

water, why not admit the same as to the granitic rocks? for often we can not draw the line between them—between gneiss and granite, for instance. Their composition is the same, and they differ only in the schistose or foliated structure, which often is so nearly obliterated in gneiss that we are in doubt whether it be present. What can granite be, then, but an example of metamorphism carried to its utmost limit; carried far enough to obliterate all traces of stratification, lamination and foliation? If water be admitted as a principal agent, heated by caloric from the earth's interior, and prevented from escaping by thousands of feet of superincumbent rock, complete plasticity would result at a temperature far below that required to melt granite in a dry state.

By this view a large proportion of granitic rocks may be only metamorphosed schists. If so, it explains why they have disturbed or changed the adjacent strata so little—the chemical influence rarely being traceable more than a quarter or half of a mile. In some instances, they may have been thrown up from the melted interior of the earth, and possibly in a state of fusion, without water. If only five or ten per cent. of water be present, it is calculated that the heat need not be as high as redness to produce the requisite plasticity.

If it be doubted whether water penetrates so deep into the earth's crust as we know granite to extend, it should be recollected that the stratified rocks, all of which were originally deposited from water, and so far as we can judge, retain more or less of it still, are from ten to twenty miles thick. But if even lava owes its fluidity in a measure to water, it may be supposed to be present in liquid granite with equal reason. In short, whoever admits the aqueo-igneous origin of the crystalline foliated rocks, will feel compelled to admit the granitic rocks to have resulted from essentially the same causes. Nor is the theory very different, after all, from that which usually prevailed. It admits fluidity from heat in the materials, and only introduces water as an important auxiliary in the work. It is by no means the old Wernerian theory revived, for that made granite a deposit from an ocean.

7. *Metamorphism throws light upon the formation of dykes and veins, whether they belong to the granitic, trappean, or volcanic groups of rock.*—It does this by introducing water along with