So great has been the pressure exerted by gigantic earth-movements upon the rocks of the crust that even the most solid and massive materials have been sheared, and their component minerals have been made to move upon each other, giving a flow-structure like that artificially produced in metals and other solid bodies (ante, p. 538). But it may be doubted whether this motion is ever strictly molecular without rupture of the constituent minerals. Microscopic examination shows that, at least as a general rule, the minerals in the most thoroughly bent and crushed rocks have been broken down. It is observable that under the effects of mechanical strain the minerals first undergo lamellation, twinning being developed along certain planes. This structure increases in distinctness with the intensity of the strain so long as the mineral (such as felspar) retains its cohesion, but the limit of endurance is soon reached, beyond which it will crack and separate into fragments, which, if the movement is arrested at this stage, may be cemented together by some secondary mineral filling up the interspaces. But should the pressure increase, the mineral may be so wholly pulverized as to assume a finely granular structure or mosaic of interlocking grains, which under the influence of continual shearing may develop a streaky arrangement, as in flow-structure and foliation.[47]

One of the most important effects of this mechanical deformation and trituration under gigantic pressures has been the great stimulus thereby given to chemical reactions. So constant and so great have these reactions been, and so completely in many cases have the ingredients of the rocks been recrystallized in fresh combinations, that the new structures

[47] Lehmann, op. cit. pp. 245, 249; G. H. Williams, Bull. U. S. Geol. Survey, No 62, p. 47.