

they could not have been deposited upon a magma. There must have been a firm crust presenting a floor upon which they were laid down. That floor, together with portions of the system of rocks which lay piled upon it, has disappeared. That it has sunk down to a zone of fusion and become absorbed by liquefaction in a sub-crustal magma, which later crystallized out as the Laurentian, is the only explanation that is open to us. It follows also that the Laurentian rocks are younger than those of the Ontarian system, as has been before indicated.

PRINCIPLES OF CLASSIFICATION.

The bearing of the facts and conclusions recorded above upon the taxonomy of the Archean is apparent. The argument establishes this cardinal principle in the classification of that great complex of rocks, viz., that its primary subdivision depends upon a distinction of cosmical importance between an older assemblage of altered normal surface-formed strata and a younger assemblage of rocks resulting from the crystallization of a sub-crustal magma.

Principles applicable to the Upper Division.—To the upper or Ontarian system the ordinary stratigraphical methods of classification are applicable. The system separates stratigraphically into two great groups. The lower and older, consisting of strata free from volcanic admixtures, so far as has been observed, is the Couthiching. It resembles in its lithological characters and in its position the Montalban of Hitchcock. The upper group, consisting of rocks which are dominantly volcanic in composition, is the Keewatin. It rests upon the Couthiching in probable unconformity, the beginning of the period in which these rocks were deposited being signalized by the advent of a widespread and continued volcanic activity. This group falls into line with the Green Mountain series in the position assigned to it by Hitchcock. Other groups may quite possibly be discovered which will swell the volume of the Ontarian system.

Principles applicable to the Lower Division.—In the Laurentian the ordinary stratigraphical principles of classification do not apply, since there are no strata properly so called; and we must seek for a principle appropriate to an assemblage of rocks essentially different in their development and mode of occurrence from all those of the stratigraphical column. The Laurentian is not homogeneous throughout its surface distribution. It is composed of different members or masses, which, while they present wonderfully constant general characters within themselves, are distinct from one another lithologically. A study of the relationship between the masses thus differentiated in space leads us to the chief moment of all geological classification, namely, their differentiation in time; and we have to consider the possibility