

in certain minerals than other parts. In all probability differential cooling and the action of gravity are not the only factors which tend to bring about these remarkable phenomena in rocks, many other factors, some of which we do not even suspect as yet, probably also working in the same direction. But whatever the causes may eventually prove to be which are most potent in bringing about these remarkable irregularities in molten rock masses, the fact remains that in cooling such masses do fall apart into portions differing in composition.

Now it stands to reason that since these changes are brought about by movements in the molten mass, the more fluid the mass is, the more favorable will be the conditions for such irregularities to develop themselves, and hence as basic magmas, both natural and artificial, are more fluid than acid magmas, it is in basic magmas that such irregularities will be most strikingly seen. As actual examples of this process we may take, for instance, the basic borders which we find in connection with so many granite masses, where during cooling the more basic part of the magma has concentrated itself toward the sides of the mass. The dark spots and patches which disfigure so many granites are, in many cases at least, portions of such basic parts which have been separated by subsequent movements in the magma. As a granite, where this is excellently seen, the Garabal Hill granite of Scotch Highlands may be cited, or the celebrated Brocken massif of the Harz Mountains, in which a gradual passage from granite to gabbro can be clearly traced. Many similar examples nearer home may be cited, as for instance the igneous core of Mount Royal and many of its associated dykes in which remarkable variations of composition may be observed.

It is a universally recognized fact that ore deposits usually have some connection with igneous rocks, that is, with rocks which have solidified from a molten condition. Of these ore deposits, however, two classes have, as Prof. Vogt points out, a peculiarly intimate relation to such rocks, namely:

- 1st. Titanic iron ores.
- 2nd. Sulphide ores containing nickel.

These deposits not only occur in connection with the igneous rock but actually appear to form part of it, the ore occurring distributed through the rock and the heavy bodies of ore merging gradually into it in many places, so that it is impossible to tell where the rock begins and