290			
7. 53	20. 0. 25	6. 24	·1464	9. 56	·03407			
8. 0	19. 55. 5	6. 27	·1462	10. 4	·03367			
8. 7	53. 20	6. 33	·1474	10. 9	·03377			
8. 10	53. 35	6. 36	·1482	10. 18	·03332			
8. 21	53. 5	6. 37	·1478	10. 22	·03330			
8. 31	42. 35	6. 39	·1480	10. 28	·03374			
8. 40	9. 0	6. 44	·1468	10. 33	·03378			
8. 43	7. 5	6. 47	·1461	10. 39	·03400			
8. 50	36. 5	6. 49	·1462	10. 49	·03369			
8. 51	41. 45	6. 57	·1455	10. 58	·03380			
8. 56	44. 25	7. 2	·1459	11. 7	·03406			
8. 59	42. 30	7. 7	·1454	11. 16	·03410			
9. 1	30. 25	7. 12	·1450	11. 18	·03406			
9. 3	26. 0	7. 18	·1439	11. 25	·03433			
9. 8	33. 20	7. 23	·1449	11. 30	·03454			
9. 13	40. 45	7. 27	·1455	11. 38	·03462			
9. 23	48. 30	7. 30	·1458	11. 44	·03422			
9. 26	19. 48. 0	7. 35	·1444	11. 49	·03422			
9. 33	20. 6. 0	7. 38	·1440	11. 56	·03430			
9. 38	3. 20	7. 39	·1443	12. 2	·03390			
9. 44	20. 17. 30	7. 40	·1441	12. 10	·03388			
10. 2	19. 36. 0	7. 41	·1442	12. 12	·03382			
10. 8	39. 25	7. 48	·1432	12. 28	·03460			
10. 12	37. 5	7. 52	·1435	12. 33	·03462			
10. 17	40. 5	8. 0	·1422	12. 50	·03490			
10. 20	40. 0	8. 7	·1436	12. 54	·03474			
10. 22	41. 0	8. 10	·1430	12. 59	·03475			
10. 24	40. 40	8. 14	·1433	13. 2	·03460			
10. 30	51. 40	8. 16	·1430	13. 10	·03470			
10. 49	31. 20	8. 18	·1432	13. 29	·03507			
10. 59	33. 20	8. 26	·1390	13. 38	·03497			
11. 11	41. 15	8. 47	·1518	13. 49	·03463			
11. 21	37. 25	8. 52	·1456	13. 53	·03425			
11. 36	23. 50	9. 2	·1506	14. 0	·03412			
11. 46	42. 35	9. 5	·1509	14. 10	·03400			
11. 51	42. 0	9. 10	·1500	14. 15	·03406			
12. 2	38. 20	9. 17	·1501	14. 22	·03386			
12. 7	37. 55	9. 21	·1503	14. 28	·03400			
12. 12	27. 40	9. 26	·1513	14. 34	·03414			

The indications are taken from the sheets of the Photographic Record, except where an asterisk is attached to the number, in which instances they are inferred from observations made with the telescope in the ancient manner. The Symbol *** denotes that the magnet has been generally in a state of agitation. The Symbol (†) denotes that the register has failed between the preceding and following readings. The Symbol ; attached to a time denotes that the reading will apply equally well to a considerable range of time near that which is recorded. A brace denotes that at this time the curve of the Vertical Force was dislocated, and the difference of the numbers included by the brace shows the amount of the displacement.

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
Feb. 1		Feb. 1		Feb. 1				
h m	° ′ ″	h m		h m		h m	°	°
12. 19	19. 30. 40	9. 35	·1476	14. 47	·03447			
12. 21	30. 10	9. 38	·1480	14. 58	·03440			
12. 29	33. 45	9. 39	·1445	15. 8	·03445			
12. 32	32. 0	9. 41	·1450	15. 19	·03448			
12. 42	36. 55	9. 46	·1379	15. 32	·03479			
12. 50	38. 15	10. 0	·1448	15. 51	·03473			
12. 52	37. 45	10. 5	·1441	16. 2	·03485			
13. 13	46. 30	10. 11	·1450	16. 18	·03493			
13. 17	46. 10	10. 13	·1446	16. 27	·03487			
13. 26	49. 0	10. 16	·1449	16. 41	·03500			
13. 36	48. 55	10. 18	·1444	16. 56	·03495			
13. 46	51. 5	10. 25	·1452	17. 17	·03510			
13. 54	19. 58. 40	10. 27	·1407	17. 38	·03488			
14. 0	20. 0. 0		(†)	18. 17	·03520			
14. 17	19. 50. 10	11. 15	·1407	18. 56	·03539			
14. 28	44. 30	11. 22	·1440	19. 40	·03543			
14. 37	48. 5	11. 26	·1429	19. 51	·03540			
14. 50	45. 15	11. 33	·1465	20. 5	·03544			
15. 3	51. 55	11. 36	·1469	20. 53	·03539			
15. 18	50. 15	11. 41	·1448	21. 8	·03532			
15. 24	51. 15	11. 52	·1477	21. 17	·03542			
15. 33	49. 40	11. 57	·1471	21. 57	·03544			
15. 40	48. 25	12. 3	·1449	22. 22	·03538			
15. 49	52. 0	12. 8	·1460	23. 30	·03516			
16. 2	52. 0	12. 13	·1449	23. 43	·03526			
16. 11	54. 25	12. 18	·1455	23. 59	·03522			
16. 30	54. 0	12. 23	·1437					
16. 39	53. 0	12. 35	·1449					
16. 47	55. 40	12. 40	·1446					
16. 58	56. 30	12. 42	·1448					
17. 3	56. 0	12. 47	·1444					
17. 17	19. 59. 0	12. 50	·1447					
17. 30	20. 0. 20	12. 53	·1445					
17. 39	19. 57. 50	13. 1	·1451					
17. 51	56. 45	13. 5	·1447					
18. 6	56. 15	13. 8	·1450					
18. 13	57. 0	13. 11	·1447					
18. 22	56. 25	13. 14	·1449					
18. 48	56. 45	13. 25	·1433					
18. 52	56. 20	13. 35	·1437					
19. 9	57. 15	13. 39	·1435					
19. 22	56. 10	13. 45	·1444					
19. 42	55. 55	13. 51	·1474					
19. 50	56. 20	13. 57	·1482					
19. 54	56. 0	14. 4	·1469					
20. 2	55. 50	14. 15	·1455					
20. 23	57. 25	14. 21	·1458					
20. 34	56. 55	14. 27	·1463					
20. 43	57. 5	14. 33	·1455					
20. 50	58. 10	14. 40	·1459					
21. 3	58. 5	14. 53	·1477					
21. 16	57. 30	15. 1	·1464					
21. 20	58. 40	15. 7	·1461					
21. 36	58. 0	15. 14	·1460					
21. 41	57. 5	15. 17	·1462					
21. 55	57. 0	15. 23	·1456					
22. 0	57. 30	15. 41	·1473					
22. 3	57. 5	15. 49	·1470					

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
Feb. 1		Feb. 1						
h m	° ′ ″	h m		h m		h m	°	°
22. 22	19. 57. 40	15. 52	·1472					
22. 29	58. 10	15. 56	·1469					
22. 33	57. 15	16. 5	·1471					
22. 44	56. 20	16. 14	·1464					
23. 0	57. 20	16. 20	·1466					
23. 8	59. 5	16. 29	·1462					
23. 10	57. 50	16. 33	·1459					
23. 29	58. 5	16. 39	·1463					
23. 33	19. 57. 30	16. 47	·1459					
23. 59	20. 0. 15	16. 54	·1461					
		17. 0	·1459					
		17. 7	·1464					
		17. 25	·1479					
		17. 30	·1476					
		17. 36	·1478					
		17. 42	·1476					
		17. 49	·1478					
		17. 58	·1474					
		18. 4	·1477					
		18. 14	·1473					
		18. 23	·1478					
		18. 32	·1476					
		18. 38	·1478					
		18. 44	·1476					
		19. 2	·1480					
		19. 14	·1476					
		19. 22	·1478					
		19. 39	·1473					
		19. 44	·1475					
		19. 49	·1473					
		19. 52	·1475					
		19. 55	·1472					
		20. 9	·1480					
		20. 33	·1478					
		20. 46	·1484					
		20. 50	·1481					
		20. 55	·1484					
		20. 59	·1480					
		21. 3	·1483					
		21. 9	·1479					
		21. 19	·1485					
		21. 24	·1482					
		21. 31	·1485					
		21. 36	·1480					
			***					
		22. 29	·1487					
		22. 33	·1482					
		22. 46	·1484					
		22. 51	·1488					
		23. 3	·1493					
		23. 12	·1493					
		23. 26	·1484					
		23. 35	·1484					
		23. 47	·1491					
		23. 50	·1491					
		23. 55	·1493					
		23. 59	·1492					

For the Horizontal and Vertical Forces, increasing readings denote increasing forces.

February 1. The spot of light for Horizontal Force was off the sheet in the direction of *decreasing* force from 10^{h}. 27^{m}. to 11^{h}. 15^{m}.

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
Feb. 11		Feb. 11		Feb. 11		Feb. 11		
h m	° ′ ″	h m		h m		h m	°	°
0. 0	20. 1. 15	0. 0	·1488	1. 0	·03345*	0. 0	60·4	60·2
0. 6	1. 45	0. 46	·1490	3. 0	·03383*	1. 0	60·4	59·8
0. 23	1. 55	1. 2	·1490	9. 0	·03523*	2. 0	60·8	60·0
0. 48	3. 45	1. 11	·1492	21. 0	·03236*	3. 0	60·4	59·6
1. 9	4. 10	1. 27	·1489			9. 0	61·0	60·5
1. 23	3. 30	1. 49	·1496			20. 0	59·6	58·2
1. 49	5. 40	2. 3	·1496			21. 0	59·1	57·7
2. 22	3. 0	2. 21	·1493			22. 0	59·6	58·2
2. 35	4. 5	2. 44	·1501			23. 0	59·2	58·0
3. 3	20. 2. 0	3. 7	·1502					
3. 39	19. 58. 30	3. 26	·1498					
3. 49	58. 15	3. 38	·1495					
4. 2	58. 40	4. 6	·1498					
4. 41	58. 25	4. 26	·1495					
5. 6	57. 55	4. 38	·1499					
6. 15	56. 55	4. 49	·1496					
6. 39	55. 20	4. 58	·1499					
6. 50	50. 15	5. 15	·1496					
7. 2	46. 5	5. 28	·1499					
7. 20	37. 40	5. 41	·1496					
7. 48	51. 10	5. 52	·1500					
7. 53	52. 0	6. 5	·1495					
8. 0	56. 20	6. 39	·1504					
8. 13	19. 47. 25	6. 51	·1521					
8. 28	20. 4. 50	6. 55	·1524					
8. 50	19. 55. 0	7. 14	·1552					
9. 1	56. 20	7. 18	·1551					
9. 13	45. 25	7. 22	·1557					
9. 26	47. 30	7. 26	·1554					
9. 32	50. 45	7. 35	·1560					
9. 37	19. 49. 30	7. 39	·1568					
10. 0	20. 0. 25	7. 45	·1545					
10. 11	19. 59. 0	7. 49	·1548					
10. 28	20. 0. 30	7. 51	·1539					
10. 37	19. 58. 0	7. 56	·1536					
10. 48	57. 50	8. 2	·1550					
10. 53	19. 59. 20	8. 7	·1535					
11. 9	20. 0. 50	8. 9	·1538					
11. 19	19. 58. 0	8. 12	·1529					
11. 28	58. 50	8. 17	·1540					
11. 32	19. 58. 15	8. 31	·1504					
11. 42	20. 4. 20	8. 38	·1489					
11. 50	2. 20	8. 43	·1494					
12. 2	12. 40	8. 46	·1486					
13. 0	20. 1. 30	9. 0	·1499					
13. 19	19. 58. 30	9. 7	·1480					
13. 32	54. 40	9. 15	·1497					
	(†)	9. 20	·1493					
14. 46	52. 0	9. 26	·1502					
14. 55	53. 20	9. 28	·1500					
15. 10	51. 25	9. 33	·1507					
15. 13	53. 0	9. 39	·1498					
15. 38	46. 45	9. 44	·1505					
15. 50	49. 0	9. 51	·1497					
16. 13	43. 35	9. 54	·1500					
16. 43	51. 20	10. 3	·1482					
16. 57	46. 10	10. 11	·1478					
17. 7	48. 15	10. 19	·1483					

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
Feb. 11		Feb. 11						
h m	° ′ ″	h m		h m		h m	°	°
17. 12	19. 44. 55	10. 25	·1478					
17. 30	48. 30	10. 30	·1482					
17. 38	45. 40	10. 34	·1477					
18. 2	50. 50	10. 39	·1487					
18. 10	50. 15	10. 45	·1470					
18. 13	50. 30	10. 50	·1476					
18. 30	48. 40	10. 53	·1472					
18. 38	48. 55	10. 59	·1478					
18. 49	19. 48. 0	11. 4	·1472					
19. 20	20. 1. 0	11. 7	·1476					
19. 23	19. 56. 40	11. 12	·1470					
19. 34	20. 0. 20	11. 16	·1474					
19. 44	19. 55. 25	11. 20	·1473					
20. 7	19. 58. 35	11. 23	·1477					
20. 30	20. 0. 10	11. 26	·1476					
20. 45	4. 15	11. 37	·1504					
21. 7	20. 0. 5	11. 41	·1501					
21. 35	19. 57. 5	11. 45	·1510					
21. 42	58. 10	11. 51	·1501					
21. 59	56. 15	11. 54	·1511					
22. 7	56. 40	12. 6	·1479					
22. 14	56. 20	12. 11	·1474					
22. 26	57. 20	12. 17	·1471					
22. 37	55. 30	12. 19	·1473					
22. 50	56. 30	12. 28	·1463					
23. 3	59. 35	12. 37	·1472					
23. 9	19. 58. 45	12. 50	·1451					
23. 28	20. 4. 0	12. 58	·1448					
23. 37	7. 25	13. 7	·1452					
23. 42	5. 55	13. 15	·1436					
23. 59	11. 0	13. 20	·1442					
		13. 26	·1437					
		13. 34	·1439					
		13. 37	·1445					
		13. 40	·1440					
		13. 49	·1449					
		13. 53	·1447					
		14. 0	·1452					
		14. 12	·1463					
		14. 32	·1449					
		14. 54	·1426					
		15. 9	·1433					
		15. 15	·1425					
			(†)					
		15. 47	·1427					
		16. 0	·1440					
		16. 10	·1444					
		16. 12	·1448					
		16. 16	·1445					
		16. 24	·1457					
		16. 32	·1449					
		16. 40	·1454					
		16. 46	·1447					
		16. 55	·1465					
		17. 0	·1445					
		17. 7	·1453					
		17. 17	·1469					
		17. 20	·1466					

The indications are taken from the sheets of the Photographic Record, except where an asterisk is attached to the number, in which instances they are inferred from observations made with the telescope in the ancient manner. The Symbol *** denotes that the magnet has been generally in a state of agitation. The Symbol (†) denotes that the register has failed between the preceding and following readings. The Symbol : attached to a time denotes that the reading will apply equally well to a considerable range of time near that which is recorded. A brace denotes that at this time the curve of the Vertical Force was dislocated, and the difference of the numbers included by the brace shows the amount of the displacement.

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
		Feb. 11						
h m	° ′ ″	h m		h m		h m	°	°
		17.23	·1470					
		17.26	·1464					
		17.41	·1479					
		17.49	·1468					
		17.53	·1470					
		18. 2	·1461					
		18.10	·1466					
		18.15	·1462					
		18.19	·1464					
		18.36	·1440					
		18.48	·1446					
		19. 0	·1448					
		19. 6	·1453					
		19.10	·1443					
		19.16	·1457					
		19.22	·1463					
		19.30	·1446					
		19.40	·1463					
		19.42	·1459					
		19.49	·1476					
		19.56	·1468					
		20. 0	·1474					
		20. 3	·1470					
		20. 9	·1475					
		20.16	·1460					
		20.23	·1473					
		20.27	·1464					
		20.30	·1468					
		20.34	·1465					
		20.40	·1468					
		20.45	·1453					
		20.50	·1461					
		21. 3	·1454					
		21. 7	·1461					
		21.16	·1454					
		21.24	·1461					
		21.32	·1458					
		21.42	·1471					
		21.50	·1460					
		21.55	·1477					
		22.13	·1463					
			(†)					
		23. 5	·1452					
		23.30	·1470					
			(†)					
Mar. 21		Mar. 21		Mar. 21		Mar. 21		
12. 0	19.53. 0	12. 0	·1504	12. 0	·03366	0. 0	60·7	61·6
12. 7	53. 0	12.10	·1505	12. 8	·03364	1. 0	60·8	61·9
12.11	56.45	12.16	·1531	12.11	·03383	3. 0	60·6	61·7
12.17	55.20	12.20	·1522	12.17	·03360	5. 0	61·2	62·3
12.23	57.55	12.23	·1526	12.39	·03328	9. 0	61·0	62·0
12.39	52. 0	12.27	·1520	12.50	·03327	21. 0	60·2	60·8
13. 2	48.40	12.33	·1516	12.57	·03316	22. 0	60·3	60·8
13. 9	51. 0	12.39	·1519	13. 2	·03310			
13.20	44. 0	12.45	·1514	13. 8	·03320			
13.27	43.25	12.53	·1523	13.22	·03282			
13.31	42.50	13. 4	·1507	13.26	·03283			

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
Mar. 21		Mar. 21		Mar. 21				
h m	° ′ ″	h m		h m		h m	°	°
13.37	19.43.45	13.12	·1518	13.31	·03286			
13.42	43.15	13.18	·1521	13.48	·03257			
13.47	43.35	13.23	·1518	13.56	·03248			
14. 1	42.55	13.29	·1523	14.13	·03219			
14.12	44. 0	13.35	·1531	14.29	·03214			
14.20	42.50	13.40	·1526	14.59	·03220			
14.29	39.50	13.46	·1530	15.17	·03210			
14.37	38. 5	13.52	·1525	15.42	·03257			
14.40	37.25	13.57	·1529	15.52	·03243			
14.47	37.20	14. 2	·1525	16.15	·03243			
14.50	38.40	14. 6	·1526	16.30	·03221			
14.53	38.20	14.14	·1507	16.42	·03163			
15. 0	39.50	14.17	·1502	16.46	·03162			
15.10	40.10	14.22	·1505	16.56	·03172			
15.17	39.30	14.24	·1501	17. 6	·03132			
15.27	41.55	14.29	·1504	17.17	·03140			
15.41	48.55	14.30	·1501	17.24	·03162			
15.48	49. 0	14.35	·1504	17.38	·03175			
15.53	47.55	14.39	·1502	17.42	·03162			
16. 0	47. 0	14.47	·1506	17.49	·03163			
16. 9	46.55	14.54	·1501	17.57	·03128			
16.18	50.15	14.58	·1505	18.10	·03123			
16.23	53.40	15. 7	·1500	18.18	·03133			
16.30	55.20	15.16	·1492	18.43	·03100			
16.42	48. 5	15.24	·1489	18.51	·03102			
16.53	53.15	15.29	·1493	19. 9	·03087			
17. 2	45.45	15.33	·1491	19.47	·03115			
17. 3	44.20	15.40	·1496	20. 7	·03140			
17.18	19.47. 5	15.47	·1499	20.12	·03139			
17.30	20. 5.20	15.52	·1494	20.30	·03158			
17.34	7.40	16. 5	·1506	20.42	·03153			
17.39	6.40	16.17	·1513	20.48	·03145			
17.47	11.25	16.29	·1506	20.54	·03152			
17.57	8. 0	16.38	·1513	21. 0	·03144			
18.10	8. 0	16.46	·1499	21.10	·03158			
18.14	9.55	16.53	·1510	21.39	·03165			
18.30	4.10	17. 1	·1525	21.47	·03172			
18.32	4.45	17.19	·1502	21.52	·03167			
18.41	2.55	17.27	·1508	22.11	·03180			
18.45	4. 0	17.32	·1497	22.17	·03179			
18.51	4.50	17.40	·1503	22.51	·03207			
18.58	2. 0	17.49	·1516	23.59	·03273			
19. 7	0.45	17.52	·1511					
19.11	20. 1. 0	17.54	·1513					
19.30	19.54.40	17.58	·1502					
19.37	52.40	18.10	·1496					
19.47	48. 0	18.16	·1503					
19.49	48.20	18.28	·1508					
19.53	46.20	18.39	·1495					
20. 3	49.15	18.45	·1492					
20.10	49.55	18.50	·1492					
20.22	19.59. 0	18.56	·1482					
20.27	20. 0.40	19. 7	·1461					
20.40	20. 0.40	19.15	·1457					
20.44	19.59.55	19.19	·1460					
20.50	20. 1.30	19.21	·1456					
21. 0	19.59. 0	19.25	·1459					
21. 8	20. 1. 0	19.42	·1441					

For the Horizontal and Vertical Forces, increasing readings denote increasing forces.

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
Mar. 21		Mar. 21						
h m	° ′ ″	h m		h m		h m	°	°
21. 13	20. 1. 0	19. 55	·1443					
21. 20	2. 0	19. 58	·1440					
21. 29	2. 15	20. 2	·1445					
21. 33	1. 10	20. 6	·1442					
21. 36	2. 0	20. 8	·1444					
21. 45	3. 30	20. 11	·1439					
21. 53	2. 0	20. 13	·1442					
22. 8	2. 55	20. 15	·1438					
22. 10	2. 15	20. 23	·1444					
22. 17	1. 5	20. 26	·1441					
22. 20	2. 0	20. 29	·1447					
22. 23	1. 0	20. 42	·1451					
22. 30	1. 55	20. 53	·1452					
22. 33	0. 40	21. 0	·1449					
22. 40	0. 10	21. 17	·1444					
22. 57	5. 15	21. 21	·1446					
23. 11	7. 0	21. 25	·1443					
23. 15	8. 30	21. 28	·1445					
23. 23	8. 0	21. 32	·1440					
23. 45	9. 0	21. 46	·1447					
23. 59	9. 0	21. 59	·1438					
		22. 8	·1442					
		22. 12	·1438					
		22. 15	·1442					
		22. 18	·1435					
		22. 22	·1439					
		22. 26	·1434					
		22. 33	·1441					
		22. 37	·1439					
		23. 5	·1449					
		23. 12	·1446					
		23. 17	·1449					
		23. 30	·1440					
		23. 40	·1444					
		23. 59	·1444					
Apr. 5		Apr. 5		Apr. 5		Apr. 5		
0. 0	20. 15. 45	0. 0	·1464	0. 0	·03298	0. 0	61 ·9	62 ·4
0. 8	13. 0	0. 8	·1454	0. 1	·03287	1. 0	61 ·4	61 ·8
0. 19	15. 45	0. 18	·1462	0. 19	·03305	3. 0	61 ·2	61 ·6
0. 31	18. 5	0. 23	·1471	0. 27	·03300	7. 45	61 ·1	61 ·7
0. 39	13. 55	0. 26	·1462	0. 31	·03279	9. 0	60 ·6	61 ·0
0. 50	18. 15	0. 29	·1476	0. 35	·03298	21. 0	61 ·5	61 ·8
0. 53	17. 0	0. 35	·1442	0. 38	·03293	22. 0	61 ·4	61 ·5
1. 0	21. 0	0. 39	·1449	0. 42	·03316	23. 0	61 ·3	61 ·6
1. 3	20. 20	0. 43	·1466	0. 49	·03327			
1. 9	22. 25	0. 47	·1478	0. 51	·03323			
1. 13	20. 10	0. 51	·1473	1. 0	·03341			
1. 21	17. 25	0. 56	·1482	1. 7	·03374			
1. 23	18. 5	1. 0	·1475	1. 26	·03390			
1. 28	14. 10	1. 5	·1498	1. 37	·03465			
1. 33	15. 50	1. 12	·1488	1. 48	·03482			
1. 42	14. 20	1. 17	·1466	1. 56	·03472			
1. 47	13. 0	1. 22	·1485	2. 0	·03483			
1. 51	13. 40	1. 25	·1471	2. 3	·03475			
1. 53	12. 40	1. 27	·1460	2. 4	·03499			
1. 59	8. 0	1. 32	·1482	2. 11	·03485			
2. 2	7. 0	1. 38	·1485	2. 12	·03528			
					***			

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
Apr. 5		Apr. 5		Apr. 5				
h m	° ′ ″	h m		h m		h m	°	°
2. 10	20. 6. 5	1. 44	·1472	2. 29	·03503			
2. 16	10. 20	1. 47	·1480	2. 32	·03577			
2. 27	6. 0	1. 50	·1466	2. 37	·03539			
2. 29	3. 50	1. 53	·1422	2. 39	·03565			
2. 39	13. 20	1. 58	·1432	2. 41	·03547			
2. 49	7. 0	2. 7	·1399	2. 50	·03537			
2. 52	12. 5	2. 13	·1423	3. 0	·03642			
3. 0	9. 0	2. 18	·1416	3. 6	·03688			
3. 4	10. 55	2. 20	·1422	3. 11	·03798			
3. 10	18. 30	2. 26	·1401	3. 20	·03862			
3. 16	20. 40	2. 32	·1446	3. 24	·03882			
3. 19	17. 5	2. 36	·1429	3. 26	·03877			
3. 27	12. 55	2. 38	·1434	3. 32	·03921			
3. 30	16. 0	2. 40	·1419	3. 37	·03878			
3. 33	10. 25	2. 44	·1424	3. 40	·03905			
3. 37	13. 45	2. 49	·1416	3. 46	·03859			
3. 41	7. 45		(†)	3. 50	·03866			
3. 52	12. 20	3. 0	·1417	3. 52	·03860			
3. 58	8. 0	3. 2	·1436	3. 56	·03870			
3. 59	8. 25	3. 6	·1504	4. 0	·03852			
4. 3	5. 55	3. 14	·1552	4. 10	·03898			
4. 7	7. 40	3. 17	·1565	4. 17	·03902			
4. 11	3. 15	3. 23	·1549	4. 25	·03978			
4. 16	9. 25	3. 30	·1579	4. 36	·03923			
4. 19	10. 0	3. 33	·1554	4. 39	·03939			
4. 21	13. 55	3. 36	·1573	4. 42	·03967			
4. 29	13. 5	3. 40	·1544	4. 47	·03963			
4. 32	11. 55	3. 45	·1556	4. 53	·03866			
4. 37	14. 20	3. 47	·1552	4. 57	·03850			
4. 41	20. 2. 50	3. 53	·1559	5. 0	·03858			
4. 47	19. 55. 20	3. 56	·1539	5. 7	·03817			
4. 53	56. 50	4. 0	·1536	5. 21	·03750			
4. 58	59. 0	4. 5	·1551	5. 26	·03712			
5. 1	19. 58. 15	4. 7	·1540	5. 41	·03617			
5. 13	20. 3. 15	4. 10	·1547	5. 46	·03582			
5. 15	2. 55	4. 15	·1565	5. 50	·03593			
5. 21	4. 10	4. 19	·1584	5. 58	·03555			
5. 22	3. 45	4. 25	·1574	6. 3	·03519			
5. 29	4. 40	4. 29	·1538	6. 10	·03529			
5. 31	6. 30	4. 32	·1511	6. 11	·03523			
5. 40	20. 2. 10	4. 35	·1479	6. 20	·03550			
5. 43	19. 58. 15	4. 38	·1471	6. 27	·03542			
5. 47	56. 55	4. 42	·1472	6. 34	·03521			
5. 50	59. 20	4. 44	·1466	6. 40	·03520			
5. 55	58. 10	4. 54	·1447	6. 46	·03510			
5. 58	59. 5	4. 59	·1459	6. 50	·03506			
6. 2	55. 15	5. 3	·1450	6. 57	·03487			
6. 8	55. 50	5. 9	·1450	7. 0	·03474			
6. 12	58. 15	5. 15	·1442	7. 7	·03482			
6. 16	19. 58. 20	5. 18	·1445	7. 11	·03480			
6. 22	20. 2. 40	5. 22	·1440	7. 27	·03518			
6. 30	19. 59. 45	5. 26	·1437	7. 32	·03512			
6. 35	55. 55	5. 30	·1441	7. 40	·03559			
6. 41	55. 10	5. 37	·1429	7. 47	·03593			
6. 58	56. 30	5. 40	·1433	7. 52	·03574			
7. 3	55. 25	5. 43	·1418	7. 54	·03580			
7. 8	56. 0	5. 47	·1435	7. 57	·03552			
7. 13	55. 25	5. 52	·1444	8. 2	·03555			

The indications are taken from the sheets of the Photographic Record, except where an asterisk is attached to the number, in which instances they are inferred from observations made with the telescope in the ancient manner. The Symbol *** denotes that the magnet has been generally in a state of agitation. The Symbol (†) denotes that the register has failed between the preceding and following readings. The Symbol : attached to a time denotes that the reading will apply equally well to a considerable range of time near that which is recorded. A brace denotes that at this time the curve of the Vertical Force was dislocated, and the difference of the numbers included by the brace shows the amount of the displacement.

April 5. The spot of light for Horizontal Force was off the sheet in the direction of *decreasing* force from $2^h. 49^m.$ to $3^h. 0^m.$

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
Apr. 5		Apr. 5		Apr. 5				
h m	° ′ ″	h m		h m		h m	°	°
7. 22	19. 58. 0	5. 59	·1425	8. 7	·03506			
7. 30	57. 5	6. 10	·1461	8. 8	·03437			
7. 33	57. 30	6. 19	·1491	8. 10	·03382			
7. 40	44. 55	6. 23	·1475	8. 12	·03390			
7. 46	46. 55	6. 26	·1477	8. 16	·03340			
7. 50	43. 0	6. 33	·1460	8. 18	·03372			
7. 57	46. 25	6. 40	·1466	8. 22	·03423			
8. 4	42. 25	6. 43	·1462	8. 27	·03439			
8. 10	45. 40	6. 49	·1468	8. 31	·03421			
8. 11	40. 20	6. 52	·1462	8. 37	·03457			
8. 14	41. 55	6. 55	·1464	8. 41	·03446			
8. 17	39. 0	6. 58	·1448	8. 47	·03440			
8. 23	40. 55	7. 8	·1464	8. 57	·03400			
8. 24	33. 10	7. 12	·1458	9. 2	·03400			
8. 25	35. 40	7. 21	·1485	9. 27	·03374			
8. 26	35. 0	7. 25	·1478	9. 37	·03382			
8. 30	38. 35	7. 28	·1485	9. 48	·03377			
8. 33	40. 5	7. 32	·1472	10. 2	·03386			
8. 36	38. 35	7. 37	·1462	10. 8	·03373			
8. 38	34. 35	7. 43	·1478	10. 11	·03387			
8. 40	32. 55	7. 46	·1470	10. 16	·03375			
8. 44	34. 0	7. 47	·1480	10. 20	·03385			
8. 47	38. 30	7. 52	·1486	10. 27	·03365			
8. 52	41. 40	8. 0	·1449	10. 32	·03382			
8. 57	41. 0	8. 5	·1468	10. 36	·03370			
9. 3	44. 40	8. 9	·1462	10. 42	·03388			
9. 17	52. 0	8. 12	·1476	10. 48	·03385			
9. 24	55. 15	8. 15	·1454	10. 52	·03367			
9. 30	54. 0	8. 18	·1457	11. 2	·03400			
9. 32	54. 15	8. 20	·1471	11. 18	·03378			
9. 40	52. 45	8. 22	·1465	11. 21	·03382			
9. 42	53. 50	8. 25	·1469	11. 28	·03365			
9. 44	53. 25	8. 28	·1460	11. 32	·03367			
9. 48	54. 40	8. 32	·1450	11. 38	·03357			
9. 50	54. 15	8. 37	·1461	11. 42	·03361			
9. 54	55. 0	8. 43	·1468	11. 48	·03347			
9. 57	54. 0	8. 52	·1455	11. 52	·03347			
10. 6	56. 25	9. 3	·1472	12. 2	·03240			
10. 13	55. 10	9. 10	·1460	12. 9	·03207			
10. 17	56. 40	9. 18	·1464	12. 17	·03222			
10. 21	56. 0	9. 24	·1454	12. 24	·03257			
10. 23	56. 20	9. 27	·1457	12. 32	·03274			
10. 32	54. 0	9. 31	·1454	12. 42	·03280			
10. 36	56. 0	9. 37	·1466	13. 2	·03318			
10. 40	54. 50	9. 39	·1461	13. 17	·03317			
10. 43	55. 20	9. 42	·1464	13. 28	·03300			
10. 48	54. 50	9. 46	·1457	13. 40	·03304			
10. 51	56. 20	9. 53	·1467	13. 42	·03298			
10. 55	53. 0	9. 56	·1464	13. 50	·03306			
11. 8	57. 20	10. 1	·1476	13. 56	·03297			
11. 16	55. 50	10. 5	·1466	14. 2	·03300			
11. 20	55. 40	10. 10	·1470	14. 19	·03293			
11. 33	53. 40	10. 13	·1466	14. 26	·03298			
11. 39	54. 15	10. 17	·1475	14. 32	·03284			
11. 47	19. 54. 5	10. 25	·1458	14. 38	·03287			
11. 58	20. 5. 0	10. 31	·1466	14. 46	·03264			
12. 8	20. 1. 35	10. 35	·1460	14. 49	·03270			
12. 19	19. 52. 5	10. 39	·1472	14. 53	·03262			

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
Apr. 5		Apr. 5		Apr. 5				
h m	° ′ ″	h m		h m		h m	°	°
12. 28	19. 49. 55	10. 42	·1468	15. 0	·03275			
12. 32	50. 55	10. 45	·1471	15. 2	·03267			
12. 35	50. 5	10. 49	·1444	15. 11	·03274			
12. 40	50. 55	10. 55	·1452	15. 22	·03306			
12. 47	49. 20	11. 0	·1459	15. 48	·03338			
12. 55	48. 15	11. 12	·1465	16. 12	·03350			
12. 58	47. 15	11. 16	·1456	16. 15	·03347			
13. 4	48. 0	11. 21	·1462	17. 4	·03367			
13. 12	50. 55	11. 24	·1454	17. 47	·03377			
13. 19	51. 0	11. 27	·1461	18. 50	·03381			
13. 23	50. 0	11. 34	·1454	19. 12	·03378			
13. 37	49. 45	11. 39	·1459	19. 20	·03367			
13. 47	50. 0	11. 43	·1453	19. 29	·03375			
13. 52	51. 50	11. 53	·1472	20. 11	·03363			
13. 59	52. 0	11. 55	·1464	20. 18	·03354			
14. 3	55. 0	11. 57	·1467	20. 21	·03360			
14. 10	55. 5	12. 0	·1450	20. 29	·03348			
14. 18	57. 30	12. 3	·1452	20. 32	·03356			
14. 22	57. 10	12. 7	·1436	20. 38	·03342			
14. 28	57. 55	12. 16	·1449	20. 39	·03352			
14. 34	19. 57. 10	12. 17	·1451	20. 42	·03340			
14. 42	20. 0. 0	12. 22	·1463	20. 47	·03341			
14. 48	19. 59. 25	12. 32	·1469	21. 22	·03340			
14. 50	20. 0. 15	12. 40	·1458	21. 29	·03330			
14. 58	19. 59. 20	12. 50	·1451	21. 33	·03336			
15. 1	20. 0. 0	13. 5	·1471	21. 37	·03328			
15. 9	19. 57. 0	13. 23	·1468	21. 43	·03340			
15. 12	55. 0	13. 27	·1464	22. 2	·03322			
15. 13	54. 0	13. 36	·1469	22. 11	·03330			
15. 18	54. 20	13. 40	·1466	22. 19	·03322			
15. 23	54. 0	13. 46	·1471	22. 28	·03330			
15. 28	55. 40	13. 52	·1465	22. 42	·03320			
15. 33	54. 5	13. 56	·1468	22. 48	·03327			
15. 39	55. 20	14. 3	·1461	22. 52	·03318			
15. 41	54. 55	14. 6	·1465	22. 57	·03320			
15. 49	56. 45	14. 12	·1460	23. 0	·03312			
15. 56	55. 40	14. 24	·1473	23. 6	·03312			
16. 0	56. 15	14. 27	·1470	23. 59	·03317			
16. 3	55. 50	14. 32	·1473					
16. 11	56. 30	14. 43	·1462					
16. 22	55. 0	14. 52	·1457					
16. 31	54. 50	14. 57	·1463					
16. 38	55. 10	15. 2	·1466					
16. 53	54. 25	15. 7	·1460					
17. 0	54. 40	15. 10	·1466					
17. 11	54. 40	15. 15	·1461					
17. 21	56. 20	15. 20	·1466					
17. 34	55. 0	15. 27	·1459					
17. 39	54. 30	15. 32	·1464					
17. 43	54. 25	15. 35	·1460					
17. 47	53. 40	15. 43	·1465					
17. 57	55. 50	15. 46	·1462					
18. 5	54. 40	15. 52	·1467					
18. 8	54. 10	15. 58	·1464					
18. 23	56. 40	16. 5	·1468					
18. 28	56. 0	16. 12	·1464					
18. 32	56. 45	16. 18	·1468					
18. 36	55. 35	16. 27	·1468					

For the Horizontal and Vertical Forces, increasing readings denote increasing forces.

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
Apr. 5		Apr. 5						
h m	° ′ ″	h m		h m		h m	°	°
18. 39	19. 56. 5	16. 33	·1465					
18. 44	54. 35	16. 42	·1467					
18. 48	55. 35	16. 47	·1464					
18. 52	53. 30	16. 55	·1469					
18. 58	54. 5	17. 0	·1465					
19. 0	53. 25	17. 5	·1468					
19. 13	53. 10	17. 8	·1464					
19. 20	51. 55	17. 12	·1466					
19. 26	53. 0	17. 23	·1463					
19. 37	53. 50	17. 26	·1466					
19. 47	52. 10	17. 29	·1464					
19. 52	53. 5	17. 41	·1465					
19. 58	52. 40	17. 46	·1468					
20. 12	53. 40	18. 2	·1466					
20. 17	52. 55	18. 16	·1470					
20. 21	54. 0	18. 22	·1464					
20. 24	52. 40	18. 30	·1467					
20. 30	53. 20	18. 44	·1468					
20. 36	51. 25	18. 57	·1464					
20. 38	52. 20	19. 7	·1467					
20. 40	50. 40	19. 15	·1463					
20. 43	52. 0	19. 23	·1469					
20. 48	51. 25	19. 40	·1466					
20. 52	54. 20	19. 53	·1461					
20. 59	54. 5	20. 3	·1466					
21. 2	55. 40	20. 7	·1462					
21. 12	54. 55	20. 12	·1466					
21. 22	54. 40	20. 17	·1459					
21. 29	53. 10	20. 21	·1464					
21. 32	54. 5	20. 25	·1459					
21. 36	53. 30	20. 29	·1461					
21. 41	56. 0	20. 32	·1456					
21. 48	56. 50	20. 36	·1460					
21. 58	57. 10	20. 39	·1455					
22. 0	56. 50	20. 46	·1461					
22. 4	58. 20	20. 53	·1465					
22. 9	57. 55	20. 57	·1456					
22. 13	58. 50	21. 0	·1459					
22. 19	19. 58. 25	21. 5	·1453					
22. 25	20. 0. 20	21. 15	·1447					
22. 38	0. 55	21. 20	·1449					
22. 42	0. 30	21. 25	·1442					
22. 46	1. 10	21. 31	·1444					
22. 50	0. 40	21. 33	·1440					
22. 53	1. 0	21. 40	·1444					
23. 3	0. 15	21. 53	·1444					
23. 10	0. 20	22. 2	·1437					
23. 15	0. 0	22. 15	·1444					
23. 26	20. 1. 20	22. 20	·1440					
23. 40	19. 59. 20	22. 25	·1446					
23. 49	19. 59. 0	22. 33	·1442					
23. 59	20. 0. 0	22. 39	·1439					
		22. 47	·1444					
		22. 50	·1440					
		22. 55	·1444					
		22. 59	·1441					
		23. 11	·1444					
		23. 30	·1452					

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
		Apr. 5						
h m	° ′ ″	h m		h m		h m	°	°
		23. 40	·1446					
		23. 59	·1460					
May 20		May 20		May 20		May 20		
0. 0	20. 12. 25	0. 0	·1489	0. 0	·03243	0. 0	63 ·8	64 ·8
0. 5	11. 20	0. 4	·1497	0. 9	·03273	1. 0	64 ·0	65 ·4
0. 10	14. 0	0. 7	·1485	0. 29	·03283	2. 0	65 ·0	66 ·7
0. 13	11. 15	0. 10	·1490	0. 40	·03360	3. 0	65 ·4	66 ·4
0. 17	12. 55	0. 14	·1486	0. 47	·03330	7. 0	65 ·7	67 ·8
0. 22	11. 15	0. 17	·1490	0. 58	·03400	8. 0	66 ·1	67 ·2
0. 26	5. 0	0. 20	·1475	1. 7	·03452	9. 0	65 ·4	66 ·2
0. 30	8. 50	0. 25	·1491	1. 32	·03490	10. 40	64 ·4	65 ·0
0. 40	10. 35	0. 27	·1476	1. 47	·03543	11. 30	64 ·7	65 ·3
0. 45	7. 0	0. 29	·1480	1. 56	·03566	21. 0	63 ·6	63 ·5
0. 51	11. 20	0. 34	·1439	2. 2	·03550	22. 0	63 ·9	64 ·2
0. 56	10. 50	0. 38	·1451	2. 5	·03563	23. 0	64 ·2	65 ·3
1. 3	15. 0	0. 41	·1455		(†)			
1. 7	14. 0	0. 47	·1492	3. 0	·04230*			
1. 8	15. 30	0. 50	·1485	3. 9	·04282			
1. 13	13. 50	0. 58	·1503	3. 16	·04322			
1. 17	14. 50	1. 6	·1511	3. 20	·04310			
1. 28	12. 0	1. 12	·1536	3. 25	·04322			
1. 39	14. 45	1. 14	·1524	3. 30	·04240			
1. 47	13. 55	1. 17	·1533	3. 32	·04250			
1. 50	15. 0	1. 20	·1524	3. 33	·04233			
1. 57	12. 35	1. 23	·1530	3. 41	·04302			
2. 5	13. 25	1. 28	·1521	3. 43	·04298			
	(†)	1. 32	·1519	3. 52	·04430			
3. 0	29. 2*	1. 42	·1535	4. 0	·04342			
3. 5	20. 0	1. 45	·1530	4. 7	·04373			
3. 11	15. 15	1. 55	·1548	4. 11	·04348			
3. 13	10. 20	1. 58	·1540	4. 20	·04387			
3. 18	12. 45	2. 1	·1542	4. 28	·04253			
3. 20	10. 0	2. 5	·1536	4. 30	·04260			
3. 23	12. 25		(†)	4. 31	·04233			
3. 28	10. 15	3. 0	·1649*	4. 33	·04250			
3. 31	15. 0	3. 5	·1645	4. 37	·04215			
3. 33	14. 25	3. 11	·1680	4. 38	·04230			
3. 40	20. 55	3. 12	·1662	4. 39	·04220			
3. 42	19. 50	3. 17	·1664	4. 48	·04330			
3. 48	26. 35	3. 20	·1649	4. 52	·04285			
3. 53	19. 20	3. 24	·1650	4. 58	·04363			
4. 1	29. 0	3. 31	1571.	5. 2	·04330			
4. 21	19. 5	3. 34	1601.	5. 3	·04342			
4. 27	20. 40	3. 37	·1586	5. 7	·04317			
4. 30	17. 35	3. 40	·1611	5. 11	·04340			
4. 37	24. 10	3. 44	·1625	5. 22	·04241			
4. 46	12. 25	3. 46	·1615	5. 23	·04243			
4. 53	22. 45	3. 48	·1626	5. 26	·04217			
4. 55	17. 15	3. 53	·1676	5. 27	·04226			
4. 58	19. 5	3. 55	·1684	5. 31	·04206			
5. 1	17. 15	3. 57	·1670	5. 35	·04218			
5. 7	21. 15	3. 59	·1687	5. 47	·04162			
5. 12	14. 25	4. 0	·1675	5. 50	·04144			
5. 19	18. 55	4. 1	·1678	5. 52	·04155			
5. 27	22. 55	4. 2	·1666	5. 54	·04100			
5. 32	16. 40	4. 5	·1662	5. 58	·04065			
5. 36	18. 10	4. 8	·1665	6. 2	·04060			

The indications are taken from the sheets of the Photographic Record, except where an asterisk is attached to the number, in which instances they are inferred from observations made with the telescope in the ancient manner. The Symbol *** denotes that the magnet has been generally in a state of agitation. The Symbol (†) denotes that the register has failed between the preceding and following readings. The Symbol : attached to a time denotes that the reading will apply equally well to a considerable range of time near that which is recorded. A brace denotes that at this time the curve of the Vertical Force was dislocated, and the difference of the numbers included by the brace shows the amount of the displacement.

May 20. The photographic registers for Declination, Horizontal Force, and Vertical Force were lost from $2^h. 5^m.$ to $3^h. 5^m.$ through the lights having been left cut off.

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
May 20		May 20		May 20				
h m	° ′ ″	h m		h m		h m	°	°
5.41	20. 14. 20	4.12	·1650	6. 3	·04063			
5.52	5. 0	4.16	·1640	6.11	·04004			
5.58	5. 55	4.19	·1648	6.31	·03950			
6. 2	4. 20	4.22	·1641	6.38	·03952			
6. 8	5. 50	4.24	·1630	6.52	·03896			
6.11	20. 3. 40	4.27	·1633	6.56	·03900			
6.18	19. 58. 20	4.32	·1598	7. 2	·03875			
6.24	19. 56. 25	4.34	·1600	7. 7	·03883			
6.40	20. 1. 15	4.35	·1591	7.18	·03860			
6.49	19. 58. 50	4.37	·1594	7.24	·03854			
6.58	20. 1. 55	4.40	·1584	7.40	·03820			
7. 2	1. 15	4.43	·1572	7.48	·03842			
7.10	3. 0	4.50	·1587	7.57	·03938			
7.20	20. 0. 15	4.53	·1598	8. 2	·03963			
7.33	19. 58. 25	4.58	·1590	8.10	·03873			
7.39	58. 55	5. 3	·1604	8.17	·03880			
7.46	56. 15	5. 5	·1593	8.28	·03803			
7.50	58. 0	5. 7	·1600	8.37	·03754			
8. 0	52. 0	5.10	·1602	9.16	·03653			
8.10	59. 20	5.17	·1563	9.20	·03658			
8.13	54. 0	5.20	·1570	9.32	·03608			
8.20	50. 25	5.23	·1562	9.39	·03617			
8.26	53. 5	5.26	·1577	9.42	·03602			
8.30	52. 20	5.29	·1571	9.57	·03598			
8.37	57. 0	5.30	·1567	10. 7	·03563			
8.38	56. 0	5.32	·1569	10.10	·03580			
8.40	57. 55	5.33	·1560	10.16	·03538			
8.43	55. 55	5.35	·1563	10.20	·03547			
8.51	58. 40	5.36	·1556	10.27	·03527			
9. 0	55. 45	5.40	·1565	10.32	·03544			
9. 3	57. 20	5.49	·1526	10.37	·03524			
9.10	19. 56. 15	5.57	·1507	10.52	·03520			
9.22	20. 0. 15	6. 1	·1517	11. 0	·03538			
9.30	19. 56. 40	6. 8	·1489	11.17	·03520			
9.36	58. 45	6.19	·1462	11.26	·03500			
9.42	56. 30	6.27	·1466	11.42	·03488			
9.49	57. 45	6.38	·1484	11.47	·03491			
10. 3	19. 59. 5	6.48	·1461	11.50	·03485			
10. 9	20. 2. 10	6.53	·1475	11.57	·03494			
10.18	19. 59. 0	6.57	·1480	12. 3	·03473			
10.24	57. 20	7. 2	·1464	12.12	·03480			
10.28	58. 0	7. 8	·1478	12.17	·03474			
10.32	57. 0	7.16	·1468	12.22	·03482			
10.40	57. 10	7.23	·1459	12.32	·03463			
10.49	54. 10	7.27	·1464	12.33	·03463			
10.54	56. 0	7.30	·1460	12.42	·03424			
11. 3	55. 0	7.33	·1464	12.48	·03421			
11.11	55. 55	7.35	·1458	12.51	·03436			
11.35	48. 20	7.37	·1469	12.55	·03392			
11.43	50. 15	7.39	·1464	12.59	·03403			
11.49	50. 0	7.52	·1501	13. 1	·03390			
11.56	51. 35	7.57	·1494	13. 8	·03400			
12. 1	51. 0	8. 1	·1506	13.12	·03374			
12. 4	49. 40	8. 5	·1500	13.21	·03384			
12.11	50. 55	8. 7	·1503	13.24	·03375			
12.18	49. 25	8.17	·1474	13.33	·03379			
12.23	53. 0	8.23	·1479	13.40	·03366			
12.29	52. 25	8.29	·1470	13.49	·03345			

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
May 20		May 20		May 20				
h m	° ′ ″	h m		h m		h m	°	°
12.34	19. 56. 30	8.32	·1462	14. 2	·03348			
12.40	53. 50	8.35	·1470	14. 6	·03355			
12.46	19. 52. 55	8.40	·1460	14. 9	·03323			
12.48	20. 1. 15	8.48	·1462	14.11	·03332			
12.50	19. 48. 0	8.54	·1460	14.13	·03320			
12.54	55. 0	8.57	·1453	14.18	·03340			
13. 0	49. 55	9. 4	·1449	14.24	·03350			
13. 3	51. 35	9.14	·1451	14.31	·03326			
13.13	48. 30	9.23	·1463	14.42	·03319			
13.20	49. 50	9.32	·1456	14.47	·03306			
13.24	48. 5	9.36	·1458	14.59	·03310			
13.28	49. 15	9.42	·1452	15.19	·03300			
13.37	48. 50	9.48	·1457	15.51	·03328			
13.47	50. 20	9.58	·1463	16. 0	·03320			
14. 1	50. 0	10. 5	·1454	16.17	·03320			
14.11	45. 15	10.12	·1473	16.22	·03307			
14.23	51. 25	10.17	·1459	16.40	·03298			
14.28	49. 40	10.21	·1468	16.47	·03287			
14.29	50. 0	10.26	·1451	17. 2	·03292			
14.37	48. 25	10.30	·1459	17.17	·03291			
14.40	49. 0	10.33	·1473	17.32	·03280			
14.47	47. 0	10.37	·1464	17.49	·03282			
14.50	48. 0	10.42	·1473	18.12	·03292			
14.54	48. 25	10.45	·1471	18.26	·03287			
15. 7	46. 0	10.50	·1464	18.32	·03290			
15.20	45. 25	10.52	·1456	19. 0	·03297			
15.44	50. 10	10.54	·1460	19.12	·03302			
16. 3	48. 20	10.57	·1458	19.17	·03298			
16. 9	48. 40	11. 0	·1468	19.39	·03300			
16.13	48. 5	11. 2	·1465	19.50	·03307			
16.18	49. 0	11. 5	·1472	20. 2	·03298			
16.22	47. 55	11. 8	·1466	20.17	·03296			
16.41	47. 0	11.13	·1476	20.48	·03281			
16.50	45. 50	11.15	·1472	21.20	·03287			
17. 4	48. 10	11.19	·1477	21.42	·03295			
17. 9	48. 0	11.23	·1471	21.47	·03294			
17.15	49. 10	11.31	·1464	22. 8	·03292			
17.23	48. 55	11.36	·1460	22.12	·03298			
17.28	49. 30	11.40	·1462	22.28	·03293			
17.32	49. 10	11.44	·1456	22.41	·03307			
17.40	50. 10	11.49	·1457	22.57	·03308			
17.50	49. 30	11.55	·1448	23.30	·03337			
18.12	51. 40	12. 2	·1458	23.38	·03326			
18.16	50. 55	12. 4	·1450	23.56	·03350			
18.19	51. 15	12. 8	·1446	23.59	·03350			
18.26	49. 55	12.16	·1450					
18.30	50. 25	12.20	·1446					
18.37	49. 10	12.24	·1453					
18.43	49. 45	12.27	·1461					
18.56	49. 25	12.33	·1452					
19. 0	49. 0	12.35	·1458					
19. 7	50. 40	12.40	·1460					
19.16	48. 20	12.45	·1449					
19.27	48. 0	12.49	·1453					
19.30	48. 30	12.52	·1471					
19.32	47. 30	12.54	·1457					
19.38	48. 45	12.58	·1463					
19.42	48. 45	13. 1	·1453					

For the Horizontal and Vertical Forces, increasing readings denote increasing forces.

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Of V. F. Magnet.
May 20		May 20						
h m	° ′ ″	h m		h m		h m	°	°
19. 48	19. 50. 0	13. 3	·1457					
20. 6	48. 55	13. 6	·1453					
20. 17	50. 5	13. 13	·1459					
20. 32	50. 20	13. 17	·1452					
20. 38	51. 15	13. 25	·1460					
20. 50	50. 55	13. 27	·1453					
20. 59	51. 35	13. 33	·1459					
21. 22	51. 55	13. 38	·1455					
21. 42	53. 15	13. 45	·1457					
21. 52	52. 45	13. 52	·1446					
22. 2	53. 45	13. 55	·1449					
22. 10	53. 20	13. 59	·1445					
22. 19	53. 45	14. 0	·1448					
22. 23	55. 0	14. 4	·1447					
22. 34	55. 0	14. 6	·1463					
22. 49	57. 25	14. 12	·1455					
22. 51	57. 5	14. 15	·1444					
22. 59	58. 5	14. 19	·1454					
23. 30	59. 5	14. 22	·1451					
23. 43	19. 57. 55	14. 26	·1458					
23. 59	20. 1. 5	14. 31	·1449					
		14. 39	·1447					
		14. 43	·1452					
		14. 48	·1445					
		14. 57	·1450					
		15. 3	·1448					
		15. 12	·1450					
		15. 17	·1453					
		15. 21	·1450					
		15. 32	·1450					
		15. 37	·1454					
		15. 41	·1451					
		15. 45	·1454					
		15. 53	·1451					
		15. 57	·1454					
		16. 6	·1450					
		16. 17	·1447					
		16. 22	·1450					
		16. 27	·1446					
		16. 33	·1449					
		16. 45	·1447					
		16. 49	·1443					
		16. 59	·1445					
		17. 5	·1448					
		17. 14	·1444					
		17. 21	·1449					
		17. 28	·1445					
		17. 35	·1448					
		17. 37	·1446					
		17. 40	·1449					
		17. 45	·1447					
		18. 2	·1449					
		18. 16	·1454					
		18. 21	·1450					
		18. 25	·1453					
		18. 35	·1452					
		18. 41	·1449					
		19. 1	·1453					

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Of V. F. Magnet.
		May 20						
h m	° ′ ″	h m		h m		h m	°	°
		19. 3	·1449					
		19. 7	·1454					
		19. 11	·1449					
		19. 16	·1451					
		19. 19	·1447					
		19. 31	·1448					
		19. 35	·1444					
		19. 39	·1447					
		19. 45	·1446					
		20. 0	·1446					
		20. 10	·1440					
		20. 35	·1439					
		20. 45	·1434					
		20. 54	·1437					
		21. 3	·1434					
		21. 15	·1435					
		21. 21	·1433					
		21. 25	·1436					
		21. 30	·1434					
		21. 34	·1438					
		21. 37	·1433					
		21. 42	·1437					
		21. 47	·1433					
		22. 0	·1434					
		22. 8	·1428					
		22. 16	·1430					
		22. 30	·1432					
		22. 34	·1428					
		22. 40	·1430					
		22. 52	·1442					
		23. 13	·1432					
		23. 23	·1435					
		23. 38	·1419					
			(†)					
		23. 52	·1419					
		23. 59	·1426					
Aug. 19		Aug. 19		Aug. 19		Aug. 19		
11. 0	19. 49. 0	11. 0	·1502	11. 0	·02912	0. 0	66·4	66·0
11. 20	19. 48. 55	11. 4	·1499	11. 5	·02915	1. 0	66·7	66·7
11. 37	20. 1. 0	11. 7	·1502	11. 13	·02922	3. 0	67·0	66·7
11. 56	19. 50. 0	11. 12	·1495	11. 27	·02906	9. 0	66·0	65·5
12. 2	50. 0	11. 17	·1500	11. 33	·02863	21. 0	64·8	64·1
12. 12	51. 50	11. 23	·1497	11. 40	·02852	22. 0	64·9	64·2
12. 21	50. 55	11. 30	·1504	11. 47	·02850	23. 0	66·0	65·2
12. 27	50. 55	11. 42	·1509	11. 48	·02843			
12. 33	50. 0	11. 49	·1518	11. 58	·02846			
12. 39	54. 40	11. 53	·1514	12. 2	·02835			
12. 41	53. 20	11. 59	·1518	12. 20	·02816			
12. 46	53. 55	12. 7	·1509	12. 27	·02813			
12. 56	48. 25	12. 15	·1512	12. 30	·02846			
13. 0	50. 10	12. 29	·1499	12. 32	·02818			
13. 10	46. 20	12. 31	·1519	12. 42	·02793			
13. 20	42. 15	12. 33	·1537	12. 51	·02818			
13. 27	44. 55	12. 35	·1522	12. 56	·02802			
13. 29	44. 25	12. 38	·1525	12. 59	·02803			
13. 32	47. 50	12. 46	·1491	13. 2	·02807			

The indications are taken from the sheets of the Photographic Record, except where an asterisk is attached to the number, in which instances they are inferred from observations made with the telescope in the ancient manner. The Symbol *** denotes that the magnet has been generally in a state of agitation. The Symbol (†) denotes that the register has failed between the preceding and following readings. The Symbol : attached to a time denotes that the reading will apply equally well to a considerable range of time near that which is recorded. A brace denotes that at this time the curve of the Vertical Force was dislocated, and the difference of the numbers included by the brace shows the amount of the displacement.

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
Aug. 19 h m	° ′ ″	Aug. 19 h m		Aug. 19 h m		h m	°	°
13. 37	19. 47. 25	12. 54	·1508	13. 8	·02794			
13. 41	49. 20	13. 3	·1497	13. 16	·02806			
13. 52	54. 40	13. 9	·1503	13. 18	·02796			
13. 57	54. 0	13. 15	·1493	13. 20	·02800			
14. 5	56. 40	13. 21	·1504	13. 26	·02760			
14. 12	52. 5	13. 27	·1523	13. 41	·02716			
14. 18	50. 30	13. 33	·1526	13. 52	·02662			
14. 23	45. 20	13. 36	·1533	13. 59	·02658			
14. 30	43. 25	13. 43	·1534	14. 13	·02582			
14. 48	54. 50	13. 47	·1543	14. 20	·02597			
14. 55	56. 15	13. 50	·1533	14. 28	·02640			
14. 59	55. 25	13. 58	·1493	14. 31	·02662			
15. 6	19. 58. 40	14. 3	·1497	14. 38	·02657			
15. 11	20. 6. 30	14. 9	·1484	14. 50	·02620			
15. 28	19. 57. 50	14. 12	·1482	15. 2	·02642			
15. 34	56. 5	14. 16	·1470	15. 10	·02583			
15. 40	52. 10	14. 18	·1472	15. 18	·02580			
15. 50	48. 0	14. 20	·1466	15. 26	·02536			
15. 57	50. 0	14. 27	·1476	15. 32	·02498			
16. 2	48. 55	14. 31	·1471	15. 39	·02500			
16. 8	52. 50	14. 33	·1478	15. 42	·02500			
16. 12	47. 55	14. 37	·1473	15. 51	·02546			
16. 22	42. 15	14. 40	·1479	15. 58	·02542			
16. 28	45. 35	14. 50	·1455	16. 7	·02563			
16. 33	43. 45	14. 57	·1462	16. 11	·02550			
16. 37	45. 10	15. 1	·1459	16. 13	·02560			
16. 40	44. 15	15. 3	·1465	16. 17	·02552			
16. 45	46. 40	15. 6	·1458	16. 28	·02604			
16. 50	44. 55	15. 15	·1476	16. 41	·02659			
16. 52	49. 15	15. 21	·1473	16. 48	·02666			
16. 54	51. 10	15. 28	·1481	16. 51	·02684			
17. 1	46. 0	15. 32	·1477	16. 58	·02675			
17. 10	47. 40	15. 37	·1486	17. 2	·02685			
17. 17	43. 50	15. 45	·1493	17. 10	·02678			
17. 20	46. 0	15. 51	·1504	17. 16	·02698			
17. 23	41. 5	15. 55	·1500	17. 18	·02686			
17. 27	42. 55	15. 58	·1494	17. 22	·02698			
17. 30	41. 20	16. 3	·1498	17. 33	·02719			
17. 38	40. 50	16. 7	·1484	17. 41	·02738			
17. 42	39. 50	16. 10	·1495	17. 43	·02728			
17. 45	43. 30	16. 14	·1474	18. 8	·02742			
18. 0	39. 40	16. 16	·1488	18. 10	·02733			
18. 13	46. 55	16. 20	·1478	18. 31	·02735			
18. 19	45. 0	16. 21	·1492	18. 35	·02723			
18. 22	46. 15	16. 25	·1483	18. 38	·02734			
18. 28	45. 55	16. 26	·1491	18. 42	·02722			
18. 32	49. 10	16. 28	·1484	18. 48	·02734			
18. 33	47. 0	16. 30	·1491	18. 51	·02723			
18. 37	50. 55	16. 31	·1479	19. 12	·02821			
18. 42	48. 20	16. 34	·1491	19. 24	·02702			
18. 49	52. 25	16. 36	·1502	19. 32	·02703			
18. 52	50. 50	16. 37	·1484	19. 40	·02712			
18. 58	53. 30	16. 42	·1497	20. 0	·02715			
18. 59	52. 55	16. 45	·1484	20. 10	·02725			
19. 1	55. 0	16. 47	·1499	20. 17	·02722			
19. 4	54. 35	16. 49	·1493	20. 21	·02726			
19. 7	56. 35	16. 55	·1480	20. 56	·02730			
19. 9	56. 0	17. 0	·1485	21. 40	·02714			

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
Aug. 19 h m	° ′ ″	Aug. 19 h m		Aug. 19 h m		h m	°	°
19. 17	19. 58. 45	17. 4	·1474	21. 43	·02683			
19. 21	59. 5	17. 7	·1460	21. 47	·02703			
19. 32	55. 10	17. 12	·1470	21. 51	·02685			
19. 38	54. 50	17. 17	·1455	21. 52	·02697			
19. 44	52. 30	17. 21	·1468	21. 58	·02717			
19. 51	54. 25	17. 23	·1453	22. 40	·02732			
19. 58	53. 50	17. 25	·1458	22. 46	·02722			
20. 2	51. 45	17. 28	·1453	22. 48	·02736			
20. 5	52. 5	17. 29	·1457	22. 52	·02723			
20. 12	49. 25	17. 34	·1451	23. 0	·02740			
20. 21	51. 10	17. 35	·1464	23. 24	·02762			
20. 28	50. 45	17. 39	·1458	23. 42	·02787			
20. 32	51. 30	17. 42	·1446	23. 50	·02793			
20. 39	50. 0	17. 53	·1451	23. 59	·02797			
20. 48	50. 0	18. 0	·1461					
20. 49	50. 40	18. 4	·1476					
21. 3	47. 50		***					
21. 12	50. 15	18. 11	·1464					
21. 30	51. 5	18. 16	·1469					
21. 37	48. 15	18. 17	·1461					
21. 43	42. 5	18. 20	·1470					
21. 48	51. 10	18. 23	·1461					
21. 50	49. 15	18. 25	·1471					
21. 52	53. 5	18. 27	·1459					
21. 53	52. 0	18. 29	·1471					
22. 2	56. 30	18. 31	·1467					
22. 10	55. 20	18. 33	·1459					
22. 15	56. 10	18. 34	·1464					
22. 37	57. 35	18. 37	·1456					
22. 42	58. 50	18. 38	·1448					
22. 49	19. 58. 0	18. 40	·1454					
22. 52	20. 0. 0	18. 41	·1442					
23. 0	19. 58. 30	18. 44	·1454					
23. 7	20. 0. 40	18. 50	·1446					
23. 12	19. 59. 15	18. 57	·1456					
23. 18	20. 0. 35	19. 5	·1450					
23. 40	1. 55	19. 9	·1452					
23. 41	1. 20	19. 17	·1445					
23. 46	2. 0	19. 27	·1450					
23. 52	2. 5	19. 37	·1462					
23. 57	1. 0	19. 46	·1456					
23. 59	1. 50	19. 57	·1452					
		20. 17	·1462					
		20. 30	·1464					
		20. 49	·1452					
		20. 59	·1457					
		21. 3	·1462					
		21. 8	·1470					
		21. 15	·1465					
		21. 25	·1466					
		21. 29	·1460					
		21. 34	·1455					
		21. 37	·1466					
		21. 41	·1431					
		21. 44	·1471					
		21. 47	·1486					
		21. 50	·1466					
		21. 52	·1446					

For the Horizontal and Vertical Forces, increasing readings denote increasing forces.

