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THE ASTRONOMER.

THE glories of the heavens force themselves on the attention of every observer. The sun, whether enthroned in his meridian majesty, or rising from the horizon amid the gilded clouds and glowing beauties of the eastern sky, or sinking peacefully into repose in the west, at the close of the day, is an object of interest to the child in the arms, and to those of maturer years—to the man of cultivated taste, and to the shepherd tending his flocks on the mountain, or in the glen. At night, the varied beauties of the firmament attract every eye. The moon, ever changing her figure and position, —sometimes invisible, sometimes a slender crescent of light, and sometimes full-orbed like the sun,—affords pleasure and advantage to every inhabitant of the earth; while the glowing firmament is decorated by turns with Venus, Jupiter, and Mars, with Arcturus and Sirius, with Taurus, and the beautiful Orion, and with innumerable other stars, sparkling like diamonds, and sown with endless variety on the azure vault of the sky. These glorious objects have never failed to attract and please all who have the natural feelings and capacities of taste; and even the frequency with which they are presented to the view, does not cause them to be neglected, unless when the mind is perversely occupied in an exclusive degree with other objects, or other pleasures, less worthy of its attention. They have at all times been the favourite theme of poets and other writers of taste; and even the sacred penmen, who aim at simplicity, and who never introduce an idea merely to beautify their writings, frequently allude in the happiest manner to their varied splendours. In the beautiful words of the Psalmist, “the heavens declare the glory of God, and the firmament showeth forth his handy-work,” we are taught the true morality of astronomy: we are taught to regard the celestial phenomena, as so many indications of the greatness, wisdom, and power of the Creator; and every new discovery achieved by the genius and the science of Newton, has tended more and more to display the intelligence of the Deity, and the glorious wonders of his works. To every well-formed mind, this would be a sufficient inducement to the study of Astronomy, even if it presented no practical advantages, and no allurements to the eye of taste. With all these recommendations, combined with the aid which it affords to navigation and geography, with the pleasures which it yields from its intrinsic beauties, and with the varied and

sublime views which it presents of the Creator, it has the strongest claims on the attention of all who have time and opportunity of prosecuting the study.

It may be useful as well as pleasing, to lay before our readers, some views and considerations, that naturally arise from the modern discoveries respecting the mechanism of the heavens. In doing this, we shall by no means intrude on the province of the regular writer on astronomy, by attempting to bring forward a complete or consecutive system of science; but shall assume the various facts and mathematical conclusions, as established already, and shall merely consider what consequences will result from these, sometimes viewed by themselves, and sometimes in connexion with several probable but unproved suppositions. Avoiding every thing of a mathematical and abstruse description, and dwelling on the lighter, more popular, and even more amusing subjects, we shall endeavour to make our observations intelligible to all our readers; and on any of the abstruser topics, we shall present the requisite information in the detached form of notes, so that it may be omitted by all those who wish to attend only to the simpler and more popular views exhibited in the body of the article. To readers who wish to have a simple and easy view of the principles of astronomy, we would recommend the treatise of Bonnycastle, or the rather antiquated one of Ferguson; while those who wish to obtain a more profound and scientific knowledge, may read the works of Gregory, Woodhouse, Vince, Delambre, Biot, or of some other of the later writers on the subject. To these and similar sources, as well as to various memoirs and papers in the transactions of learned societies, and other miscellaneous works, we shall have recourse for the necessary information; and we shall adopt the conclusions found in those works, or present views of our own, as we shall see reason in prosecuting the subject.

ON THE SUN.*

The sun, that great and glorious body which supplies to the earth the heat and light, without which neither animal

* According to the latest discoveries in astronomy, eleven bodies, called planets, revolve round the sun at different distances and in various periods, while the sun, in relation to them, is very nearly at rest. The names of these planets are Mercury, Venus, the Earth, Mars; Vesta, Juno, Ceres, Pallas; Jupiter, Saturn, and Uranus, or the Georgium Sidus, or Herschel. The distances of these from the sun in millions of British miles, and the times in which they revolve around him, called their periods, or their periodic times, will be known from the following Table:—

Dist.	Mer.	Venus.	Earth.	Mars.	Vesta.	Juno.	Ceres.	Pallas.	Jupiter.	Saturn.	Uranus.
	37	38	85	144	225	252	263	265	494	907	1810
Per.	88 d.	7 $\frac{1}{2}$ m.	1 y.	1 y 10 $\frac{1}{2}$ m.	3y 2m.	4y 4m.	4y 7m.	4y 8m.	11y 10 $\frac{1}{2}$ m.	29 $\frac{1}{2}$ y.	83y 5m.

