OPAL. — Uncrystallized silica, a little less hard than quartz and of less density (G=2·3), and having usually a greasy or waxy luster. Colors, white to milky gray, red, etc.; when showing internal colored reflections it is the gem, opal. Opal is identical with quartz in composition, yet commonly contains some water; it dissolves more readily in heated alkaline waters. Here belongs the material deposited by the hot waters of geysers, making the geyser basins (sometimes called *geyserite*); also the siliceous secretions of Sponges, and the shells of Radiolarians, and of the minute microscopic plants called Diatoms.

TRIDYMITE. — Pure silica of the density of opal, but occurring in minute thin glassy hexagonal crystals, in obsidian and some other volcanic rocks.

2. *Alumina.*

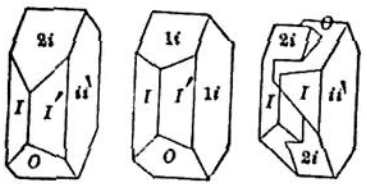
SAPPHIRE OR CORUNDUM. — Composition: Al_2O_3 = oxygen 46·8, aluminium 53·2 = 100. The crystals are the hardest of gems next to the diamond; the blue transparent crystals are sapphire, the red crystals, oriental ruby; and the coarser material when ground makes emery.

3. *Silicates of Aluminium and other Basic Elements.*

THE FELDSPARS. — The feldspars are next in abundance to quartz. Luster nearly like quartz, but often somewhat pearly on smooth faces. H = 6½–7, or very nearly as hard as quartz. Specific gravity 2·4–2·6. In general white or flesh-colored; rarely greenish or brownish. Crystals stout, never acicular. Differs from quartz in having a perfect cleavage in one direction, yielding under the hammer a smooth lustrous surface, and in another, nearly as perfect a cleavage surface, the two inclined 84° to 90° to one another; also in being more or less fusible before the blow-pipe. Composition: Silica and alumina with either potash, soda, or lime, or two or all of these combined. Contains, unless impure, no iron or magnesia.

The group of feldspars includes several species differing in the proportion of silica (the acid) to the other ingredients (bases), and in the particular alkali (potash, soda, or lime) predominant, but they graduate to some extent into one another. The kinds are as follows: —

34. 35. 36.



Orthoclase, or *potash*-feldspar, is the most common. The cleavage surfaces make a right angle with one another, whence the name, signifying *cleaving at a right angle;* the form is monoclinic. Figs. 34, 35, 36, represent crystals of this species, the last a twin crystal; cleavage takes place parallel to the faces *O* and *ii*. Composition: Silica 64·7, alumina 18·4, potash 16·9 = 100.

The other kinds are triclinic in crystallization, and the cleavages make an oblique angle with one another, of 84° – 89° 44′, and hence they are sometimes called *plagioclase*, from the Greek *plagios*, *oblique*.

Microcline. — Like orthoclase in composition; but the cleavage angle differs 16′ from 90°. The chief distinctions are optical.

Albite. — A soda feldspar, named from the Latin *albus*, *white*. When albite and orthoclase occur together, albite is usually the whiter. Composition: Silica 68·6, alumina 19·6, soda 11·8 = 100. A little more fusible than orthoclase.

Oligoclase. — A soda-lime feldspar. Composition: Silica 61·9, alumina 24·1, lime 5·2, soda 8·8 = 100. Fuses like albite.

Labradorite. — A lime-soda feldspar. Composition: Silica 52·9, alumina 30·3, lime 12·3, soda 4·5 = 100. Fuses easily, named from Labrador. *Andesite* is a species between oligoclase and labradorite in composition, named from the Andes.

Anorthite. — A lime feldspar. Composition: Silica 43·1, alumina 36·8, lime 20·1 = 100.