

of igneous rock. This is the extreme view of the origin of different species of igneous rocks by the process of differentiation. Partly in opposition to this is that known as the assimilation theory which supposes igneous rocks to owe many of their present differences to the older rocks with which they have come in contact, and by which they have been modified.* This theory could scarcely receive, under any circumstances, such wide application as that just assigned to the differentiation theory, namely, that all rocks have come from a universal common magma and are differentiated only by the rock material with which they come in contact. Nor could it be counted a directly essential character in large extrusive volcanic outputs. But in the consideration of intrusive rocks, where the invading lava may for long periods of time have been slowly taking in and dissolving the surrounding rock material, the process of magmatic stoping may have made the assimilation factor an important one in the modification of igneous rocks.

The Monteregian hills are all intrusive, and are comparatively small igneous masses; they have penetrated strata of different mineralogical and chemical composition. Thus the Hudson River mud stones, Trenton limestones, the graphitic limestone and black slates of the Farnham and Philipsburg series, as well as the quartz mica schists of the Sillery, have been penetrated by these rocks, without producing any material change in the rocks themselves, beyond a generally well marked endomorphic contact zone. Moreover, the sedimentary rocks through which the granites and the diabase series have been intruded are generally very similar to those surrounding the Monteregian hills; in fact, the Hudson River shales are the only rock of the latter region not found in the former. Hence, it would seem, whatever the cause may be of the primary magmatic differentiation the magma which gave rise to the Monteregian hills was primarily different from that which produced the other rocks discussed, with the partial exception already mentioned of the later diorite. In summarising it may be said that the rocks of southeastern Quebec present two petrographical provinces, and their differences are due to primary differentiation, i.e. to differences in the original magmas.

I. (a) Porphyry andesite series, extrusive and probably of Pre-Cambrian age.

* Dr. R. A. Daly, Am. Jour. Sci. On the Mechanics of Igneous Intrusions.