

composition, its prevailing alkali being soda. Through the base are disseminated crystals of glassy felspar, mica, and sometimes quartz and hornblende, although in the trachyte, properly so called, there is no quartz. The varieties of felspar which occur in trachyte are trisilicates, or those in which the silica is to the alumina in the proportion of three atoms to one.*

Trachytic Porphyry, according to Abich, has the ordinary composition of trachyte, with quartz superadded, and without any augite or titaniferous iron. *Andesite* is a name given by Gustavus Rose to a trachyte of the Andes, which contains the felspar called Andesin, together with glassy felspar (orthoclase) and hornblende disseminated through a dark-colored base.

Clinkstone, or *Phonolite*.—Among the felspathic products of volcanic action, this rock is remarkable for its tendency to lamination, which is sometimes such that it affords tiles for roofing. It rings when struck with the hammer, whence its name; is compact, and usually of a grayish blue or brownish color; is variable in composition, but almost entirely composed of felspar, and in some cases, according to Gmelin, of felspar and mesotype. When it contains disseminated crystals of felspar, it is called *Clinkstone porphyry*.

Greenstone is the most abundant of those volcanic rocks which are intermediate in their composition between the Basalts and Trachytes. The name has usually been extended to all granular mixtures, whether of hornblende and felspar, or of augite and felspar. The term *diorite* has been applied exclusively to compounds of hornblende and felspar. According to the analyses of Delesse and others, the chief cause of the green color, in most greenstones, is not green hornblende nor augite, but a green siliceous base, very variable and indefinite in its composition. The dark color, however, of diorite is usually derived from disseminated plates of hornblende.

The Basalts contain a smaller quantity of silica than the Trachytes, and a larger proportion of lime and magnesia. Hence, independently of the frequent presence of iron, basalt is heavier. Abich has therefore proposed that we should weigh these rocks, in order to appreciate their composition in cases where it is impossible to separate their component minerals. Thus, the variety of basalt called dolerite, which contains 53 per cent. of silica, has a specific gravity of 2.86; whereas trachyte, which has 66 per cent. of silica, has a sp. gr. of only 2.68; trachytic porphyry, containing 69 per cent. of silica, a sp. gr. of only 2.58. If we then take a rock of intermediate composition, such as that prevailing in the Peak of Teneriffe, which Abich calls Trachyte-dolerite, its proportion of silica being intermediate, or 58 per cent., it weighs 2.78, or more than trachyte, and less than basalt.† The basalts are generally dark in color, sometimes almost black, whereas the trachytes are gray, and even occasionally white. As compared with the granitic rocks, basalts and trachytes contain both of them more soda in their composition, the potash-

* Dr. Daubeny on Volcanoes, 2d ed. pp. 14, 15.

† Ibid.