

It has also been inferred, that there is a regular increase in density from the surface towards the centre, and that the equatorial protuberance is continued inwards; that is to say, that layers of equal density are arranged elliptically, and symmetrically, from the exterior to the centre. These conclusions, however, have been deduced rather as a consequence of the hypothesis of primitive and simultaneous fluidity than proved by experiment. The inequalities in the moon's motion, by which some have endeavoured to confirm them, are so extremely slight, that the opinion can be regarded as little more than a probable conjecture.

The mean density of the earth has been computed by Laplace to be about $5\frac{1}{2}$, or more than five times that of water. Now the specific gravity of many of our rocks is from $2\frac{1}{2}$ to 3, and the greater part of the metals range between that density and 21. Hence some have imagined that the terrestrial nucleus may be metallic — that it may correspond, for example, with the specific gravity of iron, which is about 7. But here a curious question arises in regard to the form which materials, whether fluid or solid, might assume, if subjected to the enormous pressure which must obtain at the earth's centre. Water, if it continued to decrease in volume according to the rate of compressibility deduced from experiment, would have its density doubled at the depth of ninety-three miles, and be as heavy as mercury at the depth of 362 miles. Dr. Young computed that, at the earth's centre, steel would be compressed into one fourth, and stone into one eighth of its bulk.* It is more than probable, however, that after a certain degree of condensation, the compressibility of bodies may be governed by laws altogether different from those which we can put to the test of experiment; but the limit is still undetermined, and the subject is involved in such obscurity, that we cannot wonder at the variety of notions which have been entertained respecting the nature and conditions of the central nucleus. Some have conceived it to be fluid, others solid; some have imagined it to have a cavernous structure, and have even endeavoured to confirm this opinion by appealing to observed irregularities in the vibrations of the pendulum in certain countries.

An attempt has recently been made by Mr. Hopkins to determine the least thickness which can be assigned to the solid crust of the globe, if we assume the whole to have been once perfectly fluid, and a certain portion of the exterior to have acquired solidity by gradual refrigeration. This result he has endeavoured to obtain by a new solution of the delicate problem of the precessional motion of the pole of the earth. It is well known that while the earth revolves round the sun the direction of its axis remains very nearly the same, *i. e.* its different positions in space are all nearly parallel to each other. This parallelism, however, is not accurately preserved, so that the axis, instead of coming exactly into the position which it occupied a year before, becomes inclined to it at a very small angle,

* Young's Lectures, and Mrs. Somerville's Connexion of the Physical Sciences, p. 90.