phyre, phonolite, and related rocks generally recognised, but also Huttonian views respecting the plutonic origin of the granite-grained massive rocks became more widely accepted.

Nevertheless, new objections were raised against the pyrogenetic origin of the granite-grained rocks. Keilhau asserted in his work on the "transitional formations" of Norway that the granite in that area had originated from the conversion of clay slates. The Munich chemist, Johann Fuchs, in 1837 attacked the doctrine of pyrogenetic origin in a series of papers entitled *Ueber die Theorien der Erde.* He pointed out that fusion experiments had never succeeded in reproducing granitic rock artificially, even although individual elements of the rock had been obtained; further, minerals having different melting-points were present in granite, yet these minerals had not consolidated from the magma in the order that corresponded with that of their fusibility, therefore he argued it was absolutely erroneous to suppose that granitic rock had formed merely as the result of slow cooling and consolidation. Fuchs advanced the view that granite, and the granitoid rocks generally, had consolidated from an amorphous magma saturated with water.

In 1845, Schafhäutl succeeded in reproducing quartz artificially by the application of superheated water in a Papin crucible, and this result seemed to confirm Fuchs' views. On the other hand, Fournet, in 1844 and 1847, pointed out that there were certain conditions under which the fusing-points of substances were lowered to temperatures much below the points at which they usually solidified. In papers written about the same time, Durocher, referring for support to Fournet's *Theory of surfusion*, supposes a mass of granite to be originally a homogeneous magma, which can remain fluid until the fusion temperature of felspar is almost reached. At about 1500° C. the separation of felspar, quartz, and mica begins, and the different minerals solidify according to their tendency to crystallisation. Durocher thinks the later formation of quartz crystals might in this way be explained, since felspar passes more readily than quartz from the viscous to the solid state.

Scheerer, the illustrious chemist and geologist, offered formidable objections to the purely pyrogenetic origin of granite in a memoir published in the *Bulletin* of the French