

Elements of the Eclipses of the Sun.

1862.	January 20.	June 17.	December 10.
Greenwich mean time of φ in R.A.	<i>h. m. s.</i> 18 54 29.5	<i>h. m. s.</i> 4 43 36.2	<i>h. m. s.</i> 15 34 17.6
Sun and Moon's right ascension.	20 10 38.59 0 1 "	5 44 37.71 0 1 "	17 13 30.66 0 1 "
Moon's Declination.	<i>S</i> 21 16 57.1	<i>N</i> 22 22 10.1	<i>S</i> 23 00 20.9
Sun's Declination.	<i>S</i> 20 04 08.4	<i>N</i> 23 24 48.0	<i>S</i> 23 01 41.0
Moon's Horary motion in R.A.	53 50.9	34 18.3	30 32.9
Sun's Horary motion in R.A.	2 38.7	2 58.0	2 45.3
Moon's Horary motion in Declination.	<i>N</i> 4 01.4	<i>N</i> 3 43.2	<i>S</i> 6 29.1
Sun's Horary motion in Declination.	<i>N</i> 6 32.9	<i>N</i> 6 03.8	<i>S</i> 6 13.3
Moon's Equa. Horizontal Parallax.	53 62.7	56 00.0	60 30.3
Sun's Equa. Horizontal Parallax.	8.7	8.4	8.7
Moon's True Semidiameter.	15 13.6	15 15.9	16 20.2
Sun's True Semidiameter.	16 16.3	15 45.5	16 16.3

Elements of the Eclipses of the Moon.

1862.	January 6.	July 1.	December 25-26.
Greenwich mean time of δ in R.A.	<i>h. m. s.</i> 19 10 12.5	<i>h. m. s.</i> 3 26 16.5	<i>d. h. m. s.</i> 26 01 07 53.2
Moon's right ascension.	7 10 00.11 0 1 "	18 42 32.01 0 1 "	6 21 48.79 0 1 "
Moon's Declination.	<i>N</i> 22 22 35.8	<i>S</i> 23 16 07.3	<i>N</i> 23 36 19.8
Sun's Declination.	<i>S</i> 22 23 41.2	<i>N</i> 23 05 31.8	<i>S</i> 23 31 49.1
Moon's Horary motion in R.A.	37 26.3	37 35.6	34 08.9
Sun's Horary motion in R.A.	2 44.2	2 35.0	2 46.4
Moon's Horary motion in Declination.	<i>S</i> 0 38.4	<i>S</i> 6 37.2	<i>N</i> 1 40.9
Sun's Horary motion in Declination.	<i>N</i> 0 18.4	<i>S</i> 0 10.8	<i>N</i> 0 08.8
Moon's Equa. Horizontal Parallax.	56 20.4	58 17.6	55 21.4
Sun's Equa. Horizontal Parallax.	8.7	8.4	8.7
Moon's True Semidiameter.	15 50.3	15 53.1	15 65.1
Sun's True Semidiameter.	16 17.2	15 43.1	16 17.3

Explanation of the Articles in the Calendar.

THE SUN'S DECLINATION is given for mean noon at Toronto, for every day: the difference for mean noon for any other place in the British Provinces, will rarely amount to one minute.

APPARENT NOON, SHOWING THE EQUATION OF TIME.—This column contains the mean time corresponding to the apparent noon on each day, or the hour which should be shown by a clock or watch at Toronto, when a Sun-dial marks twelve o'clock. Its error at any other place in the British Provinces will rarely amount to one second. The Equation of Time is the difference in time between the real place of the Sun, and its supposed or mean place. The actual interval between the successive arrivals of the Sun on the meridian, or the length of successive solar days, is variable, owing to the difference in the rapidity of the motion of the earth in different parts of its orbit, and in the inclination of the successive parts of the ellipse to the equator. But as time-keepers cannot be made to measure an interval which varies every day, a clock or watch is made to mark twenty-four hours in the average of all the days. In other words, it is made to keep pace with an imaginary or mean Sun, having a motion exactly equal to the average motion of the real or apparent Sun. Hence, when it is twelve o'clock by the real Sun, it may be before or after twelve by the mean Sun. The true Sun and the mean or imaginary Sun coincide four times in each year, viz., about the 15th of March, the 15th of June, the 1st September, and the 24th December. The difference between them or the Equation of Time, is never more than sixteen minutes. A Sun-dial gives apparent time, and must be corrected by applying the Equation of Time before setting a clock or watch by it.

SUN RISING AND SETTING.—The mean time of the Sun rising and setting is given for every day for Toronto and Montreal, and will be found given for every tenth day at Quebec, Halifax, and Fredericton, by referring to the Table at page 17. If the time is wanted for any intermediate day, enter the table of Semi-diurnal Arcs (page 17) with the Sun's declination for that day, the value given, subtracted from, or added to, the mean time of apparent noon, will give the hour of rising or setting. The value as it stands in that Table is the apparent time of setting and its complement to 12h, the apparent time of rising.

THE MOON'S RISING OR SETTING is given for every day at Montreal and Toronto: the time of rising being when she sets during daylight; and the time of setting when she rises during daylight. The time given for Montreal will never be more than four minutes in error for Halifax, three minutes in error for Fredericton, and five minutes in error for Quebec; and it is, therefore, near enough for ordinary reference at those places.

THE PLANETS.—The hour of meridian passage, right ascension and declination of each of the principal planets, is given for the 1st and 15th of each month. (*m. signifies morning.*) To which is added the mean time transit α or the mean time of transit of the first point of Aries, being the mean time corresponding to 0h. 0m. 0s. of Sidereal time, on each of those days. By the aid of this Table the time of the meridian passage of any heavenly body may be readily found. From the right ascension of the body subtract the retardation, which is at the rate of 9.53s. for each hour, or 0.16s. for each minute of its RA; add the remainder to the mean time transit α ; the sum, diminished if necessary by 24h., will be the mean time of the meridian passage of the body in question. For any other day than the 1st or 15th of the month apply a correction at the rate of 3m. 53.91 s. per day, reckoned from the nearest given day, to be added if for an earlier date, subtracted if for a later.

THE POLE STAR.—For the convenience of land surveyors and others, we this year give a Table in which will be found not only the mean time of the meridian passage of this star for every tenth day of the year, but also the mean time of its greatest elongation from the meridian, upon the parallel of 44° deg., and its azimuth at that time upon three parallels, namely, 43 deg., 44 deg., and 45 deg. The middle of these is the parallel which passes through the greatest number of Townships; and the first and third are nearly the limiting parallels of Upper Canada. The object of the Table is to furnish a ready and accurate way of referring a Theodolite or other instrument to the true meridian. Where the time is known with accuracy, this is best done by means of the Pole Star when on the meridian; but as at that time it changes its azimuth at the rate of half a minute of arc to one minute of time,