

Geological Society in 1847. His chief arguments were: (1) the occurrence of separated quartz; this, according to Scheerer, is impossible in the case of consolidation from a fluid mixture of silicates; (2) the order of succession in the separation of felspar and quartz; Scheerer ascribes no weight to Fournet's "surfusion" theory, which supposes that quartz can remain longer in solution than the more easily fusible felspar, as this is a hypothesis which has not been tested experimentally for silicate mixtures; (3) the presence of so-called pyrognomic minerals (orthite, gadolinite), whose physical properties are altered at comparatively low temperatures.

Scheerer also drew attention to the fact that water is held in chemical combination with several of the constituents of granite. This water he regarded as originally present in the magma from which the granite solidified. But if the magma, as might be safely assumed, was subjected to high pressure, which prevented the escape of the superheated water, then very probably the influence of the water might enable the granite magma to remain fluid at temperatures much lower than would be the case under the influence of dry heat. When solidification set in, the minerals with the strongest tendency to crystallise were the first to separate from the pasty granite mass, and the water concentrated itself in the remaining ground-mass, which always became more acid, and owing to the superfluity of water the separation of quartz and the pyrognomic minerals might under some circumstances be suspended until the temperature of the mass was below that of a red heat.

Although Durocher still upheld the pyrogenetic origin of granite against the objections raised by Scheerer, the hydato-pyrogenetic or aquo-igneous doctrine of Scheerer rapidly gained ground in literature. Probably its strongest antagonist was Bischof, whose explanation of the origin of granite, syenite, porphyry, and even basalt, showed a reversion to Neptunistic teaching. In the second volume of his *Physical and Chemical Geology* (1851), Bischof, after a full discussion of the rock-forming minerals, came to the conclusion that all except augite and leucite could take origin from aqueous solutions without increased temperature and under normal pressure, and that their origin from fused rock-masses was quite exceptional. Moreover, the resemblance between the composition of many eruptive rocks and that of certain sedimentary rocks