

**Aquo-igneous fusion.**—As far back as the year 1846, Scheerer observed that there exist in granite various minerals which could not have consolidated save at a comparatively low temperature.<sup>28</sup> He instanced especially gadolinites, orthites, and allanites, which cannot endure a higher temperature than a dull-red heat without altering their physical characters; and he concluded that granite, though it may have possessed a high temperature, cannot have solidified from simple igneous fusion, but must have been a kind of pasty mass containing a considerable proportion of water. It is common now to speak of the "aquo-igneous" origin of some eruptive rocks, and to treat their production as a part of what are termed the "hydro-thermal" operations of geology.

Scheerer, Elie de Beaumont, and Daubrée have shown how the presence of a comparatively small quantity of water in eruptive igneous rocks may have contributed to suspend their solidification, and to promote the crystallization of their silicates at temperatures considerably below the point of fusion and in a succession different from their relative order of fusibility. In this way, the solidification of quartz in granite after the crystallization of the silicates, which would be unintelligible on the supposition of mere dry fusion, becomes explicable. The water may be regarded as a kind of mother-liquor out of which the silicates crystallize without reference to relative fusibility.

The researches of the late Prof. Guthrie on the influence of water in lowering the fusing points of various substances have an important geological bearing. He showed that while the melting-point of nitre by itself is 320° C., an ad-

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<sup>28</sup> Bull. Soc. Geol. France, iv. p. 468.