encountered on the way up; and the same may be true of the iron, the reduction in this case having been effected, as J. L. Smith suggested, by the aid of some carbon compound in the ascending liquid basalt. But it may be that the iron was carried up by the liquid rock from the earth's interior.

Some igneous rocks consist chiefly of the "infusible" minerals chrysolite and leucite; but the complete fusion which the capability of flowing indicates is evidence that some part of the constituents of these rocks before ejection were in fusible combinations. By infusible is here meant infusible before the common blowpipe.

The more important volcanic phenomena connected with these rocks depend on the temperature of fusion, those requiring the least heat being the earliest to fuse as the temperature rose, and the longest to continue liquid as it declined, and, therefore, those that have commonly had, when ejected, the temperature of the freest liquidity.

There are three prominent classes of igneous rocks, differing in fusibility. In each class the kinds are nearly alike in chemical constitution, but differ somewhat mineralogically and in state of crystallization. There are intermediate kinds; but still the classes stand out prominently. These three groups are as follows: —

1. *Easy fusibility.* — The BASALTIC CLASS: These fuse at about 2250° F. (C. Barus); consist chiefly of pyroxene (or a related species), and of the feldspar, labradorite, whose alkalies are lime and soda; they often carry grains of chrysolite, but very rarely of quartz: as basalt, doleryte, diabase, gabbro, etc. These rocks are *basic* (pages 65, 86); but fusibility, not basicity, is the important characteristic as regards volcanic phenomena; for anorthite, the most basic of the feldspars, is one of the most infusible.

2. *Medium fusibility* (about 2520° F., Barus). — The ANDESYTE CLASS: These consist of a mineral of the pyroxene-hornblende group, and, as the feldspar portion, of oligoclase or andesite, whose alkalies are soda and lime; they often carry quartz grains: as andesyte, dacyte, quartz-andesyte, dioryte, and related kinds.

3. *Difficult fusibility* (about 2700° F., Barus, for quartz-trachyte or rhyolyte). — The TRACHYTE CLASS: These consist of potash-feldspar, orthoclase, or of orthoclase with a little oligoclase, or albite; sometimes containing mica, pyroxene, hornblende, quartz: as trachyte, rhyolyte, felsyte, granite, etc. Rhyolyte is quite viscid even at 3100° F. (Barus).

Lavas, especially the trachytic and andesytic kinds, and including lithoid obsidian, have frequently a thin laminated structure, which is produced, not by a succession in streams, the laminæ being too thin for streams, but by successive action in the supply of lava at the point of outflow; the incipient subdivisions are drawn out as the stream flows into thin sheets or layers (Iddings).

Fouqué and Lévy obtained from fused basalt on cooling after being for 48 hours at *white-red* fusion, "a temperature above the melting-point of pyroxene and labradorite," "crystals of olivine in a brownish vitreous magma"; but on cooling from *cherry-red* fusion sustained for 48 hours, numerous microlites of labradorite and pyroxene with magnetite.

Messrs. Ch. and G. Friedel (1890), on heating mica to 500° C. (900° F.) with alkaline