

the roots of ancient volcanoes, and therefore intimately connected with volcanic action, yet owe their special characters to their having consolidated under pressure at some depth within the earth's crust; and to arrange in another series the lavas and tuffs which, having been thrown out to the surface, bear the closest resemblance to the ejected materials from modern volcanoes. He is thus presented with the records of hypogene igneous action in the one group, and with those of superficial volcanic action in the other. He is furnished with a method of chronologically arranging the volcanic phenomena of past ages, and is thereby enabled to collect materials for a history of volcanic action over the globe.

In adopting this classification for unravelling the geological structure of a region where igneous rocks abound, the student will encounter instances where it may be difficult or impossible to decide in which group a particular mass of rock must be placed. He will bear in mind, however, that, after all, such schemes of classification are proposed only for convenience in systematic work, and that there are no corresponding hard and fast lines in nature. He will recognize that all crystalline or glassy igneous rocks must be intrusive at a greater or less depth from the surface; for every contemporaneous sheet has obviously proceeded from some internal pipe or mass, so that, though interbedded and contemporaneous with the strata at the top, it is intrusive in relation to the strata below.

The characters by which an eruptive (igneous) rock may be distinguished are partly lithological and partly geotectonic. The lithological characters have already been fully given (pp. 238, 269). Among the more important of them are the predominance of silicates (notably of feldspars, horn-