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Of V. F. Magnet.
h m	° ′ ″	Aug. 19 h m		h m		h m	°	°
		21. 56	·1452					
		21. 59	·1448					
		22. 9	·1456					
		22. 17	·1457					
		22. 37	·1466					
		22. 41	·1474					
		22. 45	·1469					
		22. 48	·1486					
		22. 52	·1470					
		22. 58	·1474					
		23. 2	·1483					
		23. 6	·1469					
		23. 10	·1476					
		23. 17	·1470					
		23. 19	·1476					
		23. 23	·1473					
		23. 36	·1482					
		23. 40	·1475					
		23. 44	·1482					
		23. 49	·1488					
		23. 50	·1479					
		23. 53	·1487					
		23. 57	·1475					
		23. 59	·1480					
Aug. 20		Aug. 20		Aug. 20		Aug. 20		
0. 0	20. 1. 55	0. 0	·1480	0. 0	·02792	0. 0	66·4	65·9
0. 7	1. 0	0. 2	·1485	0. 7	·02803	1. 0	66·4	66·1
0. 13	1. 50	0. 5	·1479	0. 9	·02803	3. 0	66·6	67·4
0. 20	0. 10	0. 12	·1482	0. 18	·02817	9. 0	65·2	64·8
0. 26	1. 5	0. 17	·1487	0. 22	·02807	22. 0	64·0	63·3
0. 37	20. 0. 20	0. 19	·1472	0. 30	·02830			
0. 40	19. 59. 40	0. 23	·1480	0. 38	·02825			
0. 47	20 1. 5	0. 29	·1487	0. 40	·02835			
0. 52	19. 59. 55	0. 35	·1492	0. 42	·02824			
0. 55	20. 0. 20	0. 37	·1482	0. 47	·02840			
0. 58	19. 59. 35	0. 38	·1490	0. 52	·02835			
1. 16	20. 1. 25	0. 41	·1479	0. 57	·02840			
1. 38	19. 58. 20	0. 42	·1491	1. 2	·02835			
1. 43	59. 20	0. 46	·1497	1. 6	·02848			
1. 52	59. 0	0. 51	·1489	1. 9	·02842			
2. 1	59. 20	0. 53	·1496	1. 12	·02857			
2. 10	58. 40	0. 58	·1484	1. 17	·02848			
2. 22	58. 0	1. 4	·1503	1. 19	·02856			
2. 32	58. 20	1. 7	·1491	1. 22	·02842			
2. 46	55. 0	1. 10	·1508	1. 23	·02850			
3. 3	56. 5	1. 13	·1496	1. 30	·02842			
3. 9	55. 55	1. 16	·1504	1. 42	·02863			
3. 16	57. 20	1. 19	·1489	1. 46	·02859			
3. 37	54. 0	*1. 21	·1495	1. 49	·02870			
3. 43	53. 5	1. 28	·1481	1. 52	·02863			
3. 50	53. 20	1. 35	·1484	1. 57	·02872			
3. 57	52. 0	1. 40	·1495	2. 0	·02870			
4. 18	51. 0	1. 44	·1489	2. 1	·02876			
4. 27	49. 50	1. 47	·1502	2. 4	·02870			
4. 32	50. 40	1. 51	·1493	2. 22	·02881			
4. 48	48. 50	1. 54	·1501	2. 37	·02894			
4. 55	50. 0	1. 57	·1493	2. 42	·02880			

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Of V. F. Magnet.
Aug. 20 h m	° ′ ″	Aug. 20 h m		Aug. 20 h m		h m	°	°
5. 0	19. 49. 30	2. 1	·1502	3. 2	·02915			
5. 18	53. 0	2. 2	·1492	3. 32	·02917			
5. 24	52. 55	2. 4	·1495	3. 40	·02908			
5. 33	52. 5	2. 6	·1487	3. 50	·02917			
5. 54	52. 40	2. 9	·1493	3. 53	·02914			
6. 8	52. 10	2. 13	·1489	4. 0	·02918			
6. 12	52. 5	2. 16	·1494	4. 2	·02915			
6. 17	52. 55	2. 18	·1487	4. 12	·02922			
6. 22	52. 0	2. 34	·1498	4. 22	·02913			
6. 36	53. 5	2. 36	·1492	4. 30	·02920			
6. 43	52. 10	2. 40	·1480	4. 37	·02910			
6. 49	52. 30	2. 43	·1475	4. 42	·02913			
6. 57	48. 55	2. 49	·1481	4. 49	·02922			
7. 2	47. 0	2. 56	·1489	5. 7	·02925			
7. 7	48. 0	3. 1	·1497	5. 10	·02940			
7. 17	47. 20	3. 5	·1489	5. 18	·02933			
7. 22	48. 40	3. 14	·1498	5. 21	·02936			
7. 28	47. 55	3. 20	·1483	5. 28	·02930			
7. 30	49. 0	3. 27	·1491	5. 32	·02933			
7. 37	49. 55	3. 37	·1484	5. 38	·02930			
7. 42	49. 0	3. 41	·1491	5. 49	·02940			
7. 53	51. 0	3. 44	·1486	5. 58	·02936			
8. 8	54. 10	3. 47	·1493	6. 2	·02939			
8. 22	51. 0	3. 50	·1485	6. 9	·02939			
8. 30	50. 0	3. 58	·1492	6. 18	·02972			
8. 33	50. 30	4. 2	·1486	6. 21	·02968			
8. 38	50. 0	4. 5	·1491	6. 22	·02975			
8. 42	50. 55	4. 12	·1496	6. 30	·02960			
8. 48	49. 5	4. 21	·1486	6. 38	·02967			
8. 57	47. 45	4. 27	·1491	6. 47	·02958			
9. 3	51. 30	4. 32	·1487	6. 50	·02965			
9. 12	51. 30	4. 33	·1480	6. 56	·02955			
9. 28	48. 5	4. 38	·1481	7. 0	·02970			
9. 33	48. 20	4. 41	·1476	7. 7	·02980			
9. 41	44. 50	4. 45	·1486	7. 13	·02970			
9. 48	45. 55	5. 0	·1492	7. 20	·02980			
9. 53	42. 0	5. 6	·1509	7. 26	·02977			
9. 58	43. 0	5. 13	·1497	7. 36	·02987			
10. 2	37. 30	5. 16	·1500	7. 42	·02974			
10. 12	29. 5	5. 24	·1486	8. 5	·02950			
10. 34	42. 0	5. 30	·1489	8. 12	·02933			
10. 44	37. 20	5. 34	·1484	8. 25	·02914			
10. 57	42. 55	5. 42	·1486	8. 42	·02907			
11. 0	37. 20	5. 46	·1492	8. 51	·02899			
11. 9	34. 20	5. 51	·1487	9. 3	·02877			
11. 13	30. 5	5. 54	·1481	9. 22	·02850			
11. 20	31. 20	5. 57	·1475	9. 28	·02848			
11. 27	34. 20	5. 59	·1482	9. 52	·02790			
11. 30	33. 15	6. 5	·1485	†9. 57	·02798			
11. 38	36. 55	6. 15	·1516	10. 6	·02780			
11. 42	44. 5	6. 21	·1521	10. 22	·02727			
11. 47	19. 48. 35	6. 28	·1490	10. 28	·02720			
11. 50	20. 0. 40	6. 34	·1481	10. 37	·02660			
11. 53	2. 0	6. 36	·1473	10. 42	·02608			
12. 0	15. 5	6. 39	·1476	10. 47	·02625			
12. 11	2. 5	6. 41	·1467	10. 51	·02634			
12. 18	20. 1. 50	6. 48	·1476	10. 52	·02613			
12. 22	19. 46. 40	6. 53	·1466	10. 57	·02630			

The indications are taken from the sheets of the Photographic Record, except where an asterisk is attached to the number, in which instances they are inferred from observations made with the telescope in the ancient manner. The Symbol *** denotes that the magnet has been generally in a state of agitation. The Symbol (†) denotes that the register has failed between the preceding and following readings. The Symbol ; attached to a time denotes that the reading will apply equally well to a considerable range of time near that which is recorded. A brace denotes that at this time the curve of the Vertical Force was dislocated, and the difference of the numbers included by the brace shows the amount of the displacement.

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers.	
							Of H. F. Magnet.	Of V. F. Magnet.
Aug. 20		Aug. 20		Aug. 20				
h m	° ′ ″	h m		h m		h m	°	°
12. 34	19. 58. 0	6. 59	·1474	11. 2	·02540			
12. 40	59. 40	7. 4	·1486	11. 3	·02557			
12. 50	35. 25	7. 10	·1481	11. 12	·02430			
12. 55	30. 0	7. 19	·1491	11. 16	·02440			
13. 3	36. 20	7. 22	·1485	11. 17	·02420			
13. 9	53. 40	7. 34	·1496	11. 20	·02400			
13. 11	48. 15	7. 39	·1486	11. 23	·02420			
13. 13	43. 10	7. 42	·1491	11. 27	·02398			
13. 21	22. 25	7. 44	·1485	11. 32	·02360			
13. 28	20. 30	8. 0	·1502	11. 40	·02458			
13. 36	24. 30	8. 8	·1495	11. 41	·02462			
13. 42	22. 20	8. 19	·1492	11. 47	·02480			
13. 48	27. 50	8. 23	·1487	11. 49	·02482			
13. 52	32. 40	8. 29	·1491	11. 54	·02433			
14. 2	39. 10	8. 32	·1484		(†)			
14. 10	38. 55	8. 39	·1491	13. 50	·02440			
14. 14	40. 15	8. 43	·1488	14. 0	·02527			
14. 20	46. 5	8. 48	·1494	14. 6	·02543			
14. 22	19. 54. 50	9. 0	·1499	14. 10	·02540			
14. 33	20. 5. 5	9. 2	·1494	14. 18	·02564			
14. 48	19. 53. 0	9. 9	·1486	14. 25	·02540			
14. 52	46. 10	9. 13	·1490	14. 33	·02496			
14. 57	47. 0	9. 16	·1485	14. 41	·02490			
15. 0	43. 20	9. 22	·1495	14. 47	·02444			
15. 5	46. 0	9. 29	·1498	14. 50	·02435			
15. 10	45. 15	9. 34	·1488	14. 52	·02437			
15. 18	47. 0	9. 37	·1493	14. 57	·02426			
15. 22	45. 45	9. 40	·1488	15. 2	·02452			
15. 28	45. 20	9. 42	·1490	15. 11	·02550			
15. 33	47. 20	9. 49	·1469	15. 13	·02565			
15. 42	48. 0	9. 52	·1482	15. 21	·02607			
15. 49	47. 45	9. 57	·1492	15. 38	·02678			
15. 59	48. 55	10. 1	·1481	15. 52	·02704			
16. 8	47. 40	10. 9	·1490	16. 0	·02720			
16. 13	50. 25	10. 16	·1507	16. 2	·02717			
16. 15	54. 40	10. 20	·1509	16. 9	·02724			
16. 19	48. 0	10. 23	·1520	16. 20	·02726			
16. 23	46. 25	10. 32	·1504	16. 27	·02740			
16. 28	50. 30	10. 37	·1484	16. 31	·02700			
16. 33	48. 0	10. 40	·1477	16. 40	·02713			
16. 37	50. 50	10. 49	·1514	16. 42	·02702			
16. 41	48. 20	10. 52	·1501	16. 47	·02710			
16. 45	50. 40	10. 56	·1535	16. 50	·02701			
16. 49	46. 55	11. 0	·1477	16. 56	·02703			
16. 52	45. 15	11. 2	·1493	17. 0	·02690			
16. 58	49. 25	11. 5	·1502	17. 7	·02700			
17. 1	43. 5	11. 11	·1452	17. 10	·02694			
17. 4	45. 0	11. 13	·1457	17. 26	·02695			
17. 10	45. 30	11. 19	·1439	17. 30	·02684			
17. 18	48. 50	11. 23	·1450	17. 31	·02687			
17. 23	52. 5	11. 31	·1390	17. 39	·02664			
17. 27	51. 55	11. 49	·1439	17. 42	·02665			
17. 32	54. 15	11. 55	·1429	17. 51	·02623			
17. 38	51. 50	12. 1	·1459	18. 1	·02647			
17. 43	54. 0	12. 11	·1376	18. 7	·02634			
17. 51	58. 0	12. 20	·1416	18. 9	·02638			
17. 59	57. 0	12. 30	·1489	18. 16	·02604			
18. 0	55. 45	12. 33	·1479	18. 18	·02613			

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers.	
							Of H. F. Magnet.	Of V. F. Magnet.
Aug. 20		Aug. 20		Aug. 20				
h m	° ′ ″	h m		h m		h m	°	°
18. 6	19. 59. 30	12. 37	·1493	18. 22	·02600			
18. 10	56. 35	12. 40	·1500	18. 31	·02609			
18. 19	50. 30	12. 45	·1475	18. 37	·02632			
18. 28	56. 0	12. 48	·1491	18. 47	·02613			
18. 40	51. 10	12. 51	·1479	18. 56	·02628			
18. 48	56. 0	12. 53	·1498	18. 59	·02620			
18. 57	51. 45	12. 58	·1506	19. 2	·02623			
19. 4	55. 50	13. 4	·1537	19. 4	·02620			
19. 10	54. 55	13. 6	·1525	19. 11	·02636			
19. 12	55. 0	13. 10	·1543	19. 19	·02627			
19. 22	55. 10	13. 15	·1468	19. 27	·02640			
19. 37	50. 0	13. 20	·1448	19. 42	·02660			
19. 51	52. 0	13. 29	·1415	20. 0	·02707			
20. 4	49. 40	13. 33	·1420	20. 17	·02713			
20. 12	50. 30	13. 42	·1373	20. 22	·02704			
20. 22	49. 0	14. 1	·1422	20. 30	·02712			
20. 30	49. 25	14. 5	·1418	20. 32	·02720			
20. 34	51. 0	14. 17	·1440	20. 38	·02713			
20. 40	49. 20	14. 27	·1415	20. 42	·02722			
20. 42	50. 20	14. 39	·1452	20. 56	·02715			
20. 51	48. 20	14. 43	·1454	21. 7	·02728			
21. 2	50. 20	14. 45	·1448	21. 20	·02720			
21. 8	51. 5	14. 49	·1454	21. 38	·02738			
21. 11	51. 40	14. 51	·1442	21. 56	·02723			
21. 17	50. 15	14. 57	·1453	22. 9	·02734			
21. 23	50. 25	15. 0	·1442	22. 17	·02727			
21. 28	50. 5	15. 7	·1455	22. 32	·02738			
21. 42	51. 30	15. 11	·1447	22. 39	·02737			
21. 57	54. 50	15. 19	·1453	22. 47	·02740			
22. 3	55. 45	15. 24	·1447	23. 0	·02740			
22. 30	56. 40	15. 32	·1454	23. 20	·02761			
22. 40	55. 25	15. 35	·1450	23. 28	·02782			
22. 50	57. 0	15. 39	·1455	23. 48	·02816			
23. 22	56. 40	15. 41	·1449	23. 51	·02803			
23. 30	56. 30	15. 43	·1455	23. 59	·02824			
23. 33	58. 0	15. 47	·1449					
23. 38	57. 15	15. 52	·1455					
23. 41	57. 55	15. 57	·1450					
23. 48	57. 55	16. 10	·1457					
23. 52	55. 15	16. 19	·1481					
23. 57	57. 30	16. 21	·1439					
23. 59	57. 0	16. 29	·1451					
		16. 33	·1453					
		16. 36	·1442					
		16. 40	·1456					
		16. 44	·1448					
		16. 49	·1457					
		16. 51	·1444					
		16. 59	·1450					
		17. 4	·1439					
		17. 9	·1451					
		17. 18	·1460					
		17. 21	·1454					
		17. 25	·1460					
		17. 29	·1446					
		17. 34	·1450					
		17. 44	·1421					
		17. 51	·1432					
			(†)					

For the Horizontal and Vertical Forces, increasing readings denote increasing forces.

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Of V. F. Magnet.
		Aug. 20						
h m	° ′ ″	h m		h m		h m	°	°
		19. 17	·1428					
		19. 20	·1418					
		19. 23	·1426					
		19. 25	·1420					
		19. 32	·1419					
		19. 39	·1431					
		19. 46	·1438					
		19. 50	·1442					
		20. 0	·1434					
		20. 9	·1441					
		20. 14	·1434					
		20. 19	·1439					
		20. 24	·1444					
		20. 29	·1439					
		20. 34	·1444					
		20. 43	·1431					
		20. 47	·1434					
		20. 50	·1429					
		21. 0	·1438					
		21. 7	·1434					
		21. 10	·1439					
		21. 17	·1434					
		21. 22	·1440					
		21. 30	·1441					
		21. 35	·1445					
		21. 40	·1440					
		21. 48	·1444					
		22. 5	·1439					
		22. 19	·1424					
		22. 29	·1426					
		22. 38	·1418					
		22. 52	·1428					
		23. 2	·1423					
		23. 7	·1432					
		23. 13	·1425					
		23. 22	·1442					
		23. 41	·1453					
		23. 45	·1444					
		23. 47	·1449					
		23. 49	·1441					
		23. 53	·1440					
		23. 59	·1446					
Sept. 3		Sept. 3		Sept. 3		Sept. 3		
0. 0	19. 56. 40	0. 0	·1464	0. 0	·02880	0. 0	66 ·5	66 ·2
0. 5	19. 57. 25	0. 40	·1470	0. 51	·02886	1. 0	67 ·0	66 ·7
1. 13	20. 0. 25	1. 5	·1472	1. 48	·02927	2. 0	65 ·2	65 ·7
1. 20	0. 10		(†)	3. 18	·02902	3. 0	66 ·4	65 ·7
1. 37	1. 0	1. 43	·1484	4. 17	·02918	9. 0	66 ·4	65 ·6
1. 48	2. 25	1. 56	·1484	4. 20	·02950	21. 0	65 ·1	63 ·9
2. 10	0. 55	2. 2	·1478	4. 42	·02954	23. 0	65 ·3	64 ·1
2. 30	20. 0. 15	2. 34	·1478	4. 56	·02977			
2. 52	19. 58. 55	2. 40	·1472	5. 21	·02990			
2. 55	59. 5	2. 50	·1476	5. 34	·03042			
3. 21	57. 15	2. 54	·1472	5. 38	·03035			
3. 28	57. 15	3. 4	·1477	5. 41	·03052			
3. 36	56. 25	3. 16	·1477	5. 47	·03025			
3. 49	55. 55	3. 29	·1482	5. 49	·03039			

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Of V. F. Magnet.
Sept. 3		Sept. 3		Sept. 3				
h m	° ′ ″	h m		h m		h m	°	°
3. 55	19. 55. 20	3. 34	·1481	5. 51	·03026			
4. 13	54. 5	3. 49	·1488	6. 2	·03066			
4. 20	58. 50	3. 52	·1485	6. 8	·03078			
4. 22	57. 10	4. 3	·1490	6. 18	·03057			
4. 32	54. 5	4. 9	·1487	6. 22	·03038			
4. 40	49. 15	4. 15	·1490	6. 39	·03048			
4. 47	47. 55	4. 18	·1542	6. 42	·03062			
4. 52	49. 25	4. 21	·1532	6. 51	·03066			
4. 56	50. 5	4. 25	·1544	6. 54	·03062			
5. 3	53. 30	4. 31	·1552	7. 2	·03074			
5. 18	55. 20	4. 37	·1550	7. 7	·03075			
5. 24	54. 0	4. 41	·1543	7. 21	·03144			
5. 30	53. 55	4. 45	·1540	7. 29	·03139			
5. 33	54. 50	4. 47	·1552	7. 36	·03114			
5. 37	54. 25	5. 4	·1547	7. 47	·03030			
5. 43	57. 5	5. 10	·1532	7. 49	·03037			
5. 52	52. 0	5. 19	·1517	7. 56	·03000			
5. 59	55. 40	5. 23	·1523	8. 10	·03008			
6. 5	54. 40	5. 28	·1532	8. 22	·02957			
6. 12	49. 50	5. 32	·1551	8. 32	·02944			
6. 18	57. 25	5. 35	·1547	8. 40	·02921			
6. 22	59. 40	5. 40	·1554	8. 43	·02928			
6. 30	50. 20	5. 44	·1525	8. 50	·02920			
6. 32	49. 45	5. 49	·1510	8. 58	·02928			
6. 34	49. 55	5. 59	·1534	9. 2	·02924			
6. 42	47. 30	6. 1	·1528	9. 14	·02948			
6. 51	50. 30	6. 3	·1530	9. 18	·02946			
6. 58	52. 50	6. 10	·1516	9. 22	·02979			
7. 7	49. 55	6. 17	·1528	9. 29	·02963			
7. 11	52. 35	6. 25	·1481	9. 39	·03003			
7. 13	50. 55	6. 30	·1474	9. 42	·03012			
7. 19	47. 5	6. 37	·1485	9. 49	·03006			
7. 23	48. 40	6. 40	·1482	9. 58	·03017			
7. 28	47. 50	6. 47	·1491	10. 2	·03036			
7. 32	37. 40	7. 0	·1509	10. 10	·03080			
7. 37	35. 20	7. 5	·1491	10. 19	·02965			
7. 40	31. 40	7. 12	·1503	10. 22	·02979			
7. 48	39. 30	7. 18	·1479	10. 40	·02907			
8. 0	46. 0	7. 21	·1483	10. 47	·02892			
8. 8	43. 0	7. 26	·1476	10. 52	·02888			
8. 12	46. 10	7. 30	·1455	11. 2	·02867			
8. 19	45. 5	7. 37	·1477	11. 4	·02880			
8. 23	45. 40	7. 41	·1471	11. 10	·02862			
8. 28	45. 0	7. 48	·1489	11. 14	·02870			
8. 33	46. 55	7. 52	·1478	11. 18	·02857			
8. 42	45. 45	7. 57	·1474	11. 27	·02861			
8. 50	45. 25	8. 5	·1475	11. 30	·02855			
9. 0	45. 55	8. 15	·1493	11. 36	·02870			
9. 8	44. 0	8. 21	·1475	11. 56	·02896			
9. 12	44. 25	8. 26	·1464	12. 4	·02880			
9. 20	43. 0	8. 33	·1468	12. 13	·02885			
9. 32	44. 0	8. 37	·1456	12. 18	·02880			
9. 41	47. 40	8. 45	·1449	12. 23	·02882			
9. 45	48. 0	9. 0	·1445	12. 36	·02867			
9. 50	49. 40	9. 18	·1454	12. 40	·02875			
9. 53	48. 20	9. 31	·1454	12. 47	·02863			
9. 59	41. 30	9. 37	·1448	12. 54	·02783			
10. 0	39. 5	9. 45	·1453	13. 0	·02763			

The indications are taken from the sheets of the Photographic Record, except where an asterisk is attached to the number, in which instances they are inferred from observations made with the telescope in the ancient manner. The Symbol *** denotes that the magnet has been generally in a state of agitation. The Symbol (†) denotes that the register has failed between the preceding and following readings. The Symbol : attached to a time denotes that the reading will apply equally well to a considerable range of time near that which is recorded. A brace denotes that at this time the curve of the Vertical Force was dislocated, and the difference of the numbers included by the brace shows the amount of the displacement.

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
Sept. 3		Sept. 3		Sept. 3				
h m	° ′ ″	h m		h m		h m	°	°
10. 2	19. 26. 35	9. 51	·1446	13. 3	·02782			
10. 13	30. 35	9. 56	·1455	13. 21	·02803			
10. 17	29. 0	10. 1	·1471	13. 27	·02833			
10. 22	31. 15	10. 10	·1498	13. 31	·02820			
10. 23	31. 0	10. 15	·1479	13. 37	·02823			
10. 32	36. 0	10. 20	·1492	13. 41	·02837			
10. 42	43. 40	10. 25	·1484	13. 47	·02807			
10. 51	40. 55	10. 38	·1486	13. 51	·02829			
10. 58	40. 55	10. 42	·1466	13. 53	·02810			
11. 0	41. 15	10. 46	·1457	13. 55	·02815			
11. 12	39. 20	10. 52	·1458	14. 12	·02764			
11. 20	38. 25	10. 55	·1447	14. 40	·02705			
11. 30	39. 5	10. 59	·1456	14. 51	·02695			
11. 40	42. 0	11. 1	·1449	15. 3	·02697			
11. 53	45. 0	11. 7	·1449	15. 22	·02675			
12. 2	45. 5	11. 10	·1444	15. 33	·02699			
12. 8	46. 55	11. 19	·1448	15. 42	·02690			
12. 18	47. 10	11. 25	·1443	15. 47	·02700			
12. 23	49. 30	11. 30	·1449	15. 52	·02726			
12. 30	49. 40	11. 35	·1444	16. 5	·02694			
12. 42	55. 0	11. 43	·1448	16. 14	·02637			
12. 50	51. 5	11. 55	·1460	16. 21	·02620			
12. 56	45. 20	12. 1	·1454	16. 37	·02670			
13. 0	43. 5	12. 7	·1457	16. 42	·02660			
13. 11	44. 15	12. 13	·1452	17. 7	·02705			
13. 19	42. 25	12. 19	·1456	17. 20	·02698			
13. 23	43. 40	12. 24	·1451	17. 39	·02726			
13. 30	41. 5	12. 32	·1456	17. 50	·02705			
13. 33	41. 20	12. 40	·1478	18. 2	·02667			
13. 40	44. 0	12. 46	·1485	18. 9	·02688			
13. 42	41. 0	12. 55	·1473	18. 10	·02689			
13. 48	44. 40	13. 3	·1480	18. 14	·02679			
13. 52	46. 10	13. 9	·1476	18. 26	·02683			
14. 2	46. 55	13. 19	·1459	18. 29	·02668			
14. 17	45. 0	13. 23	·1471	18. 32	·02690			
14. 27	42. 25	13. 29	·1466	18. 36	·02677			
14. 58	39. 0	13. 31	·1474	18. 42	·02668			
15. 0	39. 0	13. 34	·1468	18. 47	·02680			
15. 10	36. 0	13. 39	·1478	18. 49	·02682			
15. 12	36. 30	13. 43	·1464	18. 52	·02710			
15. 26	34. 0	13. 47	·1475	18. 54	·02700			
15. 36	45. 15	13. 50	·1466	19. 2	·02720			
15. 40	44. 45	13. 54	·1471	19. 3	·02716			
15. 46	47. 15	13. 58	·1465	19. 8	·02740			
15. 52	45. 10	14. 3	·1465	19. 13	·02730			
16. 2	47. 15	14. 10	·1456	19. 18	·02747			
16. 16	41. 55	14. 21	·1460	19. 30	·02754			
16. 22	43. 10	14. 25	·1458	19. 32	·02746			
16. 28	45. 0	14. 34	·1458	19. 41	·02757			
16. 37	42. 5	14. 37	·1460	19. 45	·02742			
16. 42	41. 15	14. 50	·1450	19. 49	·02750			
16. 46	43. 5	15. 2	·1454	19. 52	·02738			
16. 50	41. 55	15. 12	·1458	19. 57	·02770			
16. 52	42. 30	15. 27	·1443	20. 0	·02740			
17. 3	39. 30	15. 35	·1454	20. 2	·02756			
17. 13	41. 10	15. 40	·1450	20. 4	·02747			
17. 31	53. 55	15. 50	·1471	20. 12	·02759			
17. 37	54. 0	16. 0	·1474	20. 17	·02748			

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
Sept. 3		Sept. 3		Sept. 3				
h m	° ′ ″	h m		h m		h m	°	°
17. 39	19. 55. 45	16. 19	·1439	20. 21	·02760			
17. 43	52. 0	16. 27	·1448	20. 31	·02760			
17. 47	52. 50	16. 32	·1468	20. 34	·02749			
17. 51	48. 0	16. 50	·1485	20. 38	·02760			
17. 57	53. 30	16. 53	·1473	20. 40	·02750			
18. 0	54. 50	16. 58	·1482	20. 42	·02762			
18. 9	50. 45	17. 1	·1471	20. 50	·02760			
18. 13	51. 40	17. 5	·1475	20. 56	·02770			
18. 20	47. 30	17. 8	·1469	21. 0	·02762			
18. 23	49. 40	17. 12	·1477	21. 5	·02770			
18. 32	41. 0	17. 20	·1456	21. 12	·02774			
18. 37	44. 0	17. 29	·1449	21. 18	·02761			
18. 38	43. 10	17. 31	·1437	21. 22	·02770			
18. 41	49. 45	17. 35	·1456	21. 23	·02758			
18. 45	46. 45	17. 37	·1448	21. 32	·02774			
18. 51	48. 25	17. 47	·1431	21. 36	·02765			
18. 52	47. 0	17. 55	·1438	21. 38	·02780			
18. 58	52. 0	18. 0	·1446	21. 42	·02763			
19. 3	47. 40	18. 5	·1440	21. 43	·02775			
19. 12	53. 55	18. 8	·1434	21. 47	·02760			
19. 16	55. 20	18. 19	·1448	21. 50	·02773			
19. 22	53. 15	18. 22	·1438	22. 0	·02747			
19. 23	53. 25	18. 26	·1453	22. 22	·02750			
19. 29	51. 5	18. 31	·1443	22. 29	·02762			
19. 34	50. 55	18. 35	·1438	23. 0	·02752			
19. 38	47. 40	18. 38	·1448	23. 26	·02760			
19. 40	48. 40	18. 42	·1442	23. 59	·02778			
19. 42	47. 0	18. 45	·1465					
19. 47	58. 5	18. 46	·1459					
19. 50	48. 0	18. 52	·1470					
19. 52	51. 5	18. 57	·1461					
19. 57	47. 0	18. 59	·1471					
20. 0	49. 0	19. 2	·1476					
20. 3	49. 30	19. 6	·1467					
20. 10	46. 0	19. 10	·1482					
20. 13	47. 40	19. 12	·1476					
20. 21	49. 25	19. 17	·1480					
20. 26	46. 0	19. 19	·1474					
20. 33	45. 0	19. 22	·1473					
20. 38	48. 50	19. 25	·1467					
20. 42	48. 20	19. 32	·1464					
20. 45	49. 40	19. 35	·1469					
20. 50	49. 20	19. 38	·1460					
20. 53	52. 0	19. 41	·1469					
20. 59	51. 0	19. 46	·1455					
21. 2	51. 35	19. 50	·1470					
21. 10	49. 10	19. 52	·1451					
21. 12	52. 0	19. 54	·1458					
21. 17	48. 40	19. 58	·1451					
21. 20	50. 40	20. 0	·1457					
21. 26	50. 50	20. 1	·1453					
21. 29	52. 0	20. 4	·1457					
21. 32	49. 50	20. 10	·1435					
21. 38	48. 5	20. 16	·1447					
21. 44	55. 20	20. 21	·1450					
21. 55	57. 10	20. 26	·1440					
22. 4	53. 50	20. 29	·1447					
22. 16	52. 40	20. 34	·1448					

For the Horizontal and Vertical Forces, increasing readings denote increasing forces.

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
Sept. 3		Sept. 3						
h m	° ′ ″	h m		h m		h m	°	°
22. 20	19. 54. 40	20. 37	·1455					
22. 29	55. 20	20. 39	·1447					
22. 32	54. 40	20. 42	·1442					
22. 41	57. 0	20. 46	·1454					
22. 47	56. 5	20. 50	·1458					
22. 51	56. 55	20. 53	·1450					
23. 4	56. 0	20. 56	·1454					
23. 23	57. 5	20. 59	·1450					
23. 27	56. 30	21. 3	·1454					
23. 34	58. 0	21. 9	·1442					
23. 38	57. 10	21. 13	·1453					
23. 42	58. 10	21. 17	·1439					
23. 49	57. 55	21. 19	·1446					
23. 59	59. 0	21. 25	·1455					
		21. 27	·1447					
		21. 29	·1454					
		21. 32	·1445					
		21. 35	·1452					
		21. 37	·1443					
		21. 41	·1461					
		21. 46	·1466					
		21. 53	·1455					
		21. 58	·1448					
		22. 3	·1430					
		22. 17	·1439					
		22. 20	·1443					
		22. 27	·1438					
		22. 29	·1443					
		22. 35	·1439					
		22. 43	·1449					
		22. 50	·1441					
		22. 52	·1448					
		22. 57	·1443					
		22. 59	·1449					
		23. 3	·1445					
		23. 9	·1451					
		23. 24	·1454					
		23. 31	·1449					
		23. 35	·1459					
		23. 42	·1452					
		23. 45	·1457					
		23. 47	·1452					
		23. 59	·1460					
Sept. 24		Sept. 24		Sept. 24		Sept. 24		
0. 0	19. 57. 20	0. 0	·1433	0. 0	·02623	1. 15	65 ·0	64 ·3
0. 2	20. 1. 45	0. 3	·1418	0. 3	·02650	3. 0	65 ·2	65 ·0
0. 6	0. 30	0. 7	·1428	0. 7	·02640	9. 0	64 ·7	64 ·1
0. 9	3. 5	0. 11	·1425	0. 10	·02662	21. 0	64 ·5	62 ·9
0. 16	1. 30	0. 16	·1438	0. 13	·02646			
0. 20	4. 5	0. 24	·1446	0. 22	·02670			
0. 28	20. 0. 15	0. 28	·1436	0. 28	·02642			
0. 32	19. 57. 50	0. 32	·1429	0. 30	·02626			
0. 42	20. 4. 10	0. 37	·1412	0. 33	·02660			
0. 43	3. 50	0. 39	·1421	0. 36	·02643			
0. 47	5. 25	0. 41	·1417	0. 40	·02668			
0. 49	3. 25	0. 46	·1435	0. 52	·02680			
0. 52	8. 0	0. 49	·1431	1. 1	·02667			

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
Sept. 24		Sept. 24		Sept. 24				
h m	° ′ ″	h m		h m		h m	°	°
0. 57	20. 6. 25	0. 53	·1450	1. 12	·02698			
1. 2	0. 50	0. 59	·1441	1. 22	·02738			
1. 9	2. 30	1. 1	·1433	1. 23	·02722			
1. 12	5. 0	1. 4	·1425	1. 28	·02757			
1. 21	8. 0	1. 6	·1429	1. 32	·02760			
1. 27	5. 5	1. 8	·1426	1. 42	·02798			
1. 29	6. 20	1. 13	·1440	1. 52	·02818			
1. 40	4. 0	1. 17	·1437	2. 2	·02819			
1. 47	6. 35	1. 25	·1447	2. 4	·02807			
1. 53	5. 15	1. 29	·1435	2. 12	·02840			
2. 0	7. 0	1. 33	·1444	2. 16	·02835			
2. 7	6. 30	1. 40	·1431	2. 20	·02860			
2. 11	3. 55	1. 52	·1453	2. 23	·02863			
2. 16	4. 40	1. 54	·1449	2. 30	·02903			
2. 20	3. 20	1. 58	·1461	2. 50	·02982			
2. 32	3. 45	2. 7	·1465	2. 55	·02976			
2. 39	20. 1. 45	2. 12	·1453	3. 2	·03050			
2. 49	19. 59. 30	2. 18	·1470	3. 4	·03030			
2. 52	56. 50	2. 22	·1468	3. 10	·03075			
2. 56	57. 0	2. 24	·1476	3. 12	·03055			
3. 0	19. 54. 55	2. 31	·1466	3. 20	·03002			
3. 7	20. 2. 30	2. 36	·1475	3. 22	·03050			
3. 12	19. 59. 15	2. 40	·1464	3. 27	·03020			
3. 18	20. 2. 50	2. 50	·1477	3. 31	·03063			
3. 22	19. 56. 55	2. 54	·1468	3. 33	·03055			
3. 27	20. 4. 30	2. 58	·1472	3. 38	·03093			
3. 32	0. 55	3. 0	·1466	3. 40	·03137			
3. 37	7. 40	3. 5	·1461	3. 47	·03100			
3. 40	5. 0	3. 8	·1502	3. 52	·03150			
3. 46	8. 40	3. 13	·1488	3. 54	·03093			
3. 52	0. 0	3. 17	·1507	3. 59	·03115			
3. 58	20. 6. 0	3. 21	·1505	4. 2	·03173			
4. 2	19. 56. 40	3. 26	·1462	4. 7	·03145			
4. 4	20. 5. 5	3. 31	·1472	4. 9	·03170			
4. 11	0. 0	3. 32	·1497	4. 11	·03162			
4. 13	20. 1. 30	3. 36	·1455	4. 17	·03191			
4. 21	19. 55. 0	3. 38	·1474	4. 21	·03202			
4. 32	20. 6. 15	3. 42	·1465	4. 22	·03238			
4. 38	14. 55	3. 44	·1483	4. 28	·03407			
4. 48	20. 3. 10	3. 49	·1485	4. 32	·03462			
4. 50	19. 57. 0	3. 52	·1505	4. 41	·03772			
4. 52	19. 48. 45	3. 56	·1474	4. 43	·03713			
5. 0	20. 2. 15	4. 0	·1510	4. 48	·03698			
5. 4	19. 41. 5	4. 4	·1466	4. 51	·03476			
5. 11	20. 1. 15	4. 6	·1472	4. 55	·03506			
5. 16	19. 45. 15	4. 10	·1513	5. 0	·03357			
5. 19	42. 40	4. 15	·1502	5. 6	·03322			
5. 20	43. 25	4. 16	·1485	5. 12	·03340			
5. 22	41. 15	4. 18	·1493	5. 17	·03198			
5. 30	48. 25	4. 20	·1475	5. 22	·03124			
5. 38	44. 40	4. 22	·1466	5. 27	·03133			
5. 44	53. 5	4. 26	·1479	5. 38	·03053			
5. 50	51. 25	4. 34	·1531	5. 52	·03040			
5. 55	19. 52. 5	4. 36	·1546	6. 2	·02987			
6. 2	20. 1. 40	4. 43	·1628	6. 8	·02995			
6. 7	19. 58. 0	4. 47	·1587	6. 12	·02955			
6. 11	54. 45	4. 54	·1616	6. 16	·03039			
6. 15	55. 15	4. 58	·1597	6. 19	·03053			

The indications are taken from the sheets of the Photographic Record, except where an asterisk is attached to the number, in which instances they are inferred from observations made with the telescope in the ancient manner. The Symbol *** denotes that the magnet has been generally in a state of agitation. The Symbol (†) denotes that the register has failed between the preceding and following readings. The Symbol : attached to a time denotes that the reading will apply equally well to a considerable range of time near that which is recorded. A brace denotes that at this time the curve of the Vertical Force was dislocated, and the difference of the numbers included by the brace shows the amount of the displacement.

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
Sept. 24		Sept. 24		Sept. 24				
h m	° ′ ″	h m		h m		h m	°	°
6. 17	19. 48. 15	5. 0	·1609	6. 22	·02925			
6. 20	42. 35	5. 2	·1574	6. 28	·02860			
6. 23	46. 55	5. 5	·1545	6. 36	·02820			
6. 27	31. 25	5. 12	·1563	6. 40	·02833			
6. 36	48. 40	5. 14	·1552	6. 42	·02806			
6. 41	47. 0	5. 19	·1522	6. 51	·02821			
6. 50	52. 15	5. 25	·1533	6. 57	·02800			
6. 57	42. 55	5. 26	·1510	7. 2	·02783			
7. 8	46. 25	5. 30	·1500	7. 12	·02796			
7. 12	44. 55	5. 34	·1475	7. 20	·02772			
7. 23	48. 40	5. 43	·1496	7. 27	·02782			
7. 29	47. 30	5. 45	·1484	7. 32	·02769			
7. 34	50. 55	5. 50	·1480	7. 37	·02780			
7. 40	49. 25	6. 0	·1491	7. 39	·02768			
7. 44	53. 10	6. 3	·1467	7. 47	·02780			
7. 52	49. 40	6. 9	·1450	7. 52	·02774			
7. 57	50. 20	6. 14	·1462	8. 2	·02773			
8. 2	49. 20	6. 18	·1432	8. 12	·02758			
8. 13	49. 50	6. 22	·1475	8. 19	·02763			
8. 22	47. 55	6. 27	·1455	8. 23	·02746			
8. 30	49. 55	6. 31	·1477	8. 38	·02785			
8. 41	45. 25	6. 40	·1458	8. 41	·02752			
8. 51	44. 20	6. 46	·1470	8. 50	·02728			
8. 58	47. 0	6. 49	·1460	8. 53	·02690			
9. 3	55. 40	6. 51	·1458	9. 2	·02627			
9. 19	43. 0	6. 55	·1447	9. 9	·02633			
9. 32	38. 55	7. 2	·1463	9. 13	·02667			
9. 36	37. 5	7. 9	·1451	9. 22	·02698			
9. 52	46. 15	7. 18	·1462	9. 28	·02723			
10. 0	45. 40	7. 25	·1447	9. 31	·02742			
10. 8	37. 40	7. 33	·1465	9. 42	·02703			
	(†)	7. 37	·1454	9. 49	·02633			
10. 28	53. 15	7. 41	·1459	9. 56	·02628			
10. 32	48. 0	7. 49	·1442	9. 59	·02620			
10. 34	44. 5	7. 56	·1450	10. 2	·02641			
10. 42	54. 0	8. 0	·1444	10. 9	·02823			
10. 47	49. 45	8. 11	·1444	10. 12	·02747			
10. 52	46. 55	8. 17	·1434	10. 22	·02629			
11. 12	42. 50	8. 23	·1443	10. 24	·02545			
11. 22	51. 0	8. 29	·1432	10. 27	·02480			
11. 30	42. 0	8. 44	·1451	10. 32	·02572			
11. 32	29. 25	8. 49	·1439	10. 39	·02515			
11. 42	28. 30	8. 54	·1444	10. 42	·02486			
11. 46	27. 15	9. 0	·1441	10. 44	·02496			
11. 54	34. 35	9. 13	·1385	10. 52	·02383			
12. 1	33. 40	9. 27	·1413	10. 58	·02468			
12. 12	19. 35	9. 32	·1407	11. 2	·02540			
12. 20	18. 30	9. 38	·1430	11. 9	·02555			
12. 26	20. 0	9. 40	·1431	11. 13	·02500			
12. 35	33. 20	9. 48	·1442	11. 16	·02494			
12. 39	41. 25	9. 53	·1428	11. 18	·02447			
12. 46	31. 55	9. 58	·1421	11. 29	·02482			
12. 48	35. 0	10. 1	·1412	11. 30	·02499			
12. 57	52. 40	10. 10	·1394	11. 33	·02476			
13. 0	52. 0	10. 16	·1447	11. 38	·02483			
13. 2	57. 45	10. 25	·1515	11. 40	·02458			
13. 4	19. 55. 55	10. 32	·1413	11. 42	·02466			
13. 8	20. 3. 20	10. 39	·1425	11. 45	·02435			

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
Sept. 24		Sept. 24		Sept. 24				
h m	° ′ ″	h m		h m		h m	°	°
13. 9	19. 58. 0	10. 57	·1372	11. 47	·02446			
13. 11	53. 10	11. 8	·1461	11. 51	·02380			
13. 12	49. 55	11. 15	·1461	11. 56	·02360			
13. 17	53. 15	11. 17	·1453	12. 2	·02243			
13. 21	35. 20	11. 20	·1450		(†)			
13. 28	32. 15	11. 27	·1381	16. 32	·02243			
13. 30	39. 40	11. 36	·1424	16. 37	·02290			
13. 33	38. 5	11. 42	·1433	16. 39	·02286			
13. 42	57. 0	11. 51	·1467	16. 49	·02315			
13. 52	48. 15	11. 55	·1445	16. 56	·02243			
13. 57	50. 25	11. 58	·1438		(†)			
14. 4	35. 20	12. 2	·1412	17. 26	·02243			
14. 9	34. 40		(†)	17. 33	·02278			
14. 14	26. 5	14. 42	·1412	17. 38	·02256			
14. 21	28. 10	14. 47	·1417	17. 43	·02303			
14. 27	29. 40	14. 53	·1412	17. 48	·02325			
14. 36	34. 0		(†)	17. 53	·02262			
14. 40	31. 20	16. 28	·1412	17. 57	·02267			
14. 47	30. 5	16. 33	·1424	18. 5	·02217			
14. 54	18. 45	16. 37	·1443	18. 11	·02323			
15. 0	19. 7. 15	16. 40	·1429	18. 20	·02298			
15. 9	18. 52. 55	16. 42	·1421	18. 28	·02408			
15. 14	19. 8. 25	16. 50	·1426	18. 32	·02375			
15. 21	9. 20	16. 53	·1412	18. 33	·02420			
15. 29	27. 0		(†)	18. 37	·02373			
15. 33	41. 50	21. 0	·1313*	18. 38	·02432			
15. 34	52. 50	21. 15	·1321*	18. 40	·02401			
15. 41	57. 55	21. 20	·1303*	18. 43	·02447			
15. 49	46. 20	21. 25	·1303*	18. 50	·02473			
15. 53	34. 0	21. 50	·1356*	18. 52	·02536			
16. 4	23. 15	22. 10	·1348*	18. 53	·02475			
16. 17	31. 20	22. 30	·1388*	18. 58	·02507			
16. 20	40. 5	22. 40	·1380*	18. 59	·02464			
16. 24	39. 30	22. 50	·1402*	19. 0	·02493			
16. 32	45. 15	22. 55	·1398*	19. 2	·02456			
16. 39	19. 57. 0	23. 0	·1412*	19. 4	·02521			
16. 42	20. 0. 0	23. 12	·1394*	19. 7	·02482			
16. 48	19. 59. 10	23. 15	·1396*	19. 9	·02520			
16. 53	20. 2. 55	23. 20	·1391*	19. 10	·02500			
16. 58	19. 59. 15	23. 25	·1401*	19. 12	·02552			
17. 3	53. 5	23. 30	·1395*	19. 17	·02519			
17. 9	49. 45	23. 45	·1414	19. 21	·02563			
17. 13	45. 25	23. 50	·1410	19. 22	·02532			
17. 20	45. 30	23. 53	·1415	19. 24	·02580			
17. 26	19. 51. 25	23. 57	·1424	19. 29	·02577			
17. 32	20. 6. 15	23. 59	·1414	19. 32	·02523			
17. 36	4. 10			19. 37	·02598			
17. 46	24. 55			19. 42	·02538			
17. 52	20. 11. 20			19. 49	·02624			
18. 3	19. 56. 15			19. 51	·02578			
18. 11	20. 4. 15			19. 56	·02630			
18. 13	2. 20			19. 57	·02572			
18. 18	20. 3. 0			20. 0	·02603			
18. 21	19. 49. 30			20. 3	·02562			
18. 23	57. 0			20. 8	·02582			
18. 29	52. 0			20. 10	·02635			
18. 32	56. 15			20. 13	·02531			
18. 33	49. 30			20. 20	·02690			

For the Horizontal and Vertical Forces, increasing readings denote increasing forces.

September 24. The spot of light for Horizontal Force was off the sheet in the direction of *decreasing* force from 12h. 2m. to 14h. 42m.; from 14h. 53m. to 16h. 28m.; and from 16h. 53m. to 23h. 45m.; and the spot of light for Vertical Force was off the sheet, also in the direction of *decreasing* force, from 12h. 2m. to 16h. 32m.; and from 16h. 56m. to 17h. 26m.

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
Sept. 24				Sept. 24				
h m	° ′ ″	h m		h m		h m	°	°
18. 37	19. 57. 25			20. 22	·02636			
18. 40	49. 5			20. 28	·02650			
18. 44	52. 30			20. 32	·02637			
18. 45	48. 10			20. 37	·02607			
18. 50	47. 15			20. 39	·02662			
18. 51	57. 10			20. 41	·02625			
18. 52	53. 5			20. 42	·02646			
18. 56	57. 40			20. 53	·02664			
18. 57	49. 0			20. 58	·02647			
19. 0	51. 10			20. 59	·02627			
19. 2	47. 20			21. 2	·02678			
19. 8	53. 15			21. 3	·02638			
19. 11	51. 55			21. 8	·02680			
19. 13	57. 15			21. 10	·02665			
19. 16	53. 30			21. 17	·02700			
19. 20	49. 20			21. 19	·02670			
19. 22	53. 50			21. 21	·02690			
19. 23	49. 5			21. 22	·02642			
19. 29	50. 35			21. 27	·02667			
19. 30	46. 50			21. 29	·02654			
19. 34	56. 15			21. 36	·02687			
19. 39	54. 20			21. 42	·02707			
19. 40	59. 0			21. 49	·02743			
19. 42	52. 0			22. 2	·02740			
19. 43	19. 58. 0			22. 17	·02722			
19. 47	20. 2. 20			22. 39	·02904			
19. 49	19. 55. 0			22. 46	·02864			
19. 52	19. 58. 50			22. 51	·02893			
19. 54	20. 4. 0			23. 0	·02897			
19. 58	19. 56. 55			23. 1	·02913			
20. 3	20. 0. 15			23. 2	·02887			
20. 6	20. 1. 30			23. 7	·02930			
20. 9	19. 55. 0			23. 18	·02856			
20. 12	19. 50. 5			23. 27	·02858			
20. 14	20. 7. 5			23. 29	·02880			
20. 20	19. 54. 20			23. 35	·02864			
20. 23	56. 0			23. 40	·02894			
20. 30	19. 52. 40			23. 43	·02903			
20. 32	20. 0. 30			23. 49	·02883			
20. 37	20. 2. 5			23. 55	·02872			
20. 39	19. 55. 25			23. 57	·02887			
20. 41	58. 25			23. 59	·02876			
20. 43	57. 10							
20. 50	53. 55							
20. 53	55. 5							
20. 58	59. 0							
21. 0	19. 56. 25							
21. 5	20. 2. 10							
21. 12	5. 0							
21. 13	0. 20							
21. 17	20. 1. 40							
21. 20	19. 55. 30							
21. 22	59. 0							
21. 24	19. 56. 10							
21. 33	20. 3. 30							
21. 37	2. 55							
21. 44	5. 35							
21. 50	4. 30							

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
Sept. 24								
h m	° ′ ″	h m		h m		h m	°	°
21. 53	20. 5. 10							
22. 0	0. 0							
22. 5	2. 10							
22. 10	0. 0							
22. 12	1. 0							
22. 21	5. 15							
22. 26	4. 30							
22. 36	8. 20							
22. 42	7. 55							
22. 58	3. 50							
23. 11	7. 15							
23. 15	6. 25							
23. 38	6. 25							
23. 48	5. 20							
23. 51	6. 55							
23. 59	5. 40							
Sept. 25		Sept. 25		Sept. 25		Sept. 25		
0. 0	20. 5. 40	0. 0	·1414	0. 0	·02876	0. 0	64·4	63·4
0. 4	6. 0	0. 2	·1421	0. 6	·02896	5. 0	65·6	65·4
0. 13	4. 15	0. 4	·1414	0. 9	·02883	9. 0	63·6	63·5
0. 17	5. 0	0. 9	·1423	0. 12	·02897	10. 20	63·8	63·4
0. 21	3. 20	0. 12	·1419	0. 27	·02906	21. 0	64·9	63·5
0. 32	7. 0	0. 20	·1417	0. 38	·02880	22. 0	64·3	63·2
0. 34	6. 45	0. 22	·1425	0. 44	·02883	23. 0	64·8	63·7
0. 39	9. 10	0. 24	·1417	0. 52	·02920			
0. 43	10. 0	0. 36	·1431	0. 58	·02974			
0. 50	8. 40	0. 46	·1437	1. 3	·02955			
0. 52	7. 50	0. 50	·1448	1. 9	·02982			
0. 58	9. 40	0. 58	·1443	1. 21	·03015			
1. 7	8. 0	1. 3	·1446	1. 32	·02970			
1. 12	20. 1. 20	1. 10	·1437	1. 38	·02995			
1. 17	19. 59. 25	1. 23	·1449	1. 42	·02970			
1. 20	20. 0. 20	1. 31	·1461	1. 48	·03000			
1. 22	19. 59. 10	1. 34	·1452	1. 51	·02988			
1. 24	20. 1. 30	1. 39	·1458	1. 55	·03020			
1. 32	1. 50	1. 42	·1455	2. 2	·02998			
1. 38	0. 0	1. 48	·1464	2. 17	·02997			
1. 47	0. 0	1. 55	·1457	2. 22	·03006			
1. 58	2. 5	2. 3	·1441	2. 32	·03015			
2. 4	0. 30	2. 12	·1445	2. 38	·03002			
2. 10	20. 0. 25	2. 19	·1442	2. 50	·02983			
2. 15	19. 59. 0	2. 25	·1450	2. 57	·03000			
2. 23	20. 0. 55	2. 30	·1442	3. 8	·03000			
2. 26	0. 20	2. 34	·1446	3. 17	·03018			
2. 49	0. 30	2. 37	·1442	3. 26	·03026			
2. 52	1. 5	2. 48	·1446	3. 41	·03070			
2. 58	0. 25	2. 54	·1452	3. 42	·03058			
3. 3	20. 1. 0	3. 0	·1447	3. 47	·03078			
3. 11	19. 59. 40	3. 9	·1448	3. 50	·03086			
3. 19	19. 59. 20	3. 20	·1455	3. 56	·03140			
3. 28	20. 1. 10	3. 23	·1452	4. 2	·03162			
3. 33	3. 20	3. 31	·1461	4. 10	·03180			
3. 39	4. 20	3. 35	·1481	4. 14	·03182			
3. 42	3. 10	3. 37	·1469	4. 23	·03225			
3. 44	20. 3. 30	3. 39	·1480	4. 36	·03214			
3. 53	19. 58. 35	3. 42	·1469	4. 42	·03238			
3. 57	56. 50	3. 47	·1484	4. 48	·03222			

The indications are taken from the sheets of the Photographic Record, except where an asterisk is attached to the number, in which instances they are inferred from observations made with the telescope in the ancient manner. The Symbol *** denotes that the magnet has been generally in a state of agitation. The Symbol (†) denotes that the register has failed between the preceding and following readings. The Symbol : attached to a time denotes that the reading will apply equally well to a considerable range of time near that which is recorded. A brace denotes that at this time the curve of the Vertical Force was dislocated, and the difference of the numbers included by the brace shows the amount of the displacement.

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Of V. F. Magnet.
Sept. 25		Sept. 25		Sept. 25				
h m	° ′ ″	h m		h m		h m	°	°
4. 3	19. 58. 40	3. 51	·1472	5. 0	·03162			
4. 7	57. 0	3. 53	·1480	5. 6	·03148			
4. 9	53. 10	3. 57	·1487	5. 12	·03148			
4. 13	50. 25	3. 59	·1492	5. 19	·03159			
4. 19	48. 55	4. 2	·1495	5. 22	·03148			
4. 22	50. 0	4. 7	·1486	5. 28	·03160			
4. 28	57. 0	4. 12	·1493	5. 39	·03123			
4. 33	52. 0	4. 14	·1507	5. 49	·03110			
4. 37	51. 20	4. 17	·1513	5. 54	·03083			
4. 42	57. 20	4. 19	·1528	6. 12	·03047			
4. 51	53. 55	4. 24	·1537	6. 19	·03025			
4. 53	55. 55	4. 27	·1532	6. 23	·03025			
5. 0	56. 0	4. 31	·1509	6. 43	·02998			
5. 10	52. 25	4. 37	·1516	7. 2	·02982			
5. 12	53. 15	4. 41	·1526	7. 15	·02965			
5. 20	54. 0	4. 45	·1509	7. 19	·02970			
5. 27	50. 25	4. 50	·1494	7. 23	·02955			
5. 31	50. 10	4. 56	·1499	7. 28	·02960			
5. 35	49. 0	5. 9	·1465	7. 39	·02946			
5. 47	49. 40	5. 16	·1474	7. 52	·02949			
5. 52	51. 10	5. 23	·1468	8. 2	·02927			
6. 0	52. 15	5. 32	·1463	8. 10	·02950			
6. 7	54. 35	5. 39	·1466	8. 23	·02900			
6. 13	55. 0	5. 46	·1472	8. 38	·02866			
6. 24	58. 45	5. 59	·1463	8. 52	·02850			
6. 41	55. 0	6. 7	·1461	9. 8	·02800			
6. 57	51. 45	6. 13	·1455	9. 23	·02775			
7. 4	53. 15	6. 19	·1461	9. 56	·02758			
7. 10	53. 20	6. 24	·1456	10. 3	·02760			
7. 15	54. 45	6. 30	·1444	10. 32	·02690			
7. 21	51. 25	6. 39	·1443	10. 39	·02703			
7. 29	52. 20	6. 57	·1448	10. 42	·02697			
7. 34	52. 10	7. 5	·1459	10. 50	·02685			
7. 40	52. 55	7. 10	·1456	10. 57	·02692			
7. 51	50. 5	7. 13	·1458	11. 3	·02682			
8. 3	42. 0	7. 18	·1439	11. 17	·02707			
8. 15	39. 10	7. 29	·1452	11. 28	·02715			
8. 21	40. 55	7. 47	·1446	11. 30	·02708			
8. 27	41. 0	7. 49	·1449	11. 39	·02720			
8. 33	42. 50	7. 53	·1445	11. 52	·02723			
8. 42	43. 55	7. 55	·1434	12. 0	·02718			
8. 49	43. 15	7. 58	·1431	12. 5	·02723			
9. 7	50. 0	8. 6	·1440	12. 8	·02720			
9. 12	50. 30	8. 11	·1436	12. 12	·02726			
9. 29	51. 20	8. 20	·1441	12. 18	·02708			
9. 36	52. 40	8. 25	·1441	12. 27	·02718			
9. 44	51. 20	8. 31	·1446	12. 42	·02678			
9. 50	51. 50	8. 37	·1441	13. 3	·02697			
9. 52	51. 10	8. 43	·1445	13. 13	·02690			
9. 57	51. 40	8. 49	·1441	13. 22	·02700			
10. 4	56. 15	8. 54	·1449	13. 32	·02694			
10. 12	19. 58. 45	8. 59	·1450	14. 10	·02602			
10. 21	20. 3. 0	9. 4	·1458	14. 18	·02575			
10. 30	20. 1. 10	9. 12	·1448	14. 24	·02565			
10. 38	19. 57. 55	9. 15	·1451	14. 30	·02540			
10. 47	56. 55	9. 21	·1445	14. 33	·02540			
11. 0	53. 55	9. 31	·1448	14. 50	·02485			
11. 3	51. 35	9. 38	·1446	14. 58	·02498			

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Of V. F. Magnet.
Sept. 25		Sept. 25		Sept. 25				
h m	° ′ ″	h m		h m		h m	°	°
11. 23	19. 49. 20	9. 41	·1443	15. 3	·02526			
11. 28	48. 20	9. 48	·1446	15. 12	·02536			
11. 40	49. 10	9. 56	·1444	15. 19	·02550			
11. 49	51. 30	10. 4	·1451	15. 28	·02558			
12. 9	51. 55	10. 10	·1448	15. 37	·02566			
12. 12	52. 25	10. 16	·1452	15. 42	·02549			
12. 21	49. 40	10. 32	·1431	15. 51	·02562			
12. 32	49. 0	10. 36	·1444	16. 2	·02556			
12. 50	41. 40	10. 39	·1441	16. 9	·02530			
13. 7	35. 30	10. 44	·1447	16. 18	·02530			
13. 22	39. 5	10. 49	·1444	16. 30	·02518			
13. 33	40. 30	10. 54	·1449	16. 39	·02550			
13. 51	40. 25	11. 2	·1444	16. 48	·02565			
14. 9	47. 40	11. 13	·1453	17. 9	·02538			
14. 13	48. 10	11. 27	·1447	17. 20	·02550			
14. 28	52. 20	11. 47	·1449	17. 23	·02562			
14. 33	54. 0	11. 58	·1441	17. 30	·02544			
14. 50	47. 10	12. 7	·1446	17. 40	·02536			
14. 57	45. 25	12. 10	·1453	17. 49	·02534			
15. 10	47. 20	12. 14	·1449	17. 58	·02518			
15. 20	51. 20	12. 20	·1461	18. 8	·02518			
15. 27	50. 25	12. 27	·1465	18. 20	·02518			
15. 32	51. 10	12. 43	·1454	18. 39	·02543			
15. 38	51. 5	12. 54	·1452	18. 44	·02527			
15. 49	56. 5	13. 2	·1455	18. 49	·02558			
16. 0	57. 35	13. 11	·1451	18. 51	·02542			
16. 2	57. 10	13. 22	·1456	19. 2	·02525			
16. 17	59. 15	13. 29	·1454	19. 11	·02538			
16. 23	58. 15	13. 38	·1459	19. 16	·02533			
16. 30	19. 55. 10	13. 50	·1460	19. 19	·02558			
16. 42	20. 0. 55	14. 0	·1456	19. 23	·02550			
16. 58	19. 56. 15	14. 15	·1442	19. 27	·02543			
17. 2	56. 15	14. 24	·1450	19. 32	·02574			
17. 8	57. 0	14. 28	·1448	19. 36	·02559			
17. 12	19. 56. 15	14. 36	·1451	19. 40	·02580			
17. 19	20. 3. 10	14. 47	·1450	19. 43	·02570			
17. 23	2. 0	14. 52	·1455	20. 0	·02595			
17. 30	4. 0	14. 59	·1458	20. 2	·02590			
17. 34	3. 0	15. 10	·1457	20. 12	·02603			
17. 41	4. 30	15. 14	·1466	20. 14	·02598			
17. 47	3. 0	15. 26	·1469	20. 18	·02620			
17. 50	3. 25	15. 38	·1486	20. 26	·02610			
17. 57	2. 40	15. 40	·1479	20. 47	·02623			
18. 2	3. 0	15. 54	·1476	21. 32	·02631			
18. 7	2. 45	16. 2	·1478	21. 52	·02640			
18. 12	3. 30	16. 11	·1470	22. 9	·02640			
18. 20	3. 0	16. 26	·1438	22. 22	·02637			
18. 27	4. 0	16. 38	·1460	22. 42	·02640			
18. 37	5. 40	16. 45	·1466	23. 39	·02682			
18. 41	3. 25	16. 56	·1456	23. 42	·02677			
18. 42	9. 40	17. 10	·1435	23. 59	·02700			
18. 44	7. 10	17. 29	·1450					
19. 2	20. 1. 5	17. 38	·1471					
19. 12	19. 58. 40	17. 51	·1460					
19. 15	20. 2. 25	18. 1	·1454					
19. 23	19. 56. 5	18. 18	·1435					
19. 28	58. 0	18. 26	·1441					
19. 32	57. 0	18. 34	·1426					

For the Horizontal and Vertical Forces, increasing readings denote increasing forces.

