

There is perhaps no stronger case on record than that which we have been considering of the danger of forming the appetite for strong drink; and be it observed this appetite is invariably formed before the victim is aware, and he only knows it when too late. The only safe path is to avoid temptation.

## THE REVELATIONS OF ASTRONOMY.

(Continued from North British Review.)

Before we quit the subject of double stars, we must again refer to the remarkable researches of Professor Bessel, from which there is reason to believe that there are *binary systems*, in which only one of the two stars is visible, because only one is luminous. In the same manner as Mr. Adams and M. Le Verrier found irregularities in the motion of Uranus, which could only be explained by the action of another planet more remote, so Professor Bessel found certain irregularities in the motion of Sirius and Procyon, which could only be explained by their moving in orbits under the influence of central forces, and consequently round another star, which, being invisible, must be a non-luminous one. If this ingenious deduction shall be confirmed, as the other has been, by the actual discovery of the disturbing body, which, unless it has a certain degree of luminosity, we cannot expect, or if the existence of the dark companions of Sirius and Procyon be admitted by astronomers on the evidence of their disturbing influence we must abandon all those speculations respecting orders of distances in the heavens founded on the supposed connection between the size and brightness of a star and its distance. If there be dark stars, or rather, stars whose light is so faint that our best telescopes cannot descry them, there may be similar bodies, of different degrees of luminosity, in which the luminosity is either uniformly diffused over their surface, as in the case of our own sun, or in which certain portions are much brighter than others, as appears to be the case in variable stars. Should this very probable supposition be true, then may the faintest, or, what is the same thing in bodies without discs, the smallest star be the nearest, and the brightest the most remote. The very existence, indeed, of variable stars, proves that distance cannot be inferred from brightness.

The variation in the light of stars, which has been so generally observed, may arise from different causes; but when it returns every three days, as in the case of Algol, we must ascribe it to the rotation of the star about its axis, which brings necessarily into view darker and lighter portions of its surface. Sir W. Herschel has enumerated thirteen stars that are either lost or have undergone some great change, and he has also given a numerous list of stars that have changed their magnitudes since Flamsteed's time, and a smaller list of stars that have recently become visible.

The collection of stars into groups of specific forms has naturally attracted the notice of astronomers, and we owe the best portion of our knowledge of such groups to Sir W. Herschel. These clusters have commonly a spherical form, and Sir John Herschel affirms that many of them, whose area "does not exceed 8 or 10 minutes, or not more than a tenth part of the Moon," must contain at least ten or twenty thousand stars. The stars which compose these clusters are often so remote or so small that they appear only as a white space in the heavens, sometimes with and sometimes without stars. In proportion, however, as the telescope has been improved, these nebulae have been resolved into stars, and, as we have stated in preceding articles, the star dust, and world mist, and nebulosity of speculative writers, have in many cases displayed their component stars in the grand telescope of Lord Rosse. Captain Smith, as most of us had previously done, till they became the basis of mischievous speculation, has adopted *all* the extravagant ideas about nebulous matter and its condensation into stars; but while he styles the nebulae "chaotic rudiments under active arrangement, advancing towards organization and beauty," he neutralizes this opinion by the confession "that nature has yet to be caught in the fact of condensing the phosphorescent or self-luminous matter, diffused through certain regions of space into future systems, according to the plausible speculations of Sir W. Herschel." As Dr. Nichol, the most popular and eloquent expounder of the nebular hypothesis, has, with a true greatness of mind, and under the influence of Lord Rosse's discoveries, publicly renounced it, we shall not again enter into its discussion; but, in illustration of the views which

we have given of the *matter* which composes comets, we are desirous of pointing out the probability that luminous matter incapable of being resolved into stars, because not stellar, may yet be detected by powerful telescopes. If it be quite certain, as it appears to be, that the light of the comets is wholly reflected light, and if it be true that there are dark stars forming parts of our binary systems, then these stars must be illuminated, however feebly, by the bright self-luminous companions with which they revolve. Hence it follows, that if other planetary systems have the same number of comets as ours, and if the binary systems with dark stars are numerous, a great quantity of reflected light must exist in the universe, and may be rendered visible by powerful telescopes, when masses of it lie behind one another in the same line.

Having thus surveyed the various forms of matter which compose the sidereal universe, we are naturally led to inquire whether our own solar system is at rest in space, moving only in its individual parts, or revolves along with other systems about some remote but unknown centre. Dr. Halley conceived it possible that there might be a common centre round which the whole starry firmament revolved, but Tobias Mayer rendered it probable by the discovery of the proper motions of a number of stars. As in a wood, he says, the trees to which we approach separate from each other, in apparent distance, while those which remain behind appear to become closer and closer, so should the stars separate in that quarter of the heavens to which our system is moving, while in that which it is leaving, they should approach nearer to each other. Sir William Herschel found that the proper motion of 44 stars out of 56 were such as indicated an advance of our system towards a point in the constellation Hercules in R. Ascension  $250^{\circ} 52' 30''$ , and North Polar distance,  $40^{\circ} 22'$ . The celebrated Swedish astronomer, M. Argelander of Abo, extending the inquiry to 390 stars, was led to the same conclusion, and places the point to which we are moving in  $257^{\circ} 49'$  of R. Ascension, and  $28^{\circ} 49' 7''$  of North Declination. Hence it is the opinion of many astronomers that the solar system is advancing at the rate of *one-tenth of a second* annually, or of  $1^{\circ}$  in 36,000 years, so that if this motion is round a centre, it will require  $365 + 36,000 = 13,140,000$ , or thirteen millions of years to complete a revolution.

## CULTURE OF WHITE BEANS.

(From an Ohio Paper.)

**SOIL.**—The bean will grow well on any soil, from the stiffest clay to the hottest sand; but in our experience of its culture, we have found that of a light gravel, abounding somewhat with stone, to suit it best. In a clay soil the bean does not ripen so well, or show so pure a white, and it is somewhat subject to mould and rot; in rich loams it runs too much to vine; and in light shifting sands its growth is small and somewhat parched.

**PREPARATION.**—We are supposing the soil a hard poor gravel: in this case it is customary to plough about 3 inches deep; but as the bean sends out innumerable fine roots from its main stem, it is important to have the ground loose and mellow to a greater depth, and yet keep the most fertile part of it on the top.

**SEED.**—The best kind of field bean, is of small size, plump, round, slightly oblong of shape, and a white colour.

**PLANTING.**—For this purpose, some prefer throwing the field into ridges; but this should only be resorted to when the soil is stiff, or possesses a superabundant moisture; in every other case, planting on a level surface is best; Drills 2 1-2 to 3 feet apart is the favourite method of planting with those who are desirous of making the most of their ground; hills 2 1-2 to 3 feet distant each way, answer nearly as well; some sow broadcast, but when this is done, no after-culture can follow, and the crop is liable to be lessened by the growth of weeds, and the land is left in a foul state.—Beans are frequently grown among corn, being planted between each hill at the second time of hoeing. The crop under these circumstances is small; it takes also from that of the corn and it may be considered upon the whole, as scarcely paying for the extra trouble of culture. It is customary to plant beans after corn and potatoes are got in. The first week in June is quite early enough in this climate; farther north, the last of May is perhaps better; it grows quick, and we have seen first rate crops gathered from planting as late as the 15th of June, in the latitude of  $42^{\circ}$ . The