

ing not more than 3 per cent of interstitial water cannot be depressed to depths of several thousand feet beneath the level of the earth's surface, and undergo great pressure and crushing, without suffering more or less marked internal change or metamorphism.

A few illustrative examples of metamorphism may be given here; the structure of metamorphic rocks, with the phenomena of "contact" and "regional" metamorphism, will be discussed in Book IV. Part VIII.

*Production of marble from limestone.*—One of the most obvious cases of alteration—the artificial conversion of limestone into crystalline saccharoid marble—has been already referred to (p. 509).<sup>58</sup> The calcite having undergone complete transformation, its original structure, whether organic or not, has been effaced, and a new structure has been developed, consisting of an aggregate of minute rounded grains, each with an independent crystalline arrangement. The production of a crystalline structure in amorphous calcite may be effected by the action of mere meteoric water at or near the surface (ante, p. 264, and postea, p. 620). But the generation of the peculiar granular structure of marble always demands heat and pressure, and probably usually the presence of water; the details of the process are, however, still involved in obscurity. We know that where a dike of basalt or other intrusive rock has involved limestone, it has sometimes been able to convert it for a short distance into marble. The heat (and perhaps the moisture) of the invading lava have sufficed to produce a granular structure, which even under the microscope is identical with that of marble. The conversion of wide areas of lime-

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<sup>58</sup> See also "Marmorosis" in Book IV. Part. VIII.