

crust, owing to removal of its bases. The mineral *rubellan*, which occurs in hexagonal brown or red opaque inelastic tables in some basalts and other igneous rocks, is regarded as an altered form of biotite.

Phlogopite is another dark ferro-magnesian mica which contains a little fluorine. *Lepidolite* (Lithia-mica) occurs in some granites and crystalline schists, especially in veins. *Damourite*, merely a variety of muscovite, occurs among crystalline schists. *Sericite*, a talc-like variety of muscovite, occurs in soft inelastic scales in many schists, as a result of the alteration of orthoclase felspar.²⁶ *Margarodite*, a silvery talc-like hydrous mica, is widely diffused as a constituent of granite and other crystalline rocks. *Paragonite*, a scaly micaceous mineral, forms the main mass of certain alpine schists.

Hornblende (Monoclinic Amphibole, CaO, 10-12, MgO 11-24, Fe₂O₃ 0-10, Al₂O₃ 5-18, SiO₂ 40-50 also usually with some Na₂O, K₂O and FeO). Divided into two groups. 1st. Non-aluminous, including the white and pale green or gray fibrous varieties (tremolite, actinolite, etc.). 2d. Aluminous, embracing the more abundant dark green, brown, or black varieties. Under the microscope, hornblende presents cleavage-angles of 124° 30', the definite cleavage-planes intersecting each other in a well-marked lattice work, sometimes with a finely fibrous character superadded. It also shows a marked pleochroism with polarized light, which, as Tschermak first pointed out, usually distinguishes it from augite.²⁷ Hornblende has abundantly resulted from the alteration (paramorphism) of augite (see below, Uralite). In many rocks the ferro-magnesian silicate which is now hornblende was originally augite; the epidiorites, for instance, were probably once dolerites or allied pyroxenic rocks. The pale non-aluminous hornblendes are found among gneisses, crystalline limestones, and other metamorphic rocks. The dark varieties, though also found in similar situations, sometimes even forming entire masses of rock (amphibolite, hornblende-rock, hornblende-schist), are the common forms in granitic and volcanic rocks (syenite, diorite, hornblende-andesite, etc.). The former group naturally gives rise by weathering to various

²⁶ On the occurrence of this mineral in schists, see Lossen, Zeitsch. Deutsch. Geol. Ges. 1867, pp. 546, 661.

²⁷ Wien. Acad. May, 1869. See also Fouqué and Michel-Lévy, op. cit. pp. 349, 365.