THE ODD FELLOWS' RECORD.

springs and rivers. By them are produced all distur- any part of the moon's disc, in her tortuous course, bances of the chemical equilibrium of the elements of nature, which by a series of compositions and decompositions give rise to new products and originate a transfer of materials. Even the slow degradation of the solid constituents of the surface, in which its chief geological changes consist, and their diffusion among the waters of the ocean, are entirely due to the abrasion of the wind and rain, and the alternate action of the season, and when we consider the immense transfer of matter so produced, the increase of pressure over large surfaces in the bed of the ocean, and diminution over corresponding portions of the land; we are not at a loss to perceive how the elastic power of subterranean fires, thus repressed on the one hand and relieved on the other, may break forth in points when the resistance is barely adequate to their retention, and thus bring the phenomena of even volcanic activity under the general law of solar influence. The great mystery is to conceive how so enormous a conflagration (if such it be) can be kept up. If conjecture might be hazarded, we should look rather to the known possibility of an indefinite generation of heat by friction, or to its excitement by the electric discharge, than to any actual combustion of ponderable fuel, whether solid or gaseous, for the origin of the solar radiation.

CHAP. VI.

OF THE MOON.

THE moon, like the sun, appears to advance among the stars with a movement contrary to the general diurnal motion of the heavens, but much more rapid-so as to be very readily perceived (as we have before observed) by a few hours cursory attention on any moonlight night. By this continual advance-which, though sometimes quicker, sometimes slower, is never intermitted or reversed-it makes the tour of the heavens in a mean or average period of 27d. 7h. 43m. 11s. returning in that time to a position among the stars nearly coincident with that it had before, and which would be exactly so, but for causes presently to be stated. The moon then, like the sun, apparently describes an orbit round the earth, and this orbit cannot be very different from a circle, because the apparent angular diameter of the full moon is not liable to any great extent of variation. The distance of the Moon from the earth has been ascertained to be about 237,000 miles. This distance, great as it is, is little more than onefourth of the diameter of the Sun's body; so that the globe of the Sun would nearly twice include the whole orbit of the Moon-a consideration wonderfully calculated to raise our ideas of that stupendous luminary.

As the Moon is at a very moderate distance from us, (astronomically speaking) and is in fact our nearest neighbor, while the Sun and Stars are in comparison infinitely beyond it, it must of necessity happen that at by reason of its greater apparent size, is agreeable to one time or other, it must pass over and occult or optical principles, and explains the appearance of the eclipse every star or planet within a zone or belt ex- dark portion of the young Moon completing its crestending 5° on each side of the ecliptic. Nor is the cent. For, when the Moon is nearly new to the Earth, Sun itself exempt from being thus hidden, whenever the latter (so to speak) is nearly full to the former ; it

comes to overlap any part of the space occupied in the heavens by that luminary. On these occasions is exhibited the most striking and impressive of all the occasional phenomena of Astronomy-an eclipse of the Sun, in which a greater or less portion, or even in some rare conjunctures the whole of its disc is obscured, and, as it were, obliterated by the superposition of that of the Moon, which appears upon it as a circularly-terminated black spot, producing a temporary diminution of day light, or even nocturnal darkness, so that the stars appear as if at midnight. In other cases, when, at the moment that the Moon is centrally superposed on the Sun, it so happens that her distance from the Earth is such as to render her angular diameter less than the Sun's, the very singular phenomenon of an annular solar eclipse takes place, when the edge of the Sun appears for a few minutes as a narrow ring of light, projecting on all sides beyond the dark circle occupied by the Moon in its centre.

A solar eclipse can only happen when the Sun and Moon are in conjunction-that is to say, have the same or nearly the same position in the heavens. It will be seen that this condition can only be fulfilled at the time of New Moon; though it by no means follows that at every conjunction there must be an eclipse of the Sun. If the lunar orbit coincided with the ecliptic, this would be the case ; but as it is inclined to it at an angle of upwards of 5°, it is evident that the conjunction or equality of longitudes may take place when the Moon is in the part of her orbit too remote from the ecliptic to permit the discs to meet and overlap. The phenomenon of a solar eclipse, and of an occultation, are highly interesting and instructive in a physical point of view. They teach as that the Moon is an opaque body, terminated by a real and sharply defined surface, intercepting light like a solid. They prove to us also, that at those times when we cannot see the Moon, she really exists and pursues her course; and that when we see her only as a crescent, however narrow, the whole globular body is there, filling up the deficient outline, though unseen.

The monthly changes of appearance, or phases as they are called, arise from the Moon, an opaque body, being illuminated on one side by the Sun, and reflecting from it in all directions a portion of the light so received. Nor let it be thought surprising that a solid substance thus illuminated should appear to shine and again illuminate the earth. It is no more than a white cloud does, standing off upon the clear blue sky. By day the Moon can hardly be distinguished in brightness from such a cloud ; and in the dusk of the evening, clouds, catching the last rays of the sun, appear with a dazzling splendour, not inferior to the seeming brightness of the moon at night. That the earth sends also such a light to the moon, only probably more powerful,

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