

termine the effect of immersing various minerals in molten basalt, andesite, or phonolite. Among the results obtained by them are the production of a granular structure in pyroxene and hornblende, especially along the borders, as may be observed in the hornblende of recent eruptive rocks; the conversion of a hornblende crystal, which still retains its form, into an aggregate of augite prisms and magnetite, as observed also in some basalts; the conversion of garnet into various other minerals, such as meionite, melilite, anorthite, lime-olivine, lime-nepheline, specular iron, and spinel, the garnet itself never reappearing in the molten magma.<sup>17</sup>

While experiment has thus shown that certain eruptive rocks of the basic order, such as basalts and augite-andesites, may be produced by mere dry fusion, the acid rocks present difficulties which have as yet proved insuperable in the laboratory. MM. Fouqué and Michel-Lévy have vainly endeavored to reproduce by igneous fusion rocks with quartz, orthoclase, white mica, black mica, and amphibole. We may therefore infer that these rocks have been produced in some other way than by dry igneous fusion. The acid rocks, terminating in granite, form a remarkable series, regarding the origin of which we are still completely ignorant. Some data relating to their production will be given in § 2 (p. 524) in connection with the co-operation of underground water.

**Contraction of rocks in passing from a glassy to a stony state.**—Reference has been made (pp. 105, 495, 507) to the expansion of rocks by heat and their contraction on cooling; likewise to the difference between their volume in the

---

<sup>17</sup> Neues Jahrb. 1884, pp. 18, 158. Compare also A. Becker's experiments in melting pyroxenes and amphiboles, Zeitsch. Deutsch. Geol. Gesell. xxxvii. (1885), p. 10.