

(slate, greywacke), as well as the interbedding of granite with gneiss and sedimentary schists, led Bischof to agree with the opinion of Keilhau (1825) and Virlet d'Aoust (1846), that granite and syenite represented altered clay slates. Diabase and even melaphyre and basalt were regarded by Bischof as shales and clays, poor in silica, and altered by the agency of water.

C. W. C. Fuchs, in 1862, supported Bischof's views in a valuable treatise on the mineralogical and chemical constitution of the granite in the Harz mountains. He regarded the granite as a product of the alteration of sedimentary greywacke by means of water, hornstone being formed in the earlier phases of alteration, and granite during the later phases; these two rocks were connected by a transitional series of alteration products.

A serious objection to the pyrogenetic origin of granite was advanced by H. Rose in 1859. He showed that after fusion quartz passes into an amorphous modification of silica, thereby changing its specific gravity from 2.6 to 2.2. As the quartz in granite and granitoid rocks always has a specific gravity of 2.6, it seemed impossible to suppose it had merely separated from a dry fused mass.

The aquo-igneous origin of granite suggested by Scheerer on theoretical grounds was soon to receive an experimental confirmation. Struck by the peculiar changes which sedimentary deposits underwent in contact with, or in the near vicinity of, eruptive rocks, Professor Daubrée attempted to show that neither heat alone, as Hutton had supposed, nor vapours and gases would suffice to call forth these changes, but that superheated water under great pressure was the most important agent in the metamorphism of rocks. To prove this hypothesis, Daubrée in 1857 conducted a series of very instructive experiments. A glass tube partially filled with water, and hermetically sealed at both ends, was placed in a strong iron tube, which was then closed and exposed to a temperature slightly below red heat. After a few days the glass tube was attacked; in parts of it a finely laminated structure was induced, and the whole tube was transformed into a zeolitic mineral, in virtue of the removal of silica, alumina and soda, and the addition of water. Innumerable small crystals of quartz formed; microlites and diopside crystallites developed in abundance in the less violently attacked parts of the tube,