While these planets, which are called *primary*, revolve round the sun as the centre

nor vegetable life could subsist, has long been an object of attention to philosophers and astronomers; and, though many interesting questions respecting him still remain unanswered, yet the powers of modern astronomy have succeeded in determining his motions, his magnitude, and the quantity of matter which he contains. The telescope has shown, by observations on his spots, that he performs a rotation on his axis in 25 days 8 hours: and it is also ascertained, that he does not always retain exactly the same position in the system; but that the fixed point, or true centre of the system, is the common centre of gravity of the sun, the planets, and the comets. In consequence of the overpowering mass of the sun, however, this point is always very near his centre, being never at a greater distance from it than the length of his diameter; and hence, without much impropriety, he may be said to be the centre of the system. It is also determined, by means of the telescope and the other resources of modern science, that the diameter of the sun is more than 111 times the diameter of the earth: and from this it follows that almost fourteen hundred thousand bodies, each as large as the planet which we inhabit, would be required to compose a body equal to the sun. By comparing his bulk with his power in attracting the planets, it has been ascertained that he contains much less matter than the earth in proportion to his magnitude, his density being found to be only about one-fourth of that of the earth. Still, however, in consequence of his vast magnitude, he contains about 600 times as much matter as all the planets in the system.

When the sun is examined with a telescope, his surface is often found to be marked with spots. These appear to move from east to west, crossing his surface in about thirteen days and a half, and they are generally visible and invisible during equal periods. From this fact, and from the circumstance that when the spots are near the sun's limb, they all contract in one direction without undergoing any change in the other, Galileo formed the conclusion that these phenomena arise from actual spots on his surface, and not from small planets revolving round him, as had been supposed by one of the early observers of these curious phenomena; and in this opinion Galileo has been generally followed by succeeding astronomers. These spots are constantly varying in their conditions and appearances, as there are sometimes none of them to be seen on the solar disk, while at other times many of

of their motion, four of them have others called *secondaries*, *moons*, or *satellites*, which revolve round them, and accompany them in their motions round the sun. These are, the Earth, which has one secondary, the moon; Jupiter, which has four; Saturn, which has seven; and Uranus, which has six. The solar system, therefore, consists of the sun and twenty-nine planets, at present known, besides numerous comets.

them are visible. The spots too, sometimes increase or diminish in magnitude; sometimes one divides into two, while at other times two or more unite and form one. From these, and various other circumstances, it is now generally thought that the sun, instead of being a body of fire, consists of an interior mass, or nucleus of dark solid matter; and that the splendour of his appearance arises from a luminous atmosphere, or a collection of bright clouds, surrounding the opaque interior mass, while the spots are occasioned by openings in this luminous covering. Dr. Herschel, (latterly Sir William) besides entertaining this opinion, supposed the sun to be a habitable world, and that, while the phosphoric or luminous matter that surrounds him is of such a nature as to project heat and light through the whole system, the inhabitants dwelling on the interior globe are sheltered from the violence of this repository of heat and light by the interposition of a protecting veil of other clouds of a dark colour and a dense consistence.

Against the hypothesis of the sun's being inhabited, several objections have been urged. It has been said, that his peculiar office in the great system seems to be to furnish light and heat to the other bodies: that while the planets, with perhaps one exception, are more dense the nearer they are to the centre of the system, the sun is less dense than any, except some of the more remote:—that the inhabitants would be precluded from the study of astronomy by the clouds that surround them, though in other respects they would have advantages for prosecuting it, far superior to those enjoyed in any other body in the system; because, as viewed from that position, the apparent motions would be almost exactly the same as the real:—that in consequence of the sun's powerful attraction, the weight of bodies on his surface would be nearly thirty times as great as at the surface of the earth:—and that for this reason, “if every other circumstance permitted human beings to reside in the sun, their own weight would present an insuperable difficulty.”* Other arguments have also been brought from experiments made respecting the solar heat and light, and from the general nature of these substances.

