

from the sun ; and these two forces being adjusted, the earth retains its place. If the force of gravity were to cease, the earth would fly off in a tangent to that part of its orbit in which it happened to be situated at the moment ; and if the earth were to cease its revolutions, it would fall towards the centre of gravitation. Connect with this statement the fact, that the centrifugal force is in proportion to the distance of the body from its centre of attraction, and there will be no difficulty in understanding the application of the pendulum to the measurement of the earth.

If the attraction of the earth were not sufficient to neutralize the effect of its centrifugal force, the detached bodies on its surface would be thrown off ; but even under present circumstances it diminishes their weight at the equator. If the earth did not revolve on its axis, a substance would have the same weight at all places equally distant from the centre. But as the centrifugal force, which attempts to throw all bodies from the axis of rotation, increases with the distance, so the force of gravity must decrease from the poles to the equator.

From this explanation it follows, that the fall of bodies is accelerated from the equator to the poles ; and as the pendulum is a falling body, its oscillations must be accelerated in the same proportion ; and hence it is that the length of a pendulum must be altered to make it perform the same number of vibrations in all latitudes. Now it is well known, that in the instance of a spheroid of rotation, the centrifugal force varies from the equator to the poles, as the square of the sine of latitude.

From these principles we may deduce the real form and dimensions of the earth ; and although the method may appear to the general reader to be somewhat involved, yet it is capable of as great accuracy as any plan of measurement that has hitherto been adopted. While the result of the experiments that have been made to determine the form of the earth by actual measurement and by the oscillations of the pendulum, prove it to be an oblate spheroid.

#### THE RELATIVE REST OF THE FIXED STARS.

The thoughtful reader may still have some difficulties connected with this subject, and be unable to account for the unvarying position of the stars in relation to one another