became viscid, so that the descent from the surface of the heavier particles, cooled by radiation, was prevented, and a crust formed, through which cooling has since gone on very slowly. There were thus left between this crust and the solid nucleus, portions of yet unsolidified matter (or even perhaps, as suggested by Scrope, a continuous sheet), and it is in the existence of this stratum, or of lakes of uncongealed matter, that we are to find an explanation of all the phenomena of volcanoes and earthquakes, of elevation and subsidence, and of the movements which result in the formation of mountain chains, as ingeniously set forth by Mr. Shaler. The slow contraction of the gradually cooling globe, a most important agency in the latter phenomena, is evidently not excluded by this hypothesis. It may be added that a similar structure of the globe, viz., a solid nucleus and a solid crust separated from each other by a liquid stratum, was long ago suggested by Halley in order to explain the phenomena of terrestrial magnetism. Scrope has completed this hypothesis by the suggestion that variations in tension or pressure may cause portions of matter beneath the surface to pass from solid to liquid, or from a liquid to a solid state, and in this way help us to explain the local and the temporary nature of volcanic activity.

This theory of Hopkins and Scrope, apparently so complete in itself, is an approximation to the one which I adopt, though differing from it in some most important particulars. While admitting with them the existence of a solid nucleus and a solid crust, with an interposed stratum of semi-liquid matter, I consider this last to be, not a portion of the yet unsolidified igneous matter, but a layer of material which was once solid, but is now rendered liquid by the intervention of water under the influence of heat and pressure. When, in the process of refrigeration, the globe had reached the point imagined by Hopkins, where a solid crust was formed over the shallow molten layer which covered the solid nucleus, the farther cooling and contraction of this crust would result in irregular movements, breaking it up, and causing the extravasation of the yet liquid portions confined beneath. When at length the reduction of temperature permitted the precipitation of water from the dense primeval atmosphere, the whole cooling and disintegrating mass of broken-up crust and poured-out igneous rock would become exposed to the action of air and water. In this way the solid nucleus of igneous rock became surrounded with a deep layer of disintegrated and water-impregnated material, the ruins of its