

mineralogical rearrangement of its substance. It may or may not have been a crystalline rock originally. Any rock capable of alteration (and all rocks must be so in some degree) will, when subjected to the required conditions, be metamorphosed. The resulting structure, however, will, save in extreme cases, bear witness to the original character of the mass. In some instances, the change has consisted merely in the rearrangement or crystallization of one mineral originally present, as in limestone converted into marble; in others, there has been a process of paramorphism, as where augite has been changed into hornblende in the alteration of dolerites into epidiorites; in others, the constituents have been forced by mechanical movements to range themselves in parallel laminae, as where a diorite or pyroxenic rock becomes a hornblende-schist; in others, partial or complete transformation of the original constituents, whether crystalline or clastic, into new crystalline minerals has been accompanied by a complete recrystallization and change of structure in the rock. Quartzite is evidently a compacted sandstone, either hardened by mere pressure, or most frequently by the deposit of silica between its granules, or a slight solution of these granules by permeating water, so that they have become mutually adherent. A clay-slate is a hardened, cleaved, and partially metamorphosed form of muddy sediment, which on the one hand may be found full of organic remains, like any common shale, while on the other, by the appearance and gradual increase of some form of mica and other minerals, it may be traced becoming more and more crystalline, until it passes into phyllite, chistolite-slate, or some other schistose rock. Yet remains of fossils may be obtained even in the same hand-specimens with crystals of andalusite, garnet, or other minerals. The