

if the earth's nucleus were molten, phenomena similar to ebb and flow would be induced which could only be resisted by a crust of enormous thickness, *circa* 2000-2800 English miles thick. Besides, if the earth's body were plastic, the oceanic tides would not only be induced by the attraction of the sun and moon, but would also be influenced by deformations of the earth-spheroid. There are, however, no indications of this disturbing influence. Darwin therefore believes that the earth behaves as a rigid body and possesses probably a viscous-elastic constitution.

Lord Kelvin has essentially the same opinion, and ascribes to the body of the earth a degree of rigidity intermediate between that of steel and of glass. Starting from the nebular theory, Lord Kelvin (1862, 1879) supposes that the cooled and thereby heavier masses sank inward and formed an initial central nucleus, which always extended towards the periphery as the earth's mass continued to cool, until finally almost the whole earth became rigid. Ries and Winkelmann contested (1881) this hypothesis on the ground that not only a number of metals, but also silicate combinations undergo a decrease of density at the moment when they become solid, so that they could not sink in a molten mass.

The American, Barnard, wrote in 1877 a paper on the internal structure of the earth, considered as affecting the phenomena of precession and nutation. He agreed with Hopkins and Darwin that the behaviour of the earth under the attraction of other bodies in the universe shows a very high coefficient of rigidity for the earth's mass. Reyer in Vienna in the same year brought forward arguments in favour of the theory of rigidity, but supposed that the rigid magma of the nucleus was saturated and impregnated with solvents and gases in so great a degree, that whenever the pressure of the crust was relieved or modified by fractures the nuclear material could readily become viscous or fluid, and capable of eruptive action.

In opposition to the adherents of the earth's rigidity, many geologists retain the older view, at least in part, in so far as they believe there is a zone of molten magma under the firm crust, and do not accept the extreme conception of the rigidity of the nucleus.

Sterry Hunt advocated the view that the originally molten globe began to solidify in its central part. At the surface,