

suppose that solidified portions of such rocks as granite and the various lavas could ever have sunk into the centre of the earth, so as to build up there the honey-combed cavernous mass which might have served as a nucleus in the ultimate solidification of the whole planet. If the earliest formed portions of the comparatively light crust were denser than the underlying liquid, they would no doubt descend until they reached a stratum with specific gravity agreeing with their own, or until they were again melted.⁶⁵

3. *Hypothesis of a liquid substratum between a solid nucleus and the crust.*—Since the early and natural belief in the liquidity of the earth's interior has been so weightily opposed by physical arguments, geologists have endeavored to modify it in such a way as, if possible, to satisfy the requirements of physics, while at the same time providing an adequate explanation of the corrugation of the earth's crust, the phenomena of volcanoes, etc.⁶⁶ The hypothesis has been proposed of "a rigid nucleus nearly approaching the size of the whole globe, covered by a fluid substratum of no great thickness, compared with the radius, upon which a crust of lesser density floats in a state of equilibrium." The nucleus is assumed to owe its solidity to "the enormous pressure of the superincumbent matter, while the crust owes its solidity to having become cool. The fluid substratum is

⁶⁵ See D. Forbes, *Geol. Mag.* vol. iv. p. 435. The evidence for the internal solidity of the earth is criticised by Dr. M. E. Wadsworth in the *American Naturalist*, 1884.

⁶⁶ See Dana in *Silliman's Journal*, iii. (1847), p. 147. *Amer. Journ. Science* (1873). The hypothesis of a fluid substratum has been advocated by Shaler. *Proc. Bost. Nat. Hist. Soc.* xi. (1868), p. 8. *Geol. Mag.* v. p. 511. J. Le Conte, *Amer. Journ. Sci.* 1872, 1873. O. Fisher, *Geol. Mag.* v. (new series), pp. 291 and 551. "Physics of the Earth's Crust," 1883. [This author in his second edition modifies this view.] Hill, *Geol. Mag.* v. (new series), pp. 262, 479. The idea of a viscous layer between the solidifying central mass and the crust was present in Hopkins' mind. *Brit. Assoc. 1848, Reports*, p. 48.