

In a similar manner the Declination may be approximately determined at transit over any meridian not far distant from Greenwich, bearing in mind that South Declinations and East Longitudes are to be considered as *negative*. Thus, in the above *Example*: The Moon's Declination at her upper transit at Greenwich is N. $3^{\circ} 30' 3''.1$ and the "Var. of α 's Dec. in 1 hour of Long." is $-1028''.4$, which, multiplied by -0.156 , gives $+2' 40''.4$; or N. $3^{\circ} 32' 43''.5$, for the Declination at the upper transit at Paris.

The numbers in the column entitled "Sid. Time of Semid. pass^e Mer.," express the Sidereal intervals which the Moon's Semidiameter, at the time of transit at Greenwich, takes in passing the meridian, and therefore serve to determine the Transit of the centre from an observed Transit of either limb, the "Semidiameter" a similar purpose for the Declination, and the "Hor. Par.," or Horizontal Parallax, for reducing an observation to the centre of the Earth.

Eclipses. (Pages 415 to 420.)

In these pages are given the particulars necessary for indicating the times, places, &c. on the Earth where the Eclipses of the Sun and Moon will be visible, and the Elements which have been used in the calculations.

In computing the circumstances of Lunar Eclipses the geometrical diameter of the Earth's shadow is increased by $\frac{1}{3}$ th of its amount.

The Besselian Solar Eclipse Elements have the following geometrical signification:—

The fundamental plane is the plane passing through the centre of the Earth perpendicular to the axis of the Moon's shadow, *i.e.*, to the right line joining the centres of the Sun and Moon. The intersection of the fundamental plane with the Earth's equator is taken as the axis of x , and the axis of y is perpendicular to it and directed towards the North, the Earth's centre being the origin of co-ordinates; so that x and y are the co-ordinates of the point in which the axis of the shadow intersects the fundamental plane. The angle d is the declination of the point in which the axis of the shadow (in the direction Earth, Moon, Sun) intersects the celestial sphere. The angle μ is the Greenwich hour-angle of this same point.

The quantities l , l' are the radii of the shadow-cones upon the fundamental plane, l corresponding to the penumbra and l' to the umbra. The latter is regarded as positive for an annular, and negative for a total Eclipse.

The angles f and f' are the semi-angles of the shadow-cones of the penumbra and umbra respectively.

The remaining quantities x' , y' and μ' are, respectively, the changes of x , y and μ in one minute of mean time.

The Besselian Elements are useful for determining the circumstances of a Solar Eclipse at any place on the Earth's surface in the following manner:—

Let T be the assumed Greenwich Mean Time of the phase of the Eclipse for which the computation is to be made. (A sufficiently accurate value of T may