other bodies are compared with the contemporaneous rotation of the earth relative to the fixed stars, the laws of their motions take forms which are simpler and more permanent than if any other motion be taken as standard. Hence, by common consent, the motion of the earth about its axis is taken as a standard with which other motions are compared.

It is obvious that if the interval of time in which the earth makes a complete rotation were always the same, the laws of the motions of bodies, expressed by reference to the contemporaneous rotation of the earth, would be identical with the laws of their motions, expressed in terms of time. Usually in stating the laws of the motions of bodies it is assumed that the rotation of the earth is uniform, and these laws are expressed in terms of time. But though the terminology of time is employed the laws of their motions are always really expressed in terms of the standard motion.

Recent discussion of astronomical observations * seems to shew that the laws of the motions of heavenly bodies would take simpler forms, and would be more permanent, if the standard motion were that of an ideal earth, rotating so that its rate of rotation would slowly gain on the rate of rotation of the actual earth. If the time of the rotation of this ideal earth be assumed to be uniform, the time of the earth's rotation, i. e., the sidereal day, must be regarded as increasing at a slow rate ; and when the sidereal day is said to be increasing, nothing more is meant than that, as time goes on, a greater and greater number of rotations of this ideal earth occur during one rotation of the actual earth. We have no means of knowing whether the time of the rotation of the ideal earth is more or less variable than that of the real earth. But as the laws of the motions of bodies generally are simpler and more permanent when expressed in terms of the rotation of the ideal earth than when expressed in terms of the rotation of the real earth, it is convenient to assume the time of the former uniform and that of the latter variable.

While therefore it is possible to describe instants of time with any degree of precision, it is not possible to measure the interval

* See Thomson & Tait's "Treatise on Natural Philosophy," Part II , p. 830.