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Of V. F. Magnet.
Sept. 25		Sept. 25						
h m	° ′ ″	h m		h m		h m	°	°
19.33	19.59.45	18.40	·1438					
19.37	56.25	18.48	·1432					
19.51	49.55	18.55	·1426					
19.54	50. 0	19. 0	·1430					
19.58	48.10	19. 4	·1427					
20. 7	48. 0	19. 7	·1418					
20.12	52.40	19.10	·1430					
20.17	50.55	19.16	·1422					
20.22	49.55	19.23	·1434					
20.32	51.35	19.27	·1417					
20.40	51.20	19.30	·1434					
20.48	51.55	19.32	·1430					
20.51	51.30	19.46	·1426					
21.13	52.55	19.51	·1429					
21.22	53.50	19.55	·1421					
21.33	53. 0	20. 2	·1423					
22. 3	58.10	20. 5	·1416					
22.17	57.45	20. 9	·1426					
22.23	58.40	20.15	·1420					
22.37	58.55	20.18	·1423					
22.44	59. 0	20.23	·1418					
23. 0	19.59.25	20.27	·1422					
23.13	20. 0.15	20.32	·1418					
23.24	19.59.25	20.41	·1421					
23.33	19.59.40	20.54	·1420					
23.39	20. 0.30	21. 4	·1414					
23.56	19.59.55	21. 9	·1425					
23.59	20. 0.40	21.30	·1424					
		21.51	·1426					
		22. 0	·1428					
		22.20	·1422					
		22.30	·1428					
		22.40	·1426					
			(†)					
		23.16	·1431					
		23.28	·1429					
		23.37	·1436					
		23.41	·1440					
		23.46	·1436					
		23.55	·1443					
		23.59	·1438					
Sept. 26		Sept. 26		Sept. 26		Sept. 26		
0. 0	20. 0.40	0. 0	·1439	0. 0	·02702	0. 0	65·1	64·1
0.15	2.20	0. 9	·1440	0.16	·02698	1. 0	65·4	64·7
0.20	2. 5	0.23	·1434	1.22	·02738	2. 0	65·6	65·3
0.27	2.30	0.42	·1436	1.37	·02738	3. 0	65·7	65·6
0.42	2.35	0.57	·1438	1.42	·02746	9. 0	64·8	64·2
1. 9	3.55	1. 5	·1443	1.50	·02768	21. 0	65·7	64·4
1.12	2.45	1.11	·1439	1.58	·02764	22. 0	65·3	64·4
1.22	2.40	1.20	·1444	2. 8	·02778	23. 0	65·5	64·7
1.32	0.20	1.28	·1434	2.10	·02770			
1.39	1.45	1.37	·1444	2.22	·02787			
1.48	6. 0	1.47	·1473	2.32	·02790			
1.51	4.30	1.50	·1455	3.32	·02858			
2. 3	4.45		***	3.42	·02860			
2.10	3. 0	2.12	·1460	4. 3	·02882			
2.17	4. 0	2.17	·1466	4.18	·02912			

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Of V. F. Magnet.
Sept. 26		Sept. 26		Sept. 26				
h m	° ′ ″	h m		h m		h m	°	°
2.29	20. 2.45	2.24	·1460	4.22	·02915			
2.38	3. 0	2.35	·1470	4.38	·02942			
2.43	1.50	2.42	·1467	4.48	·02927			
2.52	2.10	2.51	·1474	4.58	·02942			
2.58	1.25	2.59	·1471	5. 2	·02930			
3. 7	20. 1.20	3.27	·1474	5. 8	·02942			
3.23	19.59.20	3.29	·1459	5.18	·02918			
3.27	58.10	3.36	·1467	5.29	·02920			
3.32	58.25	3.48	·1463	5.48	·02903			
3.45	56.20	4. 8	·1466	6. 0	·02905			
4.10	54.10	4.21	·1474	6.16	·02898			
4.22	47. 5	4.31	·1487	6.20	·02914			
4.26	47.40	4.39	·1498	6.26	·02902			
4.32	45.20	4.45	·1486	6.28	·02917			
4.42	47. 5	4.56	·1506	6.32	·02907			
4.50	45.55	4.59	·1495	6.38	·02918			
4.58	48.15	5. 4	·1503	6.42	·02903			
5. 2	50.35	5.15	·1491	6.52	·02896			
5. 6	51. 5	5.20	·1497	6.57	·02878			
5. 9	52.20	5.26	·1490	7. 9	·02892			
5.12	51.15	5.34	·1491	7.17	·02878			
5.16	52.30	5.37	·1488	7.22	·02898			
5.20	52. 5	5.47	·1482	7.32	·02878			
5.32	54.10	6. 5	·1481	7.40	·02842			
5.45	52.10	6.10	·1486	8. 2	·02803			
5.50	52.25	6.17	·1483	8. 7	·02804			
6. 2	50. 0	6.21	·1494	8.10	·02792			
6.11	49.40	6.27	·1484	8.17	·02793			
6.17	48.45	6.34	·1481	8.28	·02778			
6.22	46.40	6.40	·1505	8.40	·02785			
6.28	44.45	6.45	·1483	8.52	·02786			
6.32	37.25	6.50	·1486	9. 2	·02798			
6.40	47.45	6.55	·1469	9. 7	·02790			
6.44	43.50	7. 3	·1466	9.12	·02800			
7. 0	35.50	7. 8	·1454	9.23	·02778			
7.10	15.45	7.18	·1467	9.42	·02789			
7.19	11.30	7.24	·1504	10.12	·02792			
7.29	19.25	7.32	·1518	10.30	·02743			
7.34	37.55	7.38	·1496	10.38	·02742			
7.43	42.20	7.45	·1490	10.42	·02748			
7.52	38. 5	7.51	·1470	10.49	·02742			
8. 7	43.30	7.59	·1474	11.12	·02783			
8.14	43. 0	8. 4	·1479	11.22	·02793			
8.24	47.50	8.11	·1466	11.39	·02763			
8.33	44. 0	8.20	·1481	11.50	·02763			
8.43	46.40	8.30	·1457	11.54	·02768			
8.54	45.20	8.39	·1465	12. 7	·02740			
9. 1	46.40	8.46	·1462	12.22	·02682			
9.10	46.10	8.52	·1458	12.42	·02662			
9.15	46.35	9.10	·1465	12.52	·02632			
9.23	46.25	9.15	·1475	13. 0	·02622			
9.39	48.20	9.20	·1468	13. 8	·02604			
9.45	48.25	9.23	·1470	13.13	·02603			
10. 2	50.25	9.31	·1460	13.22	·02575			
10. 9	48. 0	9.40	·1467	13.33	·02560			
10.20	50.20	9.46	·1475	13.46	·02570			
10.38	48.15	9.59	·1476	13.50	·02560			
10.47	50.10	10. 8	·1476	13.56	·02563			

The indications are taken from the sheets of the Photographic Record, except where an asterisk is attached to the number, in which instances they are inferred from observations made with the telescope in the ancient manner. The Symbol *** denotes that the magnet has been generally in a state of agitation. The Symbol (†) denotes that the register has failed between the preceding and following readings. The Symbol : attached to a time denotes that the reading will apply equally well to a considerable range of time near that which is recorded. A brace denotes that at this time the curve of the Vertical Force was dislocated, and the difference of the numbers included by the brace shows the amount of the displacement.

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Readings of Thermometers. Of V. F. Magnet.	Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
Sept.26		Sept.26		Sept.26					Sept.26		Sept.26						
h m	° ′ ″	h m		h m		h m	°	°	h m	° ′ ″	h m		h m		h m	°	°
11. 2	19.44.45	10.15	·1502	14. 2	·02598				18.38	19.49.25	17.17	·1475					
11.10	45.20	10.23	·1494	14.10	·02582				18.43	46.40	17.19	·1480					
11.17	45.25	10.28	·1480	14.16	·02585				18.51	48.55	17.28	·1479					
11.30	50.10	10.39	·1477	14.22	·02560				18.58	46.55	17.30	·1473					
11.41	49.25	10.40	·1473	14.33	·02506				19.10	46.40	17.35	·1473					
11.52	44.25	10.43	·1475	14.40	·02523				19.14	49.45	17.37	·1484					
12. 2	43. 0	10.51	·1459	14.46	·02456				19.18	47.10	17.45	·1486					
12. 8	43.40	11. 0	·1468	14.50	·02353				19.21	49.50	17.50	·1477					
12.20	41. 5	11. 8	·1470	14.58	·02303				19.22	47.15	17.56	·1482					
12.29	40.40	11.15	·1478	15. 2	·02318				19.27	48.45	18. 3	·1472					
12.42	45.35	11.22	·1491	15. 3	·02308				19.30	42.55	18.16	·1466					
12.57	42.40	11.36	·1473	15.12	·02440				19.33	45.25	18.30	·1462					
13. 6	40.15	11.46	·1466	15.23	·02498				19.36	44.15	18.35	·1468					
13.14	37. 5	11.54	·1486	15.32	·02545				19.38	46.10	18.39	·1463					
13.23	32.55	12. 5	·1477	15.48	·02592				19.40	42.55	18.40	·1454					
13.31	33.20	12.10	·1478	15.59	·02640				19.41	44.10	18.42	·1441					
13.36	32.25	12.19	·1470	16.16	·02650				19.42	40.55	18.48	·1449					
13.42	32.40	12.26	·1459	16.33	·02684				19.43	42. 5	18.57	·1443					
13.58	29.10	12.34	·1465	16.46	·02697				19.47	38.10	19. 1	·1451					
14. 7	31.10	12.42	·1460	16.50	·02718				19.50	42.20	19.10	·1456					
14.12	31.25	12.53	·1436	16.52	·02706				19.52	46. 0	19.16	·1462					
14.24	34.10	12.59	·1438	17. 0	·02723				19.58	48.25	19.22	·1463					
14.33	30. 0	13. 8	·1436	17. 2	·02715				20. 0	45. 0	19.30	·1448					
14.43	43.10	13.14	·1441	17. 7	·02725				20. 3	47. 0	19.34	·1440					
14.50	43.55	13.17	·1438	17.11	·02722				20. 6	43. 5	19.36	·1455					
14.59	39. 0	13.29	·1446	17.34	·02740				20. 9	46.25	19.40	·1441					
15. 2	33.50	13.32	·1440	17.40	·02734				20.11	44. 5	19.42	·1454					
15. 5	34. 0	13.42	·1438	17.42	·02740				20.17	47. 5	19.43	·1429					
15.11	31.40	13.47	·1434	17.49	·02737				20.20	46.40	19.47	·1436					
15.18	31.10	13.53	·1431	17.54	·02723				20.28	47.55	19.51	·1462					
15.28	34.40	14. 2	·1447	18. 2	·02728				20.34	48.20	19.56	·1470					
15.43	41.30	14. 9	·1442	18.20	·02718				20.40	45.20	19.58	·1457					
15.56	48.40	14.29	·1466	18.45	·02728				20.41	47.20	20. 1	·1460					
16. 0	48. 0	14.36	·1459	18.56	·02742				20.44	46.55	20. 5	·1448					
16. 2	49.15	14.43	·1484	19. 0	·02740				20.54	48. 0	20. 8	·1443					
16.14	45.10	14.49	·1461	19.20	·02744				21. 0	49.45	20.10	·1453					
16.28	48.25	14.56	·1432	19.32	·02735				21. 1	46.55	20.12	·1440					
16.30	48. 0	14.58	·1435	19.42	·02740				21. 4	49. 0	20.14	·1447					
16.37	49.40	15. 3	·1425	19.49	·02718				21.23	50.40	20.19	·1440					
16.40	48.20	15.11	·1457	20. 0	·02723				21.40	50.30	20.23	·1436					
16.44	51.20	15.14	·1465	20.13	·02694				21.43	51.50	20.28	·1441					
16.50	49.50	15.22	·1471	20.40	·02703				21.50	52.25	20.34	·1426					
16.56	53.10	15.28	·1466	20.48	·02710				21.53	53.55	20.36	·1438					
17. 0	48.30	15.33	·1471	21. 5	·02704				22. 1	53.55	20.40	·1426					
17. 2	51.55	15.41	·1468	21.28	·02706				22. 9	56.30	20.41	·1440					
17.10	49. 5	15.46	·1463	21.40	·02702				22.24	53.55	20.47	·1425					
17.12	49.40	16. 2	·1473	22. 3	·02704				22.28	55.30	20.49	·1440					
17.16	48.25	16.20	·1475	22.13	·02712				22.38	54.10	20.58	·1437					
17.20	49.50	16.29	·1471	22.28	·02710				22.40	55.40	20.59	·1447					
17.23	49.45	16.36	·1470	23. 7	·02723				22.44	55. 0	21.10	·1438					
17.28	50.55	16.40	·1465	23.13	·02743				22.48	55.55	21.14	·1418					
17.33	46.20	16.44	·1477	23.20	·02738				22.58	56.15	21.18	·1430					
17.46	51.15	16.47	·1468	23.40	·02768				23. 3	56.40	21.27	·1421					
17.50	48.20	16.53	·1478	23.52	·02762				23. 9	59.45	21.39	·1413					
17.58	52.10	16.59	·1462	23.59	·02773				23.18	19.57.55	21.46	·1433					
18. 8	48.20	17. 2	·1474						23.28	20. 0.25	21.50	·1426					
18.23	46.40	17. 6	·1466						23.32	19.59.10	21.55	·1433					
18.33	47.50	17.10	·1473						23.40	20. 2.10	22. 2	·1425					

For the Horizontal and Vertical Forces, increasing readings denote increasing forces.

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Of V. F. Magnet.
Sept. 26		Sept. 26						
h m	° ′ ″	h m		h m		h m	°	°
23.47	20. 2. 0	22. 9	·1434					
23.52	0.25	22.15	·1420					
23.59	1.40	22.20	·1414					
		22.28	·1417					
		22.32	·1410					
		22.38	·1416					
		22.41	·1412					
			(†)					
		23.31	·1426					
		23.45	·1431					
		23.53	·1425					
		23.59	·1431					
Oct. 14		Oct. 14		Oct. 14		Oct. 14		
0. 0	19.58. 5	0. 0	·1478	0. 0	·02542	0. 0	65·0	64·2
0.20	19.58.55	0. 7	·1479	0.39	·02546	1. 0	65·0	64·2
0.43	20. 1.40	0.20	·1481	0.45	·02558	2. 0	64·7	63·9
1. 3	0.25	0.31	·1485	0.52	·02548	3. 0	65·4	63·6
1.10	1. 5	0.37	·1484	0.57	·02558	9. 0	64·2	63·2
1.32	20. 0.55	0.47	·1492	1. 2	·02550	11. 0	65·0	63·6
1.47	19.59.50	0.52	·1488	1. 8	·02563	12. 0	65·1	63·7
1.57	20. 0.35	0.57	·1489	1.38	·02567	13. 0	64·7	63·4
1.51	19.59.45	1. 3	·1483	1.40	·02563	14. 0	64·8	63·2
2.11	59.10	1.10	·1490	1.47	·02578	15. 0	64·9	63·0
2.20	59.20	1.17	·1488	1.52	·02566	21. 0	63·5	62·1
2.40	57.20	1.40	·1490	2.22	·02573	22. 0	63·8	62·4
2.49	58. 0	1.43	·1487	2.35	·02570	23. 0	63·0	61·4
2.57	57.20	1.50	·1494	2.47	·02578			
3. 3	57.25	1.54	·1488	3.18	·02580			
3.20	56.40	2. 0	·1488	3.22	·02595			
3.26	19.58. 0	2.14	·1491	3.28	·02640			
3.30	20. 7.10	2.19	·1495	3.31	·02595			
3.37	4. 0	2.37	·1488	3.33	·02606			
3.45	1.25	2.47	·1493	3.37	·02575			
3.53	0.20	3. 7	·1493	3.40	·02593			
4. 4	20. 1.20	3.22	·1499	3.42	·02565			
4.13	19.58.20	3.29	·1511	3.43	·02582			
4.18	57. 0	3.35	·1564	3.47	·02566			
4.26	50.20	3.39	·1549	3.48	·02580			
4.32	48. 0	3.44	·1544	3.52	·02566			
4.37	49.35	3.49	·1533	4. 0	·02581			
4.44	49.50	3.57	·1524	4. 2	·02568			
5. 3	54. 5	4. 7	·1536	4. 4	·02580			
5.12	50. 0	4.14	·1519	4. 7	·02548			
5.17	49.20	4.19	·1528	4.15	·02582			
5.29	19.54. 0	4.28	·1518	4.23	·02588			
5.36	20. 1. 0	4.34	·1514	4.33	·02602			
5.37	0.40	4.37	·1522	4.52	·02600			
5.42	2.55	4.42	·1518	5. 2	·02617			
5.50	3.20	4.47	·1522	5.13	·02634			
5.57	5.55	4.54	·1520	5.18	·02619			
6. 8	2. 0	5. 1	·1514	5.20	·02638			
6.14	0.40	5.10	·1542	5.23	·02629			
6.27	20. 2. 0	5.18	·1558	5.28	·02618			
6.33	19.59. 0	5.22	·1550	5.32	·02639			
6.41	57.45	5.28	·1555	5.39	·02626			
6.42	56.40	5.30	·1551	5.47	·02618			
6.52	56.20	5.33	·1541	5.52	·02638			

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Of V. F. Magnet.
Oct. 14		Oct. 14		Oct. 14				
h m	° ′ ″	h m		h m		h m	°	°
7. 3	19.53. 0	5.37	·1554	5.58	·02654			
7.12	53.10	5.39	·1557	6. 2	·02680			
7.22	54.45	5.43	·1547	6.20	·02718			
7.27	56. 0	5.47	·1541	6.23	·02707			
7.33	55. 5	5.51	·1509	6.32	·02733			
7.47	51.50	5.58	·1504	6.39	·02720			
7.54	52. 0	6. 0	·1490	6.42	·02733			
8. 4	51.25	6. 4	·1486	6.48	·02733			
8.11	52. 0	6.13	·1487	7. 3	·02750			
8.20	50.25	6.22	·1499	7.10	·02745			
8.33	50.55	6.30	·1488	7.13	·02745			
8.42	50.10	6.37	·1496	7.19	·02739			
8.52	44.15	6.42	·1486	7.54	·02735			
9. 0	43.30	6.46	·1490	8.12	·02710			
9. 9	46.55	6.54	·1479	8.16	·02702			
9.12	46.40	7. 6	·1478	8.22	·02700			
9.22	51.20	7.19	·1492	8.24	·02693			
9.29	52.15	7.35	·1483	8.40	·02678			
9.38	48.50	7.42	·1478	8.50	·02654			
9.48	44.45	7.50	·1480	8.59	·02620			
9.49	40.10	7.57	·1477	9. 3	·02623			
9.50	41.20	8. 7	·1482	9. 8	·02606			
9.52	40.25	8.18	·1477	9.17	·02620			
9.56	46. 0	8.22	·1480	9.20	·02615			
9.58	42. 0	8.27	·1478	9.27	·02626			
10. 2	40.55	8.41	·1488	9.32	·02630			
10. 9	33.55	8.45	·1484	9.40	·02656			
10.12	36.45	8.49	·1492	9.47	·02595			
10.13	35.20	8.54	·1498	9.50	·02630			
10.31	44. 0	9. 4	·1488	9.55	·02590			
10.39	19.44.25	9.10	·1492	9.59	·02566			
10.52	20. 4.15	9.14	·1484	10. 2	·02518			
10.58	19.55. 5	9.17	·1487	10.20	·02600			
11.11	45.25	9.23	·1480	10.42	·02560			
11.16	44. 5	9.30	·1459	10.48	·02516			
11.20	45.10	9.34	·1468	10.57	·02273			
11.27	40.30	9.40	·1464	11. 1	·02230			
11.33	40. 0	9.49	·1530	11. 9	·02216			
11.42	34.45	9.54	·1480	11.12	·02243			
11.47	31.25	9.59	·1500	11.17	·02300			
11.50	32.20	10. 1	·1486	11.20	·02323			
12.12	22.40	10. 4	·1482	11.30	·02364			
12.28	30.40	10.10	·1445	11.37	·02350			
12.37	27. 0	10.13	·1451	11.40	·02358			
12.45	25.20	10.18	·1447	11.42	·02342			
12.48	25. 0	10.22	·1452	11.47	·02356			
12.54	23.30	10.27	·1460	11.51	·02336			
12.59	25.20	10.38	·1460	11.57	·02304			
13. 3	25.40	10.42	·1455	12. 3	·02310			
13.22	36.40	10.50	·1457	12. 7	·02306			
13.28	37. 0	10.52	·1467	12.20	·02360			
13.37	44.35	10.54	·1453	12.30	·02309			
13.47	28. 0	10.57	·1461	12.50	·02275			
13.51	28.40	10.59	·1452	12.55	·02318			
14. 0	35.40	11. 0	·1444	13. 2	·02323			
14. 3	38. 0	11. 2	·1448	13. 9	·02347			
14.10	41.20	11. 8	·1438	13.17	·02362			
14.13	41.20	11.15	·1430	13.23	·02338			

The indications are taken from the sheets of the Photographic Record, except where an asterisk is attached to the number, in which instances they are inferred from observations made with the telescope in the ancient manner. The Symbol *** denotes that the magnet has been generally in a state of agitation. The Symbol (†) denotes that the register has failed between the preceding and following readings. The Symbol : attached to a time denotes that the reading will apply equally well to a considerable range of time near that which is recorded. A brace denotes that at this time the curve of the Vertical Force was dislocated, and the difference of the numbers included by the brace shows the amount of the displacement.

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Of V. F. Magnet.
Oct. 14		Oct. 14		Oct. 14				
h m	° ′ ″	h m		h m		h m	°	°
14. 17	19. 42. 40	11. 21	·1444	13. 32	·02336			
14. 23	42. 0	11. 25	·1444	13. 38	·02302			
14. 30	44. 0	11. 35	·1462	13. 42	·02238			
14. 34	43. 30	11. 40	·1457	13. 48	·02202			
14. 41	44. 0	11. 43	·1463	13. 58	·02277			
14. 50	41. 0	11. 46	·1460	14. 2	·02278			
15. 0	43. 0	11. 50	·1466	14. 12	·02323			
15. 6	41. 20	11. 58	·1460	14. 20	·02331			
15. 12	42. 50	12. 4	·1440	14. 40	·02370			
15. 18	42. 50	12. 10	·1433	14. 47	·02366			
15. 24	42. 10	12. 17	·1413	14. 54	·02382			
15. 33	44. 15	12. 23	·1413	15. 0	·02380			
15. 37	44. 30	12. 28	·1421	15. 16	·02442			
15. 42	46. 30	12. 33	·1418	15. 40	·02496			
15. 51	45. 20	12. 40	·1407	15. 48	·02494			
15. 58	47. 10	12. 44	·1408	15. 52	·02505			
16. 0	46. 35	12. 50	·1396	15. 57	·02502			
16. 9	47. 25	13. 2	·1406	16. 16	·02522			
16. 22	50. 5	13. 8	·1396	16. 29	·02524			
16. 27	50. 15	13. 24	·1413	16. 38	·02517			
16. 38	52. 10	13. 30	·1408	16. 46	·02525			
16. 44	50. 30	13. 34	·1413	16. 50	·02520			
16. 57	50. 45	13. 42	·1434	17. 2	·02530			
17. 6	53. 45	13. 46	·1431	17. 12	·02518			
17. 12	51. 10	13. 49	·1435	17. 22	·02535			
17. 18	51. 20	13. 51	·1433	17. 29	·02525			
17. 22	52. 55	14. 2	·1448	17. 36	·02533			
17. 29	52. 0	14. 7	·1446	17. 42	·02526			
17. 40	51. 55	14. 13	·1452	17. 52	·02532			
17. 47	50. 10	14. 34	·1435	18. 0	·02531			
18. 1	50. 0	14. 40	·1440	18. 6	·02539			
18. 3	51. 0	14. 50	·1460	18. 10	·02530			
18. 12	50. 15	14. 59	·1464	18. 17	·02538			
18. 17	51. 25	15. 13	·1450	18. 32	·02533			
18. 31	49. 40	15. 20	·1454	19. 6	·02542			
18. 53	49. 45	15. 32	·1454	19. 20	·02540			
19. 0	48. 25	15. 47	·1463	19. 36	·02548			
19. 3	49. 20	15. 53	·1458	19. 50	·02541			
19. 11	47. 0	15. 59	·1462	19. 57	·02545			
19. 23	46. 55	16. 2	·1453	20. 9	·02540			
19. 36	48. 15	16. 10	·1450	21. 29	·02522			
19. 48	46. 20	16. 23	·1457	22. 1	·02520			
19. 52	46. 5	16. 34	·1458	22. 32	·02520			
19. 58	46. 35	16. 45	·1451		(†)			
20. 3	45. 50	16. 50	·1458	23. 12	·02515			
20. 20	45. 40	17. 5	·1461	23. 29	·02502			
20. 41	45. 55	17. 13	·1452	23. 59	·02506			
20. 51	45. 55	17. 21	·1462					
21. 0	46. 30	17. 29	·1456					
21. 7	46. 20	17. 36	·1462					
21. 12	47. 0	17. 44	·1456					
21. 37	47. 20	17. 48	·1461					
21. 49	48. 50	18. 0	·1460					
21. 59	48. 45	18. 7	·1466					
22. 3	49. 25	18. 12	·1461					
22. 31	51. 10	18. 19	·1467					
	(†)	18. 25	·1461					
23. 15	54. 25	18. 34	·1459					

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Of V. F. Magnet.
Oct. 14		Oct. 14						
h m	° ′ ″	h m		h m		h m	°	°
23. 38	19. 55. 0	18. 38	·1462					
23. 59	56. 0	18. 53	·1459					
		18. 58	·1455					
		19. 2	·1459					
		19. 11	·1452					
		19. 35	·1459					
		19. 49	·1452					
		19. 58	·1456					
		20. 4	·1453					
		20. 10	·1455					
		20. 19	·1452					
		20. 24	·1454					
		20. 50	·1448					
		20. 59	·1450					
		21. 13	·1445					
		21. 39	·1442					
		21. 47	·1444					
		22. 0	·1442					
		22. 36	·1440					
			(†)					
		23. 19	·1444					
		23. 34	·1438					
		23. 42	·1440					
		23. 50	·1441					
		23. 55	·1436					
		23. 59	·1436					
Oct. 23		Oct. 23		Oct. 23		Oct. 23		
21. 54	19. 48. 20	22. 0	·1468	21. 42	·02389	21. 0	63·2	61·8
22. 0	44. 30	22. 3	·1467	21. 50	·02348	22. 0	63·8	62·1
22. 10	44. 40	22. 8	·1475	21. 55	·02344	23. 0	63·8	62·3
22. 24	50. 15	22. 17	·1471	22. 28	·02360			
22. 36	47. 0	22. 20	·1480	22. 37	·02333			
22. 47	49. 20	22. 26	·1472	22. 42	·02340			
22. 54	19. 48. 0	22. 32	·1461	22. 55	·02322			
23. 12	20. 15. 45	22. 36	·1433	23. 6	·02383			
23. 35	8. 0	22. 39	·1421	23. 15	·02390			
23. 45	1. 40	22. 42	·1428	23. 23	·02345			
23. 56	5. 0	22. 46	·1414	23. 26	·02376			
23. 59	4. 10	22. 51	·1422	23. 40	·02356			
		22. 54	·1419	23. 50	·02380			
		22. 57	·1433	23. 59	·02370			
		23. 1	·1429					
		23. 18	·1481					
		23. 20	·1465					
		23. 26	·1459					
		23. 30	·1466					
		23. 33	·1478					
		23. 41	·1472					
		23. 52	·1460					
		23. 58	·1469					
Oct. 24		Oct. 24		Oct. 24		Oct. 24		
0. 0	20. 4. 0	0. 0	·1466	0. 0	·02370	0. 0	63·8	62·5
0. 3	3. 5	0. 2	·1472	0. 6	·02374	1. 0	63·6	62·5
0. 9	4. 55	0. 5	·1466	0. 13	·02360	2. 0	63·4	62·5
0. 16	2. 30	0. 12	·1471	0. 17	·02372	3. 0	63·4	62·4
0. 21	0. 40	0. 18	·1460	0. 21	·02362	9. 0	63·9	62·9

For the Horizontal and Vertical Forces, increasing readings denote increasing forces.

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Of V. F. Magnet.
Oct. 24 h m	° ′ ″	Oct. 24 h m		Oct. 24 h m		Oct. 24 h m	°	°
0. 31	20. 4. 0	0. 21	·1468	0. 32	·02402	21. 0	62·4	61·0
0. 33	1. 45	0. 25	·1459	0. 36	·02386	22. 0	62·5	61·1
0. 40	2. 50	0. 32	·1472	0. 39	·02402	23. 0	63·1	61·4
0. 41	5. 0	0. 37	·1475	0. 42	·02390			
0. 52	1. 50	0. 39	·1486	0. 43	·02406			
0. 53	2. 20	0. 42	·1480	0. 52	·02403			
0. 57	1. 10	0. 45	·1494	0. 53	·02388			
1. 1	4. 0	0. 48	·1488	0. 55	·02400			
1. 5	2. 30	0. 51	·1492	0. 58	·02392			
1. 8	4. 20	0. 56	·1484	1. 7	·02403			
1. 11	4. 0	0. 58	·1491	1. 8	·02415			
1. 13	6. 30	1. 0	·1484	1. 12	·02403			
1. 19	5. 15	1. 4	·1492	1. 17	·02417			
1. 24	6. 50	1. 7	·1489	1. 22	·02405			
1. 30	6. 10	1. 9	·1496	1. 37	·02420			
1. 37	8. 10	1. 11	·1491	1. 42	·02426			
1. 42	10. 50	1. 15	·1500	1. 50	·02436			
1. 44	10. 5	1. 17	·1494	1. 52	·02430			
1. 50	12. 50	1. 23	·1503	1. 54	·02443			
1. 54	16. 40	1. 26	·1495	2. 2	·02467			
2. 0	12. 0	1. 32	·1502	2. 4	·02453			
2. 4	20. 30	1. 34	·1496	2. 7	·02493			
2. 7	17. 10	1. 40	·1505	2. 12	·02498			
2. 9	18. 0	1. 55	·1525	2. 22	·02518			
2. 13	14. 10	1. 56	·1511	2. 24	·02506			
2. 29	9. 30	2. 3	·1531	2. 28	·02525			
2. 40	7. 55	2. 6	·1517	2. 33	·02523			
2. 41	5. 0	2. 9	·1545	2. 35	·02540			
2. 44	6. 5	2. 13	·1537	2. 48	·02573			
2. 48	1. 0	2. 16	·1545	2. 54	·02547			
2. 52	6. 55	2. 24	·1535	3. 0	·02590			
2. 57	1. 30	2. 34	·1510	3. 3	·02573			
3. 0	20. 4. 55	2. 39	·1505	3. 7	·02606			
3. 3	19. 55. 30	2. 43	·1496	3. 9	·02580			
3. 9	20. 15. 20	2. 46	·1504	3. 18	·02690			
3. 12	7. 0	2. 52	·1480	3. 22	·02663			
3. 17	20. 11. 50	2. 56	·1486	3. 23	·02703			
3. 18	19. 59. 0	3. 0	·1465	3. 32	·02634			
3. 23	19. 52. 25	3. 4	·1478	3. 34	·02680			
3. 30	20. 3. 0	3. 8	·1451	3. 38	·02667			
3. 40	7. 55	3. 15	·1489	3. 42	·02695			
3. 42	5. 40	3. 17	·1459	3. 47	·02680			
3. 50	17. 15	3. 22	·1483	3. 57	·02736			
3. 58	9. 35	3. 24	·1475	4. 2	·02707			
4. 0	14. 35	3. 27	·1448	4. 5	·02738			
4. 2	11. 15	3. 32	·1472	4. 9	·02723			
4. 10	18. 30	3. 42	·1495	4. 18	·02788			
4. 13	15. 45	3. 46	·1487	4. 22	·02774			
4. 19	16. 40	3. 54	·1512	4. 28	·02815			
4. 23	18. 25	4. 2	·1496	4. 32	·02874			
4. 28	11. 20	4. 6	·1505	4. 36	·02864			
4. 33	16. 10	4. 9	·1496	4. 38	·02896			
4. 36	7. 20	4. 21	·1533	4. 42	·02882			
4. 40	9. 40	4. 24	·1522	4. 47	·02904			
4. 45	7. 0	4. 28	·1528	4. 49	·02907			
5. 0	13. 40	4. 31	·1519	4. 50	·02905			
5. 9	27. 55	4. 35	·1506	4. 52	·02890			
5. 10	18. 30	4. 39	·1512	4. 57	·02997			

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Of V. F. Magnet.
Oct. 24 h m	° ′ ″	Oct. 24 h m		Oct. 24 h m		h m	°	°
5. 15	20. 24. 20	4. 42	·1498	5. 2	·03045			
5. 22	20. 0. 10	4. 51	·1508	5. 7	·03132			
5. 28	19. 57. 0	4. 53	·1501	5. 11	·03315			
5. 31	20. 0. 5	5. 1	·1540	5. 16	·03165			
5. 40	19. 32. 20	5. 18	·1622	5. 19	·03210			
5. 59	20. 8. 40	5. 20	·1610	5. 22	·03150			
6. 8	20. 15. 40	5. 26	·1570	5. 26	·03126			
6. 12	19. 59. 15	5. 38	·1524	5. 28	·03143			
6. 20	20. 2. 0	5. 41	·1480	5. 32	·03230			
6. 22	16. 40	5. 47	·1500	5. 36	·03170			
6. 29	20. 2. 30	5. 49	·1482	5. 39	·03204			
6. 37	19. 54. 40	5. 54	·1494	5. 42	·03050			
6. 41	20. 3. 25	5. 57	·1486	5. 44	·03065			
6. 47	19. 55. 10	6. 0	·1497	5. 48	·02975			
6. 50	56. 15	6. 5	·1471	5. 50	·02942			
6. 52	19. 54. 0	6. 12	·1484	5. 57	·02823			
7. 0	20. 0. 55	6. 15	·1464	6. 0	·02840			
7. 7	19. 53. 30	6. 27	·1527	6. 8	·02762			
7. 12	50. 30	6. 35	·1508	6. 12	·02775			
7. 17	55. 10	6. 46	·1553	6. 13	·02882			
7. 20	53. 30	6. 49	·1517	6. 18	·02840			
7. 21	56. 20	6. 52	·1528	6. 20	·02962			
7. 23	50. 15	6. 57	·1500	6. 22	·02970			
7. 28	51. 50	7. 0	·1505	6. 26	·02957			
7. 31	51. 0	7. 4	·1480	6. 32	·03052			
7. 38	56. 40	7. 8	·1490	6. 33	·03020			
7. 40	54. 20	7. 11	·1472	6. 42	·03054			
7. 45	57. 10	7. 13	·1468	6. 43	·03020			
7. 50	54. 0	7. 18	·1461	6. 44	·03030			
7. 52	58. 20	7. 22	·1476	6. 48	·02957			
8. 2	11. 0	7. 25	·1478	6. 56	·03000			
8. 12	0. 0	7. 31	·1468	7. 2	·02906			
8. 17	5. 20	7. 36	·1476	7. 4	·02878			
8. 23	37. 0	7. 39	·1486	7. 10	·02930			
8. 30	41. 30	7. 43	·1471	7. 12	·02890			
8. 33	52. 15	7. 46	·1481	7. 18	·02959			
8. 39	54. 20	7. 51	·1471	7. 20	·02938			
8. 42	59. 55	7. 56	·1478	7. 22	·02970			
8. 47	57. 0	7. 57	·1490	7. 27	·02942			
8. 49	54. 0	8. 0	·1404	7. 29	·02988			
8. 52	46. 50	8. 5	·1439	7. 32	·02968			
9. 0	50. 0	8. 7	·1404	7. 33	·02980			
9. 3	49. 0	8. 8	·1450	7. 36	·02940			
9. 7	49. 25	8. 13	·1466	7. 40	·02928			
9. 8	47. 40	8. 15	·1462	7. 42	·02940			
9. 10	48. 0	8. 17	·1473	7. 45	·02960			
9. 13	46. 5	8. 18	·1471	7. 47	·02942			
9. 19	47. 25	8. 23	·1494	7. 51	·02962			
9. 32	44. 30	8. 25	·1470	7. 52	·02930			
9. 33	46. 10	8. 27	·1447	7. 54	·02950			
9. 38	45. 0	8. 31	·1458	7. 58	·02930			
9. 49	48. 10	8. 37	·1439	8. 0	·02990			
9. 51	45. 40	8. 39	·1460	8. 4	·02581			
9. 58	49. 0	8. 43	·1408	8. 8	·02820			
10. 1	50. 50	8. 47	·1414	8. 14	·02600			
10. 12	47. 45	8. 48	·1404	8. 17	·02526			
10. 20	53. 0	8. 55	·1440	8. 20	·02559			
10. 28	47. 50	9. 2	·1409	8. 21	·02502			

The indications are taken from the sheets of the Photographic Record, except where an asterisk is attached to the number, in which instances they are inferred from observations made with the telescope in the ancient manner. The Symbol *** denotes that the magnet has been generally in a state of agitation. The Symbol (†) denotes that the register has failed between the preceding and following readings. The Symbol : attached to a time denotes that the reading will apply equally well to a considerable range of time near that which is recorded. A brace denotes that at this time the curve of the Vertical Force was dislocated, and the difference of the numbers included by the brace shows the amount of the displacement.

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
Oct. 24		Oct. 24		Oct. 24				
h m	° ′ ″	h m		h m		h m	°	°
10. 30	19. 47. 40	9. 11	·1440	8. 25	·02550			
10. 42	51. 0	9. 15	·1434	8. 29	·02480			
10. 51	49. 20	9. 18	·1436	8. 31	·02483			
11. 0	51. 30	9. 24	·1426	8. 33	·02441			
11. 7	48. 20	9. 35	·1442	8. 34	·02480			
11. 9	51. 0	9. 39	·1435	8. 38	·02423			
11. 12	52. 45	9. 45	·1444	8. 40	·02440			
11. 13	52. 30	9. 50	·1434	8. 42	·02420			
11. 22	56. 25	9. 58	·1445	8. 43	·02439			
11. 27	50. 35	10. 6	·1435	8. 47	·02403			
11. 31	50. 0	10. 14	·1444	8. 52	·02462			
11. 42	42. 10	10. 21	·1436	8. 59	·02507			
11. 48	44. 0	10. 32	·1445	9. 2	·02470			
11. 57	48. 0	10. 35	·1439	9. 3	·02486			
12. 2	44. 55	10. 39	·1443	9. 11	·02602			
12. 3	45. 0	10. 42	·1440	9. 13	·02602			
12. 8	42. 30	10. 51	·1446	9. 17	·02619			
12. 13	44. 20	10. 54	·1440	9. 19	·02610			
12. 18	42. 0	11. 0	·1447	9. 28	·02623			
12. 20	42. 25	11. 8	·1438	9. 32	·02658			
12. 30	38. 0	11. 13	·1447	9. 40	·02646			
12. 40	41. 0	11. 16	·1439	9. 42	·02648			
12. 50	48. 0	11. 19	·1442	9. 56	·02628			
12. 53	49. 45	11. 26	·1434	10. 6	·02628			
13. 3	45. 0	11. 36	·1434	10. 18	·02618			
13. 9	44. 20	11. 48	·1443	10. 26	·02627			
13. 17	46. 15	11. 58	·1431	10. 33	·02600			
13. 28	43. 55	12. 10	·1444	10. 42	·02615			
13. 40	42. 30	12. 14	·1440	10. 53	·02598			
13. 48	40. 45	12. 17	·1443	11. 2	·02605			
13. 53	40. 50	12. 23	·1436	11. 7	·02574			
14. 3	42. 30	12. 31	·1450	11. 10	·02558			
14. 21	45. 0	12. 37	·1451	11. 12	·02562			
14. 38	50. 0	12. 42	·1461	11. 20	·02517			
14. 42	49. 0	12. 50	·1450	11. 22	·02529			
14. 49	43. 0	12. 57	·1434	11. 23	·02519			
14. 57	39. 20	13. 12	·1444	11. 39	·02520			
15. 1	41. 0	13. 19	·1433	11. 52	·02523			
15. 18	45. 45	13. 36	·1427	11. 58	·02515			
15. 22	48. 20	13. 49	·1432	12. 12	·02543			
15. 28	45. 10	14. 5	·1428	12. 27	·02517			
15. 41	42. 0	14. 10	·1430	12. 36	·02533			
15. 53	47. 25	14. 22	·1426	12. 40	·02525			
15. 58	46. 50	14. 26	·1431	12. 46	·02528			
16. 18	37. 30	14. 31	·1426	13. 1	·02500			
16. 22	36. 10	14. 41	·1402	13. 7	·02504			
16. 37	42. 0	14. 46	·1413	13. 17	·02483			
16. 42	50. 30	14. 49	·1412	13. 22	·02466			
16. 45	51. 10	14. 59	·1434	13. 32	·02470			
16. 57	48. 25	15. 16	·1430	13. 38	·02462			
17. 3	48. 20	15. 20	·1433	14. 2	·02467			
17. 10	46. 0	15. 25	·1427	14. 17	·02482			
17. 14	45. 25	15. 39	·1440	14. 32	·02447			
17. 40	49. 30	15. 50	·1456	14. 38	·02408			
17. 47	48. 20	16. 7	·1447	14. 42	·02398			
17. 52	50. 15	16. 10	·1449	14. 48	·02327			
18. 0	48. 0	16. 13	·1444	14. 53	·02363			
18. 1	49. 40	16. 20	·1443	14. 54	·02356			

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
Oct. 24		Oct. 24		Oct. 24				
h m	° ′ ″	h m		h m		h m	°	°
18. 7	19. 48. 50	16. 37	·1427	15. 6	·02372			
18. 16	52. 25	16. 42	·1431	15. 10	·02365			
18. 23	52. 10	16. 52	·1435	15. 17	·02368			
18. 38	51. 0	17. 0	·1427	15. 20	·02360			
18. 42	50. 10	17. 5	·1420	15. 26	·02359			
18. 47	50. 50	17. 11	·1419	15. 32	·02332			
18. 53	49. 20	17. 20	·1414	15. 42	·02329			
18. 58	50. 15	17. 36	·1416	15. 47	·02319			
19. 1	49. 40	17. 42	·1422	15. 52	·02324			
19. 10	52. 5	17. 50	·1427	15. 53	·02322			
19. 17	52. 40	17. 55	·1420	15. 58	·02326			
19. 22	52. 0	18. 2	·1427	16. 11	·02273			
19. 30	53. 55	18. 6	·1423	16. 28	·02239			
19. 33	52. 15	18. 11	·1432	16. 39	·02246			
19. 48	51. 10	18. 16	·1427	16. 45	·02250			
19. 51	51. 40	18. 22	·1432	16. 52	·02276			
19. 59	50. 50	18. 31	·1429	17. 2	·02253			
20. 3	51. 10	18. 35	·1430	17. 8	·02233			
20. 9	51. 5	18. 42	·1425	17. 18	·02243			
20. 13	50. 45	18. 48	·1428	17. 28	·02251			
20. 21	51. 10	18. 55	·1424	17. 56	·02310			
20. 28	50. 20	19. 3	·1422	18. 12	·02307			
20. 38	50. 0	19. 7	·1427	18. 17	·02320			
20. 44	48. 50	19. 15	·1426	18. 28	·02330			
20. 50	49. 15	19. 22	·1424	18. 36	·02340			
21. 0	49. 40	19. 31	·1428	18. 52	·02339			
21. 7	51. 10	19. 39	·1424	19. 2	·02345			
21. 13	51. 40	19. 51	·1428	19. 22	·02357			
21. 23	53. 25	19. 59	·1424	19. 57	·02352			
21. 32	54. 0	20. 8	·1426	20. 10	·02358			
21. 37	53. 25	20. 24	·1419	20. 52	·02356			
21. 42	54. 20	20. 34	·1419	21. 2	·02345			
21. 49	53. 40	20. 46	·1413	21. 28	·02352			
21. 59	55. 10	20. 51	·1418	21. 49	·02366			
22. 3	54. 0	21. 0	·1416	22. 7	·02368			
22. 9	54. 25	21. 6	·1420	22. 32	·02383			
22. 27	56. 0	21. 12	·1414	22. 43	·02406			
22. 42	54. 25	21. 22	·1419	22. 55	·02403			
22. 50	57. 0	21. 30	·1413	23. 0	·02420			
22. 56	58. 0	21. 35	·1417	23. 59	·02490			
23. 0	56. 20	21. 41	·1412					
23. 10	56. 0	21. 45	·1414					
23. 16	56. 50	21. 49	·1412					
23. 26	57. 30	21. 54	·1414					
23. 33	56. 0	22. 8	·1407					
23. 43	55. 20	22. 13	·1411					
23. 52	55. 25	22. 20	·1409					
23. 57	56. 30	22. 27	·1415					
23. 59	56. 20	22. 37	·1415					
		22. 40	·1422					
		22. 50	·1430					
		22. 56	·1426					
		23. 2	·1422					
		23. 7	·1424					
		23. 10	·1422					
		23. 25	·1426					
		23. 30	·1420					
		23. 36	·1424					

For the Horizontal and Vertical Forces, increasing readings denote increasing forces.

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H.F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
h m	° ′ ″	Oct. 24 h m		h m		h m	°	°
		23. 40	·1419					
		23. 52	·1427					
		23. 59	·1423					
Oct. 25		Oct. 25		Oct. 25		Oct. 25		
0. 0	19. 56. 30	0. 0	·1422	0. 0	·02490	0. 0	63 ·5	62 ·1
0. 9	19. 59. 20	0. 11	·1437	0. 12	·02507	1. 0	63 ·3	62 ·1
0. 17	20. 0. 0	0. 17	·1438	0. 22	·02602	3. 0	63 ·8	62 ·6
0. 22	12. 25	0. 24	·1481	0. 24	·02566	7. 0	64 ·2	63 ·4
0. 27	8. 55	0. 30	·1468	0. 32	·02586	9. 0	63 ·7	63 ·1
0. 31	12. 20	0. 38	·1463	0. 34	·02598	10. 0	63 ·8	63 ·2
0. 37	11. 55	0. 47	·1509	0. 42	·02690	21. 0	63 ·6	62 ·5
0. 42	16. 0	0. 50	·1502	0. 43	·02700	22. 0	63 ·7	62 ·5
0. 50	10. 55	0. 57	·1546	0. 48	·02758	23. 0	63 ·8	62 ·6
0. 55	16. 10	1. 1	·1538	0. 52	·02800			
1. 2	11. 55	1. 8	·1573	0. 56	·02782			
1. 7	20. 30	1. 16	·1533	1. 2	·02860			
1. 17	4. 0	1. 22	·1570	1. 3	·02854			
1. 23	13. 30	1. 43	·1630	1. 17	·03000			
1. 27	8. 0	1. 47	·1596	1. 20	·03020			
1. 32	20. 9. 30	1. 57	·1628	1. 33	·03218			
1. 35	19. 59. 10	2. 3	·1604	1. 38	·03068			
1. 42	20. 13. 10	2. 8	·1532	1. 42	·03020			
1. 49	7. 0	2. 22	·1622	1. 52	·02954			
1. 52	20. 25. 15	2. 28	·1572	2. 0	·03220			
1. 57	19. 57. 0	2. 39	·1605	2. 3	·02964			
2. 3	20. 8. 10	2. 42	·1590	2. 11	·03059			
2. 8	19. 46. 30	2. 44	·1559	2. 13	·03020			
2. 13	56. 0	2. 53	·1618	2. 18	·03212			
2. 22	47. 0	2. 54	·1626	2. 19	·03127			
2. 27	54. 0	3. 14	·1758	2. 22	·03108			
2. 32	19. 51. 0	3. 22	·1734	2. 26	·02947			
2. 40	20. 8. 30	3. 26	·1740	2. 27	·02962			
2. 44	19. 46. 0	3. 42	·1840	2. 29	·02943			
2. 48	20. 1. 0	4. 7	·1724	2. 33	·03020			
2. 54	11. 20	4. 10	·1716	2. 40	·02933			
2. 59	5. 40	4. 12	·1695	2. 50	·03083			
3. 2	12. 0	4. 17	·1706	2. 52	·03128			
3. 9	0. 30	4. 22	·1726	2. 55	·03105			
3. 10	20. 20. 10	4. 27	·1640	2. 57	·03125			
3. 19	19. 57. 15	4. 32	·1618	3. 6	·03300			
3. 22	20. 15. 50	4. 35	·1597	3. 8	·03335			
3. 26	20. 11. 20	4. 38	·1634	3. 11	·03280			
3. 28	19. 57. 20	4. 41	·1575	3. 13	·03430			
3. 36	20. 31. 0	4. 50	·1630	3. 18	·03272			
	(†)	4. 52	·1592	3. 22	·03138			
3. 59	20. 31. 0	5. 0	·1624	3. 27	·03192			
4. 6	19. 43. 30	5. 1	·1670	3. 29	·03140			
4. 13	20. 25. 55	5. 9	·1716	3. 32	·03479			
4. 18	6. 20	5. 14	·1703	3. 39	·03958			
4. 24	20. 0	5. 17	·1738	3. 42	·03640			
4. 30	31. 0	5. 21	·1696	3. 48	·03373			
4. 48	14. 5	5. 25	·1715	3. 50	·03543			
5. 3	32. 0	5. 27	·1685	3. 52	·03448			
5. 16	12. 45	5. 39	·1915*	3. 54	·03713			
5. 21	29. 0	5. 53	·1710	3. 57	·03553			
5. 23	21. 50	6. 6	·1393	3. 58	·03630			
5. 30	26. 0	6. 17	·1513	4. 0	·03563			

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H.F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
Oct. 25 h m	° ′ ″	Oct. 25 h m		Oct. 25 h m		h m	°	°
5. 40	20. 29. 0	6. 32	·1272*	4. 2	·03679			
5. 48	22. 40	6. 40	·1387	4. 12	·03209			
5. 49	15. 30	6. 44	·1420	4. 17	·03640			
5. 53	8. 45	6. 46	·1394	4. 21	·03398			
6. 3	20. 25. 40	6. 52	·1418	4. 23	·03321			
6. 8	19. 44. 20	6. 59	·1466	4. 25	·03403			
6. 17	20. 19. 0	7. 3	·1438	4. 27	·03212			
6. 23	19. 51. 50	7. 9	·1456	4. 33	·02963			
6. 34	20. 21. 0	7. 11	·1450	4. 36	·03030			
6. 38	19. 41. 15	7. 18	·1468	4. 38	·03012			
6. 45	20. 28. 40	7. 21	·1450	4. 40	·03046			
6. 52	19. 54. 50	7. 30	·1482	4. 43	·02973			
6. 56	56. 40	7. 32	·1463	4. 45	·03136			
7. 0	19. 52. 0	7. 36	·1473	4. 48	·02988			
7. 3	20. 9. 20	7. 43	·1428	4. 50	·03258			
7. 8	4. 40	7. 46	·1418	4. 52	·03207			
7. 10	1. 30	7. 50	·1428	4. 55	·03264			
7. 18	8. 45	7. 59	·1411	4. 56	·03213			
7. 23	4. 15	8. 2	·1415	4. 57	·03235			
7. 28	9. 0	8. 8	·1387	4. 59	·03212			
7. 30	20. 12. 0	8. 11	·1392	5. 0	·03225			
7. 38	19. 54. 15	8. 14	·1386	5. 2	·03200			
7. 43	51. 45	8. 17	·1390	5. 5	·03300			
7. 48	47. 40	8. 19	·1387	5. 8	·03320			
7. 50	48. 20	8. 23	·1394	5. 10	·03227			
7. 53	45. 5	8. 27	·1384	5. 13	·03382			
8. 0	48. 10	8. 38	·1396	5. 16	·03343			
8. 3	52. 45	8. 43	·1416	5. 18	·03310			
8. 9	50. 40	8. 46	·1384	5. 21	·03293			
8. 13	51. 20	8. 52	·1431	5. 24	·03256			
8. 20	49. 20	8. 57	·1385	5. 28	·03330			
8. 24	50. 40	9. 1	·1391	5. 31	·03201			
8. 38	48. 35	9. 5	·1377*	5. 33	·03227			
8. 42	50. 20	9. 33	·1403	5. 34	·03101			
8. 46	49. 40	9. 34	·1385	5. 35	·03117			
8. 47	51. 0	9. 41	·1394	5. 45	·02450			
8. 53	19. 45. 40	9. 45	·1385	5. 50	·02713			
9. 0	20. 3. 40	9. 51	·1403	5. 51	·02666			
9. 3	11. 10	9. 52	·1396	5. 53	·02715			
9. 7	20. 3. 20	9. 55	·1404	5. 58	·02485			
9. 25	19. 52. 15	9. 58	·1386	6. 7	·02365			
9. 31	55. 30	10. 1	·1345*	6. 12	·02839			
9. 32	51. 10	10. 10	·1410	6. 14	·02719			
9. 39	47. 50	10. 18	·1434	6. 19	·03085			
9. 46	50. 45	10. 22	·1424	6. 28	·02209			
9. 47	47. 40	10. 33	·1446	6. 32	·02323			
9. 52	44. 10	10. 38	·1432	6. 34	·02208			
10. 2	56. 0	10. 45	·1442	6. 38	·02520			
10. 7	40. 0	10. 56	·1412	6. 41	·02540			
10. 14	32. 40	10. 59	·1414	6. 43	·02382			
10. 27	45. 15	11. 3	·1410	6. 50	·02509			
10. 30	43. 30	11. 7	·1415	6. 52	·02698			
10. 39	51. 25	11. 11	·1412	6. 57	·02610			
10. 47	48. 10	11. 20	·1420	7. 2	·02717			
10. 50	52. 20	11. 30	·1414	7. 3	·02693			
10. 58	48. 55	11. 33	·1416	7. 4	·02725			
11. 2	45. 20	11. 36	·1410	7. 7	·02655			
11. 12	41. 20	11. 39	·1414	7. 11	·02698			

October 25. The spot of light or Declination was off the sheet in the direction of *increasing* declination from $3^h. 36^m.$ to $3^h. 59.^m$

The indications are taken from the sheets of the Photographic Record, except where an asterisk is attached to the number, in which instances they are inferred from observations made with the telescope in the ancient manner. The Symbol *** denotes that the magnet has been generally in a state of agitation. The Symbol (†) denotes that the register has failed between the preceding and following readings. The Symbol : attached to a time denotes that the reading will apply equally well to a considerable range of time near that which is recorded. A brace denotes that at this time the curve of the Vertical Force was dislocated, and the difference of the numbers included by the brace shows the amount of the displacement.

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
Oct. 25		Oct. 25		Oct. 25				
h m	° ′ ″	h m		h m		h m	°	°
11. 27	19. 43. 25	11. 43	·1408	7. 18	·02648			
11. 42	41. 0	11. 47	·1411	7. 23	·02720			
11. 47	42. 5	11. 51	·1409	7. 30	·02703			
11. 50	41. 30	12. 0	·1418	7. 32	·02788			
11. 56	43. 40	12. 8	·1412	7. 34	·02831			
11. 59	43. 20	12. 10	·1418	7. 39	·02883			
12. 3	45. 0	12. 16	·1412	7. 41	·02870			
12. 10	44. 30	12. 22	·1412	7. 42	·02880			
12. 18	49. 0	12. 30	·1417	7. 47	·02840			
12. 30	47. 10	12. 36	·1412	7. 50	·02812			
12. 36	48. 50	12. 40	·1416	7. 52	·02823			
12. 40	48. 25	12. 44	·1414	7. 58	·02762			
12. 45	50. 0	12. 50	·1418	8. 2	·02718			
12. 52	48. 45	12. 57	·1417	8. 7	·02723			
13. 3	50. 0	13. 4	·1424	8. 9	·02687			
13. 11	51. 40	13. 9	·1423	8. 12	·02707			
13. 17	51. 0	13. 16	·1430	8. 14	·02700			
13. 20	51. 50	13. 28	·1431	8. 20	·02730			
13. 33	50. 40	13. 31	·1435	8. 21	·02721			
13. 45	56. 40	13. 38	·1428	8. 28	·02742			
13. 54	52. 10	13. 45	·1416	8. 31	·02732			
14. 3	50. 20	13. 59	·1418	8. 40	·02729			
14. 7	52. 55	14. 11	·1438	8. 42	·02746			
14. 13	51. 5	14. 16	·1430	8. 50	·02637			
14. 18	52. 40	14. 22	·1429	8. 52	·02660			
14. 26	51. 45	14. 31	·1439	8. 57	·02608			
14. 31	50. 10	14. 36	·1435	8. 58	·02423			
14. 38	51. 20	14. 45	·1439	9. 0	·02512			
14. 50	49. 30	14. 49	·1427	9. 2	·02530			
14. 53	50. 40	14. 51	·1440	9. 3	·02516			
15. 0	49. 0	14. 55	·1436	9. 8	·02621			
15. 3	49. 55	14. 58	·1440	9. 13	·02566			
15. 8	48. 20	15. 2	·1436	9. 18	·02592			
15. 11	49. 30	15. 7	·1444	9. 21	·02580			
15. 21	48. 0	15. 8	·1431	9. 23	·02506			
15. 30	49. 0	15. 10	·1440	9. 31	·02463			
15. 33	48. 5	15. 14	·1443	9. 38	·02346			
15. 37	49. 5	15. 17	·1436	9. 48	·02453			
15. 41	47. 55	15. 21	·1441	9. 52	·02375			
15. 49	49. 40	15. 27	·1437	9. 54	·02280			
15. 57	49. 40	15. 32	·1441	10. 2	·02380			
16. 6	48. 50	15. 36	·1440	10. 7	·02466			
16. 11	49. 25	15. 41	·1445	10. 13	·02520			
16. 17	48. 50	15. 51	·1445	10. 17	·02500			
16. 25	49. 10	16. 3	·1447	10. 20	·02521			
16. 40	49. 20	16. 17	·1446	10. 23	·02501			
16. 47	48. 25	16. 27	·1447	10. 26	·02520			
16. 58	50. 20	16. 44	·1445	10. 29	·02503			
17. 12	50. 10	16. 55	·1449	10. 32	·02523			
17. 18	49. 20	16. 59	·1444	10. 39	·02497			
17. 20	49. 55	17. 3	·1452	10. 46	·02537			
17. 33	49. 10	17. 12	·1446	10. 51	·02486			
17. 39	50. 20	17. 18	·1443	10. 57	·02491			
17. 42	49. 25	17. 25	·1448	11. 2	·02537			
17. 48	50. 10	17. 30	·1445	11. 18	·02566			
18. 1	49. 15	17. 38	·1450	11. 36	·02563			
18. 3	50. 15	17. 42	·1446	11. 41	·02573			
18. 8	50. 15	17. 47	·1451	11. 42	·02563			

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
Oct. 25		Oct. 25		Oct. 25				
h m	° ′ ″	h m		h m		h m	°	°
18. 11	19. 48. 25	17. 52	·1448	12. 0	·02578			
18. 14	52. 10	17. 59	·1447	12. 10	·02558			
18. 20	49. 25	18. 2	·1452	12. 16	·02573			
18. 29	50. 55	18. 8	·1447	12. 21	·02562			
18. 35	49. 55	18. 11	·1452	12. 32	·02578			
18. 40	50. 45	18. 15	·1446	12. 38	·02570			
18. 49	50. 45	18. 21	·1450	12. 43	·02588			
18. 57	49. 50	18. 26	·1448	12. 48	·02585			
19. 2	50. 35	18. 36	·1450	13. 6	·02600			
19. 7	49. 50	18. 50	·1446	13. 27	·02587			
19. 11	49. 5	18. 58	·1449	13. 32	·02590			
19. 14	50. 0	19. 9	·1445	13. 52	·02558			
19. 29	48. 20	19. 16	·1449	14. 13	·02576			
19. 30	48. 55	19. 32	·1446	14. 20	·02561			
19. 33	48. 0	19. 40	·1449	14. 29	·02570			
19. 40	49. 50	19. 47	·1446	14. 42	·02563			
19. 57	48. 30	19. 54	·1449	14. 50	·02578			
20. 1	47. 55	19. 58	·1446	14. 58	·02568			
20. 9	48. 45	20. 6	·1449	15. 4	·02576			
20. 30	47. 40	20. 22	·1447	15. 8	·02563			
20. 53	47. 30	20. 25	·1443	15. 11	·02581			
20. 59	47. 0	20. 31	·1447	15. 12	·02562			
21. 3	48. 30	20. 37	·1443	15. 17	·02581			
21. 4	47. 20	20. 43	·1446	15. 21	·02563			
21. 9	49. 5	20. 47	·1439	15. 26	·02578			
21. 12	47. 30	20. 49	·1444	15. 39	·02578			
21. 20	48. 45	20. 56	·1440	15. 42	·02573			
21. 28	48. 10	20. 59	·1446	15. 50	·02580			
21. 38	48. 40	21. 3	·1442	16. 10	·02570			
21. 42	50. 0	21. 6	·1447	16. 52	·02560			
21. 50	49. 20	21. 11	·1433	17. 2	·02566			
22. 0	50. 25	21. 17	·1442	17. 7	·02558			
22. 9	49. 25	21. 22	·1434	17. 12	·02560			
22. 22	52. 10	21. 29	·1438	17. 19	·02553			
22. 29	51. 25	21. 35	·1433	17. 31	·02552			
22. 39	54. 15	21. 43	·1438	18. 20	·02541			
22. 42	53. 10	21. 49	·1434	18. 52	·02538			
22. 50	53. 20	21. 54	·1440	19. 36	·02533			
22. 57	54. 20	22. 2	·1434	20. 8	·02530			
23. 6	54. 0	22. 10	·1442	20. 12	·02534			
23. 11	54. 50	22. 17	·1436	20. 42	·02526			
23. 21	54. 30	22. 26	·1443	20. 50	·02533			
23. 27	53. 25	22. 38	·1439	20. 52	·02522			
23. 33	53. 40	22. 49	·1441	20. 59	·02538			
23. 43	52. 40	22. 57	·1436	21. 2	·02525			
23. 59	53. 20	23. 1	·1444	21. 6	·02542			
		23. 9	·1434	21. 8	·02530			
		23. 15	·1442	21. 12	·02540			
		23. 20	·1435	21. 14	·02520			
		23. 27	·1440	21. 23	·02538			
		23. 30	·1435	21. 30	·02526			
		23. 40	·1435	21. 48	·02538			
		23. 46	·1430	21. 57	·02530			
		23. 51	·1434	22. 3	·02538			
		23. 59	·1435	22. 10	·02526			
				22. 41	·02530			
				23. 0	·02540			
				23. 59	·02562			

For the Horizontal and Vertical Forces, increasing readings denote increasing forces.