With respect to the truth or falsity of Dr. Herschel's opinion, it is impossible to arrive at even a probable conclusion in the present state of science. It is an opinion of such a nature that every one would wish it to be true, as it would tend to enlarge our ideas of the Creator and his works: but there is so little known at present, calculated to support it, that it is scarcely necessary to endeavour seriously to refute it. If such an attempt be made, however, other arguments than those

* Dr. Thomas Young.

mentioned above should be employed. Some of them, indeed, such as those respecting the study of astronomy, and the weight of bodies on the sun's surface, are weak and trifling in the extreme. It even implies a reproach against the Author of the Universe, to suppose him unable to adapt the creatures of his hand to the situation in which he may think it right to place them. The study of astronomy, and the beauties of the firmament, are highly interesting to the inhabitants of this earth; but they are by no means of such a nature that omnipotent power could not make full compensation, if they were taken from us. It appears, indeed, that in all the arguments brought against the hypothesis above-mentioned, and against the opinion that all the other planets may be inhabited, it is too generally supposed, that these bodies, and every thing connected with them, must necessarily bear a close resemblance to this earth, and to the state of things which it presents. But it is obviously unreasonable to form such an opinion, when we fairly consider what actually comes under our inspection here; as we find endless variety universally prevailing among all the works of the Creator, in all their relations: and it is natural to conclude, that the same variety exists on a still greater scale, in the extended system of the universe.

It would be foreign to our purpose to enter on the consideration of other questions, which have given origin to discussions respecting the sun. Of this kind are the inquiries respecting the nature of his heat and light:—whether these are occasioned by particles of matter continually issuing from the body of the orb in all directions;—or whether the effects are produced by the solar influence acting on an intervening medium, in some such manner as sound is produced by the vibrations of the atmosphere;—whether these effects are produced by the same, or by different means:—whether the sun, in producing these effects, suffers any diminution:—and if that be so, whether any means is provided for furnishing a supply. These speculations, and several others are curious and interesting, but cannot be determined with certainty at present; and they may perhaps continue forever to baffle the exertions of astronomers.

Without the resolution of any such questions, enough is known respecting the sun, to excite feelings of wonder and awe in our minds. How vast is this earth in the limited ideas of its inhabitants! And yet the sun is more than a million times as large! This vast body has also been affording heat and light to the generations that are past, in the same manner as to the fleeting mortals of the present day. The Assyrians and the Persians, the Greeks, and the Romans, have

long since passed away with all their earthly greatness and splendour; but the glorious orb that shone on them—that lighted them to the field of victory, or in the retirements of peace—that gave them vital warmth, or matured the fruits of the earth for their support and comfort—remains the same during the march of time, free from old age and decay, the best emblem of his great Creator, and one of the grandest manifestations of his goodness and power.

RECOLLECTIONS OF 1798.

To the EDITOR of the BELFAST MAGAZINE.

SIR,—THE account of the Battle of Ballynahinch, in your First Number, was interesting to many of your readers, especially at a distance from the scene of action. It introduced various minute circumstances which could only present themselves to an eye-witness, and which were calculated to give a more vivid conception of the whole scene, than the general descriptions of history. Indeed, unless such particulars be recorded now, by those who had opportunities of witnessing them, they will soon be entirely forgotten. Yet they seem on many accounts to be worthy of preservation. Besides the graphical views which they give of such events, they exhibit human feelings in singular and interesting combinations, which, happily, we have seldom opportunities of contemplating. They are also replete with instruction to all classes in the community. The recollection of troublesome periods should not be forgotten, even in times of peace and prosperity. They teach us to estimate aright those blessings which we are apt to undervalue, merely because they are common; and they check every wanton inclination to risk all the horrors of civil commotion, which must be equally shocking to the successful and the vanquished. Those who have once experienced them, will never after refer to them with indifference.—For such reasons, I am induced to mention a few circumstances connected with the battles of Saintfield and Ballynahinch, which came within my own observation, and are similar to those which are yet fresh in the recollection of others; but which may be instructive to many, who have had the happiness to live in more peaceful times.

The battle of Saintfield was fought in the afternoon of Saturday, June 9th, 1798. I know not, indeed, whether it should be called a regular engagement. There was then in the neighbourhood of the village, and at the place of rencontre, a hedge-row by the side of the road leading from Com-