chlorite schist or a *hornblende* schist, and for filling such schists with crystals of the silicates, *hornblende, pyroxene, garnet, staurolite, ottrelite;* or if free from iron, it has the elements for making *andalusite, sillimanite, cyanite* (each $Al_2O_3SiO_2$), silica and alumina, when no alkali or other bases are free, being ready to form these aluminum silicates.

Increasing remoteness from a region of crystalline rocks favors the making of sediments free from alkali, because the alkali becomes leached out of sediments by the transporting waters. This is illustrated a few miles west of New Haven, Conn., where the mica schist gradually changes to the southward, to a chloritic hornblende schist, — hornblende and chlorite, unlike the mica, containing no potash.

When carbonaceous shales are altered to mica schist, the "fixed carbon" present (page 315) may become crystallized into *graphite;* for graphitic mica schists are common. It has been suspected that diamonds, another form of carbon, may have been made in the course of the metamorphic changes of carbonaceous shales or sandstones.

Again, if a dolomyte, or magnesian limestone, contains some silica finely disseminated through it as impurity, either in the state of quartz or of organic silica (Diatoms, spicules of Sponges), metamorphic action may, while crystallizing the limestone, fill it with bladed or radiating crystallizations of *tremolite* (white hornblende); for a portion of the dolomite ($\frac{1}{2}$ Ca $\frac{1}{2}$ MgO. CO_2) might take the silica (SiO_2) as a substitute for its carbonic acid (CO_2), and thus tremolite ($\frac{1}{2}$ Ca $\frac{1}{2}$ MgO. SiO_2) would result. When the dolomyte contains some iron, as well as the silica, *actinolite* (green hornblende) may form and in like manner be disseminated through the mass of the rock, instead of tremolite. Under similar circumstances, at a higher temperature, white *pyroxene* which has the same composition as tremolite, or green pyroxene, which has the composition of actinolite, may be formed in stouter crystallizations.

If clayey impurities are present in the limestone (these consisting of silica and alumina, with or without iron or magnesia), the limestone may become filled with *garnets* and other silicates. An Eocene limestone, in the Ligurian Apennines, much contorted and in contact with diabase, gabbro, etc., contains crystals of the soda-feldspar *albite;* and inside of the crystals there are the siliceous tests of Radiolarians (genera Ethmosphæra, Heliosphæra, and others), suggesting that possibly the silica of the albite was of organic origin. (A. Issel, 1890.)

Chrysolite consists of silica 41·4, magnesia 50·9, iron protoxide 7·7. In the rocks it is often found changed to *serpentine*, which consists, in 100 parts, of silica 43·5, magnesia 43·5, water 13. The iron protoxide and some magnesia are here rejected and water received; and usually the iron stays about or within the serpentine, as a cloud of black grains or a few black crystals of *magnetite*. So, also, the magnesian silicates, *pyroxene, hornblende, chondrodite, chlorite*, and other species, occur changed to serpentine. When such a change happens on a large scale, a chrysolite rock, or pyroxenic rock, or hornblendic rock, etc., becomes, in part or wholly, a serpentine rock. In a similar way, pyroxene, or hornblende, or garnet, may be changed to chlorite, or to epidote, etc., labradorite, or anorthite ($G = 2{\cdot}7$) to saussurite ($G = 3 - 3{\cdot}5$).

The pure amorphous serpentine often has parallel cracks (apparently due to contraction on drying), which are filled with fibrous serpentine (amianthus, or asbestos); and when the cracks are very thin and numerous, and are filled with calcite or dolomite, the specimens often have the aspect and general structure of the so-called *Eozoon* of Archæan rocks.