

rocks as the result of the conditions attending their intrusion. In consequence of the constitutional changes which appear to take place in rocks when subjected to great orographic pressure, it becomes in many cases extremely difficult, if not impossible, to distinguish between the two kinds of gneisses. Moreover, our knowledge of the cause of differentiation of igneous magmas is as yet little more than a speculation, but that the nature of this original differentiation conditions in part the character of the structure resulting from subsequent processes is obvious.

While in many respects incomplete, involving, as it does, much that is as yet little understood in the metamorphism of rocks, on the whole the evidence seems to favor the last hypothesis (V), namely, that of dynamic metamorphism.

Briefly summarized, this hypothesis supposes—

1. That the structure characterizing the leopard rock is due to orographic agencies and represents an intermediate stage in the development of a streaked augite-syenite-gneiss out of an augite-syenite which was distinguished by a coarsely crystallized structure and by a somewhat irregular aggregation of pyroxene. The character of the original magma may have been modified somewhat by the absorption of included fragments of pyroxenite.

2. That the distribution of the pyroxene has been effected presumably by the solution of portions of the original constituents and their recrystallization along lines marking the location of the cracks.

3. That with continued pressure these lumps have been more and more drawn out, the process being accompanied by recrystallization until the rock assumes the streaked gneissoid form.

While in general the evidence of crushing is rendered more or less doubtful by the extent of recrystallization, in one case (number 159) it is undoubted. This represents a partly developed gneiss in which, however, the ellipsoidal structure is but imperfectly presented. Though differing considerably from the rest of the rock in general appearance, there is little doubt but that it belongs to the same mass. The ground-mass is much finer than in any of the others and shows much less the effects of recrystallization. Large grains of microcline are partly crushed and drawn out into lens-like forms comparable to the augen-structure. A significant feature is the arrangement of the augite in irregular bands about the feldspar and quartz. In some of the augite grains the appearance of crushing and dragging is pronounced, while the general appearance of the rock, both in hand specimens and under the microscope, admits of no other conclusion than that its present structure is due to the effects of orographic pressure.