THE ORBITAL PATH OF THE EARTH.

18

therefrom. We will now briefly consider the actual conditions of the case in order to trace that actual motion which results from the vertical motion being compounded with the horizontal motion of the earth in its orbit of revolution. In Fig S, Pl. 5, The earth at n, is at the place of maximum deviation below the plane of the ecliptic, and is advancing along the orbital path in the direction n. r. m; and the velocity or rate of advance in that direction is about 50 million miles a month. Now since the axis of the earth is vertical to the direction of the motion, the centrifugal force which counteracts the attractive force of the sun operates from the centre of the orbit at right angles to the axis: but the whole attractive force of the sun is now acting on the earth from the higher position at an angle of 231 degrees; therefore, if this force is resolved, about three-fourths thereof acting in the direction horizontal to the axis is counteracted by the centrifugal force which is directly opposed to it; and nearly the one fourth is effective in attracting the earth vertically upwards in the direction r. m.; since this vertical attractive force is entirely unopposed by any counteracting influence or force it is immediately effective in producing an ascending motion of the earth; the motion so produced is a continually accelerated motion until the plane of the ecliptic is reached, but it is not a uniformly accelerated motion, because that fraction of the sun's gravitating influence, the originating and accelerating force to which this vertical motion is subject-continually decreases as the angle diminishes, and when the plane of the ecliptic is reached its influence in the vertical direction upwards entirely ceases; the earth by its acquired momentum passes the horizontal plane of orbital revolution (the ecliptic) at r. and as it ascends above that plane is again subjected to the vertical influence of a part of the sun's attractive force which is now exerted in the reverse direction, namely, from below upwards, opposing and counteracting the upward vertical motion