

which he sub-divided into two chief groups: the younger or *Algonkian* (a term introduced by Walcott from the name of an Indian race) comprises the clastic or crystalline rocks immediately below the Cambrian system, while the older or *Archæan* group comprises the wholly crystalline and foliated basement complex of rocks.

The pre-Cambrian phyllites, schists, and conglomerates of Brittany have been subjected to a close examination by Barrois (1883-94), who has greatly advanced the knowledge of the stratigraphy of that complicated area. Barrois discovered organic remains in the quartzites, and Cayeux identified them as *Radiolaria* and sponges. Rauff, on the other hand, regards these supposed fossil remains merely as mineral structures.

Alpine geologists have, in the course of detailed geological surveys, frequently been able to prove that gneissose and schistose areas of rocks which used to be regarded as pre-Cambrian represent metamorphosed portions of the younger formations. Even Cainozoic rocks have undergone complete metamorphism in highly-disturbed Alpine regions.

The insuperable difficulty with which geologists have to contend in their attempts to unravel the complicated stratigraphical relations of metamorphic rocks is that, in virtue of the changes they have undergone, any fossil remains which might originally have been contained in them have been nearly all altered beyond sure recognition. Then there is the other difficulty that not only the sedimentary series, but also the plutonic igneous masses and injected igneous rocks, when they undergo strong crust pressures, may be converted into foliated metamorphic rocks. Hence the only means of arriving at a just appreciation of the age and relationships of the metamorphic rocks is, first, by careful cartographical survey and comparison of the stratigraphical relations subsisting between the several members of a metamorphic series and the sedimentary unaltered rocks; and second, by finer microscopic investigation of rock-specimens, taken from all grades of altered and unaltered rocks whose relations in the field have been fully investigated.

Only after prolonged researches can geology hope to determine how much of the crystalline metamorphic rocks really belongs to an Archæan and pre-Cambrian basement series, and how much is of later sedimentary or igneous origin.