

There can be but little doubt that the various gneissic rocks, constituting the more acid part of the series, are of truly igneous origin; and there is no evidence whatever of their having ever formed part of a sedimentary series.

The true character of the more basic members is more uncertain, but they are probably closely related to the pyroxene granulites of Saxony, and doubtless represent either differentiation-products of the original magma, or basic intrusions whose structural relations and characters have been largely masked by the great movements which have taken place in the whole series at a later date.

The Grenville Series differs from the Fundamental Gneiss in that it contains certain rocks whose composition marks them as highly altered sediments. These rocks are chiefly limestones, with which are associated certain peculiar gneisses, rich in sillimanite and garnet, having a composition approaching ordinary shale or slate, or else very rich in quartz and passing into quartzite, having thus the composition of sandstone. These rocks, as has been shown in one of the papers before referred to, usually occur in close association with one another, and are quite different in composition from any igneous rocks hitherto described. They are considered as constituting the essential part of the Grenville series. They usually, however, form but a very small proportion of the rocky complex in the areas in which they occur, and which, owing to their presence, is referred to the Grenville series. They are associated with and often enclosed by much greater volumes of gneissic rocks, identical in character with the Fundamental gneiss. The limestones are also almost invariably penetrated by masses of coarse pegmatite, and occasionally large masses of the limestone are found embedded in what would otherwise be supposed to be the Fundamental gneiss. The whole thus presents a series of sedimentary rocks, chiefly limestones, invaded by great masses of the so-called Fundamental Gneiss, and in which, possibly, some varieties of the gneissic rocks present may owe their origin to the partial commingling of the sedimentary material with the igneous rocks by actual fusion. There is, however, no reason to believe, from the evidence at present available, that any considerable proportion of the series has originated in the last mentioned manner.

It will be readily seen that an exact delimitation of areas of the Grenville series is thus sometimes a matter of great difficulty, as they often appear to shade away into the Fundamental gneiss, and it has hitherto been difficult in the case of the Grenville series to account for the existence of such a comparatively small proportion of sedimentary strata, intimately associated with such great volumes of igneous gneisses.

The relations of the two series, as determined by the investigations of the last two seasons, throws new light upon the subject, and indicates the probable explanation of the difficulty.