

last is the most certain, since it is independent of the difficult determination of the density of the mineral masses of which the spherical segment of the mountain consists near which the observations are made. According to the most recent experiments of Reich, the result obtained is 5.44; that is to say, the mean density of the whole Earth is 5.44 times greater than that of pure water. As, according to the nature of the mineralogical strata constituting the dry continental part of the Earth's surface, the mean density of this portion scarcely amounts to 2.7, and the density of the dry and liquid surface conjointly to scarcely 1.6, it follows that the elliptical unequally compressed layers of the interior must greatly increase in density toward the center, either through pressure or owing to the heterogeneous nature of the substances. Here again we see that the vertical, as well as the horizontally vibrating pendulum, may justly be termed a geognostical instrument.

The results obtained by the employment of an instrument of this kind have led celebrated physicists, according to the difference of the hypothesis from which they started, to adopt

tions on mountains, 4.837 (Carlini's observations on Mount Cenis compared with Biot's observations at Bordeaux, *Effemer. Astron. di Milano*, 1824, p. 184); (3.) by the torsion balance used by Cavendish, with an apparatus originally devised by Mitchell, 5.48 (according to Hutton's revision of the calculation, 5.32, and according to that of Eduard Schmidt, 5.52; *Lehrbuch der Math. Geographie*, bd. i., s. 487); by the torsion balance, according to Reich, 5.44. In the calculation of these experiments of Professor Reich, which have been made with masterly accuracy, the original mean result was 5.43 (with a probable error of only 0.0233), a result which, being increased by the quantity by which the Earth's centrifugal force diminishes the force of gravity for the latitude of Freiberg ($50^{\circ} 55'$), becomes changed to 5.44. The employment of cast iron instead of lead has not presented any sensible difference, or none exceeding the limits of errors of observation, hence disclosing no traces of magnetic influences. (Reich, *Versuche über die mittlere Dichtigkeit der Erde*, 1838, s. 60, 62, and 66.) By the assumption of too slight a degree of ellipticity of the Earth, and by the uncertainty of the estimations regarding the density of rocks on its surface, the mean density of the Earth, as deduced from experiments on and near mountains, was found about one sixth smaller than it really is, namely, 4.761 (Laplace, *Mécan. Céleste*, t. v., p. 46), or 4.785. (Eduard Schmidt, *Lehrb. der Math. Geogr.*, bd. i., § 387 und 418.) On Halley's hypothesis of the Earth being a hollow sphere (noticed in page 171), which was the germ of Franklin's ideas concerning earthquakes, see *Philos. Trans.* for the year 1693, vol. xvii., p. 563 (*On the Structure of the Internal Parts of the Earth, and the concave habited Arch of the Shell*). Halley regarded it as more worthy of the Creator "that the Earth, like a house of several stories, should be inhabited both without and within. For light in the hollow sphere (p. 576) provision might in some manner be contrived."