questions as to modes of origin, I shall group the schists according to their mineral characters, beginning with those which are obviously only a further stage of the alteration of clay-slates, and ending with the gneisses, which bear a close affinity to granites.

1. ARGILLITES, ARGILLACEOUS SCHISTS, PHYLLITES.—The rocks included in this group may often be traced into the clay-slates described on p. 235. They mark a further stage of metamorphism, wherein besides mechanical deformation there has been a more or less decided recrystallization of the materials, which is demonstrated by the abundant secondary mica and by the appearance of such minerals as chiastolite, andalusite, staurolite, garnet, etc. When a clay-slate becomes lustrous by the development of mica, it is known as Phyllite—a term which may be regarded as embracing the intermediate group of rocks between normal clay-slates and true mica-schists.

Chiastolite-slate (schiste maclé), a clay-slate in which crystals of chiastolite have been developed, even sometimes side by side with still distinctly preserved graptolites or other organic remains[212] (Skiddaw, Aberdeenshire, Brittany, the Pyrenees, Saxony, Norway, Massachusetts, etc.). Staurolite-slate, a micaceous clay-slate with crystals of staurolite (Banffshire, Pyrenees). Ottrelite-slate, a clay-slate marked by minute, six-sided, grayish or blackish green lamellæ of ottrelite (Ardennes, where it is said to contain remains of trilobites, Bavaria, New England). Dipyre-slate is full of small crystals of dipyre. Sericite-phyllite is a name proposed by Lossen for those compact, greenish, reddish, or violet sericite-schists in which the naked eye can no longer distinguish the component minerals. Mica-phyllite (*phyllade gris feuilleté* of Dumont), a silky, usually very fissile slate, with minute scales of mica. German petrographers have distinguished by name some other varieties found in metamorphic areas and characterized by different kinds of concretions, but to which no

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[212] A good illustration of this association is figured by Kjerulf in his "Geologie des Südlichen und Mittleren Norwegen," Plate xiv. fig. 246. See also Brögger's memoir on Upper Silurian fossils among the crystalline rocks of Bergen. Christiania, 1882. A similar association occurs in the graptolite-shales next the granite of Galloway, Scotland.