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ASTRONOMY.

CHAPTER IV.

OF THE SUN.

THAT at so vast a distance, the Sun should appear to us of the size it does, and should so powerfully influence our condition by its heat and light, requires us to form a very grand conception of its actual magnitude, and of the scale on which those important processes are carried on within it, by which it is enabled to keep up its liberal and unceasing supply of these elements. Placed at a distance of 95,000,000 of miles from our Earth, its diameter is computed to be 882,000 miles.—If we compare it with what we have already ascertained of the dimensions of our own, we shall find that in linear magnitude it exceeds the Earth in the proportion of 111½ to 1, and in bulk, in that of 1,384,472 to 1.

It is hardly possible to avoid associating our conceptions of an object of definite globular figure, and of such enormous dimensions, with some corresponding attribute of massiveness and material solidity. That the Sun is not a mere phantom, but a body having its own peculiar structure and economy, our telescopes distinctly inform us. They show us dark spots on its surface, which slowly change their places and forms, and by attending to whose situation at different times, astronomers have ascertained that the Sun revolves round its axis, performing one rotation in a period of 25 days, and in the same direction with the diurnal rotations of the Earth *i. e.* from west to east. Here, then we have an analogy with our own Globe; the slower and more majestic movement only corresponding with the greater dimensions of the machinery, and impressing us with the prevalence of similar mechanical laws, and of at least, such a community of nature as the existence of inertia and obedience to force may argue. Now in the exact proportion in which we invest our idea of this immense bulk with the attribute of inertia, or weight, it becomes difficult to conceive its circulation round so comparatively small a body as the earth, without, on the one hand, dragging it along, and displacing it, if bound to it by some invisible tie; or, on the other hand, if not so held to it, pursuing its course alone in space and leaving the earth behind. If we tie two stones of equal weight together and fling them aloft, we see them circulate round a point between them, which is their common centre of gravity; but if one of them be greatly more ponderous than the other, this common centre will he proportionally nearer to that one, and even within its surface, so that the smaller one will circulate, in fact, about the larger, which will be comparatively but little disturbed from its place.

Whether the earth move round the Sun, the Sun round the earth, or both round their common centre of gravity, will make no difference, so far as appearances are concerned, provided the stars be supposed sufficiently distant to undergo no sensible apparent displacement by the motion so attributed to the earth. Whether they are so or not must still be a matter of enquiry; and from the absence of any measureable amount of such displacement, we can conclude nothing but this, that the scale of the sidereal universe is so great, that the mutual orbit of the earth and Sun may be regarded as an imperceptible point in the comparison.

Admitting, then, in conformity with the laws of dynamics, that two bodies connected with, and revolving about each other in free space do, in fact, revolve about their common centre of gravity, which remains immoveable by their mutual action, it becomes a matter of further enquiry, whereabouts between them this centre is situated. Mechanics teaches us that its place will divide their mutual distance in the inverse ratio of their weights and measures, and calculations grounded on observed phenomena, inform us that this ratio, in the case of the Sun and the earth, is that of 354,956 to 4, the Sun being, in that proportion more ponderous than the earth. From this it will follow that the common point about which they both circulate is only 267 miles from the Sun's centre, or about 1-3300th part of its own diameter.

Henceforward, then, in conformity with these statements, and with the Copernican view of our system, we must learn to look upon the Sun as the comparatively motionless centre about which the earth performs an annual elliptic orbit round the Sun; the Sun occupying one of the foci of the ellipse, and from that station quietly disseminating on all sides its light and heat; while the earth travelling round it, and presenting itself differently to it at different times of the year and day, passes through the varieties of day and night, summer and winter, which we enjoy.