

sulted in a further change, wherein chemical reactions have been set up and new minerals have been formed. The effects of pressure and of movement under great strain in quickening chemical activity are now clearly recognized. Not only have the original minerals been driven to rearrange themselves with their long axes perpendicular to the direction of the pressure, but secondary minerals with well-marked cleavage have been developed along the same lines and thus a distinct foliated structure has been induced in what were originally amorphous rocks.

Still more marked are the transformations where the rocks have not merely been compressed, but where they have been crushed, fractured, or stretched. The extraordinary manner in which the crust of the earth has been fractured in some areas of regional metamorphism has been worked out in great detail by the Geological Survey in the northwest of Scotland.⁴⁴ We there perceive how slice after slice of solid rock has been pushed forward one over the other, how those accumulated slices have been driven over others of similar kind, how this structure has been repeated again and again, not only on a great scale involving mountain-masses in the movement, but even on so minute a scale that the ruptures and puckerings cannot be seen without a microscope (p. 1033).

Such dynamical movements could not but be accompanied with widespread and very marked chemical change. Along the margins of faults or planes of shearing, where the rocks have been ground against each other, there is a sel-vage of foliated material which with its new mineral combinations gradually passes into the amorphous rock on either

⁴⁴ Quart. Journ. Geol. Soc. xliv. 1888, p. 378.