CHAPTER VII.

THE USE OF THE PENDULUM IN DETERMINING THE COMPRESSION OF THE EARTH.

The spheroidal form of the earth causes the force of gravity to increase from the equator towards the poles, and this force may be measured at any place by means of the oscillations of a pendulum.

If we had a heavy particle suspended from a fixed point by a fine inextensible thread without weight we should have what is called a *simple* pendulum. If this pendulum were allowed to make small oscillations (of not more than a degree in amplitude) *in vacuo*, and in a vertical plane, the time of oscillation would be given by the formula

$$t = \pi\left\{\frac{l}{g}\right\}^{\frac{1}{2}} \qquad (1)$$

Where t is the number of seconds, l the length of the pendulum in feet, and g the force of gravity.

Therefore, taking g as constant, if there were another pendulum l' feet long and vibrating in t' seconds, we should have

$$t : t' :: \sqrt{l} : \sqrt{l'}$$

or, if the time were constant and g changed to g',

$$l : l' :: g : g'$$