

is considerable, if compared with the quantities themselves; but does not throw a shadow of doubt on the truth of the theory. Indeed, the observations of each kind exhibit irregularities which we may easily account for, by ascribing them to the unknown distribution of the denser portions of the earth; but which preclude the extreme of accuracy and certainty in our result.

But the near agreement of the determination, from Degrees and from Pendulums, is not the only coincidence by which the doctrine is confirmed. We can trace the effect of the earth's Oblateness in certain minute apparent motions of the stars; for the attraction of the sun and moon on the protuberant matter of the spheroid produces the Precession of the equinoxes, and a Nutation of the earth's axis. The Precession had been known from the time of Hipparchus, and the existence of Nutation was foreseen by Newton; but the quantity is so small, that it required consummate skill and great labor in Bradley to detect it by astronomical observation. Being, however, so detected, its amount, as well as that of the Precession, gives us the means of determining the amount of Terrestrial Ellipticity, by which the effect is produced. But it is found, upon calculation, that we cannot obtain this determination without assuming some law of density in the homogeneous strata of which we suppose the earth to consist.⁴² The density will certainly increase in proceeding towards the centre, and there is a simple and probable law of this increase, which will give 1-300th for the Ellipticity, from the amount of two lunar Inequalities (one in latitude and one in longitude), which are produced by the earth's oblateness. Nearly the same result follows from the quantity of Nutation. Thus every thing tends to convince us that the ellipticity cannot deviate much from this fraction.

[2d Ed.] [I ought not to omit another class of phenomena in which the effects of the Earth's Oblateness, acting according to the law of universal gravitation, have manifested themselves;—I speak of the Moon's Motion, as affected by the Earth's Ellipticity. In this case, as in most others, observation anticipated theory. Mason had inferred from lunar observations a certain Inequality in Longitude, depending upon the distance of the Moon's Node from the Equinox. Doubts were entertained by astronomers whether this inequality really existed; but Laplace showed that such an inequality would arise from the oblate form of the earth; and that its magnitude might serve to de-

⁴² Airy, *Fig. Earth*, p. 285.