November 4. VERTICAL FORCE.—The adjustments were altered, so that the readings were increased by $19^{div}.84$ or by 0·01074 parts of the whole Vertical Force. It will be necessary therefore to diminish the indications on November 8 and December 17 by 0·01074 to connect them with the indications on the days preceding November 4.

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H.F. Magnet.	Readings of Thermometers. Of V.F. Magnet.
Nov. 8		Nov. 8		Nov. 8		Nov. 8		
h m	° ′ ″	h m		h m		h m	°	°
0. 0	20. 0. 50	0. 0	·1468	0. 0	·03365	0. 0	63·3	62·7
0. 5	2. 0	0. 2	·1468	0. 17	·03362	1. 0	63·5	62·7
0. 11	1. 15	0. 11	·1461	0. 22	·03376	3. 0	63·3	62·7
0. 13	0. 10	0. 16	·1466	0. 32	·03365	9. 0	63·4	63·2
0. 23	2. 45	0. 20	·1469	0. 49	·03367	21. 0	63·5	62·6
0. 31	1. 30	0. 28	·1465	0. 52	·03382	22. 0	63·5	62·5
0. 35	20. 1. 45	0. 35	·1464	1. 2	·03388	23. 0	63·5	62·9
0. 43	19. 59. 25	0. 37	·1461	1. 31	·03385			
0. 52	20. 1. 20	0. 39	·1465	1. 43	·03400			
0. 55	1. 0	0. 42	·1461	1. 48	·03387			
1. 1	3. 15	0. 49	·1469	1. 52	·03397			
1. 4	4. 0	0. 51	·1468	1. 56	·03388			
1. 9	6. 20	0. 54	·1472	2. 2	·03404			
1. 17	4. 30	0. 58	·1474	2. 7	·03410			
1. 30	4. 40	1. 0	·1471	2. 12	·03400			
1. 40	8. 0	1. 8	·1478	2. 18	·03420			
1. 56	3. 0	1. 14	·1472	2. 22	·03386			
2. 3	5. 40	1. 17	·1476	2. 27	·03420			
2. 10	3. 20	1. 20	·1470	2. 33	·03444			
2. 12	20. 6. 40	1. 28	·1467	2. 50	·03420			
2. 20	19. 59. 20	1. 37	·1479	2. 57	·03442			
2. 33	20. 11. 0	1. 43	·1479	3. 16	·03426			
2. 37	11. 25	1. 47	·1475	3. 21	·03432			
2. 51	5. 50	1. 49	·1478	3. 33	·03422			
2. 58	11. 0	1. 54	·1472	3. 42	·03433			
3. 10	9. 50	1. 59	·1477	3. 51	·03422			
3. 18	10. 5	2. 3	·1479	4. 2	·03437			
3. 23	7. 40	2. 11	·1475	4. 3	·03423			
3. 26	7. 55	2. 15	·1483	4. 9	·03440			
3. 31	5. 10	2. 20	·1459	4. 22	·03441			
3. 35	6. 20	2. 32	·1483	4. 28	·03460			
3. 46	7. 40	2. 37	·1485	4. 39	·03473			
3. 50	7. 0	2. 48	·1476	4. 51	·03499			
3. 55	8. 30	2. 52	·1474	5. 2	·03502			
4. 1	9. 30	2. 59	·1488	5. 29	·03542			
4. 4	7. 20	3. 1	·1483	5. 43	·03616			
4. 9	9. 20	3. 10	·1486	5. 52	·03610			
4. 11	8. 40	3. 15	·1482	6. 3	·03643			
4. 18	9. 15	3. 23	·1485	6. 12	·03648			
4. 25	5. 45	3. 27	·1479	6. 21	·03716			
4. 30	8. 20	3. 30	·1484	6. 23	·03700			
4. 34	6. 0	3. 35	·1478	6. 28	·03719			
4. 40	4. 20	3. 42	·1487	6. 36	·03742			
4. 50	5. 15	3. 49	·1491	6. 42	·03780			
5. 2	20. 1. 45	3. 53	·1485	6. 50	·03798			
5. 8	19. 58. 40	3. 57	·1486	6. 51	·03776			
5. 14	20. 0. 10	4. 1	·1490	6. 54	·03780			
5. 29	8. 0	4. 5	·1482	6. 58	·03754			
5. 32	12. 25	4. 9	·1490	7. 2	·03760			
5. 37	14. 45	4. 15	·1484	7. 3	·03734			
5. 40	13. 50	4. 18	·1487	7. 11	·03670			
5. 42	14. 15	4. 25	·1475	7. 16	·03604			
5. 51	9. 0	4. 30	·1488	7. 30	·03540			
5. 54	9. 20	4. 33	·1485	7. 33	·03546			
6. 0	8. 5	4. 37	·1494	7. 34	·03541			
6. 4	13. 5	4. 40	·1489	7. 39	·03550			
6. 10	14. 25	4. 47	·1493	7. 43	·03542			
6. 13	13. 20	4. 56	·1485	7. 57	·03550			

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H.F. Magnet.	Readings of Thermometers. Of V.F. Magnet.
Nov. 8		Nov. 8		Nov. 8				
h m	° ′ ″	h m		h m		h m	°	°
6. 18	20. 12. 50	5. 0	·1487	8. 8	·03508			
6. 32	6. 20	5. 3	·1484	8. 22	·03512			
6. 37	6. 40	5. 13	·1496	8. 32	·03498			
6. 47	2. 10	5. 23	·1506	8. 47	·03513			
6. 49	20. 2. 40	5. 26	·1503	9. 11	·03514			
6. 57	19. 55. 40	5. 29	·1505	9. 18	·03506			
7. 1	52. 40	5. 36	·1492	10. 3	·03517			
7. 3	34. 40	5. 37	·1494	10. 42	·03472			
7. 11	30. 45	5. 40	·1488	11. 9	·03486			
7. 12	26. 15	5. 43	·1490	11. 22	·03498			
7. 20	32. 20	5. 46	·1482	11. 41	·03480			
7. 28	41. 40	5. 51	·1496	11. 52	·03480			
7. 32	44. 0	5. 54	·1496	12. 16	·03420			
7. 39	41. 20	5. 56	·1491	12. 40	·03438			
7. 42	44. 0	6. 1	·1500	12. 52	·03430			
7. 47	41. 55	6. 13	·1480	13. 12	·03438			
7. 49	35. 0	6. 21	·1458	13. 36	·03418			
7. 52	30. 45	6. 26	·1450	13. 59	·03422			
7. 58	34. 55	6. 29	·1456	14. 12	·03402			
8. 2	35. 35	6. 30	·1452	14. 17	·03410			
8. 7	42. 0	6. 35	·1474	14. 31	·03408			
8. 12	42. 45	6. 39	·1467	14. 50	·03345			
8. 22	39. 0	6. 45	·1464	15. 0	·03352			
8. 30	40. 40	6. 49	·1447	15. 9	·03350			
8. 34	43. 15	6. 53	·1442	15. 20	·03368			
8. 42	44. 40	6. 59	·1419	15. 35	·03358			
8. 46	44. 5	7. 4	·1446	15. 38	·03346			
9. 0	45. 20	7. 8	·1457	15. 49	·03360			
9. 18	47. 5	7. 10	·1460	15. 51	·03358			
9. 22	48. 5	7. 13	·1477	16. 2	·03370			
10. 2	47. 0	7. 19	·1479	16. 7	·03362			
10. 7	47. 20	7. 24	·1471	16. 10	·03378			
10. 12	43. 25	7. 26	·1469	16. 18	·03366			
10. 19	42. 30	7. 32	·1442	16. 21	·03390			
10. 30	43. 15	7. 34	·1446	16. 27	·03358			
10. 41	40. 35	7. 38	·1438	16. 31	·03380			
10. 48	41. 0	7. 45	·1439	16. 38	·03372			
10. 52	39. 40	7. 50	·1456	16. 42	·03387			
11. 18	38. 0	7. 54	·1461	16. 50	·03360			
11. 27	38. 25	8. 0	·1469	16. 52	·03370			
11. 32	37. 0	8. 9	·1454	17. 0	·03372			
11. 42	36. 10	8. 14	·1452	17. 6	·03382			
12. 2	38. 50	8. 20	·1461	17. 10	·03362			
12. 11	40. 25	8. 27	·1465	17. 13	·03370			
12. 20	38. 30	8. 30	·1473	17. 18	·03373			
12. 21	38. 25	8. 39	·1447	17. 21	·03360			
12. 34	40. 0	8. 47	·1460	17. 27	·03375			
12. 37	39. 50	9. 2	·1459	17. 37	·03363			
12. 42	42. 10	9. 14	·1463	17. 40	·03370			
12. 57	44. 20	9. 19	·1469	17. 46	·03363			
13. 3	46. 10	10. 14	·1461	17. 52	·03370			
13. 9	46. 40	10. 17	·1472	17. 58	·03360			
13. 23	45. 25	10. 23	·1466	18. 2	·03363			
13. 30	45. 30	10. 26	·1469	18. 8	·03378			
13. 40	45. 0	10. 34	·1467	18. 11	·03360			
13. 45	45. 45	10. 39	·1457	18. 20	·03375			
13. 50	47. 10	10. 43	·1458	18. 30	·03362			
14. 0	47. 40	10. 47	·1452	18. 43	·03380			

The indications are taken from the sheets of the Photographic Record, except where an asterisk is attached to the number, in which instances they are inferred from observations made with the telescope in the ancient manner. The Symbol *** denotes that the magnet has been generally in a state of agitation. The Symbol (†) denotes that the register has failed between the preceding and following readings. The Symbol : attached to a time denotes that the reading will apply equally well to a considerable range of time near that which is recorded. A brace denotes that at this time the curve of the Vertical Force was dislocated, and the difference of the numbers included by the brace shows the amount of the displacement.

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Of V. F. Magnet.
Nov. 8		Nov. 8		Nov. 8				
h m	° ′ ″	h m		h m		h m	°	°
14. 3	19. 48. 10	10. 55	·1449	19. 9	·03382			
14. 10	47. 15	11. 3	·1452	19. 12	·03400			
14. 20	51. 10	11. 11	·1450	19. 17	·03387			
14. 27	52. 50	11. 18	·1446	19. 21	·03398			
14. 32	54. 50	11. 28	·1455	19. 58	·03419			
14. 40	51. 0	11. 33	·1452	20. 2	·03410			
14. 48	49. 30	11. 41	·1458	20. 9	·03422			
14. 52	48. 0	11. 48	·1461	20. 17	·03403			
15. 2	50. 10	12. 0	·1473	20. 21	·03422			
15. 9	49. 55	12. 8	·1469	20. 28	·03410			
15. 23	55. 10	12. 17	·1454	20. 32	·03424			
15. 30	54. 50	12. 32	·1458	20. 40	·03410			
15. 35	56. 10	12. 46	·1468	20. 48	·03420			
15. 42	54. 30	12. 50	·1466	21. 12	·03423			
15. 49	56. 20	12. 53	·1469	21. 18	·03410			
15. 59	57. 5	12. 57	·1464	21. 36	·03414			
16. 2	58. 25	13. 0	·1467	21. 42	·03400			
16. 8	56. 0	13. 6	·1463	21. 51	·03403			
16. 12	57. 5	13. 15	·1468	22. 0	·03418			
16. 17	19. 55. 15	13. 20	·1468	22. 21	·03400			
16. 22	20. 0. 15	13. 26	·1472	22. 28	·03415			
16. 28	19. 50. 50	13. 31	·1469	22. 32	·03401			
16. 32	53. 20	13. 42	·1471	22. 33	·03392			
16. 40	51. 15	13. 47	·1469	22. 43	·03415			
16. 45	55. 45	14. 4	·1476	23. 0	·03412			
16. 50	50. 30	14. 10	·1472	23. 10	·03423			
16. 57	53. 40	14. 15	·1478	23. 59	·03475			
17. 2	55. 0	14. 20	·1481					
17. 4	58. 0	14. 39	·1499					
17. 8	52. 20	14. 50	·1481					
17. 11	54. 50	15. 0	·1477					
17. 13	53. 0	15. 9	·1468					
17. 18	55. 40	15. 15	·1469					
17. 20	51. 20	15. 17	·1471					
17. 24	54. 20	15. 23	·1466					
17. 34	51. 25	15. 32	·1474					
17. 37	52. 45	15. 37	·1467					
17. 41	51. 0	15. 47	·1477					
17. 45	50. 40	15. 51	·1472					
17. 50	51. 50	15. 57	·1473					
17. 52	51. 50	16. 0	·1477					
17. 54	52. 40	16. 5	·1469					
18. 0	51. 0	16. 10	·1474					
18. 6	54. 50	16. 17	·1472					
18. 9	53. 50	16. 20	·1488					
18. 15	55. 20	16. 24	·1462					
18. 30	48. 20	16. 27	·1475					
18. 34	48. 0	16. 38	·1474					
18. 46	48. 15	16. 42	·1485					
18. 53	46. 30	16. 45	·1489					
19. 0	47. 40	16. 48	·1484					
19. 3	46. 45	16. 53	·1496					
19. 7	50. 0	16. 58	·1494					
19. 12	47. 40	17. 2	·1504					
19. 20	48. 40	17. 6	·1491					
19. 24	50. 15	17. 9	·1498					
19. 29	49. 40	17. 11	·1493					
19. 37	52. 0	17. 15	·1495					

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Of V. F. Magnet.
Nov. 8		Nov. 8						
h m	° ′ ″	h m		h m		h m	°	°
19. 40	19. 50. 45	17. 19	·1483					
19. 42	51. 40	17. 22	·1491					
19. 46	51. 15	17. 29	·1487					
19. 52	53. 40	17. 32	·1482					
19. 59	51. 10	17. 35	·1488					
20. 2	53. 0	17. 39	·1482					
20. 8	51. 15	17. 44	·1483					
20. 11	48. 40	17. 47	·1489					
20. 17	50. 10	17. 50	·1488					
20. 20	49. 25	17. 53	·1492					
20. 28	51. 20	17. 56	·1487					
20. 32	50. 20	18. 0	·1489					
20. 40	51. 45	18. 5	·1503					
20. 43	49. 25	18. 10	·1496					
20. 49	50. 40	18. 15	·1487					
20. 52	49. 50	18. 18	·1495					
21. 2	50. 40	18. 23	·1482					
21. 11	48. 55	18. 30	·1473					
21. 27	50. 0	18. 32	·1475					
21. 32	48. 15	18. 35	·1471					
21. 38	49. 0	18. 38	·1475					
21. 43	48. 0	18. 42	·1470					
21. 50	50. 40	18. 48	·1466					
21. 58	51. 35	18. 52	·1462					
22. 2	50. 30	18. 56	·1450					
22. 9	51. 0	19. 0	·1445					
22. 16	55. 50	19. 2	·1456					
22. 27	53. 40	19. 7	·1442					
22. 36	56. 10	19. 10	·1456					
22. 40	55. 40	19. 13	·1444					
22. 44	56. 50	19. 21	·1456					
22. 58	19. 57. 0	19. 35	·1465					
23. 8	20. 0. 20	19. 42	·1458					
23. 17	1. 45	19. 53	·1466					
23. 34	1. 0	19. 59	·1459					
23. 40	3. 45	20. 3	·1463					
23. 41	3. 0	20. 9	·1457					
23. 42	3. 30	20. 15	·1455					
23. 52	3. 30	20. 17	·1459					
23. 59	4. 0	20. 26	·1453					
		20. 29	·1458					
		20. 37	·1452					
		20. 44	·1448					
		20. 49	·1453					
		20. 54	·1449					
		21. 1	·1455					
		21. 3	·1453					
		21. 9	·1458					
		21. 20	·1450					
		21. 32	·1456					
		21. 44	·1445					
		21. 47	·1447					
		21. 50	·1442					
		21. 58	·1454					
		22. 12	·1444					
		22. 22	·1454					
		22. 30	·1443					
		22. 40	·1436					

For the Horizontal and Vertical Forces, increasing readings denote increasing forces.

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers.	
							Of H. F. Magnet.	Of V. F. Magnet.
		Nov. 8						
h m	° ′ ″	h m		h m		h m	°	°
		22. 52	·1441					
		22. 57	·1436					
		23. 1	·1437					
		23. 8	·1432					
		23. 14	·1442					
		23. 23	·1443					
		23. 37	·1447					
		23. 40	·1446					
		23. 47	·1448					
		23. 50	·1447					
		23. 52	·1450					
		23. 59	·1442					
Dec. 17		Dec. 17		Dec. 17		Dec. 17		
0. 0	20. 2. 0	0. 0	·1480	0. 0	·03283	0. 0	64 ·4	62 ·4
0. 1	0. 55	0. 2	·1475	0. 10	·03294	1. 0	64 ·1	62 ·4
0. 4	20. 1. 40	0. 5	·1480	0. 16	·03318	2. 0	64 ·0	62 ·0
0. 9	19. 59. 40	0. 9	·1482	0. 19	·03308	3. 0	63 ·7	62 ·0
0. 11	20. 2. 30	0. 12	·1491	0. 26	·03343	9. 0	63 ·2	61 ·0
0. 14	19. 59. 50	0. 15	·1484	0. 32	·03342	22. 30	62 ·8	60 ·6
0. 20	20. 2. 40	0. 23	·1498	0. 41	·03362			
0. 30	19. 59. 10	0. 29	·1484	0. 47	·03346			
0. 37	20. 1. 10	0. 36	·1487	1. 2	·03380			
0. 47	19. 56. 40	0. 47	·1474	1. 28	·03383			
0. 49	57. 0	0. 52	·1478	1. 32	·03406			
0. 53	58. 20	1. 0	·1472	1. 38	·03386			
0. 58	57. 25	1. 10	·1476	1. 42	·03373			
1. 0	57. 55	1. 15	·1470	2. 9	·03419			
1. 8	56. 20	1. 27	·1476	2. 20	·03412			
1. 12	57. 55	1. 30	·1486	2. 29	·03430			
1. 18	19. 57. 50	1. 35	·1479	2. 50	·03512			
1. 23	20. 0. 20	1. 38	·1476	2. 59	·03580			
1. 30	7. 10	1. 43	·1465	3. 2	·03562			
1. 39	20. 2. 30	1. 50	·1464		(†)			
1. 44	19. 59. 20	1. 55	·1466	3. 23	·03600			
1. 50	19. 59. 10	2. 4	·1474	3. 25	·03617			
1. 54	20. 0. 20	2. 13	·1466	3. 30	·03588			
1. 58	0. 10	2. 23	·1468	3. 32	·03604			
2. 2	1. 50	2. 30	·1475	3. 40	·03600			
2. 10	20. 2. 25	2. 36	·1474	3. 47	·03620			
2. 19	19. 59. 20	2. 41	·1509	3. 53	·03606			
2. 22	20. 0. 0	2. 48	·1502	4. 0	·03570			
2. 28	19. 58. 55	2. 57	·1530	4. 9	·03566			
2. 30	59. 50	2. 59	·1519	4. 12	·03582			
2. 39	19. 57. 50	3. 2	·1518	4. 28	·03640			
2. 46	20. 4. 40	3. 8	·1498	4. 37	·03665			
2. 50	7. 55	3. 9	·1500	4. 41	·03620			
2. 56	17. 20	3. 12	·1490	4. 50	·03579			
3. 0	14. 55	3. 21	·1499	4. 54	·03598			
3. 3	16. 40	3. 27	·1479	4. 59	·03584			
3. 17	3. 40	3. 35	·1511	5. 7	·03643			
3. 23	20. 6. 0	3. 40	·1504	5. 10	·03664			
3. 29	19. 59. 10	3. 42	·1505	5. 19	·03739			
3. 32	20. 0. 0	3. 49	·1488	5. 23	·03672			
3. 38	8. 25	3. 53	·1497	5. 30	·03620			
3. 41	9. 50	3. 56	·1494	5. 39	·03548			
3. 43	9. 20	4. 0	·1507	5. 44	·03517			
3. 44	11. 5	4. 10	·1485	5. 50	·03610			

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers.	
							Of H. F. Magnet.	Of V. F. Magnet.
Dec. 17		Dec. 17		Dec. 17				
h m	° ′ ″	h m		h m		h m	°	°
3. 50	20. 6. 30	4. 18	·1500	5. 57	·03429			
3. 53	6. 0	4. 25	·1478	5. 59	·03411			
3. 59	5. 55	4. 29	·1485	6. 4	·03512			
4. 3	11. 40	4. 35	·1458	6. 7	·03503			
4. 9	11. 25	4. 42	·1477	6. 11	·03533			
4. 12	8. 20	4. 46	·1468	6. 16	·03543			
4. 14	8. 40	4. 49	·1479	6. 26	·03543			
4. 23	15. 20	4. 53	·1481	6. 31	·03578			
4. 29	9. 40	4. 57	·1491	6. 37	·03584			
4. 32	13. 0	5. 0	·1482	6. 38	·03578			
4. 35	8. 20	5. 5	·1490	6. 41	·03584			
4. 39	2. 25	5. 10	·1473	6. 42	·03572			
4. 41	0. 10	5. 17	·1477	6. 48	·03600			
4. 44	3. 30	5. 20	·1466	6. 51	·03590			
4. 47	2. 10	5. 23	·1444	6. 52	·03600			
4. 50	2. 40	5. 25	·1447	6. 57	·03582			
4. 54	1. 0	5. 29	·1438	7. 2	·03623			
5. 1	8. 25	5. 33	·1443	7. 10	·03598			
5. 4	7. 10	5. 38	·1439	7. 20	·03560			
5. 8	9. 40	5. 41	·1447	7. 32	·03558			
5. 11	20. 6. 50	5. 43	·1471	7. 44	·03532			
5. 17	19. 56. 10	5. 45	·1490	7. 52	·03533			
5. 21	57. 25	5. 48	·1484	8. 2	·03522			
5. 23	56. 15	5. 52	·1517	8. 11	·03562			
5. 29	47. 20	5. 55	·1419	8. 21	·03494			
5. 31	48. 20	6. 0	·1432	8. 23	·03496			
5. 34	47. 10	6. 5	·1427	8. 41	·03360			
5. 41	52. 0	6. 7	·1423	8. 48	·03374			
5. 43	50. 40	6. 9	·1415	8. 53	·03322			
5. 50	19. 55. 50	6. 14	·1424	8. 58	·03317			
5. 57	20. 18. 10	6. 20	·1428	9. 0	·03320			
6. 0	20. 9. 0	6. 26	·1447	9. 4	·03303			
6. 6	19. 53. 50	6. 28	·1454	9. 11	·03303			
6. 11	55. 10	6. 33	·1450	9. 14	·03310			
6. 17	51. 55	6. 36	·1456	9. 19	·03298			
6. 22	55. 10	6. 40	·1446	9. 28	·03334			
6. 28	54. 0	6. 44	·1458	9. 37	·03312			
6. 31	56. 45	6. 49	·1439	9. 48	·03280			
6. 36	59. 0	6. 54	·1393	9. 52	·03300			
6. 39	19. 58. 20	7. 8	·1415	10. 2	·03307			
6. 43	20. 1. 40	7. 15	·1411	10. 13	·03295			
6. 46	1. 10	7. 36	·1427	10. 20	·03284			
6. 50	10. 0	7. 46	·1419	10. 28	·03288			
6. 56	12. 45	7. 53	·1428	10. 39	·03258			
7. 0	20. 4. 20	7. 57	·1424	10. 52	·03242			
7. 9	19. 47. 0	8. 0	·1432	11. 0	·03246			
7. 13	46. 40	8. 1	·1436	11. 12	·03228			
7. 22	45. 0	8. 8	·1424	11. 21	·03235			
7. 32	45. 5	8. 13	·1421	11. 28	·03222			
7. 38	44. 0	8. 18	·1421	11. 37	·03228			
7. 48	47. 5	8. 22	·1430	11. 46	·03213			
7. 53	43. 25	8. 29	·1429	11. 50	·03210			
8. 0	43. 15	8. 35	·1422	12. 10	·03200			
8. 5	39. 25	8. 40	·1427	12. 28	·03220			
8. 11	43. 20	8. 45	·1420	12. 34	·03212			
8. 19	40. 5	8. 55	·1429	12. 46	·03220			
8. 23	42. 0	9. 3	·1420	12. 57	·03208			
8. 26	41. 15	9. 10	·1419	13. 11	·03203			

The indications are taken from the sheets of the Photographic Record, except where an asterisk is attached to the number, in which instances they are inferred from observations made with the telescope in the ancient manner. The Symbol *** denotes that the magnet has been generally in a state of agitation. The Symbol (†) denotes that the register has failed between the preceding and following readings. The Symbol ; attached to a time denotes that the reading will apply equally well to a considerable range of time near that which is recorded. A brace denotes that at this time the curve of the Vertical Force was dislocated, and the difference of the numbers included by the brace shows the amount of the displacement.

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
Dec. 17		Dec. 17		Dec. 17				
h m	° ′ ″	h m		h m		h m	°	°
8. 38	19. 51. 20	9. 15	·1411	13. 20	·03170			
8. 42	49. 10	9. 23	·1419	13. 28	·03146			
8. 52	47. 45	9. 29	·1414	13. 41	·03088			
8. 56	46. 0	9. 40	·1411	13. 48	·03060			
9. 0	46. 20	9. 47	·1405	13. 54	·03015			
9. 4	43. 40	9. 55	·1420	14. 2	·03018			
9. 9	44. 30	10. 4	·1426	14. 3	·03005			
9. 18	43. 25	10. 8	·1423	14. 13	·03012			
9. 21	42. 0	10. 13	·1426	14. 18	·03006			
9. 28	43. 0	10. 19	·1423	14. 30	·03022			
9. 40	37. 5	10. 24	·1428	15. 2	·03080			
9. 48	36. 10	10. 32	·1425	15. 7	·03077			
9. 52	34. 0	10. 38	·1421	15. 23	·03087			
10. 7	34. 55	10. 53	·1417	15. 50	·03123			
10. 13	34. 25	11. 5	·1424	16. 38	·03157			
10. 31	41. 10	11. 15	·1419	17. 52	·03160			
10. 40	41. 10	11. 23	·1422	18. 6	·03165			
10. 52	38. 15	11. 30	·1418	20. 19	·03162			
11. 11	38. 30	11. 39	·1424	21. 37	·03152			
11. 17	40. 10	11. 52	·1412	21. 58	·03165			
11. 25	40. 5	12. 4	·1417	22. 10	·03153			
11. 30	41. 20	12. 15	·1412	22. 20	·03160			
11. 54	37. 50	12. 29	·1420	22. 25	·03142			
12. 4	36. 35	12. 43	·1417	22. 28	·03143			
12. 10	38. 40	12. 52	·1423	22. 39	·03163			
12. 18	39. 0	13. 6	·1420	22. 42	·03134			
12. 22	38. 25	13. 12	·1424	22. 50	·03166			
12. 32	41. 35	13. 27	·1405	23. 0	·03150			
12. 40	41. 10	13. 37	·1416	23. 9	·03178			
12. 50	42. 0	13. 43	·1422	23. 42	·03167			
12. 59	40. 40	13. 48	·1421	23. 59	·03180			
13. 8	41. 20	13. 55	·1409					
13. 11	41. 0	14. 14	·1432					
13. 20	45. 50	14. 22	·1435					
13. 23	46. 30	14. 31	·1446					
13. 32	50. 10	14. 39	·1450					
13. 38	51. 0	14. 47	·1450					
13. 50	58. 55	14. 54	·1446					
13. 52	57. 55	15. 4	·1454					
13. 56	57. 30	15. 7	·1450					
14. 1	54. 20	15. 16	·1454					
14. 9	52. 0	15. 28	·1444					
14. 13	52. 30	15. 32	·1446					
14. 22	50. 0	15. 41	·1442					
14. 31	44. 15	15. 49	·1448					
14. 42	40. 35	15. 59	·1447					
14. 47	40. 10	16. 16	·1451					
14. 50	40. 50	16. 22	·1449					
14. 59	40. 40	16. 38	·1455					
15. 3	40. 15	16. 48	·1453					
15. 10	41. 0	17. 1	·1457					
15. 20	41. 50	17. 10	·1454					
15. 26	41. 20	17. 36	·1454					

Greenwich Mean Solar Time.	Western Declination.	Greenwich Mean Solar Time.	Horizontal Force in parts of the whole H. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Vertical Force in parts of the whole V. F. uncorrected for Temperature.	Greenwich Mean Solar Time.	Readings of Thermometers. Of H. F. Magnet.	Readings of Thermometers. Of V. F. Magnet.
Dec. 17		Dec. 17						
h m	° ′ ″	h m		h m		h m	°	°
15. 31	19. 41. 30	17. 43	·1456					
15. 38	43. 0	17. 50	·1453					
15. 43	42. 30	18. 4	·1460					
15. 58	45. 40	18. 14	·1457					
16. 8	45. 30	18. 51	·1469					
16. 13	46. 20	19. 31	·1462					
16. 27	46. 20	19. 45	·1465					
16. 41	49. 0	19. 54	·1461					
16. 53	49. 25	20. 0	·1466					
17. 3	50. 25	20. 15	·1462					
17. 11	49. 25	20. 20	·1465					
17. 43	50. 40	20. 37	·1463					
17. 58	49. 20	20. 46	·1460					
18. 14	50. 20	20. 57	·1464					
18. 46	49. 10	21. 3	·1463					
19. 11	50. 0	21. 10	·1467					
19. 30	49. 35	21. 30	·1462					
19. 37	48. 55	21. 49	·1454					
19. 52	49. 50	21. 56	·1461					
19. 58	48. 40	22. 1	·1457					
20. 9	49. 55	22. 5	·1459					
20. 16	48. 55	22. 14	·1450					
20. 23	50. 5	22. 19	·1453					
20. 39	50. 10	22. 24	·1446					
20. 49	49. 15	22. 34	·1445					
20. 57	50. 30	22. 40	·1456					
21. 1	50. 0	22. 47	·1440					
21. 9	51. 30	22. 56	·1454					
21. 14	51. 20	23. 0	·1446					
21. 18	52. 0	23. 7	·1451					
21. 22	51. 0	23. 13	·1464					
21. 27	51. 40	23. 28	·1471					
21. 30	50. 15	23. 32	·1469					
21. 33	50. 30	23. 41	·1472					
21. 50	49. 20	23. 59	·1471					
21. 57	51. 45							
22. 0	50. 40							
22. 10	52. 40							
22. 12	50. 25							
22. 17	52. 55							
22. 20	55. 20							
22. 22	51. 30							
22. 33	51. 0							
22. 40	56. 20							
22. 46	49. 55							
22. 52	55. 40							
23. 13	55. 55							
23. 21	54. 55							
23. 27	56. 40							
23. 35	54. 55							
23. 39	55. 20							
23. 52	53. 45							
23. 59	55. 10							

For the Horizontal and Vertical Forces, increasing readings denote increasing forces.

ROYAL OBSERVATORY, GREENWICH.

RESULTS

OF

OBSERVATIONS

OF THE

MAGNETIC DIP.

1870.

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

Day and Approximate Hour, 1870.	Needle.	Length of Needle.	Magnetic Dip.	Observer.
d h			° ′ ″	
January 6. 1	D 1	3 inches	67. 59. 3	N
6. 2	Dover A 1	3 "	67. 54. 37	N
6. 21	Simms No. 1	3 "	67. 54. 17	N
6. 22	D 2	3 "	67. 54. 52	N
6. 23	Simms No. 2	3 "	67. 53. 37	N
7. 0	Dover A 2	3 "	67. 54. 39	N
7. 1	Dover A 1	3 "	67. 55. 24	N
11. 1	Dover A 2	3 "	67. 54. 17	N
11. 2	Dover A 1	3 "	67. 54. 19	N
12. 0	C 1	6 "	67. 54. 49	N
12. 1	Dover A 2	3 "	67. 51. 4	N
12. 2	D 1	3 "	67. 54. 6	N
12. 23	Dover A 1	3 "	67. 53. 34	N
13. 0	B 1	9 "	67. 53. 30	N
13. 1	Simms No. 1	3 "	67. 55. 8	N
13. 2	Dover A 2	3 "	67. 53. 6	N
20. 2	Dover A 1	3 "	67. 51. 4	N
21. 1	Dover A 2	3 "	67. 53. 15	N
21. 2	B 2	9 "	67. 51. 41	N
24. 1	C 2	6 "	67. 53. 17	N
24. 2	Simms No. 1	3 "	67. 53. 2	N
24. 21	C 1	6 "	67. 55. 12	N
24. 23	D 2	3 "	67. 56. 4	N
25. 0	D 2	3 "	67. 52. 15	N
25. 0	Simms No. 2	3 "	67. 52. 37	N
25. 1	Simms No. 2	3 "	67. 52. 16	N
25. 3	C 1	6 "	67. 52. 54	N
29. 1	B 2	9 "	67. 53. 30	N
February 4. 2	C 1	6 "	67. 53. 42	N
10. 1	D 2	3 "	67. 55. 42	N
10. 2	D 2	3 "	67. 53. 45	N
18. 2	C 2	6 "	67. 53. 51	N
21. 2	B 1	9 "	67. 48. 35	N
22. 0	Simms No. 1	3 "	67. 55. 39	N
22. 1	D 1	3 "	67. 57. 54	N
22. 2	D 2	3 "	67. 56. 19	N
22. 2	Simms No. 2	3 "	67. 53. 49	N
24. 2	B 2	9 "	67. 51. 25	N
25. 2	C 1	6 "	67. 54. 28	N
28. 2	B 1	9 "	67. 51. 18	N
March 8. 0	C 2	6 "	67. 52. 30	N
10. 2	B 1	9 "	67. 52. 4	N
15. 2	D 1	3 "	67. 54. 9	N
16. 2	D 2	3 "	67. 55. 50	N
19. 3	C 1	6 "	67. 53. 35	N
23. 2	B 2	9 "	67. 55. 21	N
25. 1	Simms No. 1	3 "	67. 55. 19	N
25. 2	C 2	6 "	67. 53. 7	N
29. 23	B 2	9 "	67. 55. 3	N
30. 0	Simms No. 2	3 "	67. 51. 48	N
30. 1	Simms No. 2	3 "	67. 52. 56	N
30. 2	B 1	9 "	67. 52. 0	N
April 2. 2	C 1	6 "	67. 51. 30	N
6. 1	B 1	9 "	67. 52. 19	N

Day and Approximate Hour, 1870.	Needle.	Length of Needle.	Magnetic Dip.	Observer.
d h			° ′ ″	
April 6. 2	D 1	3 inches	67. 55. 44	N
11. 23	C 2	6 "	67. 52. 9	N
12. 0	B 2	9 "	67. 48. 40	N
12. 2	D 2	3 "	67. 54. 32	N
12. 2	D 2	3 "	67. 53. 11	N
19. 22	C 1	6 "	67. 55. 25	N
20. 1	C 2	6 "	67. 52. 19	N
22. 0	D 1	3 "	67. 53. 48	N
22. 1	B 2	9 "	67. 50. 26	N
22. 3	Simms No. 2	3 "	67. 53. 15	N
26. 1	B 1	9 "	67. 51. 34	N
May 4. 2	C 1	6 "	67. 53. 13	N
9. 0	D 1	3 "	67. 54. 0	N
9. 1	D 2	3 "	67. 55. 38	N
11. 0	B 1	9 "	67. 50. 23	N
18. 1	C 2	6 "	67. 52. 39	N
18. 2	Simms No. 1	3 "	67. 49. 33	N
24. 2	B 2	9 "	67. 50. 35	N
26. 1	Simms No. 2	3 "	67. 50. 49	N
26. 2	D 1	3 "	67. 51. 19	N
27. 2	C 1	6 "	67. 50. 10	N
27. 3	D 1	3 "	67. 51. 41	N
31. 3	D 2	3 "	67. 52. 48	N
June 6. 2	C 1	6 "	67. 48. 56	N
6. 22	C 2	6 "	67. 51. 2	N
7. 0	B 1	9 "	67. 47. 47	N
7. 2	D 1	3 "	67. 51. 24	N
7. 3	C 2	6 "	67. 50. 25	N
7. 22	D 2	3 "	67. 54. 36	N
14. 2	B 2	9 "	67. 47. 58	N
20. 22	C 1	6 "	67. 52. 54	N
21. 3	C 1	6 "	67. 52. 5	N
23. 2	D 1	3 "	67. 53. 11	N
23. 22	Simms No. 1	3 "	67. 52. 15	N
23. 23	Simms No. 1	3 "	67. 51. 48	N
24. 3	Simms No. 1	3 "	67. 51. 15	N
27. 22	B 1	9 "	67. 50. 34	N
28. 0	C 2	6 "	67. 49. 57	N
28. 3	B 1	9 "	67. 49. 28	N
28. 22	C 2	6 "	67. 51. 30	N
28. 23	D 2	3 "	67. 54. 52	N
28. 23	Simms No. 2	3 "	67. 54. 19	N
29. 0	D 2	3 "	67. 51. 30	N
29. 0	Simms No. 2	3 "	67. 51. 0	N
29. 3	C 2	6 "	67. 50. 13	N
July 8. 2	C 1	6 "	67. 51. 2	N
9. 3	D 1	3 "	67. 50. 47	N
14. 22	D 2	3 "	67. 53. 50	N
15. 0	B 2	9 "	67. 50. 21	N
15. 1	C 2	6 "	67. 49. 24	N
15. 3	D 2	3 "	67. 51. 8	N
19. 21	B 1	9 "	67. 49. 18	N
20. 1	C 1	6 "	67. 53. 1	N
20. 3	B 1	9 "	67. 47. 15	N

The initial N is that of Mr. W. C. Nash.

In the month of January several observations were made with an instrument by Dover, of the Kew pattern, provided with needles 3 inches in length, marked A 1 and A 2; and observations were also made in the months January to October with 3-inch needles by Simms, marked No. 1 and No. 2, which have been used indifferently with Simms' instrument, or with Airy's instrument.

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

Day and Approximate Hour, 1870.	Needle.	Length of Needle.	Magnetic Dip.	Observer.
d h			° ′ ″	
July 22. 2	D 2	3 inches	67. 51. 34	N
28. 21	D 1	3 ,,	67. 53. 0	N
28. 22	C 2	6 ,,	67. 50. 33	N
29. 0	B 2	9 ,,	67. 50. 12	N
29. 3	D 1	3 ,,	67. 50. 51	N
August 3. 2	C 2	6 ,,	67. 51. 8	N
8. 2	B 1	9 ,,	67. 51. 14	N
8. 22	C 2	6 ,,	67. 53. 19	N
8. 23	D 2	3 ,,	67. 53. 55	N
8. 23	Simms No. 2	3 ,,	67. 52. 15	N
9. 0	D 2	3 ,,	67. 53. 11	N
9. 0	Simms No. 2	3 ,,	67. 52. 34	N
13. 2	C 1	6 ,,	67. 50. 33	N
19. 0	B 2	9 ,,	67. 53. 55	N
19. 1	D 1	3 ,,	67. 53. 38	N
24. 2	B 2	9 ,,	67. 48. 42	N
29. 22	C 1	6 ,,	67. 55. 52	N
30. 2	D 1	3 ,,	67. 54. 13	N
30. 3	C 1	6 ,,	67. 53. 52	N
September 6. 2	D 2	3 ,,	67. 50. 6	N
8. 1	C 1	6 ,,	67. 52. 29	N
8. 2	C 2	6 ,,	67. 53. 10	N
13. 22	D 1	3 ,,	67. 55. 30	N
14. 0	B 1	9 ,,	67. 50. 13	N
14. 3	D 1	3 ,,	67. 52. 43	N
19. 23	D 2	3 ,,	67. 57. 13	N
20. 2	Simms No. 1	3 ,,	67. 52. 40	N
22. 2	C 1	6 ,,	67. 49. 41	N
23. 0	B 2	9 ,,	67. 53. 56	N
27. 2	D 2	3 ,,	67. 54. 58	N
30. 0	C 1	6 ,,	67. 56. 52	N
30. 2	B 1	9 ,,	67. 53. 57	N
October 5. 2	C 2	6 inches	67. 53. 0	N
6. 2	D 1	3 ,,	67. 50. 41	N
6. 23	C 1	6 ,,	67. 53. 18	N
7. 0	Simms No. 2	3 ,,	67. 55. 11	N
14. 1	B 2	9 ,,	67. 51. 42	N
19. 1	D 2	3 ,,	67. 54. 13	N
20. 1	B 1	9 ,,	67. 53. 42	N
20. 2	D 1	3 ,,	67. 54. 18	N
31. 2	B 1	9 ,,	67. 50. 31	N
November 4. 2	C 1	6 ,,	67. 50. 6	N
9. 23	D 1	3 ,,	67. 55. 55	N
11. 1	C 2	6 ,,	67. 55. 48	N
12. 1	D 2	3 ,,	67. 53. 0	N
19. 2	B 1	9 ,,	67. 54. 47	N
21. 2	B 2	9 ,,	67. 48. 2	N
23. 1	C 1	6 ,,	67. 54. 22	N
23. 2	D 2	3 ,,	67. 51. 53	N
25. 1	C 2	6 ,,	67. 51. 20	N
28. 2	B 1	9 ,,	67. 50. 24	N
28. 3	D 1	3 ,,	67. 51. 56	N
December 7. 1	C 1	6 ,,	67. 49. 33	N
10. 2	D 2	3 ,,	67. 52. 32	N
12. 1	B 1	9 ,,	67. 49. 56	N
12. 2	C 2	6 ,,	67. 52. 37	N
15. 21	D 1	3 ,,	67. 52. 37	N
15. 22	D 2	3 ,,	67. 53. 33	N
15. 23	C 1	6 ,,	67. 52. 51	N
16. 0	B 2	9 ,,	67. 52. 44	N
16. 3	D 1	3 ,,	67. 53. 7	N
19. 21	B 2	9 ,,	67. 50. 59	N
20. 3	B 2	9 ,,	67. 51. 47	N
24. 2	C 2	6 ,,	67. 51. 27	N
31. 7	B 1	9 ,,	67. 49. 5	N

The initial N is that of Mr. W. C. Nash.

MONTHLY MEANS of MAGNETIC DIPS.

Month, 1870.	B 1, 9-inch Needle.	Number of Observations.	B 2, 9-inch Needle.	Number of Observations.	C 1, 6-inch Needle.	Number of Observations.	C 2, 6-inch Needle.	Number of Observations.	D 1, 3-inch Needle.	Number of Observations.
	° ′ ″		° ′ ″		° ′ ″		° ′ ″		° ′ ″	
January	67. 53. 30	1	67. 52. 36	2	67. 54. 18	3	67. 53. 17	1	67. 56. 35	2
February	67. 49. 57	2	67. 51. 25	1	67. 54. 5	2	67. 53. 51	1	67. 57. 54	1
March	67. 52. 2	2	67. 55. 12	2	67. 53. 35	1	67. 52. 48	2	67. 54. 9	1
April	67. 51. 57	2	67. 49. 33	2	67. 53. 28	2	67. 52. 14	2	67. 54. 46	2
May	67. 50. 23	1	67. 50. 35	1	67. 51. 42	2	67. 52. 39	1	67. 52. 20	3
June	67. 49. 16	3	67. 47. 58	1	67. 51. 18	3	67. 50. 37	5	67. 52. 18	2
July	67. 48. 17	2	67. 50. 16	2	67. 52. 2	2	67. 49. 59	2	67. 51. 33	3
August	67. 51. 14	1	67. 51. 18	2	67. 53. 26	3	67. 52. 13	2	67. 53. 56	2
September	67. 52. 5	2	67. 53. 56	1	67. 53. 1	3	67. 53. 10	1	67. 54. 6	2
October	67. 52. 6	2	67. 51. 42	1	67. 53. 18	1	67. 53. 0	1	67. 52. 30	2
November	67. 52. 36	2	67. 48. 2	1	67. 52. 14	2	67. 53. 34	2	67. 53. 56	2
December	67. 49. 31	2	67. 51. 50	3	67. 51. 12	2	67. 52. 2	2	67. 52. 52	2
Means	67. 50. 54	Sum 22	67. 51. 25	Sum 19	67. 52. 47	Sum 26	67. 52. 2	Sum 22	67. 53. 34	Sum 24

Month, 1870.	D 2, 3-inch Needle.	Number of Observations.	Dover A 1, 3-inch Needle.	Number of Observations.	Dover A 2, 3-inch Needle.	Number of Observations.	Simms No. 1, 3-inch Needle.	Number of Observations.	Simms No. 2, 3-inch Needle.	Number of Observations.
	° ′ ″		° ′ ″		° ′ ″		° ′ ″		° ′ ″	
January	67. 54. 24	3	67. 53. 48	5	67. 53. 16	5	67. 54. 9	3	67. 52. 50	3
February	67. 55. 15	3	..	..	..	..	67. 55. 39	1	67. 53. 49	1
March	67. 55. 50	1	..	..	..	..	67. 55. 19	1	67. 52. 22	2
April	67. 53. 52	2	..	..	..	..	..	..	67. 53. 15	1
May	67. 54. 13	2	..	..	..	..	67. 49. 33	1	67. 50. 49	1
June	67. 53. 39	3	..	..	..	..	67. 51. 46	3	67. 52. 39	2
July	67. 52. 11	3	..	..	..	..	..	..	..	..
August	67. 53. 33	2	..	..	..	..	..	..	67. 52. 24	2
September	67. 54. 6	3	..	..	..	..	67. 52. 40	1	..	..
October	67. 54. 13	1	..	..	..	..	..	..	67. 55. 11	1
November	67. 52. 27	2	..	..	..	..	..	..	..	..
December	67. 53. 3	2	..	..	..	..	..	..	..	..
Means	67. 53. 49	Sum 27	..	..	..	..	67. 53. 6	Sum 10	67. 52. 48	Sum 13

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 1870.

Lengths of the several Sets of Needles.	Needles.	Number of Observations with each Needle.	Mean Yearly Dip from Observations with each Needle.	Mean Yearly Dip from each Set of Needles.	Mean Yearly Dip from all the Sets of Needles.
			° ′ ″	° ′ ″	° ′ ″
9-inch Needles	B 1	22	67. 50. 54	67. 51. 9	67. 52. 25
	B 2	19	67. 51. 25		
6-inch Needles	C 1	26	67. 52. 47	67. 52. 25	
	C 2	22	67. 52. 2		
3-inch Needles	D 1	24	67. 53. 34	67. 53. 41	
	D 2	27	67. 53. 49		

RESULTS of OBSERVATIONS of MAGNETIC DIP at the Hours of Observation 9h. a.m. and 3h. p.m.

Month and Day. 1870.		Needle.	Length of Needle.	Magnetic Dip. At 9h. a.m.	Magnetic Dip. At 3h. p.m.	Excess of the Magnetic Dip at 9h. a.m. over the Magnetic Dip at 3h. p.m.
				° ′ ″	° ′ ″	′ ″
January	25	C 1	6 inches.	67. 55. 12	67. 52. 54	+ 2. 18
June	7	C 2	6 „	67. 51. 2	67. 50. 25	+ 0. 37
	21	C 1	6 „	67. 52. 54	67. 52. 5	+ 0. 49
	24	Simms No. 1	3 „	67. 52. 15	67. 51. 15	+ 1. 0
	28	B 1	9 „	67. 50. 34	67. 49. 28	+ 1. 6
	29	C 2	6 „	67. 51. 30	67. 50. 13	+ 1. 17
July	15	D 2	3 „	67. 53. 50	67. 51. 8	+ 2. 42
	20	B 1	9 „	67. 49. 18	67. 47. 15	+ 2. 3
	29	D 1	3 „	67. 53. 0	67. 50. 51	+ 2. 9
August	30	C 1	6 „	67. 55. 52	67. 53. 52	+ 2. 0
September	14	D 1	3 „	67. 55. 30	67. 52. 43	+ 2. 47
December	16	D 1	3 „	67. 52. 37	67. 53. 7	− 0. 30
	20	B 2	9 „	67. 50. 59	67. 51. 47	− 0. 48

ROYAL OBSERVATORY, GREENWICH.

OBSERVATIONS

OF

DEFLEXION OF A MAGNET

FOR

ABSOLUTE MEASURE

OF

HORIZONTAL FORCE.

1870.

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

Month and Day, 1870.	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 27	1·0 1·3	31·8	12. 3. 24 5. 27. 28	5·415 5·419	100 100	33·0 35·2	N
February 23	1·0 1·3	41·1	11. 59. 24 5. 25. 49	5·411 5·411	100 100	43·2 43·6	N
March 18	1·0 1·3	50·0	11. 57. 42 5. 25. 22	5·422 5·420	100 100	50·8 51·2	N
April 13	1·0 1·3	61·7	11. 58. 2 5. 25. 21	5·431 5·429	100 100	63·0 66·0	N
May 10	1·0 1·3	61·8	11. 56. 36 5. 24. 27	5·431 5·421	100 100	63·3 63·8	N
June 17	1·0 1·3	74·9	11. 53. 8 5. 22. 52	5·433 5·430	100 100	76·7 77·2	N
July 20	1·0 1·3	79·9	11. 52. 52 5. 22. 58	5·441 5·448	100 100	81·7 83·7	N
August 18	1·0 1·3	77·1	11. 48. 54 5. 21. 11	5·440 5·442	100 100	78·5 79·7	N
September 16	1·0 1·3	65·5	11. 52. 6 5. 22. 43	5·445 5·448	100 100	64·0 67·9	N
October 21	1·0 1·3	55·2	11. 53. 44 5. 23. 14	5·448 5·454	100 100	54·0 59·4	N
November 25	1·0 1·3	56·0	11. 51. 16 5. 22. 10	5·451 5·449	100 100	62·0 58·0	N
December 15	1·0 1·3	47·7	11. 51. 41 5. 22. 26	5·444 5·447	100 100	48·9 50·3	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 answer to 304·8 and 396·2 millimètres respectively.

The initial N is that of Mr. W. C. 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 1870.

Month and Day, 1870.		In English Measure.									Value of X in Metric Measure.
		Apparent Value of A^1.	Apparent Value of A^2.	Apparent Value of P.	Mean Value of P.	Log. A corrected by the Application of Mean Value of P. = Log. $\frac{m}{X}$	Adopted Time of Vibration of Deflecting Magnet.	Log. *m* X.	Value of X.	Value of *m*.	
							s				
January	27	+0·10438	0·10441	−0·00070	−0·00211	9·01940	5·4170	0·19161	3·856	0·4032	1·778
February	23	+0·10396	0·10404	−0·00189		9·01776	5·4110	0·19316	3·870	0·4031	1·784
March	18	+0·10387	0·10405	−0·00426		9·01761	5·4210	0·19231	3·867	0·4027	1·783
April	13	+0·10413	0·10426	−0·00306		9·01857	5·4300	0·19178	3·860	0·4029	1·780
May	10	+0·10393	0·10397	−0·00094		9·01755	5·4260	0·19235	3·867	0·4027	1·783
June	17	+0·10367	0·10370	−0·00071		9·01645	5·4315	0·19242	3·873	0·4022	1·786
July	20	+0·10373	0·10383	−0·00236		9·01685	5·4445	0·19077	3·863	0·4016	1·781
August	18	+0·10311	0·10321	−0·00238		9·01423	5·4410	0·19105	3·876	0·4005	1·787
September	16	+0·10335	0·10349	−0·00332		9·01533	5·4465	0·18919	3·863	0·4002	1·781
October	21	+0·10340	0·10346	−0·00142		9·01537	5·4510	0·18786	3·857	0·3996	1·778
November	25	+0·10306	0·10314	−0·00190		9·01398	5·4500	0·18824	3·865	0·3991	1·782
December	15	+0·10298	0·10308	−0·00238		9·01368	5·4455	0·18829	3·866	0·3990	1·783
Means........		..	..	..	..	..	..	..	3·865	..	1·782

ROYAL OBSERVATORY, GREENWICH.

RESULTS

OF

METEOROLOGICAL OBSERVATIONS.

1870.

MONTH and DAY, 1870.	Phases of the Moon.	Mean Daily Reading of the Barometer (corrected and reduced to 32° Fahrenheit).	Readings of Thermometers. Dry. Highest.	Dry. Lowest.	Dry. Mean Daily Value.	Dew Point. Mean Daily Value.	Highest in the Sun, as shown by a Self-Registering Thermometer with blackened bulb in vacuo, placed on the Grass.	Lowest on the Grass, as shown by a Self-Registering Minimum Thermometer.	In the Water of the Thames, at Greenwich, by Self-Registering Thermometers, read at 9h A.M. Highest.	In the Water of the Thames. Lowest.	Difference between the Dew Point Temperature and Air Temperature. Mean Daily Value.	Difference. Greatest.	Difference. Least.	Difference between the Mean Temperature of the Day and the Mean Temperature of the same Day on an Average of 50 Years.	Wind as deduced from Anemometers. Osler's. General Direction. A.M.	General Direction. P.M.	Pressure in lbs. on the square foot. Greatest.	Pressure. Least.	Pressure. Mean of 24 Obs.	Robinson's. Amount of Horizontal Movement of the Air on each Day.	Rain in Inches, collected in a Gauge whose receiving surface is 5 inches above the Ground.
		in.	°	°	°	°	°	°	°	°	°	°	°	°			lbs.	lbs.	lbs.	miles.	in.
Jan. 1	..	29·193	48·0	41·1	45·4	43·6	74·7	37·0	34·4	32·4	1·8	3·8	0·2	+ 8·1	SW	SSW : S	2·8	0·0	0·4	325	0·10
2	New: Greatest Dec. S.	29·439	48·8	44·1	46·0	43·2	55·0	41·5	..	..	2·8	4·0	0·4	+ 9·0	S	S : SSW : SSE	1·9	0·0	0·2	237	0·01
3	..	29·532	50·6	43·2	46·5	43·6	67·6	38·2	38·4	36·4	2·9	7·1	0·0	+ 9·8	SSW	SW : SSW	2·2	0·0	0·2	277	0·04
4	..	29·664	49·4	44·5	47·1	43·8	53·9	41·3	39·4	36·4	3·3	5·0	0·7	+10·7	S : SSW	SSW	3·6	0·0	0·7	368	0·03
5	..	29·614	47·6	37·2	43·0	41·5	48·5	33·0	40·4	37·7	1·5	4·0	0·0	+ 6·8	SSW	SW	3·8	0·0	0·2	261	0·44
6	..	29·565	46·8	37·2	42·7	39·8	56·3	30·8	40·4	38·4	2·9	5·5	1·2	+ 6·7	SSW	SSW	8·1	0·0	0·6	392	0·00
7	..	29·346	48·9	42·3	45·4	40·9	56·7	37·7	41·4	39·4	4·5	6·3	1·7	+ 9·6	SW : WSW	WSW : SW	25·0	0·1	2·0	570	0·19
8	..	28·989	50·9	42·4	45·6	38·5	50·9	40·0	43·4	42·4	7·1	9·7	2·4	+ 9·9	SW	SW : WSW	30 +	0·2	9·4	845	0·08
9	In Equator.	29·270	47·0	38·0	42·5	40·5	78·9	32·0	43·4	42·4	2·0	4·4	0·0	+ 6·7	SW : SSW	WSW : NNW	3·9	0·0	0·4	312	0·09
10	Apogee: First Quarter.	29·693	41·1	31·2	34·3	30·7	42·0	25·8	42·9	41·9	3·6	6·5	0·4	− 1·6	WSW	NNW : WSW	0·1	0·0	0·0	192	0·00
11	..	29·804	39·5	28·2	34·4	32·2	60·0	22·1	42·4	41·4	2·2	6·0	0·0	− 1·6	SW	SSW : WSW	1·0	0·0	0·1	240	0·10
12	..	29·592	40·9	33·4	37·1	31·5	64·0	27·0	41·4	39·9	5·6	7·8	1·2	+ 1·0	SW : WSW	W : WSW	6·6	0·0	0·9	478	0·06
13	..	29·692	41·0	33·2	37·0	33·8	54·0	26·2	41·4	38·4	3·2	6·9	0·0	+ 0·8	WSW	WSW : SW : S	1·5	0·0	0·1	271	0·02
14	..	29·332	50·9	38·4	45·1	40·2	75·0	37·3	41·4	38·4	4·9	8·4	1·4	+ 8·8	SW : WSW	SW : WSW	9·0	0·0	1·4	529	0·16
15	..	29·637	47·5	41·7	44·8	40·2	67·5	36·1	40·1	38·4	4·6	7·6	0·2	+ 8·4	WSW	WSW	18·4	0·0	1·1	359	0·05
16	Greatest Declination N.	30·074	48·0	41·4	44·6	44·0	50·5	34·5	40·4	38·4	0·6	3·6	0·0	+ 8·1	Calm	WSW	0·0	0·0	0·0	102	0·00
17	Full	30·358	45·7	38·5	41·7	40·4	47·2	37·0	40·4	38·9	1·3	2·8	0·0	+ 5·1	ESE	ESE	0·2	0·0	0·0	106	0·05
18	..	30·432	38·5	34·4	36·0	28·0	44·8	32·2	40·7	38·9	8·0	8·5	5·7	− 0·7	ESE : SE	ESE : ENE : NE	0·3	0·0	0·0	140	0·00
19	..	30·333	37·4	32·5	34·3	27·2	44·1	31·3	40·4	38·4	7·1	8·2	6·3	− 2·6	NE	ENE	5·9	0·0	0·6	355	0·00
20	..	30·208	32·9	30·5	31·1	24·4	35·9	29·7	39·4	38·4	6·7	10·5	2·6	− 5·9	ENE	NE	18·8	0·0	0·8	411	0·00
21	Perigee	30·141	33·7	30·3	31·5	25·8	35·4	25·1	39·4	38·4	5·7	8·3	1·4	− 5·7	NNE	NE	2·2	0·0	0·5	331	0·00
22	In Equator.	30·219	36·7	29·6	33·2	28·2	41·2	24·5	38·9	37·4	5·0	8·8	2·2	− 4·2	NE : NNE	NNE : N	0·3	0·0	0·0	176	0·00
23	..	30·219	40·8	31·3	36·4	33·6	48·5	30·0	38·9	38·4	2·8	6·4	0·0	− 1·3	NNE	NNE	3·1	0·0	0·3	333	0·00
24	Last Qr.	30·221	39·4	32·8	35·7	31·9	47·6	28·1	38·4	37·4	3·8	7·6	0·8	− 2·2	NNE	NE : NNE	1·7	0·0	0·3	314	0·00
25	..	30·278	38·7	25·6	32·1	25·2	73·5	20·0	38·4	37·4	6·9	11·5	1·5	− 6·0	NNE : NE	ENE	13·7	0·0	0·4	292	0·00
26	..	30·226	35·5	21·8	28·9	22·9	60·9	16·8	38·1	36·4	6·0	8·3	0·0	− 9·4	Calm	ENE	0·0	0·0	0·0	86	0·00
27	..	30·078	33·2	20·8	26·9	22·4	47·9	14·5	38·4	37·4	4·5	6·3	0·7	−11·5	Variable	W : SE	0·0	0·0	0·0	58	0·00
28	..	30·000	34·7	19·6	29·6	25·7	53·4	16·0	38·2	36·4	3·9	5·7	1·2	− 8·8	SE	SSE : SE : ESE	0·1	0·0	0·0	114	0·00
29	Greatest Declination S.	29·973	39·5	24·1	31·8	26·5	72·2	17·4	37·9	35·4	5·3	10·1	0·6	− 6·5	ESE	SSE : SE	0·0	0·0	0·0	145	0·00
30	..	29·826	44·9	27·0	36·5	28·2	81·7	19·5	39·9	37·4	8·3	10·3	4·4	− 1·6	SE	SSE	2·3	0·0	0·3	263	0·00
31	New	29·571	43·7	38·1	40·7	38·9	43·7	31·8	40·4	38·4	1·8	3·2	0·0	+ 2·8	SSE	S : SSW	2·4	0·0	0·4	333	0·07
Means	..	29·823	42·6	34·0	38·3	34·1	55·9	29·5	40·0	38·2	4·2	6·9	1·2	+ 1·4	...	...	..	..	..	Sum 9215	Sum 1·49

BAROMETER READINGS FROM EYE-OBSERVATIONS.

The first maximum in the month was $29^{\rm in}\cdot726$ on the 4th; the first minimum in the month was $29^{\rm in}\cdot156$ on the 1st.
The second maximum ,, was $29^{\rm in}\cdot685$ on the 6th; the second minimum ,, was $29^{\rm in}\cdot586$ on the 5th.
The third maximum ,, was $29^{\rm in}\cdot891$ on the 11th; the absolute minimum ,, was $28^{\rm in}\cdot906$ on the 8th.
The fourth maximum ,, was $29^{\rm in}\cdot727$ on the 13th; the fourth minimum ,, was $29^{\rm in}\cdot558$ on the 12th.
The absolute maximum ,, was $30^{\rm in}\cdot453$ on the 18th; the fifth minimum ,, was $29^{\rm in}\cdot322$ on the 14th.
The sixth maximum ,, was $30^{\rm in}\cdot330$ on the 25th; the sixth minimum ,, was $30^{\rm in}\cdot126$ on the 21st.
the seventh minimum ,, was $29^{\rm in}\cdot512$ on the 31st.
The range in the month was $1^{\rm in}\cdot547$.
The mean for the month was $29^{\rm in}\cdot823$, being $0^{\rm in}\cdot073$ *higher* than the average of the preceding 29 years.

