subsequently more or less altered, sometimes even fused and rendered glassy or slaggy.

When, after Werner's death, his two most famous pupils, Leopold von Buch and Alexander von Humboldt, declared themselves in favour of the volcanic origin of basalt, the defeat of the strict Neptunists was sealed. A historical account of the whole question of basalt, and the disputes between Neptunists and Volcanists, may be read in Keferstein's *Contributions to the History and Knowledge of Basalt* (1819).

But Neptunian doctrines still continued to be accredited for granite, syenite, gneiss, and other members of the holocrystalline series. Descartes, Leibnitz, and Buffon had certainly explained the primitive earth-crust as the result of cooling from a molten mass, but they had made no attempt to explain the origin of the various kinds of primitive rock. It was generally supposed that granite, gneiss, schist, porphyry, phonolite, and similar rocks were chemical precipitates separated from a primitive ocean strongly impregnated with mineral substances. Therefore Von Fichtel, writing in the end of the eighteenth century, showed an exceptionally enlightened spirit among German geologists when he included not only basalt but all granitoid, gneissose, schistose, and doleritic series as igneous in their origin. Fichtel distinguished two kinds of volcanic mountains—(*a*) those which consist of immense uniform masses, sometimes building up a whole mountain-chain, and (*b*) those in which rocks of different constitution alternate with one another in a stratified way (lava, ashes, rapilli, etc.). He described the homogeneous masses as having risen without any violent phenomena of eruption, and having penetrated the crust at the places of least resistance; whereas the others were produced by successive eruptions, during which the ejected material gathered in conical form round the craters of eruption.

But the great founder of the Plutonic school was James Hutton. According to Hutton, heat is the most powerful agent in the origin of rocks. The heat that pervades the lower horizons of the crust converts all rock-material into a molten magma. Under the superincumbent weight of the younger sedimentary rocks and the ocean, mineralogical combinations can take place which would not be possible at the surface under conditions of normal pressure and rapid cooling. The primitive schists and limestones have been produced from a