Gray continued to reside at Cambridge, (it is considered) principally on account of the valuable libraries of the University—for he was one of the greatest readers, though the most sparing of writers. While at dinner one day in the College-hall, he was taken ill, and after six days' suffering, he expired July 30, 1771: he was buried, according to his desire, by the side of his mother, at Stoke. Gray was a profound as well as elegant scholar; "he attained the highest degree of splendour of which poetical style seems to be capable; he is the only modern English writer whose Latin verse deserve general notice; in his letters he has shown the descriptive powers of a poet; in new combinations of generally familiar words he was eminently happy; and he was the most learned poet since Milton." (*Sir James Mackintosh.*) Gray was also an excellent botanist, zoologist, and antiquary.

The accomplished Earl of Carlisle, who has elegantly commemorated the genius of this poet, feeling the identification which his celebrated Ode gives to his muse with the memory of Eton, has presented to the College a bust of Gray, which has been added to the collection of the busts of other worthies placed in the Upper School-room.

(*To be continued.*)

Suggestive Hints towards Improved Secular Instruction.

BY THE REV. RICHARD DAWES, A. M.

XII

ASTRONOMY.

(*Continued from our last.*)

Call attention also to the points of the horizon on which she rises—when due south—the arc described in the heavens—her varying distance from particular stars—and why the difference in time between successive risings of what is called the Harvest Moon, is less than at any other time of the year. That the orbit in which the earth moves is not a circle, but an oval or ellipse with the sun in one of the foci—show how an ellipse may be described—that the sun is nearer the earth in winter than in summer—how the point of the horizon on which he rises varies, being farthest to the south in winter, and to the north of east in summer—how his altitude when on the meridian varies, being much greater in summer than in winter; the effect of this, so far as heat is concerned—that the length of time between sunrise and sunset varies, as you leave the equator, all the way up to the pole—the duration of twilight short at the equator, longer at other places as the latitude increases, and why? The sun not getting so high in the heavens in winter as in summer, the rays fall in a more slanting direction on the earth's surface, and on this account at this season, as well as from his not being so long above the horizon, less warmth is communicated to the earth than in summer. On fields with an aspect to the north, the rays fall still more slantingly than on those turned to the south or on a horizontal plain, and in such situations less warmth will be given to the soil or to any substances upon it; hence vegetation in the spring is not so forward in a northern as in a southern aspect—the hoar frost in autumn remains up till noon, or even the whole day, in aspects turned to the north, but vanishes early in those to the south—the same of snow remaining on the north side of hills—other reasons also, such as cold winds from the north. What must be the inclination towards the north on any given day, that the rays may fall parallel to the surface? What the inclination to the north beyond which the surface would be entirely in the shade? What the aspect to the south, that the rays of the sun may fall perpendicularly to the surface on any given day?

Light travels from the sun to the earth in 8¼ minutes, at the rate of 192,500 miles in a second of time.

It moves through a space equal to the circumference of the earth in ⅛th part of a second—a space which would take the quickest bird three weeks to fly over.

Again, point out the difference between sidereal and solar time—day—year: how a solar day is not always of the same length—clocks regulated by mean solar time, etc.: how the period of time we call a year does not consist of an exact number of days, as 365; and hence the difficulty in regulating the calendar.

That the sidereal day, or the time between any meridian leaving particular star, and coming to it again, is always the same; the star not having moved in the interval—that this is not the case with the sun—that in the interval between any two successive passages of the same meridian under him, he has moved on towards the east, and this daily motion being unequal, causes the length of a solar day to vary. A clock tells mean time, and is therefore sometimes before, and sometimes behind solar time.

That the time of the earth's making a complete revolution in its orbit is 365 days 5 hours and 48 minutes; so that if leap-year is made to occur every four years, this would be too often, and require correction.

"Hipparchus, the most celebrated astronomer of antiquity, and who lived about a century and a half before Christ, first paid great attention to the rising and setting of the stars; he discovered that the period of 365 days 6 hours, which had been considered as the true length of the solar year, was too great by about 5 minutes, and observed that the four parts, into which the year is divided by the solstices and equinoxes, are by no means equal, the sun occupying 94½ days in passing from the vernal equinox to the summer solstice, and only 92¼ from the same solstice to the autumnal equinox, and that therefore the sum remained 187 days in that part of the ecliptic which lies north of the equator, and only 178 in the other part."

Laplace concludes that the mean heat of the earth cannot be altered by 1o. of Reaumur since the time of Hipparchus, inasmuch as the dimensions of the globe would be thereby changed in a small amount, its angular velocity increased or diminished, and a sensible difference be made in the length of the day—and this is found not to be the case.

On the subject of Eclipses. There is no phenomenon connected with the appearances and motions of the heavenly bodies which creates so much astonishment among those who have never thought on the subject, as an eclipse of the sun or moon; and that the time of its having happened, or of its happening for the future, can be so exactly computed, is a subject of no less wonder.

It is familiar to every one, that an opaque body of sufficient size may be so placed between a luminous body and the eye of an observer, as to stop all the light proceeding from it, and in this case the luminous body becomes invisible.

Now an eclipse happens in consequence of one of the opaque bodies, the earth and the moon, being so placed as to prevent a light falling upon the other.

The moon coming between the sun and earth causes an eclipse of the sun, and this happens at new moon, when she is between the earth and sun, and hinders the rays of light from falling upon the earth.

The earth coming between the sun and moon causes an eclipse of the moon, and happens at the same instant of absolute time to all observers—longitude calculated from this.

The shadow of the earth or moon is conical, having the area of a great circle for its base. The length of the earth's shadow is 216.511 semi-diameters of the earth.

What is meant by the transit of a planet over the sun's disc? How is it that the transit of Mercury, on the 9th of November, 1848, could not be seen to its termination by an observer in Paris, but would by one in Ireland?

Facts of this kind, when understood, many of which they will be able afterwards to verify by their own observation, will to many, I have no doubt, be a source of rational enjoyment in their homes, and make them feel that they belong to a class of beings of an intellectual kind; instead of being unmoved or stupefied by the grandeur of the appearances about them, they will turn their thoughts to that God who made them, and call to mind the lessons they have learned at school in their childhood.

Child of the earth! O lift your glance
To yon bright firmament's expanse!
The glories of its realm explore,
And gaze, and wonder, and adore!

Doth it not speak to every sense
The marvels of Omnipotence!
Seest thou not there the Almighty name,
Inscribed in characters of flame?

Count o'er those lamps of quenchless light,
That sparkle through the shades of night;
Behold them!—can a mortal boast
To number that celestial host?

Mark well each little star, whose rays
In distant splendour meet thy gaze;
Each is a world, by him sustain'd,
Who from eternity hath reign'd.