TEMPERATURE OF THE AIR.

The highest in the month was 50°·9 on the 8th and 14th; the lowest was 19°·6 on the 28th.
The range ,, was 31°·3.
The mean ,, of all the highest daily readings was 42°·6, being 0°·6 *lower* than the average of the preceding 29 years.
The mean ,, of all the lowest daily readings was 34°·0, being 0°·5 *lower* than the average of the preceding 29 years.
The mean daily range was 8°·6, being 1°·1 *less* than the average of the preceding 29 years.
The mean for the month was 38°·3, being 0°·1 *higher* than the average of the preceding 29 years.

MONTH and DAY, 1870.	ELECTRICITY. A.M.	ELECTRICITY. P.M.	CLOUDS AND WEATHER. A.M.	CLOUDS AND WEATHER. P.M.
Jan. 1			10, r : 2, ci, ci.-cu	7, ci, ci.-cu : 10, th.-r
2			10, th.-r	10, oc.-th.-r
3			10, r	v, ci.-cu, cu,cu.-s: 0 : 8, th.-cl
4			10, r : 8, ci, ci.-s, so.-ha	10, th.-cl, so.-ha : 10, th.-cl
5			10, r : 10, r	10, oc.-th.-r : 10, oc.-r : 0, a
6			10, ci.-s, s : v	v, ci : 8,ci.-cu,ci.-s,cu.-s,lu.-ha : 10
7			10, r, st.-w : v, ci, fr.-sqs	8, ci, ci.-cu,w : 10, r : 10, fr.-h.-sqs
8			10, g : 6, ci, ci.-cu, sh.-r, h.-g	10, h.-g, r : v, g, oc.-r : v, sc, oc.-r, l, sqs
9			10, r	4, ci.-cu, ci.-s, cu : 10, r, gt.-glm : 10
10			5, ci, ci.-cu, h.-fr, h	2, ci, ci.-cu, f : 4,ci,ci.-cu : 0 : 0, h.-fr
11			0, h, h.-fr : v, ci, ci.-cu	10, r : 3, ci, ci.-s, mt, lu.-co
12			10, r : 6, ci, ci.-cu, fr.-sqs	6, ci,ci.-cu,cu,fr.-h.-sqs : 0
13			1, ci, mt, h.-fr : 1, ci, mt, so.-ha	7, ci, ci.-cu, mt : 10, r
14			10, r : 0, w	vv, ci.-cu, ci.-s, th.-r, fr.-sqs : vv, ci, ci.-cu, fr.-sqs, lu.-ha
15			ci, st.-w : ci, so.-ha	10, ci.-s, r : 10, f
16			10, th.-f, glm	7, ci.-s, cu.-s, f : 10, th.-cl, f, lu.-co
17			10, r : 10, sl.-f	10, sl.-f : 10, th.-r : 10, oc.-th.-r
18			10 : 10, sl.-f	10 : 10 : 10
19			10 : 9, ci.-cu, ci.-s, cu.-s, sl.-sn	10,ci.-s,cu.-s,cu,sl.-sn,sqs : 10, sl.-sn
20			10, h.-sqs	10, sl.-sn : 8, ci.-s, cu : 10
21			10, ci.-s, cu.-s : 10, sl	10, sl.-sn : v
22			10 : 10, sl.-sn	10, mt : 10,ci,ci.-cu,ci.-s : 10
23			10 : 10, oc.-th.-r	10, oc.-th.-r : 10 : v
24			10 : 10, th.-r	v, ci.-cu, cu.-s,cu : 9,ci.-cu,ci.-s,cu.-s,cu : v, h
25			0 v	0, sqs : 0 : 0, m
26			0, h.-fr, f	0 : 0 : 0, sl.-f, fr
27			0, h.-fr, f : 0, h.-fr, f	0, f : 0, f : 0, th.-f, h.-fr
28			cu, cu.-s : v	10 : v : v
29			0, h.-fr : 0	0 : 0 : 0, h.-fr
30			0, h.-fr : 0	ci.-s : 0 : 0, a, m
31			10 : 10, r	10 : 10 : 0

HUMIDITY OF THE AIR.

Temperature of the Dew Point.

The highest in the month was 47°·1 on the 7th; and the lowest was 20°·9 on the 20th.

The mean ,, was 34°·1, being 0°·9 *lower* than the average of the preceding 29 years.

Elastic Force of Vapour.—The mean for the month was 0in·196, being 0in·006 *less* than the average of the preceding 29 years.

Weight of Vapour in a Cubic Foot of Air.—The mean for the month was 2grs·3, being 0gr·1 *less* than the average of the preceding 29 years.

Degree of Humidity.—The mean for the month was 85 (that of Saturation being represented by 100), being 3 *less* the average of the preceding 29 years.

Weight of a Cubic Foot of Air.—The mean for the month was 555 grains, being 1 grain *greater* than the average of the preceding 29 years.

CLOUDS.

The mean amount for the month, a clear sky being represented by 0 and a cloudy sky by 10, was 6·5.

OZONE.

The mean amount for the month, on a scale ranging from 0 to 10, was 2·2.

WIND.

The proportions were of N. 5, S. 10, W. 8, E. 6, and Calm 2. The greatest pressure in the month was more than 30lbs·0 on the square foot on the 8th.

RAIN.

Fell on 15 days in the month, amounting to 1in·49, as measured in the simple cylinder gauge partly sunk below the ground; being 0in·38 *less* than the average fall of the preceding 55 years.

MONTH and DAY, 1870.	Phases of the Moon.	Mean Daily Reading of the Barometer (corrected and reduced to 32° Fahrenheit).	Readings of Thermometers. Dry. Highest.	Dry. Lowest.	Dry. Mean Daily Value.	Dew Point. Mean Daily Value.	Highest in the Sun, as shown by a Self-Registering Thermometer with blackened bulb in vacuo, placed on the Grass.	Lowest on the Grass, as shown by a Self-Registering Minimum Thermometer.	In the Water of the Thames, at Greenwich, by Self-Registering Thermometers, read at 9h A.M. Highest.	In the Water of the Thames. Lowest.	Difference between the Dew Point Temperature and Air Temperature. Mean Daily Value.	Difference. Greatest.	Difference. Least.	Difference between the Mean Temperature of the Day and the Mean Temperature of the same Day on an Average of 50 Years.	Wind as deduced from Anemometers. Osler's. General Direction. A.M.	Osler's. General Direction. P.M.	Osler's. Pressure in lbs. on the square foot. Greatest.	Pressure. Least.	Pressure. Mean of 24 Obs.	Robinson's. Amount of Horizontal Movement of the Air on each Day.	Rain in Inches, collected in a Gauge whose receiving surface is 5 inches above the Ground.
		in.	°	°	°	°	°	°	°	°	°	°	°	°			lbs.	lbs.	lbs.	miles.	in.
Feb. 1	..	29·830	47·5	37·0	42·0	38·7	59·0	31·3	40·4	38·4	3·3	7·1	0·5	+ 4·2	SSW	SSW	10·7	0·0	0·4	359	0·01
2	..	29·541	43·8	42·2	43·1	40·7	48·1	38·8	41·4	39·4	2·4	2·9	1·1	+ 5·4	S by W	S by W : S	8·6	0·0	1·1	433	0·07
3	..	29·602	48·9	42·7	44·6	42·1	61·1	40·0	41·4	39·4	2·5	4·0	0·7	+ 6·8	S	SSW : SSE	0·9	0·0	0·0	205	0·02
4	..	29·496	49·2	41·9	44·8	40·1	57·2	38·0	42·4	40·4	4·7	8·4	1·5	+ 6·8	S : SSE	S	1·8	0·0	0·2	257	0·01
5	In Equator.	29·669	50·4	38·0	42·6	39·7	90·0	33·1	41·3	38·7	2·9	7·3	0·0	+ 4·3	SSE : SSW	S : SSW	0·3	0·0	0·0	195	0·06
6	Apogee	29·759	47·9	37·8	42·9	38·6	84·7	33·3	41·4	38·4	4·3	7·8	0·2	+ 4·3	S	S by E	11·5	0·0	0·6	332	0·05
7	..	29·449	43·0	40·0	41·6	37·9	48·5	38·5	42·1	38·7	3·7	4·8	1·3	+ 2·8	S : SSE	SSE	3·7	0·0	0·6	316	0·10
8	First Qr.	29·393	45·4	34·0	39·2	37·9	63·6	34·0	42·4	39·4	1·3	5·3	0·0	+ 0·3	SE	SE : ESE	2·1	0·0	0·3	258	0·10
9	..	29·717	34·0	25·0	28·4	18·1	69·9	21·0	40·4	37·4	10·3	13·1	7·0	−10·5	ESE : ENE	ENE : NE	13·0	0·0	1·0	410	0·00
10	..	29·958	32·9	22·6	25·9	11·9	70·7	18·8	37·4	36·4	14·0	15·6	11·8	−12·9	NE	NE	3·3	0·0	0·4	376	0·00
11	..	30·163	30·5	19·4	24·7	15·5	72·9	17·8	36·4	33·4	9·2	12·3	5·0	−13·9	ENE : NE	NE	3·4	0·0	0·7	407	0·02
12	Greatest Declination N.	30·136	27·7	20·3	23·9	11·3	44·4	17·2	33·4	32·4	12·6	17·4	7·3	−14·5	NE	NE	30·0	0·4	2·7	633	0·00
13	..	29·931	28·7	26·0	26·8	14·3	29·5	25·8	32·4	31·4	12·5	14·3	9·4	−11·5	ENE	ENE	30·+	1·5	7·5	799	0·00
14	..	29·921	31·5	27·0	29·5	24·7	37·2	27·0	32·4	31·4	4·8	6·2	2·9	− 8·7	NE : ENE	ENE	30·+	0·8	3·5	698	0·00
15	..	30·076	38·9	28·0	32·3	23·2	81·9	22·0	31·9	31·4	9·1	14·6	2·8	− 5·8	ENE	NE	30·0	0·0	1·0	444	0·00
16	Full	29·927	38·9	28·2	32·9	29·3	55·7	21·1	31·9	30·9	3·6	6·5	1·6	− 5·2	NE	ENE	0·9	0·0	0·1	251	0·00
17	..	29·901	32·0	28·8	29·9	23·3	35·5	27·8	31·6	30·9	6·6	10·1	2·5	− 8·3	NE	ENE	2·0	0·0	0·3	364	0·04
18	Perigee	29·760	31·2	27·8	29·4	22·1	35·7	25·0	31·5	30·8	7·3	8·6	5·7	− 8·9	NE	NE	1·3	0·0	0·1	170	0·00
19	In Equator.	29·813	38·7	30·3	34·3	28·5	47·0	29·0	..	..	5·8	8·1	4·9	− 4·2	N : NNE	NNE	0·8	0·0	0·0	191	0·01
20	..	29·892	41·5	32·9	36·6	28·9	51·7	30·4	32·4	31·4	7·7	12·3	3·9	− 2·1	N : WSW : NW	W	2·6	0·0	0·3	311	0·00
21	..	29·462	41·7	30·0	35·5	26·3	57·7	27·5	33·4	32·4	9·2	11·9	2·3	− 3·3	W : NW	NNW	7·0	0·0	1·5	506	0·04
22	Last Qr.	29·686	35·7	24·8	30·1	17·1	68·8	19·7	34·4	33·4	13·0	15·5	5·3	− 8·9	N : NNW	NW : WSW	3·4	0·0	0·6	323	0·00
23	..	29·415	42·7	28·2	36·2	32·4	73·7	23·6	34·4	32·7	3·8	8·9	2·1	− 3·0	SW	SW	5·7	0·0	0·4	353	0·00
24	..	29·258	49·0	36·0	42·0	35·6	97·7	31·7	34·4	32·4	6·4	12·4	0·7	+ 2·6	WSW : SW	WSW : NW	4·0	0·0	0·4	360	0·00
25	Greatest Declination S.	29·446	45·9	27·3	36·3	30·3	92·4	21·7	34·9	32·4	6·0	13·6	0·5	− 3·3	W : SSW	SSW	1·0	0·0	0·0	188	0·00
26	..	29·360	52·0	34·0	41·9	37·3	81·7	29·2	..	..	4·6	12·0	0·0	+ 2·1	SW : W	W : SW	1·5	0·0	0·1	289	0·01
27	..	29·408	54·9	37·2	45·9	42·1	100·0	33·7	37·4	35·4	3·8	9·8	0·0	+ 6·0	SSW : SSE	S : SSE	1·9	0·0	0·2	244	0·00
28	..	29·446	55·6	44·5	50·3	44·3	72·6	39·4	37·4	35·4	6·0	9·2	1·8	+10·2	S : SSW	SSW : S	2·4	0·0	0·5	392	0·00
Means	..	29·693	41·4	31·9	36·2	29·7	63·9	28·4	36·6	34·8	6·5	10·0	2·9	− 2·5	...	...	..	..	..	Sum 10064	Sum 0·54

BAROMETER READINGS FROM EYE-OBSERVATIONS.

The first maximum in the month was $29^{\text{in}}\cdot 863$ on the 1st; the first minimum in the month was $29^{\text{in}}\cdot 515$ on the 2nd.
The second maximum ,, was $29^{\text{in}}\cdot 648$ on the 3rd; the second minimum ,, was $29^{\text{in}}\cdot 467$ on the 4th.
The third maximum ,, was $29^{\text{in}}\cdot 846$ on the 6th; the third minimum ,, was $29^{\text{in}}\cdot 375$ on the 8th.
The absolute maximum ,, was $30^{\text{in}}\cdot 202$ on the 12th; the fourth minimum ,, was $29^{\text{in}}\cdot 880$ on the 13th.
The fifth maximum ,, was $30^{\text{in}}\cdot 108$ on the 15th; the fifth minimum ,, was $29^{\text{in}}\cdot 730$ on the 18th.
The sixth maximum ,, was $29^{\text{in}}\cdot 971$ on the 20th; the sixth minimum ,, was $29^{\text{in}}\cdot 395$ on the 21st.
The seventh maximum ,, was $29^{\text{in}}\cdot 706$ on the 22nd; the absolute minimum ,, was $29^{\text{in}}\cdot 204$ on the 24th.
The eighth maximum ,, was $29^{\text{in}}\cdot 514$ on the 25th; the eighth minimum ,, was $29^{\text{in}}\cdot 303$ on the 26th.
The range in the month was $0^{\text{in}}\cdot 998$.
The mean for the month was $29^{\text{in}}\cdot 693$, being $0^{\text{in}}\cdot 106$ *lower* than the average of the preceding 29 years.

TEMPERATURE OF THE AIR.

The highest in the month was $55^{\circ}\cdot 6$ on the 28th; the lowest was $19^{\circ}\cdot 4$ on the 11th.
The range ,, was $36^{\circ}\cdot 2$.
The mean ,, of all the highest daily readings was $41^{\circ}\cdot 4$, being $4^{\circ}\cdot 1$ *lower* than the average of the preceding 29 years.
The mean ,, of all the lowest daily readings was $31^{\circ}\cdot 9$, being $2^{\circ}\cdot 2$ *lower* than the average of the preceding 29 years.
The mean daily range was $9^{\circ}\cdot 5$, being $2^{\circ}\cdot 0$ *less* than the average of the preceding 29 years.
The mean for the month was $36^{\circ}\cdot 2$, being $3^{\circ}\cdot 1$ *lower* than the average of the preceding 29 years.

MONTH and DAY, 1870.	ELECTRICITY.		CLOUDS AND WEATHER.	
	A.M.	P.M.	A.M.	P.M.
Feb. 1			4, ci, ci.-cu, cu, h, r	8 : 8, ci, ci.-cu, cu : v, h, a, m
2			10, th.-r, sqs	10, th.-r : 10 : 6, th.-r
3			10 : 10, oc.-th.-r	10 : 10 : 9
4			7, ci.-cu, ci.-s, cu.-s, cu : 10	10, ci.-s, cu.-s : vv,ci,ci.-cu,cu,cu.-s : vv
5			10 : 10, r	10 : v, ci, ci.-cu, cu : 0
6			4, ci, d : v	10 : 10, r, w : 10, r, w
7			10, r : 10	10, th.-r : 10, th.-r : 10, lu.-ha
8			10, r : 9, ci.-s, cu.-s, cu	10, th.-r : 10, r : 10, th.-r
9			10, h.-fr, sn, w	7, ci, cu.-s, cu : 2, ci, ci.-s : v, ci, ci.-cu, f
10			0	4, ci, ci.-cu, cu.-s : 0
11			3, ci.-cu, ci.-s, cu, sn	v, ci.-s, cu.-s, cu : 9,ci.-cu,ci.-s,cu.-s : 9, ci.-s, cu.-s, a
12			10, sn, st.-w : 10, sl.-sn, g	9, cu, cu.-s, g, oc.-sn : 10, oc.-sn, g, a
13			10, oc.-sn, h.-g	10, oc.-sn, h.-g : 10, oc.-sn, g
14			10, oc.-sn, g	10, h.-g : 10, oc.-sn, g
15			8, ci.-s, cu.-s, cu, g : v	0, sqs : ci, ci.-s : 0,h.-fr,m : 10
16			10 : 10	10 : 10 : 10, sn
17			10 : 10, sl.-sn	10, oc.-sn : 10 : 10
18			10 : 10, sl.-sn	10 : 10 : 10, sl.-sn, mt
19			10, sn : 10	10 : 10 : 10
20			10, f : 10, f	9, ci, ci.-cu, ci.-s, f, h : 10
21			10, r : 10, w	10, st.-w : 10,ci.-s,cu.-s,glm,sn : v, sn, w
22			0, h	0, h : 0 : 1, f
23			8, ci, ci.-cu, ci.-s, s : v, ci.-cu, ci.-s	10, th.-r, sqs : 10, th.-r
24			8, ci, ci.-cu, ci.-s	9, ci, ci.-cu, ci.-s, w : 4, ci.-cu, cu : 0, d, m
25			1, ci, h.-fr, mt, so.-ha	0, so.-ha : 3,ci,ci.-s,so.-ha : v
26			4, ci, s : v, so.-ha	v, ci.-cu, cu : v, r : 9, sl.-r
27			9, ci.-cu	9 : v : 0
28			0 : 10	10, ci.-cu, ci.-s, cu.-s : 0, h

HUMIDITY OF THE AIR.

Temperature of the Dew Point.

The highest in the month was $46^\circ\cdot3$ on the 28th; and the lowest was $10^\circ\cdot2$ on the 12th.

The mean ,, was $29^\circ\cdot7$, being $5^\circ\cdot4$ *lower* than the average of the preceding 29 years.

Elastic Force of Vapour.—The mean for the month was $0^{in}\cdot165$, being $0^{in}\cdot042$ *less* than the average of the preceding 29 years.

Weight of Vapour in a Cubic Foot of Air.—The mean for the month was $1^{gr}\cdot9$, being $0^{gr}\cdot5$ *less* than the average of the preceding 29 years.

Degree of Humidity.—The mean for the month was 78 (that of Saturation being represented by 100), being 7 *less* than the average of the preceding 29 years.

Weight of a Cubic Foot of Air.—The mean for the month was 555 grains, being 2 grains *greater* than the average of the preceding 29 years.

CLOUDS.

The mean amount for the month, a clear sky being represented by 0 and a cloudy sky by 10, was 7·4.

OZONE.

The mean amount for the month, on a scale ranging from 0 to 10, was 3·5.

WIND.

The proportions were of N. 5, S. 10, W. 5, E. 8, and Calm 0. The greatest pressure in the month was more than $30^{lbs}\cdot0$ on the square foot on the 13th and 14th.

RAIN.

Fell on 13 days in the month, amounting to $0^{in}\cdot54$, as measured in the simple cylinder gauge partly sunk below the ground; being $1^{in}\cdot03$ *less* than the average fall of the preceding 55 years.

MONTH and DAY, 1870.	Phases of the Moon.	Mean Daily Reading of the Barometer (corrected and reduced to 32° Fahrenheit).	Readings of Thermometers. Dry. Highest.	Readings of Thermometers. Dry. Lowest.	Readings of Thermometers. Dry. Mean Daily Value.	Readings of Thermometers. Dew Point. Mean Daily Value.	Highest in the Sun, as shown by a Self-Registering Thermometer with blackened bulb in vacuo, placed on the Grass.	Lowest on the Grass, as shown by a Self-Registering Minimum Thermometer.	In the Water of the Thames, at Greenwich, by Self-Registering Thermometers, read at 9h A.M. Highest.	In the Water of the Thames Lowest.	Difference between the Dew Point Temperature and Air Temperature. Mean Daily Value.	Difference Greatest.	Difference Least.	Difference between the Mean Temperature of the Day and the Mean Temperature of the same Day on an Average of 50 Years.	Wind as deduced from Anemometers. Osler's. General Direction. A.M.	Osler's. General Direction. P.M.	Osler's. Pressure in lbs. on the square foot. Greatest.	Pressure Least.	Pressure Mean of 24 Obs.	Robinson's. Amount of Horizontal Movement of the Air on each Day.	Rain in Inches, collected in a Gauge whose receiving surface is 5 inches above the Ground.
		in.	°	°	°	°	°	°	°	°	°	°	°	°			lbs.	lbs.	lbs.	miles.	in.
Mar. 1	..	29·490	55·1	45·3	50·9	48·0	71·3	43·0	39·4	36·4	2·9	5·8	0·6	+10·7	S: SSW	SSW	16·0	0·1	1·9	559	0·15
2	New	29·421	61·1	46·0	53·0	47·9	100·5	41·0	41·4	38·4	5·1	9·3	0·6	+12·8	SW : SSW	S by W : S by E	2·4	0·0	0·4	280	0·00
3	..	29·429	60·2	39·0	48·4	45·4	106·7	36·8	44·1	41·4	3·0	14·1	0·0	+ 8·2	ESE	SW : NE	1·5	0·0	0·2	225	0·00
4	In Equator	29·663	39·0	32·5	34·9	33·2	39·7	31·9	45·4	42·4	1·7	2·4	0·3	− 5·2	NE	NE	3·6	0·1	1·2	540	0·99
5	..	30·010	45·1	32·5	37·5	29·8	96·4	28·6	45·4	43·4	7·7	13·6	0·0	− 2·6	NE	ENE : NE	30·0	0·0	1·1	455	0·08
6	Apogee	30·175	40·8	30·4	36·0	32·6	73·9	25·8	..	..	3·4	4·6	1·6	− 4·1	NE	NNE : NE	3·7	0·0	0·6	411	0·00
7	..	30·092	42·4	32·1	36·8	33·9	51·5	31·9	..	..	2·9	5·3	1·8	− 3·4	NE	NNE	2·8	0·0	0·4	342	0·00
8	..	30·079	42·8	36·1	38·6	33·8	52·9	33·0	37·4	37·4	4·8	8·4	2·6	− 1·7	NNE	NNE	3·3	0·0	0·8	429	0·00
9	..	29·991	47·8	37·7	41·5	36·4	70·7	33·3	39·4	38·4	5·1	8·4	2·2	+ 1·1	N	N : N by E	1·7	0·0	0·2	263	0·02
10	First Qr.	29·867	48·0	36·0	41·2	34·9	61·2	30·8	40·4	38·6	6·3	10·7	2·0	+ 0·6	NW : NNW	N by W : W by S : NW	1·7	0·0	0·1	246	0·00
11	..	29·580	47·5	36·0	40·7	32·6	64·0	31·6	42·4	39·4	8·1	13·9	3·0	− 0·2	NW	N	3·9	0·0	0·7	368	0·00
12	Greatest Declination N.	29·512	40·9	31·3	33·9	27·2	64·3	27·3	42·9	40·4	6·7	10·8	3·2	− 7·3	WSW : NW	NNW	4·7	0·0	0·5	364	0·00
13	..	29·595	42·6	26·2	33·5	27·2	87·7	21·5	41·7	41·3	6·3	13·0	1·7	− 7·9	W : NE	NNE : WSW	1·6	0·0	0·0	196	0·19
14	..	29·936	44·5	23·1	33·9	26·5	97·7	18·2	41·9	40·4	7·4	16·5	2·9	− 7·6	WSW	SW : SSW	0·9	0·0	0·0	214	0·00
15	..	29·781	46·1	31·1	38·5	28·8	79·7	25·8	42·4	41·0	9·7	16·3	3·3	− 3·2	S : SSW	SSW	3·5	0·0	0·7	367	0·00
16	..	29·467	58·8	39·8	48·9	47·9	87·3	37·1	42·5	41·4	1·0	7·6	0·0	+ 7·0	SSW	SW : WSW	7·9	0·0	1·3	482	0·15
17	Full	29·656	57·9	47·1	51·7	47·8	72·7	44·2	43·4	41·4	3·9	7·4	0·2	+ 9·7	WSW	WNW : NW	2·1	0·0	0·3	342	0·10
18	Perigee : In Equator.	30·006	50·6	39·0	44·0	41·0	61·8	37·2	43·9	42·4	3·0	6·5	1·1	+ 1·9	NW : N	NNE : NE	1·0	0·0	0·1	262	0·00
19	..	30·265	45·0	30·8	36·2	32·1	86·1	25·7	45·4	43·4	4·1	10·6	0·0	− 6·0	NE	ENE : ESE	0·4	0·0	0·0	190	0·00
20	..	30·233	48·6	32·3	38·8	34·8	85·0	26·7	44·4	42·4	4·0	10·3	0·0	− 3·4	S : SW	WSW	0·1	0·0	0·0	143	0·00
21	..	30·057	52·7	42·9	46·8	44·8	63·5	39·0	..	..	2·0	5·2	0·0	+ 4·5	WSW	NW : WSW	0·1	0·0	0·0	200	0·12
22	..	29·699	53·6	31·0	40·9	38·2	74·2	28·2	43·9	42·1	2·7	10·2	0·0	− 1·3	WSW	WSW : NNE : N	3·6	0·0	0·5	387	0·11
23	..	29·866	40·9	28·3	33·7	26·0	88·7	21·3	44·3	42·4	7·7	11·0	3·0	− 8·5	NNW	NNW : NW	3·3	0·0	0·7	370	0·00
24	Last Qr. Greatest Declination S.	29·741	45·2	30·3	36·9	28·7	88·6	24·5	45·4	43·4	8·2	13·0	4·5	− 5·3	NW	NNW : N	2·2	0·0	0·3	297	0·01
25	..	29·602	44·9	28·1	35·9	30·4	104·7	22·6	44·9	42·4	5·5	13·2	0·0	− 6·4	NE	NNE	2·2	0·0	0·0	148	0·00
26	..	29·731	41·5	29·0	34·0	31·0	74·3	21·6	43·7	41·7	3·0	9·7	0·0	− 8·5	N by E	NE	7·5	0·0	0·5	382	0·13
27	..	30·154	41·9	33·7	37·1	31·7	57·5	31·4	38·4	37·4	5·4	8·6	2·0	− 5·8	NNE	NNE	0·7	0·0	0·1	279	0·00
28	..	30·276	37·9	33·6	34·9	27·9	46·2	29·8	39·4	37·9	7·0	9·4	4·9	− 8·3	NNE : NE	NE : NNE	1·0	0·0	0·1	255	0·00
29	..	30·210	41·0	33·6	35·8	29·5	50·3	27·2	40·4	38·4	6·3	10·8	3·0	− 7·8	NE : NNE	NNE	1·2	0·0	0·1	270	0·00
30	..	30·110	42·7	31·5	36·3	31·3	59·6	25·0	40·4	38·4	5·0	9·5	0·0	− 7·7	NNE : N	NE : ESE	1·5	0·0	0·1	259	0·00
31	..	30·110	47·2	27·0	37·1	33·3	101·6	22·0	40·9	38·4	3·8	12·0	0·0	− 7·3	NE : N	NE : SE	0·0	0·0	0·0	99	0·00
Means	..	29·865	46·9	34·0	39·6	34·7	74·8	29·8	42·3	40·4	5·0	9·9	1·4	− 2·0	...	...	..	..	..	Sum 9624	Sum 2·05

BAROMETER READINGS FROM EYE-OBSERVATIONS.

The first maximum in the month was $29^{in}\cdot546$ on the 1st; the absolute minimum in the month was $29^{in}\cdot368$ on the 3rd.
The second maximum ,, was $30^{in}\cdot221$ on the 6th; the second minimum ,, was $30^{in}\cdot040$ on the 7th.
The third maximum ,, was $30^{in}\cdot100$ on the 8th; the third minimum ,, was $29^{in}\cdot568$ on the 11th.
The fourth maximum ,, was $29^{in}\cdot625$ on the 11th; the fourth minimum ,, was $29^{in}\cdot509$ on the 12th.
The fifth maximum ,, was $29^{in}\cdot964$ on the 14th; the fifth minimum ,, was $29^{in}\cdot451$ on the 16th.
The sixth maximum ,, was $30^{in}\cdot289$ on the 19th; the sixth minimum ,, was $29^{in}\cdot622$ on the 22nd.
The seventh maximum ,, was $29^{in}\cdot883$ on the 23rd; the seventh minimum ,, was $29^{in}\cdot585$ on the 25th.
The absolute minimum ,, was $30^{in}\cdot296$ on the 28th; the eighth minimum ,, was $30^{in}\cdot095$ on the 30th.
The ninth maximum ,, was $30^{in}\cdot149$ on the 31st.
The range in the month was $0^{in}\cdot928$.
The mean for the month was $29^{in}\cdot865$, being $0^{in}\cdot123$ *higher* than the average of the preceding 29 years.

TEMPERATURE OF THE AIR.

The highest in the month was $61^{\circ}\cdot1$ on the 2nd; the lowest was $23^{\circ}\cdot1$ on the 14th.
The range ,, was $38^{\circ}\cdot0$.
The mean ,, of all the highest daily readings was $46^{\circ}\cdot9$, being $2^{\circ}\cdot8$ *lower* than the average of the preceding 29 years.
The mean ,, of all the lowest daily readings was $34^{\circ}\cdot0$, being $1^{\circ}\cdot1$ *lower* than the average of the preceding 29 years.
The mean daily range was $12^{\circ}\cdot9$, being $1^{\circ}\cdot6$ *less* than the average of the preceding 29 years.
The mean for the month was $39^{\circ}\cdot6$, being $1^{\circ}\cdot9$ *lower* than the average of the preceding 29 years.

MONTH and DAY, 1870.	ELECTRICITY.		CLOUDS AND WEATHER.	
	A.M.	P.M.	A.M.	P.M.
March 1			10, fr.-h.-sqs	10, th.-r : 10, r : 10, th.-r, w
2			8, ci.-cu, ci.-s, s	8, ci.-cu : v,ci,ci.-cu,ci.-s: 0
3			10 : v, ci.-s	v, ci, ci.-cu : 10
4			10, h.-r. : 10, r, sqs	10, oc.-th.-r, w : 10, w : 10, sn
5			10, sn, r : 7, ci.-cu, ci.-s, cu.-s, so.-ha, w	v, ci, ci.-cu, ci.-s, g : 0, d
6			4, ci.-cu, ci.-s, cu.-s	10, th.-r : 10, oc.-th.-r, sqs
7			8, ci.-cu, ci.-s, cu.-s : 10, cu.-s	10, ci.-s : 10, th.-r
8			10, sqs : 10, sqs	10, w : 9 : 10, sl.-r
9			10 : 9, ci.-cu, ci.-s, cu.-s, cu	10, th.-r : 10, oc.-th.-r
10			9, th.-f	10, th.-r : 0, f, d
11			10, sqs : 10, w	10, cu, cu.-s, glm :v,ci,ci.-cu,ci.-s,cu,cu.-s: 10, cu
12			10 : 10, sl.-sn	8, ci.-s, cu.-s, sqs :v,ci.-cu,ci.-s,cu,cu.-s: 10, ci, cu.-s, lu.-ha
13			10, sn : 3, ci, ci.-s, h	4, ci, ci.-cu, ci.-s : 0, f, h.-fr
14			3, ci, ci.-s, h	2, ci, ci.-s : v, ci, ci.-s, h :3,ci.-s,cu.-s,lu.-ha,lu.-co
15			v : 9, ci.-s, so.-ha	v, ci, so-ha, w : 10, ci.-s, s, lu.-ha
16			10, sc, r : 10, r, sqs	10, sqs : v, ci, ci.-cu, w : 10, r
17			10, r : 10	10, ci.-s, cu.-s : 10, ci.-s, cu.-s, th.-r: 10, oc.-th.-r
18			10	10, mt : 10 : 10
19			10 : 10	v, ci.-cu, h : 0, h.-fr
20			10, th.-cl, h, f, d	0, h : 10
21			10, r, f	10, f, glm : v, f, sl.-r : v, ci.-cu, mt
22			10, r	10, ci.-cu, mt : 10,cu.-s,sc,gt.-glm,hl: 1, fr
23			2, ci, ci.-cu, w	v,ci,ci.-s,ci.-cu,cu.-s,cu,w: 0
24			2, ci, ci.-cu	v,ci,ci.-cu,ci.-s,cu.-s: 9, ci.-s, cu.-s, cu : 10, oc.-r, sn
25			3, ci.-cu, h.-fr	6, ci, ci.-cu, cu.-s: v,ci.-cu,cu,cu.-s,sn: 0
26			10, sn	9,ci.-cu,cu.-s,s,sl.-sn,sqs: 10
27			10, mt : 10, cu.-s., mt	10, ci.-cu : 1, ci.-s
28			10 : 10, sl.-sn	10 : 10
29			10 : 10, oc.-sn	10, cu, cu.-s : 10, cu, cu.-s : 4, li.-cl, ci, ci.-s
30			9, ci.-s, cu.-s, s	10, ci.-s, cu.-s : 0, h.-fr, d
31			h.-fr : v	ci, ci.-s : v

HUMIDITY OF THE AIR.

Temperature of the Dew Point.

The highest in the month was 51°·8 on the 2nd; and the lowest was 20°·0 on the 13th.

The mean ,, was 34°·7, being 1°·5 *lower* than the average of the preceding 29 years.

Elastic Force of Vapour.—The mean for the month was 0in·201, being 0in·014 *less* than the average of the preceding 29 years.

Weight of Vapour in a Cubic Foot of Air.—The mean for the month was 2grs·3, being 0gr·2 *less* than the average of the preceding 29 years.

Degree of Humidity.—The mean for the month was 83 (that of Saturation being represented by 100), being 1 *greater* than the average of the preceding 29 years.

Weight of a Cubic Foot of Air.—The mean for the month was 554 grains, being 4 grains *greater* than the average of the preceding 29 years.

CLOUDS.

The mean amount for the month, a clear sky being represented by 0 and a cloudy sky by 10, was 7·5.

OZONE.

The mean amount for the month, on a scale ranging from 0 to 10, was 2·9.

WIND.

The proportions were of N. 13, S. 5, W. 6, E. 7, and Calm 0. The greatest pressure in the month was 30lbs·0 on the square foot on the 5th.

RAIN.

Fell on 11 days in the month, amounting to 2in·05, as measured in the simple cylinder gauge partly sunk below the ground; being 0in·46 *greater* than the average fall of the preceding 55 years.

Month and Day, 1870.	Phases of the Moon.	Mean Daily Reading of the Barometer (corrected and reduced to 32° Fahrenheit).	Readings of Thermometers. Dry. Highest.	Dry. Lowest.	Dry. Mean Daily Value.	Dew Point. Mean Daily Value.	Highest in the Sun, as shown by a Self-Registering Thermometer, with blackened bulb in vacuo, placed on the Grass.	Lowest on the Grass, as shown by a Self-Registering Minimum Thermometer.	In the Water of the Thames, at Greenwich, by Self-Registering Thermometers, read at 9h A.M. Highest.	Thames. Lowest.	Difference between the Dew Point Temperature and Air Temperature. Mean Daily Value.	Difference. Greatest.	Difference. Least.	Difference between the Mean Temperature of the Day and the Mean Temperature of the same Day on an Average of 50 Years.	Wind as deduced from Anemometers. Osler's. General Direction. A.M.	General Direction. P.M.	Pressure in lbs. on the square foot. Greatest.	Pressure. Least.	Pressure. Mean of 24 Obs.	Robinson's. Amount of Horizontal Movement of the Air on each Day.	Rain in Inches, collected in a Gauge whose receiving surface is 5 inches above the Ground.
		in.	°	°	°	°	°	°	°	°	°	°	°	°			lbs.	lbs.	lbs.	miles.	in.
April 1	New: In Equator.	30.061	48.7	30.8	37.9	32.9	107.4	27.2	41.4	39.4	5.0	13.6	0.8	− 6.7	ESE : E	ESE	0.2	0.0	0.0	139	0.00
2	Apogee	30.118	56.5	26.1	41.1	34.0	110.8	19.5	41.4	39.4	7.1	18.0	0.0	− 3.7	Calm	NE : ESE	0.2	0.0	0.0	114	0.00
3	..	30.267	54.1	30.0	41.4	34.0	100.5	22.6	42.4	41.4	7.4	15.6	0.0	− 3.6	ENE	ESE : E	1.4	0.0	0.1	176	0.00
4	..	30.317	52.9	26.0	38.0	33.5	109.9	18.3	42.6	41.9	4.5	19.1	0.0	− 7.2	ENE : E	ESE	0.8	0.0	0.1	165	0.00
5	..	30.149	59.0	31.8	43.0	34.9	118.9	26.5	43.7	42.4	8.1	22.4	0.0	− 2.4	E : ENE	E : ESE	0.6	0.0	0.1	162	0.00
6	..	29.936	65.5	28.0	46.7	33.9	123.5	21.2	44.4	42.4	12.8	25.4	1.5	+ 1.3	Calm : NE	SW	0.3	0.0	0.0	140	0.00
7	..	29.804	65.4	36.0	50.6	33.6	119.5	28.4	..	..	17.0	24.5	7.2	+ 5.2	WSW	SW : SSW	0.5	0.0	0.0	203	0.00
8	Greatest Declination N.	29.496	65.0	41.3	51.9	41.9	117.5	32.4	45.4	44.4	10.0	22.0	3.5	+ 6.5	SSW	SSW	4.2	0.0	0.3	292	0.00
9	First Qr.	29.337	58.7	42.5	46.9	41.6	102.3	36.8	45.6	44.5	5.3	14.6	0.0	+ 1.6	SSW	SSW : SW	5.7	0.0	0.3	327	0.07
10	..	29.695	63.6	38.1	47.1	34.6	101.7	33.3	45.4	43.7	12.5	29.5	1.0	+ 1.9	WSW	W : WNW	9.1	0.0	0.7	416	0.08
11	..	29.970	60.5	37.8	47.7	40.0	109.4	30.2	46.4	44.4	7.7	17.3	2.2	+ 2.6	WSW : W	WNW : WSW	0.6	0.0	0.0	255	0.00
12	..	30.004	60.4	37.0	47.9	39.0	121.7	32.5	47.4	44.4	8.9	19.8	0.0	+ 2.9	WSW	WSW	1.5	0.0	0.1	280	0.00
13	..	30.044	64.9	39.7	51.5	44.4	105.5	35.2	..	..	7.1	16.7	3.2	+ 6.6	WSW	WSW	1.5	0.0	0.1	287	0.00
14	In Equator	30.120	65.2	47.1	54.0	42.9	115.2	37.9	..	..	11.1	20.2	5.0	+ 9.0	WSW : NW	N by W	1.0	0.0	0.1	253	0.00
15	Full: Perigee	30.197	64.6	42.5	52.2	41.7	110.7	34.1	..	..	10.5	19.6	2.9	+ 6.9	NW : W : N	N	0.6	0.0	0.0	182	0.00
16	..	30.304	65.2	37.9	50.4	43.8	80.9	29.5	..	..	6.6	17.1	0.5	+ 4.9	NNE : WSW	Calm : WSW	0.0	0.0	0.0	107	0.00
17	..	30.215	64.3	39.3	49.9	42.1	121.9	32.2	..	..	7.8	17.3	0.2	+ 4.2	WSW : NE : E	E by S : E	2.3	0.0	0.1	226	0.00
18	..	30.042	57.3	40.0	47.1	41.6	120.0	35.0	..	..	5.5	13.5	0.0	+ 1.1	E by S	E : ENE	1.7	0.0	0.5	290	0.00
19	..	29.846	72.8	36.2	55.3	40.7	120.9	29.3	..	..	14.6	26.1	1.0	+ 8.9	ENE : E	S : SE	0.8	0.0	0.1	184	0.00
20	..	29.842	78.7	45.5	63.1	40.5	135.0	36.0	..	..	22.6	30.8	4.0	+16.4	SSE : S	S : SSE	1.2	0.0	0.1	184	0.00
21	Greatest Declination S.	29.996	74.6	49.3	60.5	47.0	123.9	39.0	..	..	13.5	23.5	4.8	+13.5	WSW	SW	1.5	0.0	0.2	223	0.00
22	Last Qr.	30.087	69.9	41.6	55.3	38.9	128.5	33.3	..	..	16.4	25.7	2.0	+ 8.1	SW	SW	2.0	0.0	0.2	289	0.00
23	..	30.191	63.2	46.7	53.8	37.0	111.7	39.8	..	..	16.8	23.8	6.7	+ 6.4	WSW : NW : N	NW	0.8	0.0	0.1	237	0.00
24	..	30.205	63.6	40.5	51.2	43.1	118.5	32.5	..	..	8.1	20.7	1.6	+ 3.6	WSW	W : WSW	2.3	0.0	0.3	314	0.00
25	..	30.176	67.0	47.1	55.4	46.6	97.5	40.7	..	..	8.8	17.5	2.9	+ 7.7	WSW : NW	WNW : WSW	0.4	0.0	0.0	233	0.00
26	..	29.934	62.8	39.7	49.8	43.0	121.3	35.2	..	..	6.8	17.6	1.1	+ 1.9	SW : WSW	W : NW	5.2	0.0	0.4	360	0.05
27	..	29.960	54.2	39.0	45.5	36.6	97.1	28.3	..	..	8.9	17.6	4.1	− 2.6	NW : N	NNW	3.5	0.0	0.5	342	0.00
28	In Equator	29.906	51.0	37.6	40.7	31.5	104.0	30.0	..	..	9.2	17.4	3.4	− 7.7	WSW : NNW	N : N by W	2.3	0.0	0.2	217	0.01
29	Apogee	29.778	52.7	36.2	43.6	36.0	98.6	27.5	..	..	7.6	17.0	0.0	− 5.2	N	NNW : WSW	1.1	0.0	0.1	262	0.03
30	New	29.521	57.8	40.3	47.8	45.2	71.0	40.0	..	..	2.6	8.7	0.0	− 1.5	W : NW	W : WSW	2.7	0.0	0.3	319	0.04
Means	..	29.984	62.0	38.4	48.9	39.2	110.8	31.5	..	..	9.7	19.8	2.0	+ 2.7	...	...	..	..	..	Sum 7178	Sum 0.28

Barometer Readings from Eye-Observations.

The absolute maximum in the month was 30^{in}·355 on the 4th; the first minimum in the month was 30^{in}·033 on the 1st.
The second maximum ,, was 30^{in}·333 on the 16th; the absolute minimum ,, was 29^{in}·314 on the 9th.
The third maximum ,, was 30^{in}·238 on the 24th; the third minimum ,, was 29^{in}·829 on the 20th.
The fourth maximum ,, was 29^{in}·994 on the 27th; the fourth minimum ,, was 29^{in}·886 on the 26th.
The range in the month was 1^{in}·041.
The mean for the month was 29^{in}·984, being 0^{in}·218 *higher* than the average of the preceding 29 years.

Temperature of the Air.

The highest in the month was 78°·7 on the 20th; the lowest was 26°·0 on the 4th.
The range ,, was 52°·7.
The mean ,, of all the highest daily readings was 62°·0, being 4°·3 *higher* than the average of the preceding 29 years.
The mean ,, of all the lowest daily readings was 38°·4, being 0°·8 *lower* than the average of the preceding 29 years.
The mean daily range was 23°·6, being 5°·2 *greater* than the average of the preceding 29 years.
The mean for the month was 48°·9, being 1°·8 *higher* than the average of the preceding 29 years.

MONTH and DAY, 1870.	ELECTRICITY.		CLOUDS AND WEATHER.	
	A.M.	P.M.	A.M.	P.M.
April 1			10 : v	4,ci,ci.-cu,ci.-s : 0 : 0, d
2			0, h.-fr : 0, h, f	0, h : 0 : 0, d, h
3			0 : 0, h	0, h : 0 : 0, h.-fr
4			fr : v, th.-cl, f, d	0 : 0 : 0
5			th.-f : v, f, h	0 : 0 : 0, f, a, m
6			0, th.-f : 0, sl.-f	0 : 0, h : 0, m
7			2, ci, sl.-f	2, ci.-s, h : 1, ci.-cu, h : 0, lu.-ha, m
8			0 : 2, ci, ci.-cu, so.-ha	4,ci,ci.-cu,cu.-s,w : 2,ci,ci.-cu,cu,so.-ha : 0, d, h
9			10, oc.-th.-r	9,ci,ci.-cu,cu.-s,r,sqs : v : 0, d, lu.-co
10			9, ci.-cu, ci.-s, cu.-s, s, r	8, cu, cu.-s, t, r, sqs : v, ci, ci.-s
11			7, ci.-cu, ci.-s, mt	7,ci.-cu,ci.-s,cu,h : 7,ci.-cu,ci.-s,cu.-s,cu,h : 5,cu.-s,sl.-f
12			ci.-cu, ci.-s, h, d	7, ci, ci.-cu,cu.-s : 7, ci, ci.-cu : 5,ci,ci.-s,h,lu.-ha
13			9, ci, ci.-cu, ci.-s, sl.-r	v,th.-cl,ci,ci.-s,ci.-cu : v, ci, ci.-s,ci.-cu : 10, ci.-s, lu.-ha
14			3, ci, ci.-cu, h	v,ci,ci.-cu,ci.-s,cu.-s,h,so.-ha : 2,ci.-s,d,h,lu.-co,lu.-ha
15			3, ci.-cu, ci.-s, cu, h.-d	4, ci, ci.-cu, h : 1,ci.-s,h,d,sl.-f,lu.-co
16			0, d, h, sl.-f	0, h, f : 0, h, f : 0
17			0, mt : 0, mt	0 : 10, mt
18			10 : 10 : v, ci.-cu	0 : 0 : 0, a
19			0, d : 0	0 : 0 : 0, d, m
20			0 : 0	ci, ci.-s : 1, ci.-s
21			0, d : 0, h	0, h, : ci, ci.-cu : 0, ms
22			3, ci, d, so.-ha	4, ci, ci.-cu : 3,ci,ci.-cu,so.-ha : 2, h, m
23			4, ci, ci.-cu, h	ci, ci.-cu, h : 0, mt
24			10, th.-cl	10 : v : 0, h
25			9, ci.-cu, cu.-s	7, ci.-cu, ci.-s, h, so.-ha : 2, ci, s, mt
26			7, ci.-cu, ci.-s, h	9, ci.-s, cu.-s, sqs : 10, r
27			8, ci.-cu, ci.-s, cu.-s, cu	8,ci,ci.-cu, cu.-s, t, oc.-r, mt, sqs: v, cu.-s
28			10, oc.-r, sl.-sn	8, ci, ci.-s, cu.-s, cu, h : v
29			8, ci, ci.-cu, cu.-s, h	6,ci.-cu,ci.-s,cu.-s,h : 10,ci.-s,cu.-s,r,glm : 10, r
30			10, r, mt, glm	10, glm : 10, cu.-s : 10, s, cu.-s

HUMIDITY OF THE AIR.

Temperature of the Dew Point.

The highest in the month was $51^{\circ}\cdot0$ on the 21st; and the lowest was $29^{\circ}\cdot3$ on the 1st.

The mean ,, was $39^{\circ}\cdot2$, being $1^{\circ}\cdot4$ *lower* than the average of the preceding 29 years.

Elastic Force of Vapour.—The mean for the month was $0^{in}\cdot239$, being $0^{in}\cdot015$ *less* than the average of the preceding 29 years.

Weight of Vapour in a Cubic Foot of Air.—The mean for the month was $2^{grs}\cdot8$, being $0^{gr}\cdot1$ *less* than the average of the preceding 29 years.

Degree of Humidity.—The mean for the month was 69 (that of Saturation being represented by 100), being 10 *less* than the average of the preceding 29 years.

Weight of a Cubic Foot of Air.—The mean for the month was 546 grains, being 3 grains *greater* than the average of the preceding 29 years.

CLOUDS.

The mean amount for the month, a clear sky being represented by 0 and a cloudy sky by 10, was $4\cdot0$.

OZONE.

The mean amount for the month, on a scale ranging from 0 to 10, was $3\cdot1$.

WIND.

The proportions were of N. 5, S. 7, W. 11, E. 5, and Calm 2. The greatest pressure in the month was $9^{lbs}\cdot1$ on the square foot on the 10th.

RAIN.

Fell on 6 days in the month, amounting to $0^{in}\cdot28$, as measured in the simple cylinder gauge partly sunk below the ground; being $1^{in}\cdot45$ *less* than the average fall of the preceding 55 years.

MONTH and DAY, 1870.	Phases of the Moon.	Mean Daily Reading of the Barometer (corrected and reduced to 32° Fahrenheit).	Readings of Thermometers. Dry. Highest.	Dry. Lowest.	Dry. Mean Daily Value.	Dew Point. Mean Daily Value.	Highest in the Sun, as shown by a Self-Registering Thermometer with blackened bulb in vacuo, placed on the Grass.	Lowest on the Grass, as shown by a Self-Registering Minimum Thermometer.	In the Water of the Thames, at Greenwich, by Self-Registering Thermometers, read at 9h A.M. Highest.	Lowest.	Difference between the Dew Point Temperature and Air Temperature. Mean Daily Value.	Greatest.	Least.	Difference between the Mean Temperature of the Day and the Mean Temperature of the same Day on an Average of 50 Years.	Wind as deduced from Anemometers. Osler's. General Direction. A.M.	P.M.	Pressure in lbs. on the square foot. Greatest.	Least.	Mean of 24 Obs.	Robinson's. Amount of Horizontal Movement of the Air on each Day.	Rain in Inches, collected in a Gauge whose receiving surface is 5 inches above the Ground.
		in.	°	°	°	°	°	°	°	°	°	°	°	°			lbs.	lbs.	lbs.	miles.	in.
May 1	..	29·404	59·8	43·2	48·6	37·7	116·7	37·0	..	..	10·9	20·0	4·4	− 1·2	WSW : W	WSW : NW	3·1	0·0	0·6	393	0·00
2	..	29·730	54·7	36·0	42·0	35·3	87·1	29·7	..	..	6·7	17·2	2·4	− 8·3	N by W : N	NNW : NNE : N	3·2	0·0	0·4	277	0·02
3	..	29·860	50·9	31·9	40·2	34·5	80·5	27·0	..	..	5·7	12·2	0·0	−10·6	WSW : WNW	NW	1·1	0·0	0·2	258	0·00
4	..	30·063	56·2	31·5	44·1	34·4	118·5	23·1	..	..	9·7	17·9	0·7	− 7·1	NW : WSW : N	NNE : SE	0·6	0·0	0·1	166	0·00
5	Greatest Declination N.	30·079	60·9	37·0	48·1	41·3	111·7	30·6	..	..	6·8	18·6	0·0	− 3·4	WSW : NW	NE	0·4	0·0	0·0	157	0·00
6	..	30·133	60·6	37·5	48·7	43·4	107·1	28·2	..	..	5·3	14·8	1·2	− 3·0	NNE	NNE : Calm	0·2	0·0	0·0	121	0·00
7	..	30·150	59·5	36·9	47·6	42·9	96·9	28·0	..	..	4·7	14·2	0·0	− 4·1	NE	NNE : SE	1·2	0·0	0·1	189	0·00
8	First Qr.	30·148	53·5	33·4	43·6	38·7	86·1	23·2	..	..	4·9	13·2	0·0	− 8·1	NE	E : ESE	1·0	0·0	0·1	174	0·00
9	..	29·982	61·5	29·8	44·7	39·5	135·9	21·3	..	..	5·2	19·5	0·0	− 6·8	NE	E : ESE	1·5	0·0	0·1	172	0·00
10	..	29·740	59·9	38·3	47·5	40·9	129·5	30·0	..	..	6·6	17·9	0·0	− 3·8	ESE : E	ESE	0·5	0·0	0·1	164	0·00
11	..	29·365	60·8	35·2	48·8	46·5	84·7	26·1	..	..	2·3	14·4	0·0	− 2·4	SE	S : SSW	4·6	0·0	0·6	301	0·19
12	In Equator	29·351	63·0	47·7	53·5	46·0	120·5	43·0	..	..	7·5	14·8	2·1	+ 2·3	SW	SW	30·0	0·0	2·8	538	0·00
13	..	29·500	60·0	48·7	51·9	49·7	93·7	42·5	..	..	2·2	7·8	0·0	+ 0·5	SW	SSW : SW	30·0	0·1	1·7	490	0·18
14	Perigee	29·753	65·8	48·2	55·2	48·0	125·2	42·5	..	..	7·2	15·3	2·9	+ 3·5	WSW	SW	17·1	0·1	1·6	501	0·00
15	Full	29·797	65·7	44·0	54·4	47·2	125·9	38·3	..	..	7·2	13·5	0·0	+ 2·4	SW : SSW	SSW	2·1	0·0	0·3	246	0·00
16	..	29·740	66·0	48·3	54·0	48·3	133·2	42·1	..	..	5·7	15·8	0·0	+ 1·7	Calm : SW	SW : WSW	1·4	0·0	0·1	216	0·04
17	..	30·060	67·8	42·1	54·2	46·8	138·2	34·7	..	..	7·4	16·6	0·4	+ 1·6	WSW	SW : SSW	3·6	0·0	0·4	316	0·00
18	Greatest Declination S.	30·098	76·2	42·3	59·8	50·1	139·5	33·6	..	..	9·7	21·3	0·0	+ 6·9	SSW	SW	1·9	0·0	0·2	252	0·00
19	..	30·023	81·2	47·2	63·9	49·8	142·7	37·5	..	..	14·1	27·5	0·0	+10·7	WSW	SW	1·9	0·0	0·2	239	0·00
20	..	30·000	80·7	49·1	65·2	52·0	144·5	40·0	..	..	13·2	26·0	0·0	+11·7	WSW	SW	1·5	0·0	0·3	306	0·00
21	..	29·953	85·4	51·4	67·2	52·5	147·4	44·3	..	..	14·7	30·7	0·4	+13·4	WSW	WSW : SSW	0·9	0·0	0·1	217	0·00
22	Last Qr.	29·862	82·1	49·5	64·7	48·9	142·3	45·5	..	..	15·8	28·6	4·0	+10·6	WSW	W : N	2·6	0·0	0·3	249	0·00
23	..	30·138	61·7	43·5	51·6	44·7	100·9	37·2	..	..	6·9	16·5	0·0	− 2·7	NNE : NE	ENE : SE	0·5	0·0	0·1	162	0·00
24	..	30·130	76·7	38·5	59·1	48·9	131·7	30·8	..	..	10·2	23·3	0·0	+ 4·5	SW : WSW	W : NW : N by W	1·1	0·0	0·1	178	0·00
25	In Equator	30·228	70·3	45·0	56·2	42·4	140·2	37·8	..	..	13·8	23·6	5·2	+ 1·3	NNW : NNE	NNE : ESE	1·5	0·0	0·3	255	0·00
26	Apogee	30·192	72·0	37·9	55·5	41·7	139·2	29·4	..	..	13·8	25·4	0·0	+ 0·3	NE	NE : SE	0·2	0·0	0·0	126	0·00
27	..	30·083	67·8	42·9	54·3	47·3	135·7	34·0	..	..	7·0	16·7	2·1	− 1·1	Calm : NE	E : ESE	0·9	0·0	0·1	148	0·00
28	..	30·004	70·3	42·4	54·9	48·7	136·3	32·3	..	..	6·2	18·2	0·0	− 0·8	E : ENE	E : E by S	0·8	0·0	0·1	167	0·00
29	..	29·890	78·7	45·5	61·2	50·6	143·3	39·7	..	..	10·6	28·0	0·0	+ 5·2	Calm : SW	SW	1·7	0·0	0·2	195	0·00
30	New	29·707	77·2	50·6	60·9	50·7	145·7	43·3	..	..	10·2	27·0	1·2	+ 4·6	SW : SSW	SW	3·9	0·0	0·6	317	0·00
31	..	29·621	68·0	46·7	54·5	48·1	126·6	40·2	..	..	6·4	15·1	0·4	− 2·1	SW : WSW	WSW : SW	15·6	0·0	1·0	412	0·04
																				Sum	Sum
Means	..	29·896	66·9	42·0	53·4	45·1	122·8	34·6	..	..	8·3	19·1	0·9	+ 0·5	...	...	..	..	..	7902	0·47

BAROMETER READINGS FROM EYE-OBSERVATIONS.

The first minimum in the month was 29in·373 on the 1st.
The first maximum in the month was 30in·165 on the 8th; the absolute minimum ,, was 29in·195 on the 11th.
The second maximum ,, was 29in·852 on the 14th; the third minimum ,, was 29in·689 on the 16th.
The third maximum ,, was 30in·127 on the 18th; the fourth minimum ,, was 29in·822 on the 22nd.
The absolute maximum ,, was 30in·280 on the 25th; the fifth minimum ,, was 29in·610 on the 31st.
The range in the month was 1in·085.
The mean for the month was 29in·896, being 0in·124 *higher* than the average of the preceding 29 years.

TEMPERATURE OF THE AIR.

The highest in the month was 85°·4 on the 21st; the lowest was 29°·8 on the 9th.
The range ,, was 55°·6.
The mean ,, of all the highest daily readings was 66°·9, being 2°·3 *higher* than the average of the preceding 29 years.
The mean ,, of all the lowest daily readings was 42°·0, being 2°·2 *lower* the average of the preceding 29 years.
The mean daily range was 24°·9, being 4°·6 *greater* than the average of the preceding 29 years.
The mean for the month was 53°·4, being 0°·4 *higher* than the average of the preceding 29 years.

MONTH and DAY, 1870.	ELECTRICITY.		CLOUDS AND WEATHER.	
	A.M.	P.M.	A.M.	P.M.
May 1			7, ci.-cu, ci.-s, cu.-s, sl.-r	v, ci.-cu, ci.-s, cu, sl.-r, t : 10, sl.-r
2			10 : 10, ci.-s, cu.-s, cu	8, ci.-cu, ci.-s, cu.-s, cu, h, r : 3, ci.-s, s, d
3			ci : 10, sl.-r	10, sl.-r : v : 1, cu.-s
4			8, ci, ci.-cu, cu.-s	8, ci, ci.-cu, cu, s : 3, ci, ci.-cu, ci.-s : 8, cu.-s, mt
5			0, mt, h : ci, ci.-cu, so.-ha	v, ci.-cu, cu.-s : 10, ci.-cu, cu.-s
6			9, ci.-cu, ci.-s,	10 : v : 2, h.-d
7			0 : 10, ci.-s, cu.-s	9, cu.-s : v : 0, d
8			10, d	10 : v : 0, h.-fr
9			9, ci.-cu, ci.-s, cu.-s	4, ci, ci.-cu : v, ci, ci.-cu, ci.-s, cu.-s : 0
10			7, ci, ci.-cu, cu.-s : v	5, ci, ci.-cu, ci.-s : 2, ci.-s, cu.-s : 0, h
11			8, th.-cl, so.-ha	10, cu.-s, r, sqs : 10, r, fr.-sqs : 10, r, sqs
12			6, ci.-cu, ci.-s, cu.-s, g	6, ci.-cu, ci.-s, cu, h.-g : v, cu, g : 1, s, w
13			10, cu.-s, sl.-r, sqs	10, cu.-s, sc, h.-r, fr.-h.-sqs : v, ci, ci.-cu, cu.-s, s, w
14			vv, cu.-s, sqs	5, ci, ci.-cu, ci.-s, cu.-s, fr.-h.-sqs : 1, ci.-s, h
15			9, ci, ci.-cu, cu.-s	7, ci, ci.-cu, cu.-s : 9, cu.-s
16			10, r : 10, oc.-r	8, ci.-cu, ci.-s, cu.-s, r : v, ci.-s, cu.-s, cu : 0
17			6, ci.-cu, cu	8, ci.-cu, ci.-s, cu.-s, so.-ha : v, ci.-s, cu.-s, so.-ha : 2, ci.-s, s
18			2, ci, ci.-cu, d	1, ci.-cu : ci, ci.-cu : 0, l, ms
19			4, ci	5, ci, ci.-cu : v, ci, ci.-cu, ci.-s : 2, ci.-s, s, a, m
20			3, ci, ci.-s	6, ci, ci.-s, so.-ha : 4, ci : 3, ci, a, ms
21			1, ci, mt	1, ci : ci : 0, l
22			3, ci, ci.-s, h, mt	2, ci, h : 1, cu.-s, a
23			10, ci.-cu, ci.-s, cu.-s	10, th.-cl : 10, h : 10, h
24			0, h	v, ci, ci.-cu, ci.-s, cu.-s, so.-ha : v, ci.-cu, ci.-s, cu.-s, m
25			1, ci, h, so.-ha	1, ci : 2, ci, ci.-cu, cu : 1, s, d
26			0, h.-d : 0, h	0 : 0 : 1, s
27			v, ci, ci.-cu	v, ci.-cu, ci.-s, cu.-s : 0
28			6, ci, ci.-cu	9, ci, ci.-cu, cu.-s : v, ci, ci.-s, cu.-s, so.-ha : 4, ci, ci.-cu, cu.-s
29			5, ci	4, ci, ci.-cu, h : 6, ci.-s, s, cu, d
30			v, ci, ci.-cu, ci.-s, cu, sl.-r, so.-ha, sqs	v, ci, ci.-cu, ci.-s, cu, sl.-r, w : vv, ci.-cu, ci.-s, cu.-s, s
31			8, ci,-cu, ci.-s, cu.-s, fr.-h.-sqs	vv, ci.-cu, ci.-s, cu.-s, r, sqs : vv, ci.-cu, ci.-s

HUMIDITY OF THE AIR.

Temperature of the Dew Point.

The highest in the month was 55°·9 on the 20th; and the lowest was 32°·9 on the 4th.

The mean „ was 45°·1, being 0°·5 *lower* than the average of the preceding 29 years.

Elastic Force of Vapour.—The mean for the month was $0^{in}\cdot301$, being $0^{in}\cdot003$ *less* than the average of the preceding 29 years.

