

outside of it. It is further an accepted theorem, universally acknowledged by scientific men, that our globe was originally in a state of igneous fusion, and that all the material which constitutes the rocks of our day existed in the form of a melted zone encircling the central part of the globe. It is evident that, before the conditions for the formation of sedimentary rocks could exist, the liquid globe must have become, to some extent, solid; a crust at least, must have been formed upon it, from the disintegration of which the material of such sedimentary rocks could have been derived, and upon which that material could have been deposited. This crust, and the rocks which from time to time after its solidification penetrated or were erupted through it, must consequently, have been the first rocks, and they must have yielded the material for all those subsequently formed by aqueous agencies. It would, therefore, appear legitimate to name the former class original and the latter, derived rocks.

Where, as in the case of the volcanic and sedimentary rocks which are being formed at the present day, we can observe the process of their formation, no doubt can arise as to their origin. These rocks, however, form but a very minute fraction of those which build up the earth's crust, and it becomes necessary, in order properly to discriminate among the latter, to point out the distinguishing characters of original and derived rocks. The further we go back in geological time, and the older the rocks are which we are called on to classify, the greater is the difficulty of doing so, and the more divergent the opinions of geologists become as to their origin. The stratigraphical relations of rocks are most effective in determining this, but it will be necessary at present to confine ourselves to considerations of a more purely petrological nature. This is the more easily done, since the lithological characters afford abundant means of recognizing original and derived rocks, and distinguishing them from each other.

Original rocks are made up of crystalline particles of one or more minerals, principally silicates. These are seldom perfect in crystalline form, are frequently more or less irregular or distorted, and are intimately bound together to a compact whole, without the intervention of any foreign substance as a cementing material. They are thus mutually interlocked to a crystalline mass, which, however, possesses at the same time an average mineralogical and