or if l were constant and g variable

$$t : t' :: \frac{1}{\sqrt{g}} : \frac{1}{\sqrt{g'}} \qquad (2)$$

If n and n' are the number of oscillations in ~~the~~ a given time for t and t', then, $n' : n :: t : t'$

$$:: \sqrt{l} : \sqrt{l'}$$

From (2) we have, $g' = \frac{t^2}{t'^2} g$

$$= \frac{n'^2}{n^2} g \qquad (3)$$

To find the value of g' we can either ascertain by measurement the length of a pendulum that makes a certain number of oscillations in a given time, or we can use a pendulum of invariable length and find g' from equation (3). Both methods have been used, but the last is the easiest in practice.

A simple pendulum as described above is, of course, an imaginary quantity, and all pendulums actually used are what are called "compound" pendulums. But it is possible to calculate the length l of a simple pendulum that would oscillate in the same time as the compound one, by finding the position of the "centre of oscillation;" that is, of the point which moves in the same manner as would the pendulum if its whole mass were collected at that point, thus constituting a simple pendulum. The centres of oscillation and suspension are interchangeable, and if a pendulum is suspended from the former, the latter becomes the new centre of oscillation.

The compression of the earth is calculated thus: If c is the compression, φ the latitude of a station, g the force of gravity at the equator, g' that at the station, and m the ratio of the centrifugal force at the equator to g, we have, by the formula known as Clairaut's Theorem,

$$g' = g \; [1 + (\tfrac{5}{2} m - c) \sin^2 \varphi]$$

and, since $g' = \frac{n'^2}{n^2} g$, if n is the number of oscillations in