Weight of Vapour in a Cubic Foot of Air.—The mean for the month was $3^{grs}\cdot4$, being $0^{gr}\cdot1$ *less* than the average of the preceding 29 years.

Degree of Humidity.—The mean for the month was 73 (that of Saturation being represented by 100), being 3 *less* than the average of the preceding 29 years.

Weight of a Cubic Foot of Air.—The mean for the month was 539 grains, being 3 grains *less* than the average of the preceding 29 years.

CLOUDS.

The mean amount for the month, a clear sky being represented by 0 and a cloudy sky by 10, was 5·6.

OZONE.

The mean amount for the month, on a scale ranging from 0 to 10, was 3·6.

WIND.

The proportions were of N. 6, S. 8, W. 9, E. 7, and Calm 1. The greatest pressure in the month was $30^{lbs}\cdot0$ on the square foot on the 12th and 13th.

RAIN.

Fell on 5 days in the month, amounting to $0^{in}\cdot47$, as measured in the simple cylinder gauge partly sunk below the ground; being $1^{in}\cdot70$ *less* than the average fall of the preceding 55 years.

MONTH and DAY, 1870.	Phases of the Moon.	Mean Daily Reading of the Barometer (corrected and reduced to 32° Fahrenheit).	Readings of Thermometers. Dry. Highest.	Dry. Lowest.	Dry. Mean Daily Value.	Dew Point. Mean Daily Value.	Highest in the Sun, as shown by a Self-Registering Thermometer with blackened bulb in vacuo, placed on the Grass.	Lowest on the Grass, as shown by a Self-Registering Minimum Thermometer.	In the Water of the Thames, at Greenwich, by Self-Registering Thermometers, read at 9h A.M. Highest.	In the Water. Lowest.	Difference between the Dew Point Temperature and Air Temperature. Mean Daily Value.	Difference. Greatest.	Difference. Least.	Difference between the Mean Temperature of the Day and the Mean Temperature of the same Day on an Average of 50 Years.	Wind as deduced from Anemometers. Osler's. General Direction. A.M.	General Direction. P.M.	Pressure in lbs. on the square foot. Greatest.	Pressure. Least.	Pressure. Mean of 24 Obs.	Robinson's. Amount of Horizontal Movement of the Air on each Day.	Rain in Inches, collected in a Gauge whose receiving surface is 5 inches above the Ground.
		in.	°	°	°	°	°	°	°	°	°	°	°	°			lbs.	lbs.	lbs.	miles.	in.
June 1	..	29.655	64.8	48.0	55.3	48.9	100.3	46.3	..	..	6.4	14.6	0.0	− 1.7	WSW	WSW	5.2	0.0	0.7	389	0.12
2	Greatest Declination N.	29.837	73.6	47.3	59.2	51.8	130.0	38.4	..	..	7.4	23.0	0.0	+ 1.9	WSW : NW	NW : WSW	0.2	0.0	0.0	147	0.00
3	..	30.010	70.6	52.0	57.4	53.0	82.7	50.1	..	..	4.4	12.1	0.0	0.0	WSW	NE : ESE	0.0	0.0	0.0	160	0.00
4	..	30.212	69.0	50.4	58.0	51.7	108.5	48.5	..	..	6.3	13.0	0.0	+ 0.7	SE : SW : NE	ESE : E	0.1	0.0	0.0	85	0.00
5	..	30.333	72.2	52.0	56.7	50.4	127.7	44.2	..	..	6.3	20.3	0.0	− 0.5	NE : NNE	NNE : E	2.4	0.0	0.2	206	0.00
6	First Qr.	30.310	75.4	41.4	58.6	45.5	146.5	31.7	..	..	13.1	28.7	0.0	+ 1.6	NNE : N	NNE : ENE	2.0	0.0	0.2	199	0.00
7	..	30.239	74.9	42.5	57.0	48.4	148.5	35.2	..	..	8.6	25.2	0.7	0.0	NNE	NNE	3.2	0.0	0.4	285	0.00
8	In Equator	29.970	76.8	51.3	61.9	45.5	145.7	51.0	..	..	16.4	29.6	4.0	+ 4.6	NNE	NNE : SW	1.3	0.0	0.1	226	0.00
9	..	29.655	72.7	52.6	58.4	46.6	126.6	43.7	..	..	11.8	23.4	4.4	+ 0.7	WSW : NW	NNW	1.9	0.0	0.3	250	0.00
10	..	29.565	65.9	44.8	55.1	46.1	118.4	35.0	..	..	9.0	16.0	4.5	− 2.9	WSW : W	WNW : WSW	2.5	0.0	0.3	290	0.00
11	Perigee	29.709	69.9	50.0	58.5	48.3	119.7	42.0	..	..	10.2	20.5	3.9	+ 0.2	WSW : W	WSW	18.5	0.0	1.2	498	0.00
12	..	29.997	74.2	56.0	61.6	51.5	108.7	52.5	..	..	10.1	21.1	4.6	+ 3.0	WSW	WSW : W	3.0	0.0	0.6	371	0.00
13	Full	29.993	83.0	54.3	66.4	53.6	150.8	46.1	..	..	12.8	25.3	3.2	+ 7.6	WSW	WSW : SW	0.8	0.0	0.1	260	0.00
14	Greatest Declination S.	29.967	83.2	51.2	65.9	51.7	150.1	42.5	..	..	14.2	30.3	0.6	+ 6.9	WSW	WSW : W	1.7	0.0	0.1	196	0.00
15	..	29.986	83.7	51.2	66.1	52.5	145.6	42.4	..	..	13.6	28.4	1.4	+ 7.1	WSW : SW	WSW : SW	1.1	0.0	0.1	180	0.00
16	..	29.812	86.2	53.3	69.5	55.4	151.5	45.0	..	..	14.1	31.3	0.6	+10.5	S : SE	SSE : NE	2.6	0.0	0.2	157	0.04
17	..	29.756	77.1	53.0	61.5	52.6	151.7	45.0	..	..	8.9	20.9	2.3	+ 2.5	NE : WSW	WSW	3.5	0.0	0.6	339	0.11
18	..	29.928	75.9	50.5	60.9	56.8	115.7	42.0	..	..	4.1	15.6	0.0	+ 1.8	SW : SSW	WSW : SW	1.6	0.0	0.2	274	0.00
19	..	30.048	83.2	53.1	66.5	54.9	149.2	47.0	..	..	11.6	27.9	0.2	+ 7.3	WSW	WSW : SW	1.1	0.0	0.1	228	0.00
20	Last Qr.	30.088	81.8	54.7	67.2	56.0	141.3	47.5	..	..	11.2	23.5	1.4	+ 7.7	WSW : W	W : NW	2.3	0.0	0.3	296	0.00
21	In Equator	30.153	84.1	53.7	68.8	55.9	145.4	45.0	..	..	12.9	24.1	2.8	+ 8.9	NE	NE : SSW	0.1	0.0	0.0	97	0.00
22	..	30.051	90.2	57.8	72.9	59.8	157.4	50.0	..	..	13.1	28.0	2.7	+12.6	SW : WSW	SW	0.3	0.0	0.0	140	0.00
23	Apogee	30.016	72.9	53.0	60.4	49.8	124.5	44.0	..	..	10.6	21.1	4.8	− 0.3	N : NNE	NNE : SE	1.9	0.0	0.2	246	0.00
24	..	29.817	64.0	50.2	54.6	46.0	97.7	40.6	..	..	8.6	13.0	2.7	− 6.6	W	WSW : NW	4.0	0.0	0.4	303	0.12
25	..	29.945	68.0	47.7	56.0	42.4	130.0	41.3	..	..	13.6	21.1	4.0	− 5.6	NW : N	NW	2.3	0.0	0.5	344	0.00
26	..	29.841	68.6	50.0	59.1	49.6	105.7	39.4	..	..	9.5	17.3	2.0	− 2.6	WSW : W	W	2.1	0.0	0.4	350	0.00
27	..	29.817	71.4	55.3	59.9	47.8	117.5	50.7	..	..	12.1	22.7	6.2	− 1.7	W : NW	N : NNE	2.6	0.0	0.3	255	0.00
28	New	29.929	68.1	48.8	57.2	48.9	128.0	40.3	..	..	8.3	15.8	0.0	− 4.3	NE	SW : NE	0.1	0.0	0.0	102	0.00
29	Greatest Declination N.	29.903	75.1	44.9	58.7	50.0	131.1	36.6	..	..	8.7	22.4	0.4	− 2.7	NW : N	N	0.9	0.0	0.0	170	0.00
30	..	29.883	69.0	50.5	58.0	45.8	125.0	46.0	..	..	12.2	19.6	5.0	− 3.1	NW	NW : NNW	1.1	0.0	0.2	258	0.00
Means	..	29.947	74.8	50.7	60.9	50.6	129.4	43.7	..	..	10.3	21.9	2.1	+ 1.8	...	...	..	..	..	Sum 7301	Sum 0.39

BAROMETER READINGS FROM EYE-OBSERVATIONS.

The absolute maximum in the month was 30in·367 on the 6th; the absolute minimum in the month was 29in·550 on the 10th.
The second maximum ,, was 30in·048 on the 12th; the second minimum ,, was 29in·715 on the 17th.
The third maximum ,, was 30in·191 on the 21st; the third minimum ,, was 29in·771 on the 24th.
The fourth maximum ,, was 29in·973 on the 25th; the fourth minimum ,, was 29in·764 on the 27th.
The fifth maximum ,, was 29in·944 on the 28th.
The range in the month was 0in·817.
The mean for the month was 29in·947, being 0in·136 *higher* than the average of the preceding 29 years.

TEMPERATURE OF THE AIR.

The highest in the month was 90°·2 on the 22nd; the lowest was 41°·4 on the 6th.
The range ,, was 48°·8.
The mean ,, of all the highest daily readings was 74°·8, being 3°·7 *higher* than the average of the preceding 29 years.
The mean ,, of all the lowest daily readings was 50°·7, being 0°·7 *higher* than the average of the preceding 29 years.
The mean daily range was 24°·1, being 3°·1 *greater* than the average of the preceding 29 years.
The mean for the month was 60°·9, being 1°·9 *higher* than the average of the preceding 29 years.

MONTH and DAY, 1870.	ELECTRICITY. A.M.	ELECTRICITY. P.M.	CLOUDS AND WEATHER. A.M.	CLOUDS AND WEATHER. P.M.
June 1			10, ci.-s, cu.-s, cu, sqs	10, ci.-cu, sqs, r : 1, s, cu.-s, d
2			6, ci, ci.-cu, ci.-s, cu.-s	7,ci.-cu,ci.-s,cu,h : v, ci, ci.-cu, cu.-s : 2, h
3			10, mt, h : 10, mt	10, mt : 2, ci.-cu, ci.-s, cu.-s,h.-d
4			9, ci.-cu, ci.-s, mt	10, sl.-r, h, li.-cl : 5, ci.-cu, cu.-s
5			10 : 10	v : 0 : 0, h.-d
6			0 : 0, h	1, ci, ci.-cu : 1, ci.-cu : 0, m
7			0 : v, ci, ci.-cu, cu, h	v, ci, ci.-s, cu.-s, w : 10, sl.-r
8			0, mt : 0, mt	0 : 0, h : 2,ci.-cu,cu.-s,d
9			10, sl.-r	4, ci.-cu, so.-ha : 6, ci, ci.-cu, h, so.-ha : 3, ci.-cu, ci.-s, s, lu.-co, lu.-ha
10			10, cu.-s, h : 10	10 : v, ci.-s, cu.-s : 10
11			6, ci.-cu, ci.-s : 10, h.-sqs	10, fr.-h.-sqs : 7, cu.-s, fr.-sqs
12			10, cu.-s	10, w : 8, ci.-cu, cu.-s, w
13			0, h	0 : 0, h : 0
14			0 : 0, h	1, ci, cu.-s : 0, h
15			6, ci, ci.-cu, cu, h	7, ci.-cu, cu : 4, ci.-cu, cu : 1, ci.-s
16			7, ci, ci.-cu, cu, so.-ha	6, ci, ci.-cu, cu : 6,ci.-cu,ci.-s,cu.-s : 10, cu.-s, h.-r, l, t
17			10, t.-s, h.-r : 10, cu.-s	7, ci, ci.-cu, sqs, sl.-r : v, ci.-cu, ci.-s, cu.-s
18			10, ci.-s, cu.-s, th.-r : 10	10 : v,ci.-s,cu.-s,sl.-r: 4, ci, ci.-s, cu.-s
19			3, ci, ci.-s	2, li.-cl, ci, ci.-s : 3, li.-cl, ci.-s, h
20			10, ci.-cu, ci.-s	8,ci.-cu,ci.-s,w : v,ci,ci.-cu,cu.-s : 1, s
21			0 : 0	7,ci,ci.-cu,cu,h : 7,ci,ci.-cu,cu,h : 2,ci,ci.-cu,ci.-s 0, d, m, s
22			10, cu.-s	9, cu, cu.-s, h : 9,ci.-cu,cu,cu.-s: 10, cu.-s
23			9, ci.-s, cu.-s	10, ci, ci.-cu, ci.-s : v, *th.-cl*
24			10 : 10, th.-r	10, r : 10, r 0, sqs
25			8, ci, ci.-cu, cu.-s, cu, w	8, ci, ci.-cu, cu.-s, cu : 1, s
26			10, ci.-cu, ci.-s, cu.-s	7, w : 10, w 10
27			7, ci, ci.-cu, cu	10 : 10, sl.-r : 10
28			7, ci.-cu, cu.-s	10, h : v, ci.-cu, ci.-s, cu.-s, cu
29			6, ci, ci.-cu, cu, h	8,ci.-cu,ci.-s,cu.-s: 10, ci.-cu, ci.-s : 4, ci.-cu, ci.-s, s
30			6, ci.-cu, ci.-s, h	v, ci.-cu, ci.-s, cu.-s, h : v

HUMIDITY OF THE AIR.

Temperature of the Dew Point.

The highest in the month was 63°·0 on the 22nd; and the lowest was 41°·9 on the 25th.

The mean „ was 50°·6, being 0°·1 *lower* than the average of the preceding 29 years.

Elastic Force of Vapour.—The mean for the month was $0^{in}\cdot369$, being $0^{in}\cdot003$ *less* than the average of the preceding 29 years.

Weight of Vapour in a Cubic Foot of Air.—The mean for the month was $4^{grs}\cdot1$, being $0^{gr}\cdot1$ *less* than the average of the preceding 29 years.

Degree of Humidity.—The mean for the month was 68 (that of Saturation being represented by 100), being 6 *less* than the average of the preceding 29 years.

Weight of a Cubic Foot of Air.—The mean for the month was 532 grains, being *the same as* the average of the preceding 29 years.

CLOUDS.

The mean amount for the month, a clear sky being represented by 0 and a cloudy sky by 10, was 6·4.

OZONE.

The mean amount for the month, on a scale ranging from 0 to 10, was 3·2.

WIND.

The proportions were of N. 8, S. 5, W. 13, E. 4, and Calm 0. The greatest pressure in the month was $18^{lbs}\cdot5$ on the square foot on the 11th.

RAIN.

Fell on 4 days in the month, amounting to $0^{in}\cdot39$, as measured in the simple cylinder gauge partly sunk below the ground; being $1^{in}\cdot55$ *less* than the average fall of the preceding 55 years.

MONTH and DAY, 1870.	Phases of the Moon.	Mean Daily Reading of the Barometer (corrected and reduced to 32° Fahrenheit).	Readings of Thermometers. Dry. Highest.	Dry. Lowest.	Dry. Mean Daily Value.	Dew Point. Mean Daily Value.	Highest in the Sun, as shown by a Self-Registering Thermometer, with blackened bulb in vacuo, placed on the Grass.	Lowest on the Grass, as shown by a Self-Registering Minimum Thermometer.	In the Water of the Thames, at Greenwich, by Self-Registering Thermometers, read at 9h A.M. Highest.	In the Water of the Thames. Lowest.	Difference between the Dew Point Temperature and Air Temperature. Mean Daily Value.	Difference. Greatest.	Difference. Least.	Difference between the Mean Temperature of the Day and the Mean Temperature of the same Day on an Average of 50 Years.	Wind as deduced from Anemometers. Osler's. General Direction. A.M.	General Direction. P.M.	Pressure in lbs. on the square foot. Greatest.	Pressure. Least.	Pressure. Mean of 24 Obs.	Robinson's. Amount of Horizontal Movement of the Air on each Day.	Rain in Inches, collected in a Gauge whose receiving surface is 5 inches above the Ground.
		in.	°	°	°	°	°	°	°	°	°	°	°	°			lbs.	lbs.	lbs.	miles.	in.
July 1	..	29·857	68·0	49·2	54·4	48·3	124·7	40·0	..	..	6·1	18·0	3·0	− 6·5	W by S : NW	NW : W by S	3·7	0·0	0·3	289	0·16
2	..	29·810	69·0	44·8	56·5	47·4	126·0	37·2	..	..	9·1	20·7	1·3	− 4·6	W by S : WNW	WNW : W	1·5	0·0	0·3	294	0·00
3	..	29·769	66·0	47·1	56·1	50·2	91·6	36·8	..	..	5·9	14·8	1·1	− 5·2	WSW	WSW : W : SW	0·4	0·0	0·0	188	0·00
4	..	29·696	81·3	53·4	66·3	61·6	132·1	51·2	..	..	4·7	19·4	2·6	+ 4·8	SW : WSW	W : WSW	3·4	0·0	0·5	388	0·04
5	..	29·792	72·4	61·8	64·4	59·0	106·0	55·0	..	..	5·4	10·5	1·5	+ 2·7	SW	SW	10·4	0·0	0·8	419	0·01
6	First Quarter: In Equator.	29·835	74·8	58·0	63·2	53·0	120·8	51·5	..	..	10·2	21·9	2·3	+ 1·4	SSW : WNW : W	W	1·4	0·0	0·2	240	0·06
7	..	29·938	83·1	55·2	67·8	49·8	148·2	49·3	..	..	18·0	32·5	2·4	+ 5·9	WSW : NE : SSW	SW : SSW	0·6	0·0	0·0	140	0·00
8	..	29·816	89·7	50·0	69·6	52·1	145·8	42·2	..	..	17·5	33·6	2·5	+ 7·9	Calm : SE	S : SE	0·6	0·0	0·0	122	0·00
9	Perigee	29·650	78·0	62·0	67·6	61·6	114·7	60·3	..	..	6·0	15·6	0·9	+ 5·9	SE : NE	SSW : SW	0·7	0·0	0·0	149	0·01
10	..	29·690	81·5	61·2	68·3	58·1	134·9	57·0	..	..	10·2	22·6	1·1	+ 6·5	WSW	W : WSW	1·2	0·0	0·2	265	0·08
11	..	29·521	76·3	55·8	64·7	56·0	116·0	50·2	..	..	8·7	19·4	0·8	+ 2·9	WSW : NE	SE	0·3	0·0	0·0	101	0·35
12	Greatest Dec. S.: Full	29·565	74·4	57·0	63·5	53·0	125·8	51·2	..	..	10·5	18·2	3·2	+ 1·5	NW	NW : W : WSW	0·3	0·0	0·0	176	0·00
13	..	29·679	74·8	53·8	62·6	56·7	117·2	45·0	..	..	5·9	13·6	0·8	+ 0·3	WSW	SW	0·4	0·0	0·0	186	0·02
14	..	29·896	79·7	57·9	66·8	53·5	129·4	52·1	..	..	13·3	24·3	1·3	+ 4·3	NW : W : N	SW : SSW	0·5	0·0	0·0	137	0·00
15	..	29·773	85·0	52·0	68·8	51·7	141·4	47·9	..	..	17·1	28·2	0·4	+ 6·3	SSE	SSW	1·8	0·0	0·1	192	0·00
16	..	29·721	77·1	56·3	65·4	52·1	151·4	51·2	..	..	13·3	21·8	0·2	+ 3·0	WSW : W	W : WSW	1·8	0·0	0·2	287	0·35
17	..	29·901	77·1	54·0	63·0	49·9	129·1	45·6	..	..	13·1	23·9	5·6	+ 0·8	WSW : W	W : NW : WSW	0·9	0·0	0·1	216	0·00
18	..	29·945	70·4	56·7	63·0	55·6	112·7	49·8	..	..	7·4	12·8	3·0	+ 1·1	SW	SW : WSW	0·3	0·0	0·0	139	0·00
19	In Equator	30·049	84·2	61·0	71·0	59·3	148·4	58·2	..	..	11·7	24·7	1·5	+ 9·4	SW : WSW	W : NW	0·3	0·0	0·0	144	0·00
20	Last Qr.	30·083	86·–	59·2	71·8	56·4	143·3	51·3	..	..	15·4	28·6	2·3	+10·4	NNE	W : WSW	0·5	0·0	0·0	159	0·00
21	Apogee	29·978	88·1	59·3	72·5	58·9	145·7	50·9	..	..	13·6	25·8	2·5	+11·0	WSW	W : NW : N	2·1	0·0	0·2	289	0·00
22	..	30·011	87·6	61·0	72·0	54·7	153·0	52·0	..	..	17·3	35·7	2·5	+10·5	N : NNE	NE : ESE	2·1	0·0	0·2	157	0·00
23	..	29·947	79·1	53·7	66·1	53·4	149·5	43·9	..	..	12·7	26·7	1·2	+ 4·5	E : ESE	E	2·7	0·0	0·4	245	0·00
24	..	29·809	82·2	59·3	69·8	53·8	147·7	54·2	..	..	16·0	24·1	4·2	+ 8·1	E	E : ENE	4·2	0·0	0·5	288	0·00
25	..	29·666	88·8	59·6	71·7	57·0	148·7	51·2	..	..	14·7	27·8	2·9	+ 9·9	ENE : E : SE	SSW	1·3	0·0	0·1	191	0·00
26	Greatest Declination N.	29·770	76·8	60·6	66·1	61·0	111·0	52·4	..	..	5·1	13·3	0·4	+ 4·2	Variable	NNE	3·7	0·0	0·1	158	0·93
27	..	29·876	82·3	59·9	67·4	59·3	140·3	55·6	..	..	8·1	22·6	0·9	+ 5·4	NNE	NE : NNE	2·3	0·0	0·4	310	0·00
28	New	29·999	64·9	52·0	57·6	52·9	82·7	48·0	..	..	4·7	9·2	2·1	− 4·6	NNE	NNE	2·1	0·0	0·6	351	0·00
29	..	29·931	67·3	49·7	58·2	50·5	102·0	41·2	..	..	7·7	16·4	3·1	− 4·1	NNE	NE : NNE	1·3	0·0	0·3	272	0·00
30	..	29·794	74·9	55·4	63·1	56·9	124·7	55·0	..	..	6·2	17·0	1·1	+ 0·7	NE : ENE	ENE : ESE	0·7	0·0	0·1	208	0·00
31	..	29·587	80·5	60·3	67·9	62·7	126·8	54·2	..	..	5·2	17·5	1·9	+ 5·5	NE	E	0·9	0·0	0·1	200	0·00
Means	..	29·818	78·1	56·0	65·4	55·0	128·8	49·7	..	..	10·3	21·3	2·6	+3·5	...	...	..	..	..	Sum 6900	Sum 2·01

BAROMETER READINGS FROM EYE-OBSERVATIONS.

The first minimum in the month was $29^{\text{in}}\cdot653$ on the 4th.

The first maximum in the month was $29^{\text{in}}\cdot966$ on the 7th; the absolute minimum ,, was $29^{\text{in}}\cdot497$ on the 11th.

The second maximum ,, was $29^{\text{in}}\cdot917$ on the 14th; the third minimum ,, was $29^{\text{in}}\cdot689$ on the 16th.

The absolute maximum ,, was $30^{\text{in}}\cdot134$ on the 20th; the fourth minimum ,, was $29^{\text{in}}\cdot643$ on the 25th.

The fourth maximum ,, was $30^{\text{in}}\cdot017$ on the 28th; the fifth minimum ,, was $29^{\text{in}}\cdot555$ on the 31st.

The range in the month was $0^{\text{in}}\cdot637$.

The mean for the month was $29^{\text{in}}\cdot818$, being $0^{\text{in}}\cdot011$ *higher* than the average of the preceding 29 years.

TEMPERATURE OF THE AIR.

The highest in the month was $89^{\circ}\cdot7$ on the 8th; the lowest was $44^{\circ}\cdot8$ on the 2nd.

The range ,, was $44^{\circ}\cdot9$.

The mean ,, of all the highest daily readings was $78^{\circ}\cdot1$, being $4^{\circ}\cdot1$ *higher* than the average of the preceding 29 years.

The mean ,, of all the lowest daily readings was $56^{\circ}\cdot0$, being $3^{\circ}\cdot0$ *higher* than the average of the preceding 29 years.

The mean daily range was $22^{\circ}\cdot1$, being $1^{\circ}\cdot0$ *greater* than the average of the preceding 29 years.

The mean for the month was $65^{\circ}\cdot4$, being $3^{\circ}\cdot5$ *higher* than the average of the preceding 29 years.

MONTH and DAY, 1870.	ELECTRICITY.		CLOUDS AND WEATHER.	
	A.M.	P.M.	A.M.	P.M.
July 1			v, ci.-cu, cu.-s, cu, oc.-r	v,ci,ci.-cu,cu.-s,cu,r,sqs: 5, ci.-cu, ci.-s, cu.-s, cu, s
2			8, ci.-cu, cu.-s	8, ci, ci.-cu, cu.-s: v, cu.-s : 3, ci, ci.-s, s
3			10, f	10 : 10 : 10
4			10, r : 9, ci.-cu, ci.-s, cu.-s	10, w : v,ci.-cu,ci.-s,cu.-s,w: 10, cu.-s, s
5			0 : 10, li.-cl, w	10, th.-r, sqs : 10, fr.-sqs : 10, sqs
6			10, r, mt : 10, r	8, ci, ci.-cu, cu, cu.-s : 3,ci,ci.-s,cu.-s,s,mt,lu.-co
7			2, ci, ci.-cu	6, ci, ci.-cu, cu: 3, ci, ci.-cu : 2, ci, ci.-cu
8			ci	7, li.-cl, ci.-s : 10, th.-r
9			8, ci, ci.-cu, r, h	10, h, sl.-r : 6, ci.-s, cu, s : 10, ci.-s, l
10			10, r : 9, ci, ci.-cu	8, ci, cu.-s : v, so-ha : 10
11			10, li.-cl, so.-ha	10, r : 10, r : 10, h.-r
12			7, ci, ci.-cu, cu.-s	10, h : v : 2, ci.-s, s : 0, h.-d
13			10	10 : 9, ci, ci.-cu,cu.-s, r: v, cu.-s, oc.-r
14			7, ci, ci.-cu, h	8, ci.-cu, ci.-s : v, ci.-cu, ci.-s, h : 0, h
15			3, ci, ci.-cu	5,ci,ci.-cu,ci.-s: 4, ci, ci.-cu : 3, ci.-s
16			t.-s, h.-r : 0	v, ci, ci.-cu, cu.-s : 1
17			10, li.-cl, h, f	9,ci.-cu,ci.-s,cu,h,f: v : 10, sl.-r
18			9, ci.-cu, ci.-s, s	10, ci.-cu, ci.-s : 7, ci.-cu, ci.-s, cu.-s : 10
19			li.-cl : v	v, ci, ci.-s, cu.-s : 5, cu.-s, mt
20			0, h : 0, h	0, h : v, h : 5, ci, ci.-s, s
21			6, ci, ci.-cu	4, ci, ci.-s, w : 3, ci, ci.-s, w : 3, ci, ci.-s
22			0 : 0	0 : 0 : 0
23			1, ci, ci.-cu	0, w : 0, w : 3, ci, ci.-cu, cu.-s
24			3, ci, ci.-cu	2, ci, ci.-cu, w : 0
25			8, ci.-cu, ci.-s, cu.-s	5, ci, ci.-cu, cu : 6, ci, ci.-cu, cu : 2, ci, cu.-s, l
26			10, t.-s, l, h.-r	9, ci.-s, cu.-s, r : 10 : 10, cu.-s
27			10, mt, f	5, ci, ci.-cu, cu.-s : v, ci, ci.-cu, cu.-s: 0, d
28			10, li.-cl	10, li.-cl : 0
29			10, sl.-r : 10, cu.-s	9, cu.-s : 10, cu.-s : 10
30			10, cu.-s	10 : 7,ci.-s,ci.-cu,cu.-s: v, ci.-s, s, h.-d
31			10, l, t : 10, sl.-f	10, sl.-f, sl.-r : v : v, l

Humidity of the Air.

Temperature of the Dew Point.

The highest in the month was $64^{\circ}\cdot9$ on the 9th; and the lowest was $47^{\circ}\cdot2$ on the 2nd.

The mean ,, was $55^{\circ}\cdot0$, being $1^{\circ}\cdot3$ *higher* than the average of the preceding 29 years.

Elastic Force of Vapour.—The mean for the month was $0^{in}\cdot433$, being $0^{in}\cdot019$ *greater* than the average of the preceding 29 years.

Weight of Vapour in a Cubic Foot of Air.—The mean for the month was $4^{grs}\cdot8$, being $0^{gr}\cdot2$ *greater* than the average of the preceding 29 years.

Degree of Humidity.—The mean for the month was 70 (that of Saturation being represented by 100), being 5 *less* the average of the preceding 29 years.

Weight of a Cubic Foot of Air.—The mean for the month was 525 grains, being 3 grains *less* than the average of the preceding 29 years.

Clouds.

The mean amount for the month, a clear sky being represented by 0 and a cloudy sky by 10, was 6·6.

Ozone.

The mean amount for the month, on a scale ranging from 0 to 10, was 3·4.

Wind.

The proportions were of N. 5, S. 7, W. 12, E. 7, and Calm 0. The greatest pressure in the month was $10^{lbs}\cdot4$ on the square foot on the 5th.

Rain.

Fell on 10 days in the month, amounting to $2^{in}\cdot01$, as measured in the simple cylinder gauge partly sunk below the ground; being $0^{in}\cdot55$ *less* than the average fall of the preceding 55 years.

MONTH and DAY, 1870.	Phases of the Moon.	Mean Daily Reading of the Barometer (corrected and reduced to 32° Fahrenheit).	Readings of Thermometers. Dry. Highest.	Dry. Lowest.	Dry. Mean Daily Value.	Dew Point. Mean Daily Value.	Highest in the Sun, as shown by a Self-Registering Thermometer with blackened bulb in vacuo, placed on the Grass.	Lowest on the Grass, as shown by a Self-Registering Minimum Thermometer.	In the Water of the Thames, at Greenwich, by Self-Registering Thermometers, read at 9h A.M. Highest.	In the Water of the Thames. Lowest.	Difference between the Dew Point Temperature and Air Temperature. Mean Daily Value.	Difference. Greatest.	Difference. Least.	Difference between the Mean Temperature of the Day and the Mean Temperature of the same Day on an Average of 50 Years.	Wind as deduced from Anemometers. Osler's. General Direction. A.M.	Osler's. General Direction. P.M.	Osler's. Pressure in lbs. on the square foot. Greatest.	Pressure. Least.	Pressure. Mean of 24 Obs.	Robinson's. Amount of Horizontal Movement of the Air on each Day.	Rain in Inches, collected in a Gauge whose receiving surface is 5 inches above the Ground.
		in.	°	°	°	°	°	°	°	°	°	°	°	°			lbs.	lbs.	lbs.	miles.	in.
Aug. 1	..	29.654	81.0	62.8	67.4	63.8	133.3	58.0	..	..	3.6	15.3	0.9	+ 5.0	NNE	NE	2.1	0.0	0.1	105	0.14
2	In Equator	29.737	70.1	61.0	62.9	60.9	83.7	60.0	..	..	2.0	6.7	0.0	+ 0.5	E	ESE : ENE	0.3	0.0	0.0	134	0.01
3	Perigee	29.669	69.0	59.9	62.6	58.8	79.6	57.0	..	..	3.8	9.0	1.3	+ 0.2	ENE : NE	NE : WSW	0.3	0.0	0.0	123	0.00
4	First Qr.	29.583	78.9	57.0	66.1	60.7	128.0	50.0	..	..	5.4	15.8	0.6	+ 3.8	SW	SW	1.1	0.0	0.1	164	0.00
5	..	29.599	78.2	57.0	65.9	54.2	146.8	50.9	..	..	11.7	22.8	0.8	+ 3.7	WSW	SW	1.6	0.0	0.2	239	0.00
6	..	29.779	81.0	53.5	64.4	53.0	143.0	45.2	..	..	11.4	27.2	0.6	+ 2.3	WSW	SW	0.6	0.0	0.0	156	0.00
7	..	29.683	66.1	57.3	60.6	57.7	79.9	47.2	..	..	2.9	4.5	0.0	— 1.4	SSE	SSE	0.9	0.0	0.1	157	0.12
8	Greatest Declination S.	29.752	75.1	59.5	65.6	58.9	119.5	56.2	..	..	6.7	12.4	0.6	+ 3.6	Calm : ENE	ENE : NE	1.9	0.0	0.2	216	0.13
9	..	29.895	78.7	56.8	65.0	56.3	138.7	49.4	..	..	8.7	20.6	2.5	+ 2.9	NNE	NNE	2.2	0.0	0.2	252	0.08
10	..	29.940	73.4	58.0	63.7	56.2	123.6	51.6	..	..	7.5	13.6	2.9	+ 1.6	N	N by E	2.9	0.0	0.3	270	0.29
11	Full	30.008	75.6	56.3	64.1	54.7	124.5	50.0	..	..	9.4	17.9	1.7	+ 2.0	N	NNE	2.9	0.0	0.4	318	0.00
12	..	30.049	79.1	56.8	66.9	58.0	142.7	50.8	..	..	8.9	21.4	1.1	+ 4.9	NNE	NE : E	2.3	0.0	0.3	251	0.00
13	..	30.081	77.6	58.9	65.7	52.1	146.2	52.2	..	..	13.6	23.8	3.0	+ 3.8	NE	NE : E by S : ENE	2.1	0.0	0.3	300	0.00
14	..	30.015	72.2	55.7	62.8	50.4	138.5	47.6	..	..	12.4	21.0	6.3	+ 1.1	NNE	NNE	2.3	0.0	0.4	298	0.00
15	In Equator	29.912	73.1	57.6	61.9	52.9	116.0	56.0	..	..	9.0	19.0	3.0	+ 0.4	NNE	ENE : NE	1.8	0.0	0.3	283	0.00
16	..	29.906	71.9	55.2	62.2	50.5	108.6	45.0	..	..	11.7	19.8	6.0	+ 0.9	NE	NE : E	1.0	0.0	0.1	210	0.00
17	..	29.890	71.9	53.0	60.8	53.4	99.3	42.0	..	..	7.4	17.0	2.5	— 0.3	NNE : NE	NNE : ESE	1.5	0.0	0.0	145	0.00
18	Apogee	29.696	79.9	46.3	63.4	53.8	133.5	40.9	..	..	9.6	25.3	0.2	+ 2.4	WSW	W : NW : N	1.7	0.0	0.2	200	0.00
19	Last Qr.	29.708	70.1	52.6	58.2	46.6	133.7	45.5	..	..	11.6	24.1	5.0	— 2.7	NW : NNE	N	4.2	0.0	0.7	352	0.00
20	..	29.896	70.8	46.3	57.2	45.9	133.5	36.4	..	..	11.3	23.6	2.3	— 3.6	N by W : WSW	N : NE	1.9	0.0	0.1	175	0.00
21	..	30.013	68.8	45.0	57.3	44.8	129.7	32.3	..	..	12.5	23.6	1.8	— 3.4	NW : N	N : SE : S	2.5	0.0	0.1	170	0.00
22	..	29.811	68.9	45.8	55.6	48.6	120.5	35.2	..	..	7.0	19.8	0.0	— 5.1	W by S	SW	3.2	0.0	0.4	290	0.55
23	Greatest Declination N.	29.677	67.1	50.3	57.0	49.6	105.7	44.1	..	..	7.4	13.7	0.6	— 3.6	WNW : NW	NW	0.8	0.0	0.2	254	0.00
24	..	29.705	71.9	51.2	60.1	47.5	126.5	43.2	..	..	12.6	19.3	1.8	— 0.4	WSW : W	NW	2.2	0.0	0.3	287	0.01
25	..	29.763	69.8	48.6	58.1	44.4	116.0	39.4	..	..	13.7	23.0	2.9	— 2.4	W : NW	NW	2.5	0.0	0.4	330	0.00
26	New	29.682	66.8	52.0	56.1	44.3	114.9	42.0	..	..	11.8	19.6	6.8	— 4.2	WSW : NW : N	N	2.5	0.0	0.5	332	0.00
27	..	29.756	70.0	44.3	56.9	45.1	116.7	34.5	..	..	11.8	24.1	1.1	— 3.2	NW : W	NW : SW	1.3	0.0	0.0	169	0.14
28	..	29.302	72.6	53.2	59.7	53.7	125.7	52.3	..	..	6.0	14.8	1.0	— 0.2	SW : WSW	WNW	22.9	0.4	2.2	550	0.55
29	In Equator : Perigee.	29.697	65.8	49.6	56.6	43.2	117.3	43.0	..	..	13.4	20.0	5.0	— 3.1	NNW	NNW : NW	6.0	0.0	0.7	353	0.00
30	..	30.022	65.1	42.5	53.8	45.8	115.7	31.0	..	..	8.0	16.4	1.1	— 5.6	W by S : NW : N	N	1.1	0.0	0.1	191	0.00
31	..	30.044	69.0	41.0	55.1	47.3	119.7	36.0	..	..	7.8	21.6	0.5	— 4.1	WSW	W : SW	1.9	0.0	0.1	173	0.00
Means	..	29.804	72.6	53.1	61.1	52.0	121.3	46.0	..	..	9.1	18.6	2.1	— 0.1	...	...	..	..	..	Sum 7447	Sum 2.02

BAROMETER READINGS FROM EYE-OBSERVATIONS.

The first maximum in the month was $29^{in}\cdot752$ on the 2nd; the first minimum in the month was $29^{in}\cdot574$ on the 4th.
The second maximum ,, was $30^{in}\cdot100$ on the 13th; the second minimum ,, was $29^{in}\cdot620$ on the 18th.
The third maximum ,, was $30^{in}\cdot025$ on the 21st; the third minimum ,, was $29^{in}\cdot645$ on the 23rd.
The fourth maximum ,, was $29^{in}\cdot789$ on the 27th; the absolute minimum ,, was $29^{in}\cdot260$ on the 28th.
The absolute maximum ,, was $30^{in}\cdot118$ on the 31st.
The range in the month was $0^{in}\cdot858$.
The mean for the month was $29^{in}\cdot804$, being $0^{in}\cdot013$ *higher* than the average of the preceding 29 years.

TEMPERATURE OF THE AIR.

The highest in the month was 81°·0 on the 1st and 6th; the lowest was 41°·0 on the 31st.
The range ,, was 40°·0.
The mean ,, of all the highest daily readings was 72°·6, being 0°·1 *lower* than the average of the preceding 29 years.
The mean ,, of all the lowest daily readings was 53°·1, being *the same as* the average of the preceding 29 years.
The mean daily range was 19°·5, being 0°·1 *less* than the average of the preceding 29 years.
The mean for the month was 61°·1, being 0°·2 *lower* than the average of the preceding 29 years.

MONTH and DAY, 1870.	ELECTRICITY. A.M.	ELECTRICITY. P.M.	CLOUDS AND WEATHER. A.M.	CLOUDS AND WEATHER. P.M.
Aug. 1			10, h.-r : 10, f	10,ci.-cu, cu.-s, cu, h, r, l, t: 10, oc.-r
2			10 : 10, m.-r	10 : 10, ci.-s, cu.-s : 10
3			10 : 10, glm	10, sl.-f : 10 : 10, sl.-f
4			10, f, d	6, ci, ci.-cu, cu, h: 6, ci, ci.-cu, cu : 8, ci.-cu, ci.-s, cu.-s
5			3, ci, cu.-s	6, ci, ci.-s, cu, cu.-s : 7, ci, ci.-cu, ci.-s : 7, ci, ci.-cu, ci.-s, s, d
6			v, li.-cl	4, ci.-cu, ci.-s, h: 5, ci.-cu : 0, d, ms
7			10 : 10, r	10, r : v : 10
8			v, ci.-cu, ci.-s, cu.-s : h.-r, t	v, ci, cu.-s, ci.-s, oc.-r : vv, ci.-s, cu.-s, ms
9			6, ci, ci.-cu, cu	v, ci, ci.-cu, cu, cu.-s, r : vv, ci.-cu, ci.-s, s, h.-d, ms
10			v, h.-d : 10, glm, r	9, ci.-cu, ci.-s, cu.-s, r : v, ci.-cu, ci.-s, cu, cu.-s: 2, ci, ci.-s, s, ms
11			9, ci, cu.-s	9, cu.-s : v, ci, ci.-cu, cu.-s, w: 1, ci, cu.-s, ms
12			2, ci, ci.-cu, d	v, ci.-cu, cu : 0, d, ms
13			6, ci, ci.-cu, cu.-s	2, ci, ci.-cu, cu.-s: ci, ci.-cu : 0 : v
14			v : 4, ci, ci.-cu	10, ci.-s, cu.-s : 10
15			10 : 10, oc.-th.-r	10, cu.-s, th.-r : v, ci.-cu, cu.-s : 0, ms
16			10	v : 5, ci, ci.-cu : 1, cu.-s, s
17			10	v, ci, ci.-cu, cu.-s : 0, d
18			0, th.-f : 0, h	0, h : v, ci.-cu, h : 1, ci.-s, l
19			5, ci, ci.-cu, cu.-s	7, ci.-cu, ci.-s, cu.-s, w : v, ci.-cu, ci.-s, cu, cu.-s: 0, l, m
20			0	7, ci, ci.-cu, cu.-s : v, ci.-cu, ci.-s : 2, ci.-s, s, a, l, m
21			5, ci.-cu	9, ci.-cu, ci.-s, h : v, ci.-cu : 1
22			th.-f : 6, ci.-cu, ci.-s, h	10, ci.-s, cu.-s : 10, ci.-s, cu.-s, glm, h.-r : 10, h.-r, w
23			10, glm	7, ci.-cu, ci.-s, cu.-s, h : 8, ci, ci.-cu, ci.-s, cu.-s : 5, h
24			sl.-r : 7, ci.-s, cu.-s	v, ci, ci.-cu, ci.-s, cu.-s : v, ci, ci.-cu, ci.-s, cu.-s : 0
25			6, ci : v	8, ci, ci.-cu, ci.-s, cu.-s, w: v, ci, ci.-cu, ci.-s : 0
26			7, ci, ci.-cu, cu, cu.-s	v, cu.-s, w : vv, cu.-s, sl.-r : 1, ci.-s
27			0, sl.-f, h, h.-d	5, ci.-cu : 8, ci, ci.-cu, ci.-s: 10, h.-r
28			10, h.-r, h.-sqs : 10, sl.-r, fr.-h.-sqs	v, shs.-r, g : v, w : 7, w
29			5, ci, ci.-cu, cu	v, ci, ci.-cu, cu.-s : v, ci, ci.-cu, cu, cu.-s: 0, d, l, m
30			2, ci.-cu, d	9, ci.-cu, ci.-s, cu.-s: 5, ci.-cu, ci.-s, h : 2, ci.-s, h
31			0, f, h.-d	4, ci, ci.-cu, cu, h : 2, ci.-cu : 0, d

HUMIDITY OF THE AIR.

Temperature of the Dew Point.

The highest in the month was 66°·1 on the 1st; and the lowest was 41°·7 on the 29th.

The mean „ was 52°·0, being 1°·8 *lower* than the average of the preceding 29 years.

Elastic Force of Vapour.—The mean for the month was 0in·388, being 0in·029 *less* than the average of the preceding 29 years.

Weight of Vapour in a Cubic Foot of Air.—The mean for the month was 4grs·3, being 0gr·3 *less* than the average of the preceding 29 years.

Degree of Humidity.—The mean for the month was 73 (that of Saturation being represented by 100), being 4 *less* than the average of the preceding 29 years.

Weight of a Cubic Foot of Air.—The mean for the month was 529 grains, being *the same as* the average of the preceding 29 years.

CLOUDS.

The mean amount for the month, a clear sky being represented by 0 and a cloudy sky by 10, was 6·2.

OZONE.

The mean amount for the month, on a scale ranging from 0 to 10, was 3·2.

WIND.

The proportions were of N. 13, S. 4, W. 7, E. 7, and Calm 0. The greatest pressure in the month was 22lbs·9 on the square foot on the 28th.

RAIN.

Fell on 10 days in the month, amounting to 2in·02, as measured in the simple cylinder gauge partly sunk below the ground; being 0in·37 *less* than the average fall of the preceding 55 years.

MONTH and DAY, 1870.	Phases of the Moon.	Mean Daily Reading of the Barometer (corrected and reduced to 32° Fahrenheit).	Readings of Thermometers. Dry. Highest.	Dry. Lowest.	Dry. Mean Daily Value.	Dew Point. Mean Daily Value.	Highest in the Sun, as shown by a Self-Registering Thermometer, with blackened bulb in vacuo, placed on the Grass.	Lowest on the Grass, as shown by a Self-Registering Minimum Thermometer.	In the Water of the Thames, at Greenwich, by Self-Registering Thermometers, read at 9h A.M. Highest.	Thames Lowest.	Difference between the Dew Point Temperature and Air Temperature. Mean Daily Value.	Difference Greatest.	Difference Least.	Difference between the Mean Temperature of the Day and the Mean Temperature of the same Day on an Average of 50 Years.	Wind as deduced from Anemometers. Osler's. General Direction. A.M.	General Direction. P.M.	Pressure in lbs. on the square foot. Greatest.	Pressure Least.	Pressure Mean of 24 Obs.	Robinson's. Amount of Horizontal Movement of the Air on each Day.	Rain in Inches, collected in a Gauge whose receiving surface is 5 inches above the Ground.
		in.	°	°	°	°	°	°	°	°	°	°	°	°			lbs.	lbs.	lbs.	miles.	in.
Sept. 1	..	29.741	72.6	44.9	59.4	49.4	139.5	35.2	..	..	10.0	21.2	3.3	+ 0.4	SSW : SW	SW : SSW	3.3	0.0	0.5	288	0.00
2	First Qr.	29.348	71.4	56.5	60.9	56.4	100.7	50.5	..	..	4.5	13.3	1.3	+ 2.2	SSW	SW	14.3	0.0	0.8	387	0.01
3	..	29.481	64.8	54.2	58.2	52.0	72.2	48.0	..	..	6.2	12.6	0.8	− 0.2	SW : WSW	NW	1.9	0.0	0.2	273	0.08
4	Greatest Declination S.	29.822	70.9	44.7	57.4	49.9	104.7	35.0	..	..	7.5	23.2	1.7	− 0.8	WSW	SW : S	2.5	0.0	0.2	246	0.00
5	..	29.518	70.0	55.0	60.5	57.1	114.5	48.0	..	..	3.4	11.0	0.6	+ 2.5	SSW	SSW	14.3	0.0	0.9	400	0.17
6	..	29.330	66.0	53.4	57.8	55.0	98.5	48.0	..	..	2.8	7.2	0.0	− 0.1	SW	SSW : SW	3.4	0.0	0.1	203	0.21
7	..	29.200	57.9	49.3	52.5	51.1	68.9	43.1	..	..	1.4	4.2	0.4	− 5.3	SSW	SSW : WSW	1.2	0.0	0.1	214	0.52
8	..	29.562	64.9	46.4	55.4	47.4	119.1	38.5	..	..	8.0	16.9	0.8	− 2.4	WSW	W : WSW	15.0	0.0	0.8	404	0.13
9	Full	29.264	71.4	51.5	59.9	54.2	124.4	47.3	..	..	5.7	15.7	0.0	+ 2.2	SSE : SW	WSW	14.7	0.1	1.3	485	0.30
10	..	29.599	63.8	50.8	55.6	45.8	111.5	43.2	..	..	9.8	17.6	2.0	− 2.1	WSW	W	30.0	0.0	3.4	632	0.00
11	In Equator.	29.997	66.8	44.7	53.9	47.9	96.5	36.0	..	..	6.0	15.5	0.4	− 3.7	WSW	WSW	0.3	0.0	0.0	143	0.00
12	..	29.947	68.8	45.1	56.8	49.6	129.9	36.8	..	..	7.2	18.0	0.4	− 0.7	SW : WSW	WSW	2.8	0.0	0.4	284	0.00
13	..	29.782	60.0	49.8	54.5	53.2	79.8	43.0	..	..	1.3	4.8	0.0	− 2.8	WSW	WSW : W	2.2	0.0	0.5	324	0.21
14	Apogee	29.774	65.8	44.5	54.0	47.7	107.8	37.0	..	..	6.3	16.2	0.0	− 3.2	W by S : WNW	NNW : NNE	5.0	0.0	0.8	363	0.00
15	..	30.172	63.1	37.5	50.5	42.3	112.5	30.0	..	..	8.2	17.5	0.0	− 6.6	W : NE	ENE	0.0	0.0	0.0	111	0.00
16	..	30.349	64.8	38.8	52.1	45.7	119.4	30.0	..	..	6.4	17.8	0.0	− 4.8	SE : ENE	Variable	0.0	0.0	0.0	87	0.00
17	..	30.237	64.5	47.5	56.2	53.1	85.5	40.6	..	..	3.1	9.9	0.2	− 0.5	SW : WSW	W : NW	0.4	0.0	0.0	189	0.00
18	Last Qr.	30.154	65.3	52.5	57.1	55.8	79.6	49.7	..	..	1.3	7.7	0.0	+ 0.6	NNW : NE	NNE : SE	0.0	0.0	0.0	79	0.00
19	Greatest Declination N.	30.169	63.4	44.0	52.7	49.4	97.6	36.5	..	..	3.3	11.3	0.4	− 3.5	SE	ESE	0.2	0.0	0.0	120	0.00
20	..	30.141	68.9	39.6	53.6	50.5	119.6	31.3	..	..	3.1	16.7	0.0	− 2.4	Calm	N : NE : SSW	0.0	0.0	0.0	86	0.00
21	..	30.154	66.3	42.2	54.9	51.1	90.6	34.2	..	..	3.8	11.0	0.0	− 0.9	WSW	W : SE	0.1	0.0	0.0	91	0.00
22	..	30.175	67.0	47.4	55.9	51.7	121.7	42.0	..	..	4.2	11.9	0.2	+ 0.4	E : ESE	ESE : E	1.3	0.0	0.1	145	0.00
23	..	30.174	64.2	43.5	54.2	47.8	119.5	34.5	..	..	6.4	14.0	0.0	− 1.0	ENE : ESE	E	7.3	0.0	0.3	225	0.00
24	..	30.159	65.8	42.0	53.4	45.0	122.0	31.1	..	..	8.4	18.5	0.0	− 1.6	ESE	E	0.9	0.0	0.1	161	0.00
25	New: in Equator.	30.152	69.1	37.4	51.5	48.3	115.6	32.0	..	..	3.2	13.5	0.0	− 3.3	NE	E by S : E	0.3	0.0	0.0	115	0.00
26	Perigee	30.023	70.9	43.8	55.8	49.8	125.3	35.2	..	..	6.0	17.1	0.0	+ 1.2	Calm : NE	E	0.5	0.0	0.0	122	0.00
27	..	30.087	70.2	45.2	57.3	50.6	124.7	36.8	..	..	6.7	18.5	0.0	+ 2.9	NE	E	1.6	0.0	0.1	165	0.00
28	..	30.152	71.9	48.3	58.5	55.1	117.5	38.3	..	..	3.4	14.3	0.0	+ 4.3	NE	ENE : ESE	0.7	0.0	0.1	144	0.00
29	..	30.227	70.8	46.2	57.6	53.0	123.6	37.4	..	..	4.6	15.7	0.2	+ 3.5	NE	ENE : E	0.6	0.0	0.1	159	0.00
30	..	30.301	64.0	46.6	54.2	49.7	113.3	38.0	..	..	4.5	12.6	0.0	+ 0.2	ENE	ENE : E	0.9	0.0	0.1	220	0.00
Means	..	29.906	66.8	46.4	55.7	50.5	108.5	38.9	..	..	5.2	14.2	0.4	− 0.9	...	...	..	..	..	Sum 6865	Sum 1.63

BAROMETER READINGS FROM EYE-OBSERVATIONS.

The first maximum in the month was $29^{in}.846$ on the 4th; the first minimum in the month was $29^{in}.325$ on the 2nd.
The second maximum ,, was $29^{in}.601$ on the 8th; the absolute minimum ,, was $29^{in}.160$ on the 7th.
The third maximum ,, was $30^{in}.015$ on the 11th; the third minimum ,, was $29^{in}.239$ on the 9th.
The absolute maximum ,, was $30^{in}.369$ on the 16th; the fourth minimum ,, was $29^{in}.669$ on the 14th.
The fifth maximum ,, was $30^{in}.202$ on the 23rd; the fifth minimum ,, was $30^{in}.129$ on the 20th.
the sixth minimum ,, was $30^{in}.001$ on the 26th.

The range in the month was $1^{in}.209$.

The mean for the month was $29^{in}.906$, being $0^{in}.095$ *higher* than the average of the preceding 29 years.

TEMPERATURE OF THE AIR.

The highest in the month was 72°.6 on the 1st; the lowest was 37°.4 on the 25th.
The range ,, was 35°.2.
The mean ,, of all the highest daily readings was 66°.8, being 1°.0 *lower* than the average of the preceding 29 years.
The mean ,, of all the lowest daily readings was 46°.4, being 2°.9 *lower* than the average of the preceding 29 years.
The mean daily range was 20°.4, being 1°.9 *greater* than the average of the preceding 29 years.
The mean for the month was 55°.7, being 1°.6 *lower* than the average of the preceding 29 years.

MONTH and DAY, 1870.	ELECTRICITY.		CLOUDS AND WEATHER.	
	A.M.	P.M.	A.M.	P.M.
Sept. 1			0 : 0, ci	0, w : 3, ci, ci.-s : 4, ci.-s, h
2			10 : 10, r, fr.-h.-sqs	7,ci,ci.-cu,cu,s,sqs: v : 1, d
3			7, ci.-cu, ci.-s, cu.-s : t, r	v,ci.-s,cu.-s,s : v, ci.-cu, cu.-s, : v, cu.-s, h : 0, a
4			1, ci, mt, d	7, ci.-cu, ci, cu, cu.-s : 4,ci,ci.-s,s,h,h.-d,lu.-ha
5			10, cu.-s, fr.-sqs	10, oc.-th.-r, sqs: 10, h.-r : 10, sl.-r
6			10 : 10, ci.-s, cu.-s	10, r : 10, c.-r : 4, ci, cu.-s
7			10, r : 10, r	10, h.-r : v, r : 3, ci.-s, cu.-s, l
8			2, ci, ci.-cu, cu, fr.-h.-sqs	6, ci,ci.-cu,cu,h.-sqs: v,ci,ci.-cu, cu : v,ci.-cu,cu,cu.-s,h,h.-d,lu.-ha,h.-r
9			10, r, fr.-h.-sqs 7, ci, ci.-s, cu.-s, fr.-h.-sqs	9,ci,ci.-cu,cu.-s,sqs,r : 6,ci.-cu,cu,cu.-s,sqs,r : 1,ci.-cu,st.-w
10			g : v, ci.-cu, h.-g	10, g, th.-r : v, w : 3, ci.-cu, h.-d
11			5, ci, h, f, d	6, ci.-s, h, f, so.-ha : 0, d
12			4, ci, ci.-cu, ci.-s	6, li.-cl : v, ci, ci.-cu, sl.-r : 1,ci,d,lu.-co,lu.-ha
13			10, ci.-s, s, r	10, r : 10, r : 10
14			9, ci.-s, ci.-cu, cu.-s, cu : v, ci, ci.-cu, cu, h, sqs	4, ci.-cu, cu, w: : 0, h.-d
15			0, th.-f, h.-d : 0, sl.-f	3, ci, ci.-cu : 2, ci, ci.-s : 2, s, f, d, a
16			0 : v, sl.-f	v, ci.-cu, h : 0, h.-d
17			10, sl.-f, sl.-r	10 : 10, cu.-s : 10, sl.-f
18			10, gt.-glm	v, glm : 10, h
19			9, ci.-cu, cu.-s, h.-d	10 : 0 : 0, d
20			0, th.-f : 0, f	0 : 0, h : 0, h.-d, sl.-f
21			0, f : 0, sl.-f	0, h, f : 1, li.-cl, h, sl.-f: 0
22			7, ci, ci.-cu, ci.-s	v, ci.-cu, ci.-s : 0 : 0, h.-d
23			0 : 0	0, st.-w : 0 : 0, d
24			0, f, h.-d : 0	0 : 0 : 0, a
25			0, h.-d : 10, li.-cl, th.-f, h.-fr, d	0 : 0 : 0, d, a
26			0, th.-f, h.-d : 0, f	1, ci, ci.-s : 1, ci : 0, d, a
27			0, th.-f, d : 0, f	0 : 0 : 0, d
28			0, f : 0, sl.-f	4, ci, ci.-cu,cu, cu.-s : 0 : 0, h, d
29			0, f, d : 0, sl.-f	0 : 0 : 10, li.-cl, d
30			10	0 : vv : 0, d

HUMIDITY OF THE AIR.

Temperature of the Dew Point.

The highest in the month was 61°·1 on the 2nd; and the lowest was 42°·3 on the 15th.

The mean ,, was 50°·5, being 0°·7 *lower* than the average of the preceding 29 years.

Elastic Force of Vapour.—The mean for the month was $0^{in}\cdot367$, being $0^{in}\cdot014$ *less* than the average of the preceding 29 years.

Weight of Vapour in a Cubic Foot of Air.—The mean for the month was $4^{grs}\cdot1$, being $0^{gr}\cdot1$ *less* than the average of the preceding 29 years.

Degree of Humidity.—The mean for the month was 83 (that of Saturation being represented by 100), being 2 *greater* than the average of the preceding 29 years.

Weight of a Cubic Foot of Air.—The mean for the month was 537 grains, being 4 grains *greater* than the average of the preceding 29 years.

CLOUDS.

The mean amount for the month, a clear sky being represented by 0 and a cloudy sky by 10, was 4·3.

OZONE.

The mean amount for the month, on a scale ranging from 0 to 10, was 3·7.

WIND.

The proportions were of N. 4, S. 7, W. 9, E. 9, and Calm 1. The greatest pressure in the month was $30^{lbs}\cdot0$ on the square foot on the 10th.

RAIN.

Fell on 8 days in the month, amounting to $1^{in}\cdot63$, as measured in the simple cylinder gauge partly sunk below the ground; being $0^{in}\cdot80$ *less* than the average fall of the preceding 55 years.

MONTH and DAY, 1870.	Phases of the Moon.	Mean Daily Reading of the Barometer (corrected and reduced to 32° Fahrenheit).	Readings of Thermometers. Dry. Highest.	Readings of Thermometers. Dry. Lowest.	Readings of Thermometers. Dry. Mean Daily Value.	Readings of Thermometers. Dew Point. Mean Daily Value.	Highest in the Sun, as shown by a Self-Registering Thermometer with blackened bulb in vacuo, placed on the Grass.	Lowest on the Grass, as shown by a Self-Registering Minimum Thermometer.	In the Water of the Thames, at Greenwich, by Self-Registering Thermometers, read at 9h A.M. Highest.	In the Water of the Thames, at Greenwich, by Self-Registering Thermometers, read at 9h A.M. Lowest.	Difference between the Dew Point Temperature and Air Temperature. Mean Daily Value.	Difference between the Dew Point Temperature and Air Temperature. Greatest.	Difference between the Dew Point Temperature and Air Temperature. Least.	Difference between the Mean Temperature of the Day and the Mean Temperature of the same Day on an Average of 50 Years.	Wind as deduced from Anemometers. Osler's. General Direction. A.M.	Wind as deduced from Anemometers. Osler's. General Direction. P.M.	Osler's. Pressure in lbs. on the square foot. Greatest.	Osler's. Pressure in lbs. on the square foot. Least.	Osler's. Pressure in lbs. on the square foot. Mean of 24 Obs.	Robinson's. Amount of Horizontal Movement of the Air on each Day.	Rain in Inches, collected in a Gauge whose receiving surface is 5 inches above the Ground.
		in.	°	°	°	°	°	°	°	°	°	°	°	°			lbs.	lbs.	lbs.	miles.	in.
Oct. 1	First Qr.	30·377	66·8	41·5	54·7	46·7	120·3	30·2	..	..	8·0	17·1	0·0	+ 0·8	ENE	E	16·0	0·0	0·5	267	0·00
2	Greatest Declination S.	30·330	68·3	44·9	55·5	50·9	122·9	36·0	..	..	4·6	11·0	0·0	+ 1·7	E	E	2·7	0·0	0·2	205	0·00
3	..	30·306	68·6	47·1	56·3	48·9	124·0	38·1	..	..	7·4	18·0	0·0	+ 2·6	NE : E	ESE : NE	1·3	0·0	0·1	154	0·00
4	..	30·312	58·7	46·7	51·5	51·0	88·3	35·8	..	..	0·5	5·3	0·0	— 2·0	NNE : NE	Variable	0·0	0·0	0·0	98	0·00
5	..	30·156	58·4	46·4	51·5	50·1	80·5	36·7	..	..	1·4	7·0	0·0	— 1·8	E: NE	NNE	0·0	0·0	0·0	96	0·00
6	..	29·934	56·1	46·8	49·8	46·3	71·7	44·0	..	..	3·5	7·4	1·3	— 3·1	NNE: NW	NW : S	0·1	0·0	0·0	98	0·00
7	..	29·562	65·8	43·6	55·7	49·2	87·7	37·0	..	..	6·5	12·6	0·0	+ 3·2	SE: SW	SSW : SSE	0·7	0·0	0·0	145	0·00
8	..	28·981	67·1	52·1	58·4	53·3	110·5	46·0	..	..	5·1	13·5	1·2	+ 6·3	S by E : SW	WSW	10·3	0·0	0·9	427	0·20
9	In Equator: Full	28·861	58·7	39·5	48·1	43·3	100·4	35·2	..	..	4·8	9·9	0·0	— 3·7	WSW : W	NNW : NW	2·6	0·0	0·3	331	0·01
10	..	29·331	52·8	34·2	42·9	36·7	98·7	26·0	..	..	6·2	10·3	2·5	— 8·7	W : NNW	N by E : N : W	2·8	0·0	0·2	292	0·01
11	..	29·726	55·4	32·4	43·4	35·3	95·5	24·5	..	..	8·1	16·4	1·0	— 8·0	W by S	W by S : SW	0·3	0·0	0·0	205	0·00
12	Apogee	29·193	63·1	34·2	49·7	44·7	67·7	29·3	..	..	5·0	11·2	0·0	— 1·5	S by E : S	WSW	30·+	0·0	2·2	536	0·04
13	..	29·320	56·8	49·4	52·3	44·9	71·5	46·0	..	..	7·4	11·6	1·5	+ 1·4	W by S : W	W by N : N	30·+	0·0	4·9	690	0·08
14	..	29·846	59·7	37·0	47·7	41·2	106·7	35·5	..	..	6·5	14·1	0·0	— 2·9	NNE	NE : SSW	0·3	0·0	0·0	148	0·00
15	..	29·759	59·0	33·0	45·5	38·9	96·0	26·0	..	..	6·6	16·5	0·0	— 4·8	Variable	S by W : S	0·1	0·0	0·0	107	0·00
16	Greatest Declination N.	29·168	58·8	42·7	51·5	51·1	69·8	35·0	..	..	0·4	2·9	0·0	+ 1·5	SSW	SW	22·8	0·0	1·6	486	0·60
17	Last Qr.	29·441	54·8	42·1	47·4	39·8	85·5	34·9	..	..	7·6	14·2	4·4	— 2·4	WSW : W	W : WSW	16·2	0·0	0·6	423	0·02
18	..	29·688	59·0	39·8	50·1	44·4	106·6	32·0	..	..	5·7	11·2	0·0	+ 0·5	WSW : SW	S by W : SSW	10·2	0·0	0·4	297	0·06
19	..	29·308	59·3	45·0	50·5	47·0	100·4	40·5	..	..	3·5	8·0	0·0	+ 1·2	SW	SW	18·0	0·0	1·9	511	0·23
20	..	29·279	51·3	41·7	46·2	43·0	97·8	37·1	..	..	3·2	7·6	0·7	— 2·9	WSW	WSW: W: WNW	22·0	0·0	1·4	593	0·33
21	..	29·765	56·6	45·5	49·6	44·0	76·5	38·0	..	..	5·6	10·8	2·3	+ 0·7	NNW : NW	NW : WSW	6·8	0·0	0·3	272	0·00
22	..	29·599	59·9	47·1	52·5	50·8	82·1	39·8	..	..	1·7	11·2	0·0	+ 3·8	SW	SW	3·3	0·0	0·3	324	0·13
23	In Equator	28·762	58·8	46·2	50·6	47·4	101·7	40·2	..	..	3·2	6·8	0·0	+ 2·1	SW	WSW	12·8	0·0	0·7	464	0·57
24	New	28·914	56·1	43·5	48·4	42·9	77·4	38·7	..	..	5·5	11·0	5·0	+ 0·2	WSW : W	W : WSW	30·0	0·0	1·6	590	0·02
25	Perigee	29·347	53·0	41·4	47·3	43·7	92·9	34·2	..	..	3·6	7·8	1·7	— 0·6	WSW	WSW	2·1	0·0	0·2	317	0·00
26	..	29·332	47·9	42·1	45·1	42·3	51·0	36·0	..	..	2·8	5·0	2·0	— 2·5	WSW	WSW : SW	3·3	0·0	0·2	298	0·00
27	..	29·439	55·5	41·1	47·4	42·1	93·9	34·0	..	..	5·3	13·4	2·8	+ 0·1	WSW : W by S	W by S : W	3·8	0·0	0·5	393	0·00
28	..	29·705	52·2	44·8	48·0	44·8	71·3	35·8	..	..	3·2	8·4	2·5	+ 1·0	W by S: NW	NW : WNW	2·7	0·0	0·2	334	0·29
29	Greatest Declination S.	29·714	55·0	47·2	50·8	50·5	61·9	43·2	..	..	0·3	6·0	0·0	+ 4·0	W by S: W	SW:SSW:WSW	2·1	0·0	0·2	331	0·28
30	..	29·730	55·1	43·4	47·4	41·6	81·7	35·8	..	..	5·8	13·4	2·0	+ 0·8	NW: W	W : WSW	2·3	0·0	0·4	369	0·00
31	First Qr.	29·496	56·4	44·3	48·8	48·2	58·2	38·8	..	..	0·6	4·2	0·0	+ 2·3	SW : WSW	N : N by W	1·8	0·0	0·5	323	0·47
Means	..	29·570	58·2	42·8	49·8	45·3	88·7	36·1	..	..	4·5	10·4	1·0	— 0·3	...	...	..	..	..	Sum 10124	Sum 3·34

BAROMETER READINGS FROM EYE-OBSERVATIONS.

The absolute maximum in the month was $30^{in}\cdot398$ on the 1st; the first minimum in the month was $28^{in}\cdot781$ on the 9th.
The second maximum ,, was $29^{in}\cdot754$ on the 11th; the second minimum ,, was $29^{in}\cdot121$ on the 12th.
The third maximum ,, was $29^{in}\cdot884$ on the 14th; the third minimum ,, was $29^{in}\cdot059$ on the 16th.
The fourth maximum ,, was $29^{in}\cdot780$ on the 18th; the fourth minimum ,, was $29^{in}\cdot202$ on the 19th.
The fifth maximum ,, was $29^{in}\cdot316$ on the 20th; the fifth minimum ,, was $29^{in}\cdot228$ on the 20th.
The sixth maximum ,, was $29^{in}\cdot840$ on the 21st; the absolute minimum ,, was $28^{in}\cdot744$ on the 24th.
The seventh maximum ,, was $29^{in}\cdot446$ on the 25th; the seventh minimum ,, was $29^{in}\cdot307$ on the 26th.
The eighth maximum ,, was $29^{in}\cdot829$ on the 28th; the eighth minimum ,, was $29^{in}\cdot601$ on the 29th.
The ninth maximum ,, was $29^{in}\cdot754$ on the 30th; the ninth minimum ,, was $29^{in}\cdot374$ on the 31st.
The range in the month was $1^{in}\cdot654$.
The mean for the month was $29^{in}\cdot570$, being $0^{in}\cdot136$ *lower* than the average of the preceding 29 years.

TEMPERATURE OF THE AIR.

The highest in the month was 68°·6 on the 3rd; the lowest was 32°·4 on the 11th.
The range ,, was 36°·2.
The mean ,, of all the highest daily readings was 58°·2, being 0°·4 *lower* than the average of the preceding 29 years.
The mean ,, of all the lowest daily readings was 42°·8, being 1°·1 *lower* than the average of the preceding 29 years.
The mean daily range was 15°·4, being 0°·7 *greater* than the average of the preceding 29 years.
The mean for the month was 49°·8, being 0°·6 *lower* than the average of the preceding 29 years.

MONTH and DAY, 1870.	ELECTRICITY. A.M.	ELECTRICITY. P.M.	CLOUDS AND WEATHER. A.M.	CLOUDS AND WEATHER. P.M.
Oct. 1			0, th.-f, h.-d : 0, d, sqs	0, sqs : 0 : 0, d
2			ci, ci.-cu, cu, cu.-s	0 : 0, h.-d, m
3			vv, li.-cl, f	0 : 0 : 0, h.-d
4			10, m.-r, f	v,ci.-cu,cu.-s,cu,h : 0, f : 10, th.-f
5			10, f	10, f : 10 : 10
6			10, th.-f, glm	v, f, glm 5, ci.-s, h, f : 9,ci.-cu,cu.-s,f,d,lu.-co
7			8, ci, ci.-cu, cu.-s, sl.-f	10 : 10 : 10, sl.-f
8			10, r : 8, ci, ci.-cu, cu, cu.-s, w	8, ci, ci.-cu, cu, cu.-s : 7,ci,ci.-cu,cu.-s,cu,r : 3,ci.-cu,ci.-s,lu.-co,lu.-ha
9			ci, ci.-cu	10, oc.-r, mt : 10, r : 0
10			0, h.-fr : 3, ci, ci.-s, cu.-s	v,ci,ci.-cu,cu,cu.-s,r : v, ci, ci.-s, cu.-s : 0, h.-fr, sl.-f, h
11			0, h, sl.-f, h.-fr	0, h : 2, ci, h, sl.-f : 0, h.-fr
12			10, st.-w, r	10, oc.-r, st.-w :vv,ci.-cu,ci.-s,cu.-s,g: 2, h.-g
13			10, h.-g, oc.-r	10, st.-w : 10, r : 10, r
14			8, ci, ci.-cu, cu.-s	6, ci, ci.-cu, cu : 3, cu : 0, sl.-f, a, ms
15			0, sl.-f, h.-d : 0, h, f	5, ci, ci.-cu, cu : 2,ci,ci.-cu,cu.-s: 2, s, h
16			10, r, fr.-sqs	10, r, fr.-h.-sqs : 10, c.-r, sqs : v, r, ms
17			ci.-cu, sqs	5, ci.-cu,cu.-s,oc.-r: vv, oc.-r : 0
18			ci, sl.-f	10, r, so.-ha : 10, w, r
19			8, ci, ci.-s, cu.-s, s, so.-ha	10, h.-sqs, r, glm : v, oc.-shs : 10, th.-cl, sqs, m
20			10, r : 8, ci, ci.-cu, cu.-s	10, r, st.-w : 10, h.-shs, w : 10, w
21			0, h, mt	2, ci.-s, h : 9,ci.-cu,cu.-s,h: 0, h
22			10	10, r : 10, r : v, m
23			10, h.-r	v, ci.-s, cu.-s, r : 3, s
24			10, th.-r, w	9, cu, cu.-s, h.-sqs : 0, a, ms
25			4, ci, ci.-cu, cu.-s	10, cu.-s, cu, sl.-f : v, d, a, ms
26			10, f	10, f : 10, th.-r, l : v
27			3, ci, cu.-s, d	7,ci,ci.-cu,cu,cu.-s : v, sl.-r : 0
28			10, h.-r, mt	10, ci.-s, cu.-s, glm : v, h, f
29			10, sl.-f	10, r : 10, c.-r : 10
30			4, ci, f, d	5, ci.-cu, cu, h, sl.-f : 10
31			10, r : 10, c.-r	10, mt, r : v : 0, m

HUMIDITY OF THE AIR.

Temperature of the Dew Point.

The highest in the month was 55°·9 on the 2nd; and the lowest was 33°·4 on the 11th.

The mean „ was 45°·3, being 0°·9 *lower* than the average of the preceding 29 years.

Elastic Force of Vapour.—The mean for the month was $0^{\text{in}}\cdot 303$, being $0^{\text{in}}\cdot 012$ *less* than the average of the preceding 29 years.

Weight of Vapour in a Cubic Foot of Air.—The mean for the month was $3^{\text{grs}}\cdot 5$, being $0^{\text{gr}}\cdot 2$ *less* than the average of the preceding 29 years.

Degree of Humidity.—The mean for the month was 85 (that of Saturation being represented by 100), being 2 *less* than the average of the preceding 29 years.

Weight of a Cubic Foot of Air.—The mean for the month was 537 grains, being 2 grains *less* than the average of the preceding 29 years.

CLOUDS.

The mean amount for the month, a clear sky being represented by 0 and a cloudy sky by 10, was 6·2

WIND.

The proportions were of N. 5, S. 8, W. 13, E. 5, and Calm 0. The greatest pressure in the month was more than $30^{\text{lbs}}\cdot 0$ on the square foot on the 12th and 13th.

RAIN.

Fell on 16 days in the month, amounting to $3^{\text{in}}\cdot 34$, as measured in the simple cylinder gauge partly sunk below the ground; being $0^{\text{in}}\cdot 57$ *greater* than the average fall of the preceding 55 years.

MONTH and DAY, 1870.	Phases of the Moon.	Mean Daily Reading of the Barometer (corrected and reduced to 32° Fahrenheit).	Readings of Thermometers. Dry. Highest.	Dry. Lowest.	Dry. Mean Daily Value.	Dew Point. Mean Daily Value.	Highest in the Sun, as shown by a Self-Registering Thermometer, with blackened bulb in vacuo, placed on the Grass.	Lowest on the Grass, as shown by a Self-Registering Minimum Thermometer.	In the Water of the Thames, at Greenwich, by Self-Registering Thermometers, read at 9h A.M. Highest.	In the Water … Lowest.	Difference between the Dew Point Temperature and Air Temperature. Mean Daily Value.	Difference … Greatest.	Difference … Least.	Difference between the Mean Temperature of the Day and the Mean Temperature of the same Day on an Average of 50 Years.	Wind as deduced from Anemometers. Osler's. General Direction. A.M.	Osler's. General Direction. P.M.	Osler's. Pressure in lbs. on the square foot. Greatest.	Pressure. Least.	Pressure. Mean of 24 Obs.	Robinson's. Amount of Horizontal Movement of the Air on each Day.	Rain in Inches, collected in a Gauge whose receiving surface is 5 inches above the Ground.
		in.	°	°	°	°	°	°	°	°	°	°	°	°			lbs.	lbs.	lbs.	miles.	in.
Nov. 1	..	30·242	54·1	39·0	46·1	42·2	95·1	32·2	..	..	3·9	10·8	0·0	− 0·3	N : NNE	NNE	2·0	0·0	0·3	291	0·00
2	..	30·343	53·4	30·0	41·1	38·8	83·5	24·3	..	..	2·3	8·2	0·0	− 5·2	N	E : ESE	0·4	0·0	0·0	89	0·00
3	..	30·313	42·7	29·8	36·1	35·6	84·6	23·7	..	..	0·5	3·3	0·0	−10·0	Calm	W : SW	0·0	0·0	0·0	58	0·00
4	..	30·284	50·5	30·4	42·4	39·5	58·5	27·8	..	..	2·9	6·7	0·0	− 3·5	WSW	NE	0·3	0·0	0·0	104	0·00
5	In Equator	30·293	51·6	42·8	46·6	42·7	75·8	40·4	..	..	3·9	8·2	0·0	+ 0·9	NNE	NNE : NE	0·1	0·0	0·0	90	0·00
6	..	30·057	48·0	38·8	43·3	40·9	54·0	29·6	..	..	2·4	4·8	1·5	− 2·2	NE	NW : WSW	0·1	0·0	0·0	102	0·00
7	..	29·891	51·6	34·0	42·9	41·8	75·0	28·0	..	..	1·1	8·8	0·0	− 2·4	WSW : SW	WNW : SW : SSW	0·2	0·0	0·0	154	0·04
8	Apogee : Full	29·881	49·9	34·2	41·4	40·7	66·7	30·5	..	..	0·7	3·1	0·0	− 3·6	SW : NE	ESE : Calm	0·0	0·0	0·0	103	0·00
9	..	29·663	42·6	35·4	38·8	38·4	44·0	28·6	..	..	0·4	1·8	0·0	− 5·9	Calm	Calm : N by E	0·5	0·0	0·0	106	0·00
10	..	29·334	40·1	33·4	35·6	32·3	47·0	31·0	..	..	3·3	4·1	2·2	− 8·8	N	N by E	6·3	0·0	0·8	394	0·00
11	..	29·361	39·3	33·3	36·4	31·4	44·0	29·4	..	..	5·0	9·2	3·2	− 7·7	N by E	N : NNW	3·8	0·0	0·8	393	0·00
12	..	29·206	42·2	29·1	35·1	29·2	72·7	23·7	..	..	5·9	10·4	3·3	− 8·7	W	WSW	0·9	0·0	0·1	317	0·00
13	Greatest Declination N.	29·210	45·0	31·0	37·5	36·3	54·7	26·1	..	..	1·2	6·4	0·0	− 6·0	WSW	W : WSW	0·9	0·0	0·1	327	0·07
14	..	29·054	48·8	36·3	42·7	39·0	69·5	28·0	..	..	3·7	7·1	1·7	− 0·5	SW : WSW	SW : W by N	2·7	0·0	0·2	335	0·00
15	..	29·024	38·9	29·0	33·7	31·6	40·6	22·1	..	..	2·1	4·6	0·0	− 9·2	SW : NE	SW : W	1·9	0·0	0·2	260	0·00
16	Last Qr.	29·200	44·3	32·3	38·0	34·7	72·3	28·0	..	..	3·3	7·3	2·1	− 4·6	W by S	WSW : SW	0·0	0·0	0·0	238	0·00
17	..	29·343	43·3	30·4	35·7	33·0	68·9	24·1	..	..	2·7	8·8	0·0	− 6·6	SW : W by S	WSW : SW	0·0	0·0	0·0	155	0·00
18	..	29·455	44·8	31·6	36·8	33·7	79·8	25·6	..	..	3·1	8·8	0·0	− 5·2	W by S : WNW	W : SW	0·1	0·0	0·0	189	0·00
19	In Equator	29·232	46·9	24·3	38·7	35·0	79·7	24·2	..	..	3·7	10·5	0·0	− 3·1	SSW : SE	SSW : S	1·2	0·0	0·1	199	0·12
20	..	29·297	48·2	36·9	42·5	39·0	80·5	31·2	..	..	3·5	7·4	0·0	+ 0·9	SW : NW : W	SW	2·1	0·0	0·1	253	0·11
21	..	29·202	49·7	40·2	44·0	41·1	51·9	37·5	..	..	2·9	7·4	0·0	+ 2·6	SSW	SSW	4·4	0·0	0·4	366	0·11
22	Perigee	29·041	52·9	38·8	45·8	43·4	54·3	33·8	..	..	2·4	7·2	0·0	+ 4·6	SSW : S	WSW	30·+	0·0	1·7	435	0·23
23	New	29·161	53·0	42·3	46·7	40·8	89·7	35·0	..	..	5·9	11·4	1·3	+ 5·6	WSW	W by S : SW	30·0	0·0	1·3	462	0·23
24	..	29·214	58·9	46·3	52·5	47·1	85·0	37·0	..	..	5·4	11·6	2·0	+11·5	SW	SW	30·+	0·1	3·2	640	0·10
25	Greatest Declination S.	29·410	55·3	45·8	49·5	45·5	82·0	40·7	..	..	4·0	8·2	0·0	+ 8·6	SW	SW	4·7	0·0	0·5	376	0·19
26	..	29·740	55·6	38·3	46·7	45·3	77·4	31·0	..	..	1·4	8·4	0·0	+ 5·8	S by W : S	SSW	0·1	0·0	0·0	128	0·00
27	..	30·103	46·9	36·3	42·3	42·1	63·3	31·3	..	..	0·2	2·1	0·0	+ 1·2	WSW : S	SSE : SE	0·0	0·0	0·0	87	0·00
28	..	30·151	46·5	37·6	42·5	40·8	49·5	36·7	..	..	1·7	4·8	0·0	+ 1·2	SE	SSE : SE	0·3	0·0	0·0	100	0·00
29	First Qr.	30·123	46·9	41·6	43·8	39·4	54·7	41·1	..	..	4·4	6·6	2·2	+ 2·2	SSE : E : ESE	ESE : E	1·2	0·0	0·0	172	0·00
30	..	30·277	42·7	34·3	38·9	33·1	45·5	30·0	..	..	5·8	7·0	5·5	− 3·0	ESE	ESE : SE	2·3	0·0	0·3	290	0·00
Means	..	29·637	47·8	35·4	41·5	38·5	66·7	30·4	..	..	3·0	7·2	0·8	−1·7	...	...	..	..	..	Sum 7213	Sum 1·20

BAROMETER READINGS FROM EYE-OBSERVATIONS.

The absolute maximum in the month was 30in·357 on the 2nd; the first minimum in the month was 29in·324 on the 10th.
The second maximum ,, was 29in·389 on the 11th; the second minimum ,, was 29in·162 on the 12th.
The third maximum ,, was 29in·270 on the 13th; the third minimum ,, was 28in·983 on the 14th.
The fourth maximum ,, was 29in·492 on the 18th; the fourth minimum ,, was 29in·172 on the 19th.
The fifth maximum ,, was 29in·362 on the 20th; the absolute minimum ,, was 28in·970 on the 22nd.
The sixth maximum ,, was 29in·358 on the 23rd; the sixth minimum ,, was 29in·166 on the 24th.
The range in the month was 1in·387.
The mean for the month was 29in·637, being 0in·129 *lower* than the average of the preceding 29 years.

TEMPERATURE OF THE AIR.

The highest in the month was 58°·9 on the 24th; the lowest was 24°·3 on the 19th.
The range ,, was 34°·6.
The mean ,, of all the highest daily readings was 47°·8, being 1°·3 *lower* than the average of the preceding 29 years.
The mean ,, of all the lowest daily readings was 35°·4, being 2°·0 *lower* than the average of the preceding 29 years.
The mean daily range was 12°·4, being 0°·7 *greater* than the average of the preceding 29 years.
The mean for the month was 41°·5, being 2°·3 *lower* than the average of the preceding 29 years.

MONTH and DAY, 1870.	ELECTRICITY. A.M.	ELECTRICITY. P.M.	CLOUDS AND WEATHER. A.M.	CLOUDS AND WEATHER. P.M.
Nov. 1			o	6, ci, ci.-cu, ci.-s : o, d, sl.-f, ms
2			o, f, h.-fr : o, f	o : ci, ci.-cu : o, h.-d, h.-fr, f
3			ci.-cu, ci.-s, h.-fr, f, so.-ha	o, th.-f : ci, f : o, f
4			10, f, mt, d	10, f : 10, ci.-cu, ci.-s, cu.-s, sl.-f : 9
5			10, f	8, ci.-cu, mt : 10 : 10, f
6			10, th.-f	10, f : 10, th.-f
7			6, ci.-cu, ci.-s, cu.-s, h, f	10, f, r : 10, sl.-f
8			10, ci.-cu, ci.-s, f	10, ci.-cu, ci.-s, sl.-f : 8, ci.-cu, d
9			10, th.-f	10, th.-f : 10, th.-f : 10, sl.-f
10			10, mt	10, w : 10, sl.-sn, w : vv, sc, w
11			v, ci.-cu, ci.-s, cu.-s, cu	10, ci.-s, cu.-s, cu : 10, cu.-s, cu : 10, sl.-sn
12			o, h.-fr : o, h.-fr	ci, mt : ci.-cu : o
13			10, f, sn : 10, th.-r, sl.-f	10 : o, ms
14			v, lu.-co, lu.-ha : 10 : 10, li.-cl	10, sl.-r : v : o, m
15			o, h.-fr, ms : v, ms, h.-fr, lu.-ha : 10, sl.-sn, glm	7, ci.-s : v : o, m
16			ci, h.-fr, sl.-f	6, ci, ci.-cu, cu, so.-ha : o, h, f, h.-fr
17			o, f, h.-fr	ci, ci.-s, mt : o, d, h.-fr
18			o, f	o : o, mt : o, h.-fr, m
19			ci, ci.-s, cu, cu.-s, h.-fr, f	8, ci, ci.-cu, cu, cu.-s : 10 : 10, r, l
20			10, r : ci, ci.-cu, f	vv, li.-cl, oc.-shs : 2, ci.-s, cu.-s
21			8, cu.-s, r, sqs	9, oc.-r : v, cu.-s, oc.-shs, m
22			7, ci, ci.-s, ci.-cu, cu.-s, r	vv, cu, ci.-s, cu.-s, ci.-cu, r, fr.-h.-sqs : 10, r, t, l, fr.-h.-sqs, m
23			v, ci, ci-cu, fr.-h.-sqs, r	v, ci, ci.-cu, cu, cu.-s, sl.-r : o, h, d
24			v, cu.-s, r, g	vv, fr.-h.-sqs : 10, r, w
25			vv, r	2, ci, ci.-cu, ci.-s : cu.-s, s, h.-d
26			8, th.-cl, sl.-f	5, ci, ci.-cu, cu.-s : o, h.-d, th.-f
27			7, ci.-cu, ci.-s, h.-d, f	5, ci.-cu, ci.-s, sl.-f : 10, f
28			10, f, d	10 : 10 : 10
29			10	10 : 10 : 10, ci.-s, s
30			10	10 : 10 : 10

HUMIDITY OF THE AIR.

Temperature of the Dew Point.

The highest in the month was $49^{\circ}\cdot8$ on the 24th; and the lowest was $28^{\circ}\cdot7$ on the 12th.

The mean ,, was $38^{\circ}\cdot5$, being $1^{\circ}\cdot2$ *lower* than the average of the preceding 29 years.

Elastic Force of Vapour.—The mean for the month was $0^{in}\cdot233$, being $0^{in}\cdot016$ *less* than the average of the preceding 29 years.

Weight of Vapour in a Cubic Foot of Air.—The mean for the month was $2^{grs}\cdot7$, being $0^{gr}\cdot1$ *less* than the average of the preceding 29 years.

Degree of Humidity.—The mean for the month was 90 (that of Saturation being represented by 100), being 2 *greater* than the average of the preceding 29 years.

Weight of a Cubic Foot of Air.—The mean for the month was 548 grains, being *the same as* the average of the preceding 29 years.

CLOUDS.

The mean amount for the month, a clear sky being represented by 0 and a cloudy sky by 10, was 6·1.

WIND.

The proportions were N. 5, S. 9, W. 10, E. 5, and Calm 1. The greatest pressure in the month was more than $30^{lbs}\cdot0$ on the square foot on the 22nd and 24th.

RAIN.

Fell on 9 days in the month, amounting to $1^{in}\cdot20$, as measured in the simple cylinder gauge partly sunk below the ground; being $1^{in}\cdot15$ *less* than the average fall of the preceding 55 years.

MONTH and DAY, 1870.	Phases of the Moon.	Mean Daily Reading of the Barometer (corrected and reduced to 32° Fahrenheit).	Readings of Thermometers. Dry. Highest.	Dry. Lowest.	Dry. Mean Daily Value.	Dew Point. Mean Daily Value.	Highest in the Sun, as shown by a Self-Registering Thermometer, with blackened bulb in vacuo, placed on the Grass.	Lowest on the Grass, as shown by a Self-Registering Minimum Thermometer.	In the Water of the Thames, at Greenwich, by Self-Registering Thermometers, read at 9h A.M. Highest.	In the Water of the Thames. Lowest.	Difference between the Dew Point Temperature and Air Temperature. Mean Daily Value.	Difference. Greatest.	Difference. Least.	Difference between the Mean Temperature of the Day and the Mean Temperature of the same Day on an Average of 50 Years.	Wind as deduced from Anemometers. Osler's. General Direction. A.M.	General Direction. P.M.	Pressure in lbs. on the square foot. Greatest.	Pressure. Least.	Pressure. Mean of 24 Obs.	Robinson's. Amount of Horizontal Movement of the Air on each Day.	Rain in Inches, collected in a Gauge whose receiving surface is 5 inches above the Ground.
		in.	°	°	°	°	°	°	°	°	°	°	°	°			lbs.	lbs.	lbs.	miles.	in.
Dec. 1	..	30·410	39·3	30·0	35·5	31·5	46·7	25·1	..	..	4·0	7·2	1·2	− 6·6	Calm : NE : E	ESE	7·5	0·0	0·2	203	0·00
2	In Equator	30·397	35·5	29·5	32·3	25·8	37·5	24·9	..	..	6·5	7·8	4·2	− 9·9	ESE	W : N	2·5	0·0	0·1	127	0·00
3	..	30·044	41·9	29·7	36·9	34·0	43·9	25·0	..	..	2·9	6·0	1·7	− 5·4	NNW : WNW	N : NNE	2·9	0·0	0·2	314	0·00
4	..	30·170	40·8	28·2	33·4	25·6	78·8	25·1	..	..	7·8	10·1	3·1	− 8·8	ENE	NE : NNE	2·3	0·0	0·2	282	0·12
5	Apogee	30·084	33·7	25·3	30·3	28·2	38·4	19·0	..	..	2·1	3·8	1·3	−11·9	WSW : SSW	WSW : SW	0·0	0·0	0·0	124	0·11
6	..	29·656	37·0	32·1	35·0	34·0	37·1	31·3	..	..	1·0	1·8	0·0	− 7·1	SW	SW : NNE	0·1	0·0	0·0	147	0·28
7	..	29·535	37·7	32·3	34·4	30·0	44·9	26·0	..	..	4·4	5·3	3·4	− 7·6	NNE	N by E	2·5	0·0	0·3	342	0·04
8	Full.	29·530	32·4	26·2	29·4	25·7	34·0	21·6	..	..	3·7	6·0	0·8	−12·3	N : N by E	N by W	0·7	0·0	0·0	161	0·11
9	..	29·624	32·9	30·6	31·7	30·8	33·4	30·6	..	..	0·9	1·1	0·0	− 9·6	WNW : WSW	W by S	0·0	0·0	0·0	139	0·17
10	Greatest Declination N.	29·794	34·9	32·2	33·6	32·6	40·0	31·8	..	..	1·0	1·2	0·5	− 7·4	N : NE	ENE	0·0	0·0	0·0	97	0·01
11	..	29·650	38·7	31·4	34·3	30·6	62·5	27·0	..	..	3·7	5·8	1·1	− 6·4	SE	SE	1·0	0·0	0·0	178	0·04
12	..	29·159	48·7	32·1	42·1	40·1	51·4	30·0	..	..	2·0	5·0	0·0	+ 1·5	SE : E	WSW : SW	3·9	0·0	0·4	386	0·23
13	..	29·321	48·7	45·7	47·3	46·2	50·7	39·0	..	..	1·1	2·3	0·0	+ 6·8	SW	S by E	3·2	0·0	0·2	324	0·11
14	..	29·022	57·4	46·4	52·5	49·9	62·3	40·0	..	..	2·6	5·2	0·0	+12·1	SSE : SW	SW	14·2	0·0	1·5	522	0·39
15	Last Qr.	29·358	47·7	43·2	45·2	43·9	49·7	34·2	..	..	1·3	1·7	0·0	+ 5·0	SSW	SE : E	1·7	0·0	0·1	203	0·62
16	..	29·700	44·0	38·5	40·3	36·5	55·5	35·0	..	..	3·8	5·5	1·1	+ 0·3	NE : E	E : NE	0·6	0·0	0·0	164	0·30
17	In Equator	29·868	41·7	33·5	37·6	36·0	45·7	28·7	..	..	1·6	2·9	0·7	− 2·2	NNE	Calm : NW : W by S	0·2	0·0	0·0	159	0·01
18	..	29·899	47·5	33·5	42·3	38·5	49·5	31·5	..	..	3·8	9·0	1·4	+ 2·7	WSW	W by S	10·9	0·0	0·6	437	0·01
19	..	29·577	50·9	45·1	48·7	46·4	52·8	41·8	..	..	2·3	4·8	1·5	+ 9·3	W by S	WSW	8·6	0·1	1·0	565	0·12
20	..	29·451	48·0	34·7	42·1	38·5	61·0	31·0	..	..	3·6	7·6	2·3	+ 3·0	NW : WNW	NNW : E	10·3	0·0	0·6	370	0·00
21	Perigee.	29·690	34·7	24·3	27·7	14·7	39·4	22·0	..	..	13·0	15·1	9·6	−11·1	E : E by N	NE	22·0	0·0	0·8	452	0·01
22	New: Greatest Declination S.	29·778	26·3	20·4	23·4	16·1	57·8	16·0	..	..	7·3	17·0	3·9	−15·1	NE	NNE	1·6	0·0	0·1	267	0·03
23	..	29·785	29·9	17·6	24·1	17·2	52·4	12·9	..	..	6·9	14·5	0·8	−14·0	N	N by W : NNE	0·7	0·0	0·0	169	0·00
24	..	29·593	31·3	15·3	22·5	17·1	46·9	8·8	..	..	5·4	11·8	0·0	−15·3	Calm	SSE : Calm	0·0	0·0	0·0	86	0·00
25	..	29·537	28·2	9·8	20·6	19·6	31·5	3·8	..	..	1·0	5·9	0·0	−17·0	Calm	N by E	1·2	0·0	0·0	126	0·00
26	..	29·725	33·0	22·7	28·3	27·2	35·9	22·7	..	..	1·1	3·2	0·0	− 9·1	N by E	NNE : NE	0·6	0·0	0·0	210	0·02
27	..	29·674	29·2	22·0	26·2	22·7	37·5	18·0	..	..	3·5	6·8	0·0	−11·1	ENE	NNE : NE : ESE	1·1	0·0	0·1	243	0·26
28	..	29·698	33·4	25·4	29·6	24·2	52·8	24·7	..	..	5·4	9·5	0·4	− 7·6	ENE : NE	NNE : NE	0·6	0·0	0·0	204	0·12
29	First Qr.	29·854	33·7	22·0	27·9	22·3	54·5	18·0	..	..	5·6	9·0	1·7	− 9·4	NE	NE : NNE	0·7	0·0	0·1	209	0·00
30	In Equator	30·026	29·8	19·0	24·0	19·8	52·8	14·0	..	..	4·2	7·0	1·7	−13·4	ENE	NE : NNE	0·3	0·0	0·0	165	0·02
31	..	30·099	28·7	15·8	23·3	18·7	36·3	8·9	..	..	4·6	8·0	0·9	−14·2	NNE : NE	NE : Calm	0·6	0·0	0·0	126	0·00
Means	..	29·733	38·0	28·9	33·6	29·8	47·5	24·8	..	..	3·8	6·7	1·4	− 6·2	...	...	..	..	..	Sum 7501	Sum 3·13

BAROMETER READINGS FROM EYE-OBSERVATIONS.

The absolute maximum in the month was 30in·446 on the 1st; the first minimum in the month was 29in·954 on the 3rd.
The second maximum ,, was 30in·260 on the 4th; the second minimum ,, was 29in·519 on the 8th.
The third maximum ,, was 29in·815 on the 10th; the third minimum ,, was 29in·116 on the 12th.
The fourth maximum ,, was 29in·357 on the 13th; the absolute minimum ,, was 28in·937 on the 14th.
The fifth maximum ,, was 29in·401 on the 15th; the fifth minimum ,, was 29in·327 on the 15th.
The sixth maximum ,, was 29in·962 on the 17th; the sixth minimum ,, was 29in·407 on the 19th.
The seventh maximum ,, was 29in·829 on the 23rd; the seventh minimum ,, was 29in·533 on the 25th.
The eighth maximum ,, was 29in·781 on the 26th; the eighth minimum ,, was 29in·598 on the 27th.
The ninth maximum ,, was 30in·133 on the 31st.
The range in the month was 1in·509.
The mean for the month was 29in·733, being 0in·075 *lower* than the average of the preceding 29 years.

TEMPERATURE OF THE AIR.

The highest in the month was 57°·4 on the 14th; the lowest was 9°·8 on the 25th.
The range ,, was 47°·6.
The mean ,, of all the highest daily readings was 38°·0, being 7°·3 *lower* than the average of the preceding 29 years.
The mean ,, of all the lowest daily readings was 28°·9, being 6°·9 *lower* than the average of the preceding 29 years.
The mean daily range was 9°·1, being 0°·4 *less* than the average of the preceding 29 years.
The mean for the month was 33°·6, being 6°·9 *lower* than the average of the preceding 29 years.

MONTH and DAY, 1870.	ELECTRICITY. A.M.	ELECTRICITY. P.M.	CLOUDS AND WEATHER. A.M.	CLOUDS AND WEATHER. P.M.
Dec. 1			10, ci.-cu, cu.-s, th.-r	7, ci.-cu, ci.-s : 10
2			7, ci.-cu, ci.-s, cu.-s, fr	6, ci, ci.-cu, ci.-s, f, glm : 9, ci.-cu, lu.-co
3			10, sl.-sn	10 : 10, sl.-r : 10
4			10, r, sn : 2, ci.-cu, cu, fr	7, ci.-cu, cu.-s, cu : 10
5			10, sl.-sn, sl	10, sn : 10, sn : 10
6			10, r : 10, r, glm	10, r : 10, f : 10, r
7			9, ci.-cu, ci.-s, cu.-s, mt	9, cu.-s, mt : 7, ci.-s, cu.-s : 7, ci.-s, cu.-s
8			10, fr : 8,ci,ci.-cu,ci.-s,h.-fr,sl.-f	10, oc.-sn : 10, sn : 10, sn
9			10, sn : 10, sn, glm	10, sn, mt : 10, sn, f, glm : 10, sn
10			10, sl.-sn	10, glm : 10 : 10, oc.-th.-r, f
11			10, r, sl	4, ci, ci.-cu : 0 : ci, ci.-cu, h
12			10, r : 10, r	v, li,-cl : 10, oc.-th.-r
13			10, th.-r	10, r : 10, r : 10
14			10, r : 10, w, r	v, oc.-r, sqs : vv, ci.-s, s, sqs
15			0 : 8, ci.-s	10, r : 10, h.-r : 10, c.-r
16			9, ci.-s, cu.-s	10, r : 10, r : 10
17			10, th.-cl, mt, th.-r	10, glm, f : 7, th.-cl, f
18			10, oc.-r	10 : 10, sqs
19			10, fr.-sqs : 10, oc.-r, fr.-sqs	10, oc.-th.-r : 10, r : 10, st.-w
20			fr.-sqs : 9, ci, ci.-cu	9, ci, cu.-s, cu, mt : v : 10, d
21			10, fr.-h.-sqs, sn	10, sn, w : 10 : 7, cu.-s
22			sn : 9, ci.-cu, cu.-s, cu	v, ci.-cu, cu.-s, sn : 10, oc.-sn : 8
23			10, h.-fr, sl.-f : v, ci, ci.-cu, sl.-f	ci, ci.-cu, ci.-s : 0, fr, h, m
24			0, sl.-f, h.-fr	0 : 0, h.-fr
25			0, fr, th.-f	0 : 10
26			10, sl.-f	v, oc.-sn : v, oc.-sn
27			10, sn	10, sn : 10, sn : 10, sn
28			10, sn : 10, sn : v	v, ci, ci.-cu, ci.-s, cu : 10, sn : 10
29			4, ci, ci.-cu, ci.-s	3, ci, ci.-s : li.-cl : 10
30			10 : v, sl.-sn	v, sn : vv
31			10, sl.-f	10 : 10

HUMIDITY OF THE AIR.

Temperature of the Dew Point.

The highest in the month was 53°·9 on the 14th; and the lowest was 10°·4 on the 23rd.

The mean ,, was 29°·8, being 7°·4 *lower* than the average of the preceding 29 years.

Elastic Force of Vapour.—The mean for the month was $0^{in}\cdot166$, being $0^{in}\cdot058$ *less* than the average of the preceding 29 years.

Weight of Vapour in a Cubic Foot of Air.—The mean for the month was $1^{gr}\cdot9$, being $0^{gr}\cdot7$ *less* than the average of the preceding 29 years.

Degree of Humidity.—The mean for the month was 86 (that of Saturation being represented by 100), being 2 *less* than the average of the preceding 29 years.

Weight of a Cubic Foot of Air.—The mean for the month was 559 grains, being 7 grains *greater* than the average of the preceding 29 years.

CLOUDS.

The mean amount for the month, a clear sky being represented by 0 and a cloudy sky by 10, was 8·1.

WIND.

The proportions were of N. 11, S. 5, W. 5, E. 9, and Calm 1. The greatest pressure in the month was $22^{lbs}\cdot0$ on the square foot on the 21st.

RAIN.

Fell on 22 days in the month, amounting to $3^{in}\cdot13$, as measured in the simple cylinder gauge partly sunk below the ground; being $1^{in}\cdot17$ *greater* than the average all of the preceding 55 years.

The following table contains the highest and lowest readings of the Barometer, reduced to 32° Fahrenheit, extracted from the photographic records. The readings are accurate; but the times are liable to great uncertainty, as the barometer frequently remains at its highest or lowest point through several hours. The time given is the middle of the stationary period. Where the symbol : follows the time, it denotes that the quicksilver has been sensibly stationary through a period of more than one hour.

MAXIMA.			MINIMA.			MAXIMA.			MINIMA.		
Approximate Mean Solar Time, 1870.		Reading.	Approximate Mean Solar Time, 1870.		Reading.	Approximate Mean Solar Time, 1870.		Reading.	Approximate Mean Solar Time, 1870.		Reading.
	d h m	in.		d h m	in.		d h m	in.		d h m	in.
January	3. 9. 20	29·625	January	0. 18. 15	29·090	April	21. 21. 30	30·145	April	19. 4. 40:	29·823
	4. 7. 35	29·742		3. 15. 50	29·503		23. 11. 30:	30·240		22. 9. 40	30·030
	5. 14. 45	29·719		5. 1. 20	29·560		27. 9. 40:	29·995		26. 7. 10:	29·875
	7. 2. 35	29·413		6. 14. 20	29·155	May	7. 19. 40	30·177	May	1. 2. 15	29·368
	10. 20. 30	29·905		8. 0. 20	28·885		12. 22. 0	29·553		11. 10. 15:	29·192
	12. 22. 30	29·735		11. 20. 0	29·543		14. 16. 30:	29·876		13. 2. 55	29·414
	17. 23. 0	30·466		14. 5. 20	29·309		17. 20. 15:	30·130		15. 17. 10	29·660
	25. 11. 15:	30·345		21. 1. 50	30·112		25. 10. 55	30·285		22. 3. 30	29·810
February	0. 23. 30	29·900		30. 22. 10	29·503	June	5. 19. 10	30·379		30. 23. 55	29·600
	3. 10. 0:	29·650	February	2. 3. 30:	29·512		12. 12. 15	30·070	June	10. 4. 45	29·545
	5. 14. 25	29·867		4. 8. 45:	29·467		20. 19. 0	30·205		16. 13. 55	29·640
	11. 21. 0	30·202		8. 3. 0	29·375		25. 9. 10	29·988		24. 6. 35	29·728
	14. 22. 5:	30·122		13. 9. 0	29·880		27. 20. 35	29·960		26. 16. 20	29·756
	19. 22. 45	29·980		18. 6. 30:	29·730	July	5. 0. 55	29·840	July	3. 21. 30	29·645
	22. 8. 30	29·710		21. 9. 35	29·393		6. 22. 10	29·975		5. 14. 35	29·726
	24. 21. 57	29·530		24. 3. 34	29·200		14. 10. 56	29·930		11. 15. 20	29·480
	28. 6. 45	29·524		25. 18. 0:	29·284		19. 20. 35	30·140		15. 16. 55	29·660
March	0. 23. 40	29·555		28. 16. 0	29·412		28. 9. 5	30·030		24. 21. 25	29·623
	5. 22. 45	30·230	March	2. 16. 55	29·313	August	1. 21. 14	29·764		31. 5. 50	29·555
	8. 8. 30	30·105		7. 14. 58	30·005		12. 18. 5	30·110	August	4. 15. 0	29·542
	11. 8. 20	29·633		10. 23. 20	29·568		21. 1. 35	30·028		18. 15. 20	29·570
	14. 0. 0	29·968		12. 18. 15	29·464		24. 22. 0	29·790		22. 16. 0	29·569
	19. 20. 15:	30·307		16. 2. 50	29·450		26. 20. 0:	29·791		25. 17. 15	29·624
	22. 23. 0	29·895		22. 2. 55	29·595		30. 12. 25	30·154		28. 0. 20	29·245
	28. 1. 10	30·310		25. 3. 40:	29·585	September	3. 21. 35	29·860	September	2. 3. 40	29·325
	30. 21. 15	30·170		30. 2. 55	30·090		8. 4. 55	29·609		7. 5. 0	29·145
April	3. 21. 15	30·360	April	1. 4. 40:	30·029		10. 21. 40	30·020		8. 23. 0	29·220
	15. 21. 50:	30·341		9. 1. 0:	29·310		15. 22. 0	30·385		13. 17. 15	29·640

MAXIMA.		MINIMA.		MAXIMA.		MINIMA.	
Approximate Mean Solar Time, 1870.	Reading.	Approximate Mean Solar Time, 1870.	Reading.	Approximate Mean Solar Time, 1870.	Reading.	Approximate Mean Solar Time, 1870.	Reading.
d h m	in.	d h m	in.	d h m	in.	d h m	in.
September 22. 21. 0	30·202	September 20. 4. 0	30·118	November 17. 22. 15	29·517	November 14. 4. 50:	28·983
October 0. 21. 0	30·398	26. 2. 45	29·995	20. 9. 0:	29·373	19. 16. 50:	29·150
11. 9. 50	29·765	October 8. 20. 15	28·780	23. 9. 20	29·380	22. 1. 30:	28·931
14. 8. 5	29·900	12. 17. 0	29·060	December 1. 22. 15	30·466	24. 15. 0	29·080
17. 22. 0:	29·805	16. 12. 30	29·050	4. 9. 35	30·288	December 3. 15. 20:	29·953
19. 21. 35	29·324	19. 9. 45	29·190	9. 21. 20	29·840	7. 18. 20:	29·518
21. 10. 30:	29·851	20. 4. 25	29·210	12. 22. 35	29·371	11. 23. 0	29·080
25. 10. 40	29·498	23. 19. 0	28·725	14. 22. 0	29·433	13. 23. 50	28·930
28. 8. 35	29·840	26. 1. 10	29·295	17. 15. 0	30·020	15. 4. 50	29·295
29. 22. 50	29·764	29. 7. 30	29·562	22. 21. 10	29·840	19. 11. 25	29·341
November 1. 22. 0	30·375	30. 23. 10	29·350	26. 9. 10:	29·790	25. 4. 30:	29·520
10. 22. 35	29·400	November 10. 2. 35	29·320	30. 22. 10:	30·138	27. 15. 30:	29·598
13. 10. 30	29·270	12. 16. 45:	29·133				

ABSOLUTE MAXIMA AND MINIMA READINGS OF THE BAROMETER for each Month in the YEAR 1870.

[Extracted from the preceding Table.]

1870, MONTH.	Readings of the Barometer. Maxima.	Readings of the Barometer. Minima.	Range of Reading in each Month.
	in.	in.	in.
January	30·466	28·885	1·581
February	30·202	29·200	1·002
March	30·310	29·313	0·997
April	30·360	29·310	1·050
May	30·285	29·192	1·093
June	30·379	29·545	0·834
July	30·140	29·480	0·660
August	30·154	29·245	0·909
September	30·385	29·145	1·240
October	30·398	28·725	1·673
November	30·375	28·931	1·444
December	30·466	28·930	1·536

The highest reading in the year was 30in·466 in the months of January and December. The lowest reading in the year was 28in·725 in the month of October.

The range of reading in the year was 1in·741.

MONTHLY MEANS of RESULTS for METEOROLOGICAL ELEMENTS.

1870, 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.	Mean Temperature.	Mean Temperature of Dew Point.	Mean Elastic Force of Vapour.	Mean Weight of Vapour in a Cubic Foot of Air.	Mean additional Weight required to saturate a Cubic Foot of Air.
	in.	°	°	°	°	°	°	°	°	in.	grs.	grs.
January ..	29·823	50·9	19·6	31·3	42·6	34·0	8·6	38·3	34·1	0·196	2·3	0·5
February..	29·693	55·6	19·4	36·2	41·4	31·9	9·5	36·2	29·7	0·165	1·9	0·6
March	29·865	61·1	23·1	38·0	46·9	34·0	12·9	39·6	34·7	0·201	2·3	0·5
April	29·984	78·7	26·0	52·7	62·0	38·4	23·6	48·9	39·2	0·239	2·8	1·2
May	29·896	85·4	29·8	55·6	66·9	42·0	24·9	53·4	45·1	0·301	3·4	1·2
June	29·947	90·2	41·4	48·8	74·8	50·7	24·1	60·9	50·6	0·369	4·1	1·9
July	29·818	89·7	44·8	44·9	78·1	56·0	22·1	65·4	55·0	0·433	4·8	2·1
August ...	29·804	81·0	41·0	40·0	72·6	53·1	19·5	61·1	52·0	0·388	4·3	1·7
September.	29·906	72·6	37·4	35·2	66·8	46·4	20·4	55·7	50·5	0·367	4·1	0·8
October ...	29·570	68·6	32·4	36·2	58·2	42·8	15·4	49·8	45·3	0·303	3·5	0·6
November .	29·637	58·9	24·3	34·6	47·8	35·4	12·4	41·5	38·5	0·233	2·7	0·3
December .	29·733	57·4	9·8	47·6	38·0	28·9	9·1	33·6	29·8	0·166	1·9	0·3
Means	29·806	70·8	29·1	41·8	58·0	41·1	16·9	48·7	42·0	0·280	3·2	1·0

1870, Month.	Mean Degree of Humidity. (Sat. = 100.)	Mean Weight of a Cubic Foot of Air.	Mean Amount of Cloud. 0—10	Rain. Number of Rainy Days.	Amount collected on the Ground. Gauge read Daily.	Gauge read Monthly.	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 in lbs. on the Square Foot.	From Robinson's Anemometer. Mean Daily Horizontal Movement of Air in Miles.
		grs.			in.	in.											
January	85	555	6·5	15	1·49	1·58	54	125	36	81	101	223	68	12	44	0·69	297
February	78	555	7·4	13	0·54	0·60	34	192	52	62	135	111	43	36	7	0·88	359
March	83	554	7·5	11	2·05	2·15	130	262	28	19	48	115	52	87	3	0·42	310
April	69	546	4·0	6	0·28	0·24	61	34	84	51	44	201	118	84	43	0·17	239
May	73	539	5·6	5	0·47	0·37	63	105	63	66	31	298	46	44	28	0·41	255
June	68	532	6·4	4	0·39	0·23	96	97	21	25	14	193	177	93	4	0·26	243
July	70	525	6·6	10	2·01	1·93	60	115	67	42	35	217	141	61	6	0·18	223
August	73	529	6·2	10	2·02	2·00	164	185	44	23	16	118	81	105	8	0·29	240
September	83	537	4·3	8	1·63	1·70	19	109	122	56	46	218	95	27	28	0·36	229
October	85	537	6·2	16	3·34	3·40	48	70	62	25	55	264	156	64	0	0·65	327
November	90	548	6·1	9	1·20	1·30	77	67	43	60	67	238	121	28	19	0·34	240
December	86	559	8·1	22	3·13	3·00	138	210	69	65	23	106	73	29	31	0·21	242
Means	79	543	6·2	Sum 129	Sum 18·55	Sum 18·50	Sum 944	Sum 1571	Sum 691	Sum 575	Sum 615	Sum 2302	Sum 1171	Sum 670	Sum 221	0·41	267

(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, except Sundays and Good Friday.

Days of the Month, 1870.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
1	52·73	51·92	51·12	50·15	S	49·23	49·47	50·26	51·25	52·20	52·77	52·86
2	S	51·89	51·08	50·12	49·45	49·23	49·50	50·25	51·30	S	52·72	52·83
3	52·69	51·86	51·06	S	49·43	49·24	S	50·31	51·28	52·27	52·75	52·85
4	52·68	51·83	50·99	50·08	49·42	49·23	49·55	50·33	S	52·25	52·77	S
5	52·65	51·81	50·97	50·06	49·41	S	49·62	50·36	51·42	52·28	52·82	52·83
6	52·61	S	S	50·03	49·39	49·23	49·65	50·40	51·43	52·28	S	52·83
7	52·58	51·75	50·82	50·02	49·38	49·24	49·69	S	51·44	52·35	52·83	52·83
8	52·57	51·71	50·88	49·99	S	49·22	49·62	50·46	51·47	52·37	52·82	52·78
9	S	51·66	50·87	49·95	49·35	49·26	49·63	50·49	51·55	S	52·81	52·81
10	52·48	51·63	50·83	S	49·34	49·25	S	50·51	51·56	52·38	52·83	52·79
11	52·47	51·60	50·80	49·92	49·32	49·26	49·68	50·55	S	52·42	52·81	S
12	52·46	51·55	50·76	49·88	49·32	S	49·69	50·58	51·63	52·43	52·84	52·82
13	52·42	S	S	49·87	49·28	49·27	49·78	50·62	51·66	52·46	S	52·80
14	52·43	51·51	50·69	49·85	49·32	49·27	49·75	S	51·68	52·48	52·87	52·80
15	52·39	51·48	50·67	GoodFriday.	S	49·28	49·78	50·68	51·72	52·49	52·85	52·78
16	S	51·46	50·65	49·79	49·29	49·31	49·81	50·72	51·77	S	52·85	52·76
17	52·33	51·37	50·62	S	49·28	49·28	S	50·74	51·78	52·52	52·85	52·75
18	52·28	51·33	50·58	49·73	49·29	49·31	49·86	50·78	S	52·57	52·88	S
19	52·26	51·33	50·54	49·73	49·27	S	49·88	50·81	51·84	52·57	52·89	52·75
20	52·22	S	S	49·72	49·27	49·33	49·93	50·84	51·88	52·59	S	52·77
21	52·20	51·32	50·49	49·70	49·27	49·34	49·94	S	51·90	52·60	52·87	52·66
22	52·18	51·28	50·46	49·67	S	49·37	49·98	50·92	51·94	52·65	52·87	52·62
23	S	51·26	50·42	49·64	49·25	49·36	49·99	50·92	51·97	S	52·92	52·61
24	52·12	51·25	50·38	S	49·25	49·34	S	50·97	52·00	52·63	52·88	52·58
25	52·11	51·21	50·36	49·60	49·24	49·37	50·05	51·02	S	52·67	52·91	S
26	52·06	51·18	50·32	49·58	49·24	S	50·07	51·03	52·06	52·67	52·93	52·57
27	52·01	S	S	49·54	49·23	49·42	50·12	51·16	52·10	52·71	S	52·55
28	52·00	51·15	50·26	49·57	49·23	49·43	50·12	S	52·08	52·68	52·88	52·53
29	51·99		50·23	49·51	S	49·44	50·15	51·16	52·14	52·73	52·89	52·51
30	S		50·18	49·48	49·23	49·43	50·18	51·16	52·18	S	52·84	52·51
31	51·92		50·16		49·20		S	51·21		52·76		52·48
Means.	52·34	51·51	50·64	49·81	49·31	49·31	49·83	50·71	51·73	52·50	52·84	52·71

(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 the same times.

Days of the Month, 1870.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
1	50·30	48·46	46·75	46·11	S	48·84	51·96	54·67	56·53	56·22	55·16	52·65
2	S	48·40	46·65	46·05	46·90	48·96	52·07	54·66	56·53	S	55·12	52·59
3	50·29	48·33	46·67	S	46·94	49·07	S	54·82	56·47	56·23	54·99	52·48
4	50·22	48·27	46·55	46·07	47·03	49·15	52·34	54·93	S	56·14	54·98	S
5	50·11	48·20	46·43	46·05	47·12	S	52·40	55·02	56·58	56·11	54·94	52·37
6	49·98	S	S	46·03	47·21	49·37	52·56	55·08	56·54	56·04	S	52·30
7	49·90	48·04	46·32	46·05	47·27	49·47	52·70	S	56·48	56·08	54·83	52·27
8	49·83	48·00	46·35	46·02	S	49·58	52·83	55·23	56·53	56·12	54·75	52·15
9	S	47·86	46·33	46·00	47·38	49·71	52·83	55·32	56·60	S	54·63	52·07
10	49·58	47·74	46·27	S	47·44	49·79	S	55·36	56·54	55·98	54·57	51·98
11	49·57	47·72	46·29	46·02	47·48	49·88	53·06	55·47	S	55·99	54·48	S
12	49·50	47·69	46·23	45·99	47·57	S	53·12	55·57	56·61	55·97	54·45	51·87

(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 the same times—*concluded.*

Days of the Month, 1870.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
13	49·40	*S*	*S*	46·01	47·56	50·12	53·17	55·60	56·52	55·98	*S*	51·73
14	49·40	47·60	46·18	46·06	47·67	50·22	53·20	*S*	56·52	55·95	54·31	51·71
15	49·36	47·53	46·22	Good Friday.	*S*	50·33	53·26	55·73	56·50	55·94	54·18	51·56
16	*S*	47·47	46·20	46·08	47·75	50·44	53·35	55·80	56·52	*S*	54·14	51·30
17	49·22	47·45	46·18	*S*	47·79	50·48	*S*	55·83	56·48	55·86	54·02	51·14
18	49·14	47·38	46·17	46·12	47·87	50·57	53·43	55·93	*S*	55·88	53·99	*S*
19	49·12	47·35	46·14	46·15	47·90	*S*	53·57	55·93	56·46	55·86	53·91	51·03
20	49·02	*S*	*S*	46·17	48·02	50·80	53·66	55·99	56·45	55·77	*S*	50·93
21	48·96	47·26	46·13	46·20	48·04	50·94	53·75	*S*	56·44	55·73	53·70	50·78
22	48·92	47·17	46·12	46·28	*S*	51·07	53·84	56·14	56·40	55·73	53·61	50·67
23	*S*	47·11	46·10	46·26	48·10	51·11	53·88	56·10	56·41	*S*	53·56	50·67
24	48·89	47·06	46·13	*S*	48·16	51·13	*S*	56·23	56·40	55·60	53·48	50·58
25	48·84	46·98	46·08	46·38	48·26	51·31	54·06	56·27	*S*	55·54	53·32	*S*
26	48·77	46·92	46·06	46·45	48·31	*S*	54·09	56·27	56·42	55·48	53·23	50·46
27	48·69	*S*	*S*	46·50	48·37	51·54	54·22	56·32	56·34	55·47	*S*	50·43
28	48·65	46·78	46·08	46·66	48·46	51·64	54·23	*S*	56·35	55·36	53·01	50·38
29	48·63		46·12	46·64	*S*	51·75	54·33	56·42	56·32	55·36	52·90	50·27
30	*S*		46·02	46·73	48·67	51·81	54·43	56·40	56·26	*S*	52·78	50·23
31	48·50		46·02		48·68		*S*	56·50		55·28		50·15
Means .	49·34	47·62	46·25	46·20	47·77	50·35	53·32	55·69	56·47	55·83	54·12	51·36

(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 the same times.

Days of the Month, 1870.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
1	46·77	44·88	...	44·45	*S*	53·00	57·38	60·80	60·07	57·81	54·40	50·20
2	*S*	44·70	...	44·28	48·93	53·21	57·40	60·65	59·92	*S*	54·33	50·22
3	46·44	44·59	...	*S*	48·90	53·39	*S*	60·74	59·72	57·83	54·17	50·10
4	46·40	44·52	...	44·38	48·95	53·52	58·12	60·87	*S*	57·74	54·16	*S*
5	46·40	44·48	...	44·40	48·97	*S*	58·17	60·90	59·66	57·70	54·02	49·84
6	46·29	*S*	*S*	44·47	48·95	53·64	58·28	60·90	59·59	57·61	*S*	49·69
7	46·37	44·60	44·02	44·58	48·94	53·90	58·52	*S*	59·47	57·68	53·66	49·46
8	46·45	44·71	44·18	44·65	*S*	54·00	58·78	60·96	59·48	57·68	53·48	49·22
9	*S*	44·76	44·22	44·78	48·84	54·16	58·95	61·03	59·51	*S*	53·30	49·00
10	46·55	44·75	44·20	*S*	49·00	54·28	*S*	61·01	59·37	57·46	53·14	48·78
11	46·67	44·82	44·23	45·17	49·02	54·44	59·32	61·06	*S*	57·42	53·00	*S*
12	46·70	44·84	44·22	45·30	49·13	*S*	59·12	61·13	59·22	57·30	52·83	48·02
13	46·63	*S*	*S*	45·49	49·15	54·80	58·88	61·11	59·06	57·20	*S*	47·87
14	46·60	44·63	44·26	45·65	49·33	54·93	58·84	*S*	59·50	57·01	52·44	47·30
15	46·43	44·42	44·30	Good Friday.	*S*	55·10	58·89	61·12	58·88	56·83	52·14	47·36
16	*S*	44·36	44·23	45·97	49·52	55·26	58·94	61·14	58·79	*S*	51·96	46·91
17	46·25	44·11	44·10	*S*	49·60	55·37	*S*	61·16	58·68	56·47	51·68	47·02
18	46·21	43·91	44·08	46·37	49·82	55·58	59·02	61·21	*S*	56·41	51·52	*S*
19	46·30	43·82	44·17	46·57	49·96	*S*	59·21	61·12	58·51	56·29	51·31	47·58
20	46·28	*S*	*S*	46·76	50·12	56·02	59·30	61·13	58·42	56·11	*S*	47·63
21	46·28	43·61	44·40	46·95	50·32	56·28	59·40	*S*	58·38	56·00	50·81	47·65
22	46·21	43·48	44·49	47·19	*S*	56·51	59·50	61·10	58·32	55·90	50·70	47·62
23	*S*	...	44·60	47·40	50·79	56·60	59·60	60·96	58·27	*S*	50·37	47·77
24	46·03	...	44·73	*S*	51·14	56·66	*S*	60·96	58·20	55·51	50·32	47·67
25	45·89	...	44·76	47·94	51·47	56·97	59·98	60·83	*S*	55·42	50·21	*S*
26	45·74	...	44·73	48·20	51·72	*S*	60·38	60·65	58·07	55·30	50·18	47·40

At temperatures below 43°·5 the fluid of this thermometer descends below the scale; the readings from February 23 to March 5 were less than 43°·5.

(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 the same times—*concluded.*

Days of the Month, 1870.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
27	45·62	...	S	48·37	51·96	57·28	60·43	60·55	58·00	55·25	S	47·16
28	45·50	...	44·69	48·56	52·18	57·31	60·45	S	57·96	55·02	50·26	46·94
29	45·39		44·63	48·72	S	57·37	60·58	60·35	57·91	54·92	50·27	46·60
30	S		44·42	48·82	52·63	57·32	60·72	60·19	57·82	S	50·26	46·45
31	44·97		44·38		52·72		S	60·16		54·52		46·22
Means.	46·21	...	...	46·22	50·08	55·27	59·16	60·88	58·88	56·55	52·11	48·06

(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 the same times.

Days of the Month, 1870.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
1	41·01	39·20	40·38	41·29	S	56·80	60·11	64·28	59·96	57·88	51·90	46·92
2	S	39·42	41·20	41·52	49·02	56·70	59·98	64·32	59·83	S	51·72	46·48
3	42·14	39·92	42·10	S	48·90	56·60	S	64·38	59·91	57·80	51·15	45·82
4	42·76	40·59	42·91	42·08	48·60	56·71	59·71	64·36	S	57·57	50·62	S
5	43·20	41·08	42·78	42·37	48·33	S	59·98	64·31	59·94	57·50	50·13	44·97
6	43·51	S	S	42·76	48·38	56·95	60·58	64·38	60·00	57·22	S	44·42
7	43·51	41·62	41·87	43·11	48·58	57·10	61·08	S	59·87	57·16	50·07	44·02
8	43·70	41·92	41·72	43·63	S	57·37	61·70	64·34	59·68	57·08	49·81	43·80
9	S	41·99	41·62	44·19	48·72	57·83	62·24	64·28	59·38	S	49·51	43·42
10	43·98	41·62	41·61	S	48·89	58·18	S	64·18	59·25	56·84	49·12	43·08
11	43·72	41·02	41·75	44·83	49·19	58·19	63·14	64·18	S	56·17	48·81	S
12	43·09	40·50	41·82	44·86	49·50	S	63·00	64·14	58·77	55·35	48·31	42·56
13	42·60	S	S	45·10	49·68	58·34	62·68	64·10	58·50	54·92	S	42·30
14	42·28	39·50	41·28	45·53	50·10	58·64	62·52	S	58·47	54·86	47·29	42·92
15	42·43	39·07	40·91	Good Friday.	S	59·17	62·66	64·27	58·40	54·78	47·03	43·81
16	S	38·81	40·78	46·53	50·62	59·80	62·81	64·16	58·11	S	46·77	44·20
17	43·00	38·62	41·13	S	50·96	60·15	S	63·90	57·84	54·32	46·28	44·16
18	43·26	38·45	42·06	47·15	51·31	60·53	62·77	63·90	S	54·38	46·10	S
19	43·30	38·50	42·76	47·51	51·77	S	63·00	63·60	58·00	54·06	45·84	44·10
20	42·89	S	S	47·90	52·52	60·67	63·21	63·52	58·11	53·91	S	44·34
21	42·28	38·20	42·71	48·51	53·33	61·13	63·67	S	57·87	53·61	45·66	44·58
22	41·85	38·30	42·93	49·26	S	61·52	64·18	62·80	57·67	53·46	46·00	44·12
23	S	38·22	43·12	49·68	54·93	61·70	64·56	62·15	57·64	S	46·02	43·50
24	41·32	38·20	42·80	S	55·33	61·93	S	61·88	57·58	53·31	46·40	42·75
25	41·20	38·52	42·29	50·12	55·30	61·79	65·16	61·65	S	53·18	46·75	S
26	41·09	38·73	42·05	50·30	55·52	S	65·50	61·34	57·33	52·80	47·30	41·30
27	40·73	S	S	50·31	55·60	60·71	65·49	61·10	57·36	52·57	S	40·88
28	40·27	39·55	41·59	50·11	55·85	60·51	65·14	S	57·51	52·03	47·39	40·53
29	39·90		41·48	49·72	S	60·32	64·90	60·65	57·68	51·92	47·26	40·12
30	S		41·41	49·26	56·31	60·12	64·33	60·50	57·71	S	47·17	39·98
31	39·28		41·12		56·62		S	60·26		51·91		39·79
Means.	42·24	39·65	41·86	46·31	51·69	59·21	62·85	63·22	58·55	54·87	48·09	43·29

(V.)—Reading of a Thermometer whose bulb is sunk to the depth of 1 inch below the surface of the soil, within the case which covers the tops of the deep-sunk Thermometers, at the same times.

Days of the Month, 1870.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
1	43·0	39·7	49·0	41·4	S	59·5	61·3	69·4	60·0	57·5	49·1	41·1
2	S	42·4	50·0	41·7	48·6	60·0	60·0	67·3	61·8	S	44·8	38·7
3	45·8	43·1	48·3	S	46·0	62·0	S	65·6	62·3	57·0	43·0	38·7
4	46·4	43·8	42·1	42·7	47·0	63·2	64·3	67·7	S	56·7	44·6	S
5	45·5	44·3	40·5	43·5	49·0	S	66·0	67·1	62·0	55·9	47·2	36·5
6	43·0	S	S	45·0	51·0	60·8	63·5	66·8	62·5	54·7	S	38·2
7	44·0	42·3	39·2	47·8	51·4	61·0	66·0	S	58·0	57·7	45·9	38·3
8	46·1	43·7	40·8	51·0	S	63·0	68·2	67·0	56·7	60·0	44·8	34·8
9	S	36·5	42·5	50·0	49·2	64·2	69·5	67·2	61·8	S	43·3	36·8
10	39·3	33·2	41·8	S	51·2	62·0	S	66·5	58·0	49·5	41·8	35·1
11	37·7	33·2	43·5	47·8	53·3	61·8	68·8	66·0	S	52·0	41·3	S
12	39·8	31·4	39·2	48·2	54·3	S	66·4	67·6	58·2	51·0	40·0	40·2
13	38·5	S	S	49·2	55·2	64·4	66·8	67·5	57·5	53·8	S	45·6
14	44·0	33·8	38·0	52·6	55·8	66·0	66·8	S	58·5	55·0	44·1	51·0
15	43·7	35·0	39·0	Good Friday.	S	67·8	68·6	66·0	54·5	52·0	39·0	46·2
16	S	35·0	45·0	49·8	55·8	70·0	66·8	64·5	55·0	S	40·9	43·2
17	44·0	34·0	48·7	S	56·5	66·0	S	65·0	57·5	49·9	39·3	42·3
18	41·0	33·5	47·0	50·7	58·4	64·5	67·0	64·1	S	49·2	40·5	S
19	39·1	35·7	42·0	53·2	61·3	S	69·7	63·3	59·0	54·7	40·5	47·0
20	37·0	S	S	58·3	63·7	68·3	69·8	61·8	56·0	50·2	S	44·5
21	36·2	37·3	45·5	57·3	63·8	69·4	71·0	S	56·3	51·3	46·6	36·6
22	37·0	34·2	46·0	57·0	S	72·5	71·5	61·2	62·0	53·4	44·2	34·7
23	S	37·2	43·7	55·3	60·7	68·3	69·3	59·2	57·0	S	48·0	32·4
24	38·2	40·0	40·0	S	59·2	63·6	S	61·7	56·5	51·2	50·8	30·8
25	38·4	37·5	40·0	57·3	61·5	61·7	71·6	60·5	S	49·8	49·7	S
26	34·3	40·7	38·0	53·8	58·5	S	67·8	58·5	57·0	49·0	48·5	34·2
27	33·0	S	S	50·7	61·0	62·5	68·5	58·5	58·4	48·8	S	32·5
28	34·2	46·5	38·5	47·6	60·5	62·5	65·0	S	60·0	49·3	45·3	33·5
29	34·4		39·1	48·7	S	62·2	63·5	58·8	58·3	51·5	46·0	33·6
30	S		40·3	49·0	64·0	62·2	65·7	58·5	58·0	S	43·8	32·0
31	38·7		39·6		61·8		S	56·6		53·3		30·5
Means.	40·1	38·1	42·5	50·0	56·1	64·2	67·1	63·8	58·6	52·9	44·3	38·1

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

Days of the Month, 1870.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
1	47·5	39·8	54·7	45·2	S	61·5	64·0	75·8	69·2	65·1	51·6	38·5
2	S	44·0	57·0	51·2	49·2	66·6	65·8	65·5	64·5	S	47·5	33·8
3	47·8	46·0	54·0	S	46·0	65·8	S	65·8	62·4	65·5	41·5	37·7
4	48·8	46·0	38·0	50·0	51·2	68·8	73·4	74·1	S	56·8	45·3	S
5	45·5	46·9	42·0	50·3	56·0	S	69·6	73·8	66·8	56·0	49·0	33·5
6	45·0	S	S	58·0	57·8	70·2	66·5	72·2	64·5	52·8	S	36·1
7	45·0	42·1	38·8	61·0	57·0	70·5	74·8	S	57·8	63·4	49·4	36·0
8	48·2	44·8	40·0	63·0	S	71·2	83·0	71·3	61·0	65·0	44·5	31·5
9	S	29·9	46·1	56·0	57·8	70·0	73·0	73·0	69·0	S	40·2	33·2
10	35·0	30·7	45·2	S	57·2	66·0	S	69·5	62·3	50·0	37·8	37·3
11	37·4	29·7	45·1	55·3	60·3	65·5	75·4	71·0	S	53·0	38·0	S
12	39·8	25·9	36·4	56·8	60·7	S	71·5	75·0	67·0	53·0	40·8	45·5
13	39·0	S	S	59·7	55·7	74·0	70·9	73·3	57·0	55·8	S	48·0
14	49·1	31·9	41·7	62·6	63·8	76·2	73·0	S	61·0	57·0	47·7	55·7
15	44·9	36·2	41·1	Good Friday.	S	76·1	78·5	70·0	61·2	54·0	33·7	47·5

(VI.)—Reading of a Thermometer within the case covering the deep-sunk Thermometers, whose bulb is placed on a level with their scales, at the same times—*concluded.*

Days of the Month, 1870.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
d	°	°	°	°	°	°	°	°	°	°	°	°
16	*S*	35·1	51·0	54·8	63·0	81·8	73·5	68·6	61·5	*S*	42·1	42·1
17	44·0	31·7	53·8	*S*	64·8	68·7	*S*	68·2	61·3	52·4	39·3	40·5
18	37·5	31·0	48·5	55·1	71·2	68·7	68·5	73·0	*S*	58·2	42·5	*S*
19	36·4	37·5	40·0	64·5	74·8	*S*	79·5	65·0	61·4	58·8	45·5	50·1
20	32·0	*S*	*S*	74·0	78·2	76·6	78·2	65·8	64·5	50·8	*S*	45·0
21	32·3	39·0	49·7	69·0	77·7	80·3	81·0	*S*	62·2	55·9	46·3	29·8
22	35·5	34·5	49·0	65·9	*S*	86·4	80·5	67·7	65·7	58·2	45·7	26·7
23	*S*	40·4	38·1	60·3	64·0	69·8	75·5	60·8	65·2	*S*	51·2	27·3
24	37·6	47·0	42·4	*S*	69·5	62·2	*S*	67·8	63·8	52·7	56·5	25·0
25	38·3	42·3	43·5	63·8	67·8	63·6	79·8	65·0	*S*	53·0	52·2	*S*
26	32·9	46·0	37·0	59·9	68·0	*S*	69·9	59·5	65·0	48·0	52·5	32·6
27	29·0	*S*	*S*	51·0	67·0	66·5	75·0	64·2	68·2	52·2	*S*	28·5
28	33·3	53·5	36·7	45·5	69·5	65·5	63·8	*S*	69·2	50·4	44·6	30·0
29	37·8		38·6	51·0	*S*	69·0	66·0	60·8	67·3	53·0	46·5	32·1
30	*S*		41·8	52·0	71·9	66·7	70·5	63·3	61·5	*S*	41·5	28·5
31	42·0		43·0		65·3		*S*	65·7		54·0		25·6
Means .	40·1	38·8	44·2	57·4	63·3	70·3	73·1	68·4	63·9	55·6	45·1	36·2

WEEKLY MEANS of READINGS of THERMOMETERS.

1870. Period.	Thermometers sunk in the ground. Bulb 24 French Feet deep.	Bulb 12 French Feet deep.	Bulb 6 French Feet deep.	Bulb 3 French Feet deep.	Bulb 1 Inch deep.	Thermometer inclosed in the box which covers the scales of the deep-sunk Thermometers, and placed on a level with their scales.
d d	°	°	°	°	°	°
January 1 to January 7	52·66	50·13	46·45	42·69	44·6	46·6
8 to 14	52·47	49·55	46·60	43·23	40·9	41·4
15 to 21	52·28	49·14	46·29	42·86	40·2	37·9
22 to 28	52·08	48·79	45·83	41·08	35·8	34·4
29 to February 4	51·90	48·43	44·84	39·72	40·4	42·6
February 5 to 11	51·69	47·93	44·69	41·54	38·9	37·3
12 to 18	51·45	47·52	44·38	39·16	33·8	32·0
19 to 25	51·28	47·16	..	38·32	37·0	40·1
26 to March 4	51·10	46·72	..	40·81	46·1	50·5
March 5 to 11	50·86	46·33	44·17	41·89	41·4	42·9
12 to 18	50·66	46·20	44·20	41·33	42·8	45·4
19 to 25	50·44	46·12	44·52	42·77	42·9	43·8
26 to April 1	50·22	46·07	44·55	41·49	39·5	40·4
April 2 to 8	50·05	46·04	44·46	42·58	45·3	55·6
9 to 15	49·89	46·02	45·28	44·90	49·6	58·1
16 to 22	49·72	46·17	46·63	47·81	54·4	63·9
23 to 29	49·57	46·48	48·20	50·04	52·2	55·2
30 to May 6	49·43	46·99	48·92	48·75	48·4	52·0
May 7 to 13	49·33	47·45	49·01	49·09	52·4	58·1
14 to 20	49·29	47·83	49·72	51·21	58·6	69·3
21 to 27	49·25	48·21	51·23	55·00	60·8	69·0
28 to June 3	49·23	48·78	52·86	56·48	61·3	66·8
June 4 to 10	49·24	49·51	53·92	57·36	62·4	69·4
11 to 17	49·28	50·25	54·98	59·05	66·0	73·7
18 to 24	49·34	50·94	56·27	61·25	67·8	74·0
25 to July 1	49·43	51·67	57·27	60·59	62·1	65·9
July 2 to 8	49·61	52·48	58·21	60·50	64·7	72·2
9 to 15	49·72	53·11	59·00	62·71	67·8	73·7
16 to 22	49·90	53·60	59·23	63·27	69·3	76·9
23 to 29	50·08	54·14	60·24	65·13	67·6	71·7
30 to August 5	50·28	54·75	60·78	64·33	67·1	70·9
August 6 to 12	50·50	55·34	61·02	64·25	66·9	72·0
13 to 19	50·72	55·80	61·14	63·99	65·1	69·7
20 to 26	50·95	56·17	60·94	62·22	60·5	64·4
27 to September 2	51·21	56·45	60·21	60·38	58·7	64·6
September 3 to 9	51·43	56·53	59·57	59·80	60·6	63·6
10 to 16	51·67	56·54	59·13	58·58	57·0	61·7
17 to 23	51·89	56·44	58·43	57·86	58·0	63·4
24 to 30	52·09	56·35	57·99	57·53	58·0	65·8
October 1 to October 7	52·27	56·14	57·73	57·52	56·6	59·8
8 to 14	52·42	56·00	57·34	55·87	53·6	55·6
15 to 21	52·56	55·84	56·35	54·18	51·2	55·0
22 to 28	52·67	55·53	55·40	52·89	50·2	52·4
29 to November 4	52·75	55·15	54·42	51·54	47·7	48·8
November 5 to 11	52·82	54·70	53·43	49·57	44·1	43·1
12 to 18	52·86	54·18	52·09	46·96	40·6	41·0
19 to 25	52·89	53·60	50·62	46·11	46·6	49·6
26 to December 2	52·87	52·86	50·23	47·09	43·9	42·9
December 3 to 9	52·82	52·27	49·55	44·41	37·2	34·7
10 to 16	52·79	51·69	47·71	43·15	43·5	46·0
17 to 23	52·69	50·87	47·54	44·13	39·6	36·6
24 to 31	52·53	50·36	46·92	40·76	32·4	28·9

ABSTRACT OF THE CHANGES OF THE DIRECTION OF THE WIND, AS DERIVED FROM OSLER'S ANEMOMETER.

By *direct* motion, in the following statements, is meant that the change of the direction of the wind was in the order N., E., S., W., N., &c.; by *retrograde* is meant in the order N., W., S., E., N., &c.

1869. Dec. 31^{d}. 12^{h}. The direction of the wind was S.
1870. Jan. 31. 12. ,, ,, S.S.W., which implies a direct motion of 382½°.
On Jan. 15. 21. 30^{m}, 16^{d}. 22^{h}, 26^{d}. 22^{h}, 28^{d}. 8^{h}. 45^{m}, the trace was shifted to the next set of lines upwards, implying retrograde motion of 1440°.
Therefore the whole excess of retrogade motion in the month of January was 1057½°.

1870. Jan. 31^{d}. 12^{h}. The direction of the wind was S.S.W.
Feb. 28. 12. ,, ,, S., which implies a retrograde motion of 382½°.
On Feb. 2. 22, the trace was shifted to the next set of lines downwards; on Feb. 9^{d}. 21^{h}, 13^{d}. 9^{h}. 15^{m}, the trace was shifted to the next set of lines upwards, implying direct motion of 360°, and retrograde motion of 720°.
Therefore the whole excess of retrograde motion in the month of February was 742½°

1870. Feb. 28^{d}. 12^{h}. The direction of the wind was S.
March 31. 12. ,, ,, E., which implies a direct motion of 270°.
On March 2. 22, 4^{d}. 2^{h}. 45^{m}, 12^{d}. 22^{h}, 25^{d}. 9^{h}. 15^{m}, 31^{d}. 2^{h}. 45^{m}, the trace was shifted to the next set of lines upwards; on March 3^{d}. 3^{h}, 19^{d}. 22^{h}, the trace was shifted to the next set of lines downwards, implying retrograde motion of 1800°, and direct motion of 720°.
Therefore the whole excess of retrograde motion in the month of March was 810°.

1870. March 31^{d}. 12^{h}. The direction of the wind was E.
April 30. 12. ,, ,, W.S.W., which implies a retrograde motion of 202½°.
On April 18. 2. 45^{m}, the trace was shifted to the second set of lines downwards; and on April 1^{d}. 22^{h}, 6^{d}. 22^{h}, 27^{d}. 20^{h}. 45^{m}, to the next set of lines downwards; on April 1^{d}. 2^{h}. 45^{m}, 2^{d}. 8^{h}. 45^{m}, 7^{d}. 2^{h}. 45^{m}, 11^{d}. 2^{h}. 45^{m}, 16^{d}. 9^{h}. 30^{m}, to the next set of lines upwards, implying direct motion of 1800°, and retrograde motion of 1800°.
Therefore the whole excess of retrograde motion in the month of April was 202½°.

1870. April 30^{d}. 12^{h}. The direction of the wind was W.S.W.
May 31. 12. " " W.S.W., which implies no change.
On May 4. 21. 30^{m}, 14^{d}. 23^{h}. 45^{m}, 23^{d}. 0^{h}. 10^{m}, 27^{d}. 23^{h}. 45^{m}, 28^{d}. 22^{h}, the trace was shifted to the next set of lines downwards; on May 9^{d}. 9^{h}. 15^{m}, 15^{d}. 21^{h}. 15^{m}, 22^{d}. 9^{h}. 15^{m}, 23^{d}. 2^{h}. 45^{m}, 29^{d}. 23^{h}. 45^{m}, the trace was shifted to the next set of lines upwards, implying direct motion of 1800°, and retrograde motion of 1800°.
Therefore there was no change in the month of May.

1870. May 31^{d}. 12^{h}. The direction of the wind was W.S.W.
June 30. 12. " " W., which implies a direct motion of 22½°.
On June 28. 8. 45^{m}, the trace was shifted to the second set of lines upwards; and on June 6^{d}. 22^{h}, 14^{d}. 22^{h}, 16^{d}. 2^{h}. 45^{m}, 16^{d}. 8^{h}. 30^{m}, to the next set of lines upwards; on June 3^{d}. 22^{h}, 8^{d}. 8^{h}. 45^{m}, 14^{d}. 8^{h}. 45^{m}, 16^{d}. 20^{h}. 45^{m}, 20^{d}. 8^{h}. 45^{m}, 21^{d}. 2^{h}. 45^{m}, 22^{d}. 2^{h}. 45^{m}, 22^{d}. 8^{h}. 45^{m}, 23^{d}. 22^{h}, the trace was shifted to the next set of lines downwards, implying retrograde motion of 2160°, and direct motion of 3240°.
Therefore the whole excess of direct motion in the month of June was 1102½°.

1870. June 30. 12. The direction of the wind was W.
July 31. 12. " " N.E., which implies a direct motion of 135°.
On July 7. 2. 45^{m}, 9^{d}. 2^{h}. 45^{m}, 11^{d}. 20^{h}. 45^{m}, 21^{d}. 22^{h}, 24^{d}. 8^{h}. 0^{m}, 25^{d}. 22^{h}, 29^{d}. 8^{h}. 45^{m}, the trace was shifted to the next set of lines downwards; on July 21^{d}. 23^{h}. 45^{m}, the trace was shifted to the second set of lines upwards; and on July 7^{d}. 20^{h}. 45^{m}, 8^{d}. 0^{h}. 20^{m}, 8^{d}. 9^{h}. 30^{m}, 8^{d}. 22^{h}, 24^{d}. 22^{h}, 27^{d}. 8^{h}. 45^{m}, to the next set of lines upwards, implying direct motion of 2520°, and retrograde motion of 2880°.
Therefore the whole excess of retrograde motion in the month of July was 225°.

1870. July $31^d. 12^h$. The direction of the wind was N.E.

Aug. 31. 12. ,, ,, S.S.W., which implies a retrograde motion of $202\frac{1}{2}°$.

On Aug. 3. 20. 45^m, $6^d. 2^h. 45^m$, $7^d. 22^h$, $8^d. 8^h. 45^m$, the trace was shifted to the next set of lines upwards; on Aug. $14^d. 9^h. 45^m$, $17^d. 21^h$, $21^d. 21^h. 30^m$, $25^d. 2^h. 45^m$, the trace was shifted to the next set of lines downwards, implying retrograde motion of 1440°, and direct motion of 1440°.

Therefore the whole excess of retrograde motion in the month of August was $202\frac{1}{2}°$.

1870. Aug. 31^d. 12. The direction of the wind was S.S.W.

Sept. 30. 12. ,, ,, E.N.E., which implies a direct motion of 225°.

On Sept. 23. 8. 45^m, $29^d. 0^h$, the trace was shifted to the second set of lines upwards; and on Sept. $18^d. 22^h$, $19^d. 22^h$, $20^d. 0^h$, $20^d. 2^h. 45^m$, $22^d. 22^h$, to the next set of lines upwards; on Sept. $16^d. 21^h$, $17^d. 23^h. 30^m$, $20^d. 8^h. 30^m$, $29^d. 8^h. 45^m$, to the next set of lines downwards, implying retrograde motion of 3240°, and direct motion of 1440°.

Therefore the whole excess of retrograde motion in the month of September was 1575°.

1870. Sept. $30^d. 12^h$. The direction of the wind was E.N.E.

Oct. 31. 12. ,, ,, N., which implies a retrograde motion of $67\frac{1}{2}°$.

On Oct. 11. 22, the trace was shifted to the next set of lines upwards; on Oct. $14^d. 9^h. 15^m$, $14^d. 20^h. 45^m$, the trace was shifted to the next set of lines downwards, implying retrograde motion of 360°, and direct motion of 720°.

Therefore the whole excess of direct motion in the month of October was $292\frac{1}{2}°$.

1870. Oct. $31^d. 12^h$. The direction of the wind was N.

Nov. 30. 12. ,, ,, S.E., which implies a direct motion of 135°.

On Nov. 2. 22, $5^d. 22^h$, $9^d. 0^h$, the trace was shifted to the next set of lines downwards; on Nov. $5^d. 23^h. 45^m$, $7^d. 21^h$, $27^d. 20^h. 30^m$, the trace was shifted to the next set of lines upwards, implying direct motion of 1080°, and retrograde motion of 1080°.

Therefore the whole excess of direct motion in the month of November was 135°.

1870. Nov. $30^d. 12^h$. The direction of the wind was S.E.

Dec. 31. 12. ,, ,, E.N.E., which implies a retrograde motion of $67\frac{1}{2}°$.

On Dec. 9. 22, $15^d. 20^h. 45^m$, the trace was shifted to the next set of lines upwards; on Dec. $2^d. 0^h. 20^m$, $12^d. 22^h$, the trace was shifted to the next set of lines downwards, implying retrograde motion of 720°, and direct motion of 720°.

Therefore the whole excess of retrograde motion in the month of December was $67\frac{1}{2}°$.

The whole excess of retrograde motion to the end of the year was $3352\frac{1}{2}°$.

The revolution-counter which is attached to the vertical spindle of the vane, whose readings increase with change of direction of the wind in the order N., E., S., W., &c., or in *direct* motion, and decrease with change of direction in the order N., W., S., E., &c., or in *retrograde* motion, gave the following readings:—

	revs.
On 1869, December $31^d. 12^h$	108·25
On 1870, December $31^d. 12^h$	98·90

Implying an excess of retrograde motion, during the year, of 9·35 revolutions, or 3366°.

AMOUNT OF RAIN COLLECTED IN EACH MONTH OF THE YEAR 1870.

1870, MONTH.	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 Library.	On the Roof of the Photographic Thermometer Shed.	Crosley's.	Cylinder partly sunk in the Ground read daily.	Cylinder partly sunk in the Ground read Monthly.
	in.	in.	in.	in.	in.	in.	in.	in.
January	0·83	0·83	1·23	1·00	1·36	1·37	1·49	1·58
February	0·17	0·27	0·32	0·31	0·38	0·47	0·54	0·60
March	1·00	1·10	1·33	1·63	1·95	1·98	2·05	2·15
April	0·10	0·09	0·24	0·24	0·30	0·32	0·28	0·24
May	0·25	0·21	0·30	0·21	0·44	0·48	0·47	0·37
June	0·28	0·24	0·32	0·35	0·38	0·42	0·39	0·23
July	1·62	1·68	1·88	1·90	2·04	1·97	2·01	1·93
August	1·40	1·40	1·72	1·56	1·99	1·78	2·02	2·00
September	1·20	1·19	1·49	1·34	1·60	1·35	1·63	1·70
October	1·88	1·90	2·63	2·15	3·13	2·88	3·34	3·40
November	0·63	0·55	0·96	0·75	1·14	0·97	1·20	1·30
December	2·01	2·14	2·65	2·74	3·01	2·29	3·13	3·00
Sums	11·37	11·60	15·07	14·18	17·72	16·27	18·55	18·50

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	2½	38	4½
Gauge on the Roof of the Library	177	2	22	4
Gauge on the Roof of the Photographic Thermometer Shed	164	10	10	0
Crosley's Gauge	156	6	1	8
The Two Cylinder Gauges partly sunk in the Ground	155	3	0	5

ROYAL OBSERVATORY, GREENWICH.

OBSERVATIONS

OF

LUMINOUS METEORS.

1870.

Month and Day, 1870.		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						°	
January	25	6. 59. 55	M.	1	Bluish-white	1·3	None	15	1
	30	8. 10. 15	M.	2	Bluish-white	1·5	Train	20	2
February	1	6. 28. 3	M.	3	Bluish-white	0·3	Train	15	3
	15	9. 30. 0	N.	Jupiter × 2	Pale yellow	2	None	15	4
	24	7. 46. 50	W., M.	Jupiter	Reddish	2·5	Train, sparks	30	5
April	5	10. 31. 0	N., M.	1	Bluish-white	1	None	12	6
	6	8. 23. 50	M.	1	Bluish-white	1	Slight	20	7
	7	10. 0. 45	M., W.B.	1	Bluish-white	0·7	Slight	10	8
	19	9. 25. 15	M.	2	Bluish-white	0·5	Slight	10	9
	21	10. 14. 0	W.	1	Yellowish	1	Fine	30	10
	"	10. 20. 0	W.	2	Bluish-white	0·5	None	15	11
	22	9. 25. 40	M., B.	2	Bluish-white	0·5	None	7	12
May	18	10. 13. 8	N.	4	Bluish-white	Very rapid	None	10	13
	"	10. 43. 40	M.	2	Bluish-white	0·5	None	15	14
	"	10. 47. 19	N., B.	2	White	Flash	. . .	2	15
	"	10. 51. 30	N.	1	White	. . .	. . .	5	16
	"	10. 55. 29	W.	2	Bluish-white	0·5	Slight	15	17
	"	10. 58. 3	N.	3	Bluish-white	. . .	None	4	18
	"	11. 4. 30	N.,W.,M.,B.	Jupiter	Yellowish	1·5	Fine	15	19
	19	10. 1. 50	M.	1	Bluish-white	0·7	Slight	15	20
	20	9. 54. 5	W.	3	Bluish-white	0·5	None	5	21
	"	10. 8. 15	W.	3	Bluish-white	0·5	None	3	22
	"	10. 10. 30	W.	3	Bluish-white	1	None	5	23
	"	10. 55. 10	W.,M.,B.	1	Bluish-white	1·5	Slight	. .	24
	"	12. 31. 30	M.	1	Bluish-white	0·7	Slight	15	25
	24	10. 23. 0	S.	> Jupiter	Bluish	1	Slight	10	26
June	6	9. 55. 0	M.	2	Yellowish-white	0·5	None	7	27
	21	10. 51. 10	M.	1·5	Bluish-white	0·7	Train	15	28
	"	11. 12. 0	M.	3	Bluish-white	0·3	None	3	29
July	27	10. 36. 30	M.	2	Bluish-white	0·5	Slight	12	30
August	6	9. 21. 37	N.	> 1	Bluish-white	1	. . .	17	31
	"	9. 25. 45	W.	1	Yellowish	1·5	Slight	5	32
	"	10. 48. 2	S.	2	Bluish-white	0·3	Slight	. .	33
	"	11. 2. 0	S.	1	Bluish-white	0·7	None	. .	34
	"	11. 3. 0	B.	> Jupiter	Reddish	. . .	Reddish	15	35
	"	11. 11. 28	S.	2	Bluish	1	None	. .	36
	"	11. 19. 0	B.	> 1	White	. . .	Slight	15	37
	"	11. 20. 43	S.	3	Bluish-white	0·3	Slight	. .	38
	"	11. 25. 25	S.	4	. . .	0·6	None	. .	39
	"	11. 27. 8	S.	1	Bluish-white	1·5	Fine, reddish 2s.	. .	40
	"	11. 29. 0	B.	1	White	. . .	None	13	41
	"	11. 30. 0	B.	2	Bluish	0·5	None	18	42
	"	11. 35. 7	S.	2	Bluish	0·3	None	7	43
	"	11. 36. 0	B.	2	White	. . .	None	10	44
	"	11. 41. 58	S.	1	Bluish	0·5	Slight	. .	45
	"	11. 54. 18	S.	2	Bluish-white	. . .	Fine, 2s.	. .	46
	"	11. 55. 0	B.	2	White	Short	None	10	47
	"	11. 58. 14	S.	3	Bluish-white	0·5	None	. .	48
	"	12. 3. 10	S.	> 1	Bluish	0·7	Slight	. .	49
	8	10. 2. 27	W.	1	Bluish-white	1·5	Fine	15	50
	"	10. 10. 6	N.	> 1	Bluish-white	1·5	Train	. .	51
	"	11. 3. 0	B.	1	White	. . .	Train	. .	52
	9	9. 24. 0	M., B.	Jupiter	Bluish-white	1·0	Train	. .	53
	"	9. 51. 30	M.	2	Bluish-white	0·5	None	7	54
	"	9. 59. 43	N.	2	White	0·5	None	4	55

No. for Reference.	Path of Meteor through the Stars.
1	From a point nearly midway between α Cephei and α Lyræ at an inclination of 45°.
2	From q Orionis to f Tauri.
3	From the Pleiades disappeared about 5° below Jupiter.
4	Fell almost perpendicularly in the S. No stars near. Moon about 25° above and somewhat to the left of point of appearance of Meteor.
5	From a point near l Orionis, passed close to κ Orionis, and burst midway between α and β Canis Majoris.
6	From direction of p Lyncis disappeared close to Procyon.
7	From direction of β Cephei passed close below Cassiopeia, and disappeared a little below β Pegasi.
8	From α Leonis disappeared about 7° below Procyon.
9	From direction of Polaris to ι Aurigæ.
10	From a point about 5° to the left of β Geminorum passed nearly across β Canis Minoris.
11	From the direction of Polaris passed midway between α Aurigæ and α Geminorum.
12	From a point near L Camelopardali disappeared close to β Aurigæ.
13	Passed between ϵ and δ Virginis from direction of ζ Boötis.
14	From η Virginis disappeared a little below α Virginis.
15	Directed from γ Coronæ Borealis disappeared near ξ Boötis.
16	In West moving horizontally from N. to S. at altitude 20°. Below, and to the left of α Leonis.
17	From direction of γ Draconis towards α Coronæ Borealis.
18	Passed close to β Cephei from direction of θ Cephei.
19	From a point near η Boötis fell slowly to τ Virginis.
20	From α Boötis to a point midway between α and κ Virginis.
21	From direction of Polaris passed towards a point 10° W. of β Aurigæ.
22	From direction of Polaris towards α Aurigæ.
23	From direction of Polaris passed about 1° to the left of θ Geminorum.
24	From direction of κ Ursæ Majoris fell towards α Geminorum.
25	From direction of Polaris fell perpendicularly towards N. horizon.
26	From the direction of α Coronæ, fell at right angles to a line joining α Lyræ and Arcturus.
27	From a point between α and β Aurigæ fell vertically towards horizon.
28	From direction of β Ophiuchi burst near α Cephei.
29	From ζ Cephei to o Cygni.
30	From direction of α Cassiopeiæ to a little below β Ursæ Majoris.
31	Fell at inclination of 7° from perpendicular, from near γ Andromedæ.
32	Fell from δ Andromedæ to the horizon at an angle of 45° to the left.
33	From a point a few degrees below α Cephei passed close to a Lyræ.
34	From a point about 20° below α Lyræ fell vertically towards α Aquarii.
35	From a point a few degrees below α Pegasi fell vertically.
36	From a point about 15° North of α Persei shot in the direction of o Ursæ Majoris.
37	From a point about 12° below α Pegasi fell at an angle of 30° to the left towards the horizon.
38	From β Cephei disappeared between o and κ Honorum.
39	From a point close before α Pegasi to β Cephei.
40	From a point about 5° N. of α Persei disappeared about 10° in front of γ Cephei.
41	From ζ Cassiopeiæ to a point about 5° to right of α Cassiopeiæ.
42	From a point about 5° below δ Persei shot upwards at an inclination of 85° (left of vertical).
43	From θ Cassiopeiæ to κ Honorum.
44	From a point about 5° below δ Cassiopeiæ moved nearly parallel to δ and α Cassiopeiæ.
45	From β Cassiopeiæ to ζ Draconis.
46	From κ Persei shot to a point between γ and β Andromedæ.
47	From a point a little above γ Andromedæ moved in the direction of α Andromedæ.
48	From a point a few degrees below β Cephei passed midway between ϵ and δ Cassiopeiæ.
49	From κ Persei across α Ursæ Majoris.
50	From direction of β Cassiopeiæ towards Polaris.
51	Center of path below and opposite β Ursæ Majoris; moving from direction of α Draconis.
52	From a point about 10° above α Persei fell towards horizon at angle of 25° to left.
53	From direction of α Pegasi passed across α Andromedæ towards β Andromedæ.
54	From a point a few degrees to left of γ Persei towards α Aurigæ.
55	Passed across ϵ Cygni from direction of β Cygni.

Month and Day, 1870.	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						°	
August 9	10. 5. 56	N., M., B.	Venus	Yellow	> 1	Train	30	1
„	10. 21. 11	N.	3	Bluish-white	0·5	None	5	2
„	10. 49. 7	N., B.	1	White	0·4	None	5	3
„	11. 15. 41	B.	1	White	. . .	. . .	. .	4
„	11. 17. 31	N., S., M., B.	Jupiter	Yellowish-white	1	Train	12	5
„	11. 23. 38	N., M., B.	2	Bluish-white	0·5	None	5	6
„	11. 47. 48	S.	1	Bluish-white	0·3	Slight	10	7
„	11. 53. 48	N., S., M.	> 1	White	0·8	Train	5	8
„	12. 1. 2	N., S.	> 1	Bluish-white	0·8	Train	8	9
„	12. 39. 30	M.	1	Yellowish	0·7	Train	20	10
10	9. 28. 25	M., B., W. B.	2	Bluish-white	0·7	Train	7	11
„	9. 28. 58	B.	3	Bluish-white	. . .	. . .	3	12
„	9. 35. 45	M., W. B., B.	2	Bluish-white	0·7	Train	25	13
„	9. 44. 3	M., W. B., B.	2	Bluish-white	1	Train	15	14
„	9. 57. 0	M.	1	Bluish-white	1	Fine	. .	15
„	9. 59. 15	B.	. . .	White	. . .	. . .	5	16
„	10. 1. 10	M., W. B.	1	White	1	Train	. .	17
„	10. 1. 13	M., W. B., B.	Jupiter	Greenish-white	1·5	Fine	20	18
„	10. 18. 43	M., S.	1	Bluish-white	0·7	Train	15	19
„	10. 20. 28	W. B.	. . .	Bluish	0·5	Slight	. .	20
„	10. 25. 25	B.	3	White	. . .	. . .	. .	21
„	10. 26. 27	M.	2	Bluish-white	0·5	Train	. .	22
„	10. 27. 27	N.	> Jupiter	Pale yellow	1·3	Train	15	23
„	10. 28. 55	M., W. B.	1	White	0·7	Train	10	24
„	10. 29. 2	N.	> 1	White	0·7	Train	10	25
„	10. 33. 2	N.	< Jupiter	Yellowish	0·5	Train	10	26
„	10. 33. 10	M., B.	1	Bluish-white	1	Train	15	27
„	10. 45. 2	B.	3	White	. . .	. . .	. .	28
„	10. 49. 45	W. B., B.	Jupiter	Yellowish	1·2	Fine	30	29
„	10. 55. 19	M., B.	2	Bluish-white	0·7	Slight	7	30
„	10. 56. 45	W.	2	Bluish-white	0·5	None	6	31
„	10. 59. 54	W., S., B.	1	Bluish-white	0·7	Slight	12	32
„	11. 1. 40	W., M., B.	2	Bluish-white	0·7	Train	10	33
„	11. 5. 13	W.	2	Bluish-white	0·5	Slight	. .	34
„	11. 6. 5	M., W. B., B.	2	Bluish-white	0·5	Train	7	35
„	11. 40. 51	N., M.	2	Bluish-white	0·7	Slight	4	36
„	11. 41. 52	M., S.	3	Bluish-white	0·5	None	5	37
„	11. 44. 21	N.	> 1	Bluish-white	0·6	. . .	. .	38
„	11. 54. 41	W., B.	1	Bluish-white	0·7	Train	7	39
„	12. 3. 32	N., W. B.	Very large	. . .	. . .	. . .	Short	40
„	12. 54. 3	W., B.	2	Bluish-white	1	Slight	10	41
„	13. 3. 6	W.	3	Bluish-white	0·5	None	. .	42
„	13. 6. 16	B.	1	. . .	0·8	Yellowish	15	43
„	13. 8. 48	W., M.	1	Bluish-white	1	Fine	8	44
„	13. 22. 53	M.	1	. . .	0·7	Train	10	45
„	13. 25. 42	M.	> 1	Yellowish	1·3	Train	10	46
11	8. 55. 58	M.	1	Yellowish	1·3	Train	15	47
„	9. 0. 18	M.	1	White	1	Train	15	48
„	9. 0. 36	M.	Venus	Bluish-white	1·5	Fine	25	49
„	9. 36. 32	M.	3	Bluish-white	0·5	. . .	5	50
„	10. 6. 18	W.	1	Bluish-white	1·5	Fine	15	51
„	10. 13. 45	W., M., W. B., B.	1	Yellowish	1·5	Fine	15	52
„	10. 16. 50	M.	2	Bluish-white	0·5	Slight	7	53
„	10. 37. 50	W., M.	2	Bluish-white	0·5	None	8	54
„	10. 38. 58	M., W. B.	1	White	1	Train	15	55
„	10. 39. 20	B.	. . .	Yellowish	1·5	Fine	20	56
„	10. 46. 14	W., M., W. B.	1	Yellowish	1	Train	. .	57
„	10. 52. 17	W., M., B.	1	Bluish-white	1	Slight	10	58
„	11. 4. 18	W., M., B.	1	Bluish-white	1·5	Fine	. .	59
„	11. 6. 10	B.	2	Bluish-white	0·6	Slight	10	60
„	11. 9. 15	W.	2	Bluish-white	0·5	None	10	61

No. for Reference.	Path of Meteor through the Stars.
1	From α Pegasi towards Capricornus (Moon's light too bright for definite observation of point of disappearance).
2	Passed across γ Draconis from direction of β Cephei.
3	From direction of β Pegasi moved above α Andromedæ towards γ Andromedæ.
4	From between α and β Cassiopeiæ towards ψ Cephei.
5	From η Pegasi disappeared near o Honorum.
6	Path parallel to β, γ, and δ Cassiopeiæ, but 15° to right, same altitude.
7	From a point 1° left of α Persei fell vertically.
8	From about 2° above ε Cassiopeiæ moved on a path to N.E. parallel to line joining ε and δ Cassiopeiæ.
9	From direction of Polaris passed between Capella and α Persei.
10	From M Camelopardali towards θ Boötis.
11	From a point about 3° below ε Cassiopeiæ passed towards φ Andromedæ.
12	From a point a few degrees below δ Cassiopeiæ towards ζ Cassiopeiæ.
13	From θ Cassiopeiæ to a point midway between α Andromedæ and β Pegasi.
14	From κ Honorum passed in direction of φ Pegasi.
15	From a point a few degrees below ε Cassiopeiæ towards a point about 12° below Polaris.
16	From a few degrees below γ Cephei to a few degrees above Polaris.
17	From a point a few degrees to the right of Polaris passed across that star, and disappeared near ε Ursæ Majoris.
18	From a point about 10° below Polaris passed between δ and ε Ursæ Majoris.
19	From a point 5° to the left of γ Persei fell in the direction of Capella.
20	From a point 1° right of α Cassiopeiæ, directed from γ Cassiopeiæ.
21	From near χ Persei to θ Andromedæ.
22	From φ Andromedæ towards β Andromedæ.
23	From direction of γ Cassiopeiæ passed midway between α and β Andromedæ.
24	From a point about 12° below Polaris disappeared 2° below α Ursæ Majoris.
25	Passed across α Ursæ Majoris, and between β and γ Ursæ Majoris.
26	Directed from β Andromedæ, center of path opposite α Andromedæ (20° below). Path a continuation of line joining δ Cassiopeiæ [and β Andromedæ.
27	From γ Cassiopeiæ passed between α Cygni and α Cephei.
28	From χ Persei towards o Cassiopeiæ.
29	From α Persei to about 10° below Polaris.
30	From δ Cassiopeiæ passed over γ Cassiopeiæ.
31	From the direction of α Cassiopeiæ passed close above β Andromedæ.
32	From direction of γ Cephei towards Polaris.
33	From α Cassiopeiæ passed through Honores towards η Pegasi.
34	From the direction of a point a little above β Andromedæ to a point about 20° below γ Pegasi.
35	From γ Cassiopeiæ passed a little above α Cassiopeiæ.
36	From direction of Cassiopeia passed to Polaris.
37	From direction of α Cassiopeiæ passed a little below β Ursæ Minoris.
38	From direction of β Andromedæ (at altitude 30° in S.E.) fell at inclination 45°.
39	From direction of Cassiopeia passed near β Andromedæ.
40	A brilliant flash from the bursting of a meteor (like lightning) above the moon and to the right. Sky cloudy.
41	From direction of β Arietis shot towards horizon at an angle of about 45°.
42	From direction of β Persei, passed about 10° above ρ Persei.
43	From near δ Cephei to α Lyræ.
44	From direction of γ Persei to a point a little to the right of Capella.
45	From D Ursæ Majoris towards ζ Ursæ Majoris.
46	From direction of δ Ursæ Majoris towards η Ursæ Majoris.
47	From the direction of ε Cassiopeiæ to midway between α Coronæ and β Herculis.
48	From a point 7° below Polaris passed close to γ Ursæ Majoris.
49	From a point 3° to the right of Polaris to near α Herculis.
50	From β Cassiopeiæ towards f Custodis.
51	From direction of η Ursæ Majoris to a point about 5° below η Boötis.
52	From ε Cassiopeiæ towards β Pegasi.
53	From γ Persei in direction of b Lyncis.
54	From δ Cassiopeiæ to a little above α Andromedæ.
55	From η Persei passed near to π Ursæ Majoris.
56	From near β Ursæ Minoris towards α Ophiuchi.
57	From direction of θ Cassiopeiæ to a point about 2° above β Andromedæ.
58	Fell from ζ Draconis towards ι Draconis.
59	From direction of δ Cassiopeiæ to a point a little to the right of ε Pegasi.
60	From a few degrees to the right of η Draconis moved a few degrees to the right.
61	From direction of β Draconis shot towards π Herculis.

Month and Day, 1870.		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						°	
August	11	11. 14. 22	W.,M.,W.B.	2	Yellowish	0·7	Slight	12	1
	„	11. 22. 24	W.	1	Yellowish	0·5	Train	7	2
	„	11. 29. 22	W., B.	3	Bluish-white	0·5	None	5	3
	„	11. 30. 5	W.B.	2	White	. . .	Train	..	4
	„	11. 38. 26	W.,M.,B.	1	Yellowish	0·7	Fine	7	5
	„	11. 41. 35	M.	2	Bluish-white	0·5	Train	10	6
	„	11. 45. 0	B.	2	Bluish	. . .	Train	12	7
	„	11. 46. 35	B.	1	Yellowish	1·2	Fine	15	8
	12	9. 24. 34	B.	1	Yellow	1·2	Fine	20	9
	„	10. 31. 58	N.	1	White	0·5	None	5 or 6	10
	15	8. 55. 3	N.	1	White	0·7	None	10	11
	„	10. 41. 59	N.,W.,B.	> 1	Bluish-white	1·5	Fine	15	12
	„	10. 44. 25	W.	2	Bluish-white	0·5	None	6	13
	19	10. 15. 0	N.	1	Bluish-white	0·8	None	12	14
	20	9. 23. 14	B.	> Jupiter	Violet	1·5	Long	30	15
	29	10. 2. 0	N.	1	Bluish-white	0·5	Train	5	16
September	1	9. 7. 46	W.	1	Bluish-white	1	Slight	15	17
	4	8. 38. 0	N.	1	White	1	None	15	18
	„	8. 45. 0	N.	> 1	White	1·5	Train	20	19
	9	8. 27. 50	M.	1	Bluish-white	1·5	Train	15	20
	19	8. 31. 6	W.	Jupiter	Yellowish	2	Fine	30	21
	„	8. 39. 0	W.	3	Bluish-white	1	None	7	22
	„	10. 49. 5	M.	1	Bluish-white	0·7	Train	15	23
	21	10. 1. 0	W.	3	Bluish-white	0·5	None	5	24
	22	9. 33. 45	M.	2	Bluish-white	0·5	Slight	7	25
	23	7. 32. 0	W.	3	Bluish-white	0·5	None	20	26
	„	8. 59. 58	W.	3	Yellowish	1	None	Short.	27
	24	8. 0. 40	M.	3	Bluish-white	0·5	None	5	28
	„	8. 47. 15	M.	2	Bluish-white	2·3	Train	20	29
	„	8. 53. 0	N., W.	> 1	White	0·8	None	..	30
	„	9. 0. 0	N., W.	2	Bluish-white	0·5	None	5	31
	„	9. 22. 30	M.	3	Bluish-white	0·5	Slight	7	32
	„	10. 16. 5	M.	3	Bluish-white	0·5	None	7	33
	„	10. 44. 35	M.	1	Bluish-white	0·7	Slight	15	34
	25	8. 54. 0	W.	3	Bluish-white	0·5	None	..	35
	26	7. 45. 0	W.,M.,B.	2	Bluish-white	0·7	Slight	15	36
	„	8. 50. 0	M.	1	Bluish-white	1·5	Train	10	37
	„	10. 0. 30	M.	2	Bluish-white	0·5	None	7	38
	28	9. 51. 45	M.	1	Whitish	1·5	Fine	10	39
October	2	8. 9. 30	M.	1	Bluish-white	1·5	Train	15	40
	14	10. 21. 20	M., B.	1	Bluish-white	0·7	Slight	13	41
	„	11. 20. 15	M.	2	Bluish-white	0·7	Slight	40	42
	„	11. 21. 10	M.	2	Bluish-white	0·7	. . .	10	43
	„	11. 27. 55	W., M.	2	Bluish-white	0·5	Train	13	44
	„	12. 43. 43	W.,M.,B.	1	Bluish-white	3	Train	25	45
	16	8. 28. 12	M.	> 1	Bluish-white	4·5	Slight	7	46
	„	9. 26. 5	M.	1	Bluish-white	1·7	Train	15	47
	19	6. 42. 0	M.	2	Bluish-white	0·7	None	15	48
	22	9. 52. 0	M.	> 1	Yellowish	0·7	Train	12	49
	24	11. 8. 0	M.	2	Bluish-white	0·7	Train	15	50
	„	11. 9. 0	N.	> 1	Bluish-white	1	Train	..	51
	„	11. 23. 20	M.	2	Bluish-white	1	Train	12	52
	„	11. 26. 0	N.	1	White	0·5	Train	6	53
	„	11. 50. 0	M.	1	Bluish-white	1	Train	7	54
	„	12. 7. 30	M.	1	Bluish-white	1·3	Fine	15	55
	„	13. 22. 0	N.	1	White	0·6	None	18	56
	25	7. 42. 20	M.	2	Bluish-white	0·7	Train	5	57
	„	9. 55. 45	M.	2	Bluish-white	1	Train	12	58
	31	8. 7. 0	N.	Jupiter	Bluish-white	0·5	. . .	..	59

No. for Reference.	Path of Meteor through the Stars.
1	From direction of β Cassiopeiæ shot towards *f* Custodis.
2	Low down on N. horizon vertically below Polaris.
3	Passed about 3° below γ Cephei, at right angles to line joining that star and Polaris, towards ϵ Cassiopeiæ.
4	From a little below γ Andromedæ passed to a point about 7° to the right of that star.
5	Passed about 3° below ϵ Cassiopeiæ towards α Cephei.
6	From direction of α Persei to *b* Lyncis.
7	From direction of α Cassiopeiæ towards β Pegasi.
8	From direction of δ Draconis towards α Lyræ.
9	From direction of λ Draconis fell between δ and ϵ Ursæ Majoris.
10	From θ Persei to κ Persei.
11	Fell nearly perpendicularly from direction of α Coronæ Borealis midway between Arcturus and α Serpentis.
12	Passed across ζ Ursæ Majoris from direction of κ Draconis.
13	Directed from 12 Canum Venaticorum towards η Boötis.
14	Passed across α Ursæ Majoris from direction of γ Cassiopeiæ.
15	From near Polaris in direction of α Persei.
16	Passed midway between β and γ Andromedæ moving towards α Arietis.
17	From the direction of ι Honorum fell about 1° to the right of δ Andromedæ.
18	Passed nearly perpendicularly across α Pegasi, disappearing a few degrees below that star. Path parallel to line joining β and γ Pegasi.
19	Fell from a point midway between Polaris and Cassiopeia towards o Ursæ Majoris.
20	From η Pegasi fell a few degrees below α Aquilæ.
21	From a point midway between δ and γ Equulei to a point about 2° right of α Equulei.
22	Passed midway between α and γ Aquilæ towards δ Aquilæ.
23	From direction of β Andromedæ towards γ Cygni.
24	Passed from left to right, parallel to a line joining λ and *i* Aquilæ and about 5° below those stars.
25	From a point between ρ Cassiopeiæ and φ Andromedæ to δ Cassiopeiæ.
26	Directed from α Delphini towards λ Delphini.
27	From σ Ursæ Majoris towards α Ursæ Majoris.
28	From δ Aquilæ to θ Aquilæ.
29	From a point about 3° below Polaris in direction of β Persei.
30	From the direction of Capella passed about 4° above β Aurigæ.
31	Directed from γ Ursæ Majoris passed about 3° above 12 Canum Venaticorum.
32	From β Ursæ Minoris across ι Draconis.
33	From a point about 6° below Polaris to α Ursæ Majoris.
34	From γ Pegasi fell nearly vertically.
35	From *c* Persei towards *c* Muscæ.
36	From direction of α Persei to *b* Lyncis.
37	From α Boötis fell towards the left at an angle of 40°.
38	From *b* Lyncis to π Ursæ Majoris.
39	From ζ Draconis fell to the left towards horizon at an inclination of 15°.
40	From β Cephei to κ Draconis.
41	From direction of α Cygni fell vertically towards horizon.
42	From a few degrees above ζ Ursæ Majoris fell towards the left at an inclination of 40°.
43	From ϵ Ursæ Majoris fell to the left at an inclination of 60°.
44	From α Draconis fell a little below Lyra.
45	From direction of δ Ursæ Minoris towards α Ursæ Majoris.
46	From ζ Draconis towards α Draconis.
47	From a point between η and ζ Draconis in direction of *h* Ursæ Majoris.
48	From η Ursæ Majoris towards a point about 10° below Arcturus.
49	From direction of γ Andromedæ passed nearly midway between α Arietis and γ Pegasi.
50	From α Cephei to α Aquarii.
51	From near zenith towards Delphinus. Path produced backwards would cut Cassiopeia.
52	From γ Ceti towards ι Ceti.
53	Path parallel to line joining β and η Pegasi: point of appearance midway between β and μ Pegasi. Movement towards π Pegasi.
54	From δ Ursæ Minoris to β Ursæ Minoris.
55	From α Trianguli, across Cassiopeia to α Cephei.
56	Fell towards α Lyræ from direction of Cepheus.
57	Shot almost horizontally from right to left about 2° above α Lyræ.
58	From direction of Polaris passed midway between α and β Aurigæ.
59	Fell nearly perpendicularly. Started at a point 20° to right of Pleiades.

Month and Day, 1870.	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						°	
November 1	8. 35. 0	W.	1	Bluish-white	1·5	Train	20	1
„	10. 45. 0	W.	Jupiter	Bluish-white	2	Very fine.	30	2
12	12. 40. 31	M.	2	Bluish-white	0·5	Train	7	3
„	12. 48. 20	S.	1	Blue	0·2	. . .	..	4
„	12. 50. 25	M.	1	Bluish-white	2·0	Fine	15	5
„	13. 37. 11	M.	1	Bluish-white	0·7	. . .	15	6
13	9. 37. 59	W.	> Jupiter	Yellowish	3	Very fine	40	7
„	{ 12. 15. 0 12. 30. 0 }	W.	. . .	. . .	. . .	. . .	..	8
14	11. 56. 8	M.	2	Bluish-white	0·5	Train	(7)	9
„	12. 3. 50	S.	1	Bluish-white	. . .	None	..	10
„	12. 36. 28	B.	2	Red	1	Train	20	11
„	12. 52. 38	B.	1	White	. . .	. . .	12	12
„	13. 2. 26	B.	1	Red	1·5	Long	20	13
„	13. 5. 56	M.	1	Bluish-white	0·7	Train	15	14
„	13. 24. 22	M.	2	Bluish-white	0·5	Slight	7	15
„	13. 54. 9	W.	1	Bluish-white	0·5	Greenish	15	16
„	13. 55. 49	W.	1	Bluish-white	1	Greenish	5	17
„	14. 6. 34	S.	> 1	Bluish-white	. . .	Slight	..	18
„	14. 15. 20	M.	1	Bluish-white	1·3	Train	10	19
„	14. 37. 24	M.	2	Bluish-white	1	Slight	7	20
„	15. 2. 44	B.	3	White	. . .	Train	10	21
„	15. 12. 38	W., B.	1	White	1·5	Fine	12	22
„	15. 19. 30	N.	> 1	Bluish-white	> 1	Train	15	23
„	15. 19. 40	W.	1	Bluish-white	1	Greenish	..	24
„	15. 24. 15	B.	2	Bluish	. . .	. . .	7	25
„	15. 27. 45	N.	1	Bluish-white	0·6	Train	10	26
„	15. 27. 59	W.	1	Yellowish	Rapid	Slight	15	27
„	15. 35. 0	W.	1	Bluish-white	Rapid	Slight	8	28
„	15. 37. 49	S.	1	Bluish-white	0·3	. . .	..	29
„	15. 40. 53	B.	2	Bluish-white	. . .	. . .	20	30
„	15. 44. 45	N.	3	Bluish-white	0·5	None	4	31
„	15. 47. 50	N., S.	> 1	Bluish-white	> 1	Fine	12	32
„	15. 57. 55	W., S.	1	Bluish-white	1	None	14	33
„	16. 3. 35	N., M.	2	White	< 1	None	..	34
„	16. 9. 45	S.	2	Bluish-white	0·3	Slight	..	35
„	16. 12. 17	M.	1	Bluish-white	1	Slight	7	36
„	16. 19. 29	N.	1	Bluish-white	0·3	None	3	37
„	16. 20. 35	M.	1	Bluish-white	1·3	Train	10	38
„	16. 21. 2	N.	> 1	White	0·8	Train	12	39
„	16. 24. 47	M.	2	Bluish-white	0·7	Train	10	40
„	16. 26. 12	N.	2	White	0·5	None	4	41
„	16. 30. 41	B.	2	Bluish	. . .	. . .	10	42
„	16. 32. 30	N.	> 1	Bluish-white	> 1	Train	12	43
„	16. 35. 55	M.	1	Bluish-white	1	Slight	15	44
„	16. 40. 20	N., M., B.	2	Bluish-white	1	Train	..	45
„	16. 41. 55	M., B.	1	Reddish	1·5	Fine	15	46
„	16. 45. 25	N., M., B.	Jupiter	Bluish-white	3	Train	> 25	47
„	16. 54. 57	B.	2	White	. . .	. . .	15	48
„	17. 0. 42	N.	3	White	0·5	None	..	49
„	17. 2. 40	W., M., B.	1	Whitish	1·7	Greenish	..	50
„	17. 7. 45	W., B.	2	Bluish-white	. . .	Slight	15	51
„	17. 8. 35	M., B.	1	Bluish-white	1·5	Fine	15	52
„	17. 11. 40	W.	> 1	Bluish-white	2	Greenish	15	53
„	17. 14. 40	W.	3	Bluish-white	1	None	10	54
„	17. 21. 25	M.	1	Bluish-white	1·3	Fine	15	55
„	17. 21. 50	B.	1	White	1·5	Fine	20	56
„	17. 25. 0	N.	2	Bluish-white	0·6	None	..	57
„	17. 28. 0	N., M., B.	3	White	0·4	None	10	58
„	17. 28. 39	M., B.	1	Bluish-white	1	Fine	10	59
„	17. 28. 59	W.	2	Bluish-white	1·5	None	14	60

No. for Reference.	Path of Meteor through the Stars.
1	Passed from left to right in a line at right angles to joining-line of α Ursæ Majoris and β Aurigæ, and about 3° above α Ursæ Majoris.
2	From ϵ Herculis passed close to α Lyræ.
3	From the Moon in direction of Polaris.
4	From a point close above β Cephei passed over ζ Cephei.
5	From a point 2° right of β Ursæ Majoris fell almost vertically towards horizon, but slightly to the left.
6	From θ Ursæ Majoris passed near to γ Ursæ Majoris.
7	Passed midway between α and κ Draconis and continued its path parallel to ζ and η Ursæ Majoris.
8	Clouds coming up rapidly from W. Three vivid flashes, which must have proceeded from large meteors, seen through clouds in due S. at about altitude 20°.
9	From o Ursæ Majoris to ψ Ursæ Majoris.
10	From a point about 10° below Polaris fell vertically and passed across η Draconis.
11	From direction of α Arietis towards β Pegasi.
12	From direction of 12 Canum Venaticorum passed about 10° below η Ursæ Majoris.
13	From δ Arietis fell towards η Piscium.
14	From θ Ursæ Majoris passed a little below Polaris in direction of β Cephei.
15	From β Canis Minoris in direction of γ Leonis.
16	From direction of ϵ Leonis passed just above o Leonis.
17	Passed from α Leonis in continuation of line joining that star and η Leonis.
18	From direction of γ Leonis disappeared about 7° past η Ursæ Majoris.
19	From a point about 4° above δ Leonis fell towards the horizon at an inclination of about 25° to the left.
20	From a point between ϵ and ζ Ursæ Majoris in direction of θ Draconis.
21	From y Ursæ Majoris towards θ Boötis.
22	From ι Draconis fell midway between θ and η Draconis.
23	From direction of Polaris across ζ Draconis.
24	From η Leonis passed about 3° above α Hydræ.
25	Between α and β Canis Minoris.
26	From direction of μ Ursæ Majoris fell parallel to line joining ψ Ursæ Majoris and 12 Canum Venaticorum.
27	From ξ Ursæ Majoris towards 12 Canum Venaticorum.
28	Passed across α Hydræ from direction of η Leonis.
29	From direction of η Ursæ Majoris towards ν Draconis.
30	From direction of g Geminorum to i Monocerotis.
31	Moving from Leo. Between the Moon and Procyon.
32	From ϵ Ursæ Majoris towards η Draconis.
33	Passed about 1° above Procyon from direction of β Cancri.
34	From near χ Leonis. Line of flight nearly parallel to β and δ Leonis.
35	From direction of β Leonis passed across γ Boötis.
36	From direction of a point about 3° to the right of η Draconis fell near β Draconis.
37	Passed across ζ Ursæ Majoris, moving from the direction of ν Ursæ Majoris.
38	From ι Leonis towards β Virginis.
39	Passed midway between η Ursæ Majoris and 12 Canum Venaticorum from direction of ν Ursæ Majoris.
40	From direction of ζ Hydræ passed a little above α Leonis to θ Leonis.
41	Appeared about 4° left of β Leonis and moved towards horizon on a path parallel to line joining β and δ Leonis.
42	From direction of K Orionis towards c Orionis.
43	Passed across center of Cassiopeia from direction of Polaris.
44	From ϵ Ursæ Majoris passed near β Ursæ Minoris in direction of β Cephei.
45	Described a curved path above α Hydræ. Started at a point about 12° from Mars measured on line of continuation of joining line of δ Leonis and Mars.
46	From δ Leonis passed near 12 Canum Venaticorum in direction of γ Boötis.
47	From about 2° left of ζ Ursæ Majoris fell across β Boötis. Slight curve in path.
48	From b Leonis towards β Leonis.
49	From the direction of α Ursæ Majoris passed midway between α and β Ursæ Minoris.
50	Directed from γ Leonis to a point 2° or 3° to the right of Mars.
51	Directed from γ Leonis fell 10° to the right of Mars.
52	Directed from γ Leonis fell in direction of β Virginis.
53	Directed from ξ Ursæ Majoris towards β Boötis.
54	Directed towards β Draconis from 12 Canum Venaticorum.
55	From a point midway between 12 Canum Venaticorum and η Ursæ Majoris fell in direction of θ Draconis.
56	Fell vertically through Cassiopeia.
57	Path parallel to γ and β Draconis. Point of appearance 10° below and to the left of β Draconis.
58	Passed between η and ζ Ursæ Majoris from direction of 12 Canum Venaticorum.
59	From t Leonis fell near o Virginis.
60	Directed from ζ Ursæ Majoris towards ι Draconis.

Month and Day, 1870.		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						°	
November	14	17. 33. 0	W.	2	Bluish-white	1·5	Slight	25	1
	15	6. 18. 53	M.	1	Bluish-white	3	Fine	15	2
	18	10. 12. 0	N.	2	White	0·5	None	..	3
	21	6. 18. 20	M.	3	Bluish-white	0·7	Train	20	4
	22	9. 53. 20	M.	1	Bluish-white	1	Train	7	5
December	23	7. 28. 0	M.	2	Bluish-white	0·7	Train	7	6

No. for Reference.	Path of Meteor through the Stars.
1	Directed from β Leonis towards η Boötis.
2	Directed from δ Persei towards λ Draconis. Path curved.
3	From direction of the Pleiades passed midway between Aldebaran and λ Tauri.
4	From direction of γ Cassiopeiæ to β Arietis.
5	From direction of α Cephei passed about 10° below δ Cephei in direction of ζ Draconis.
6	From a point nearly midway between α and β Aurigæ, fell in direction of β Tauri.