

the only difference between the two rocks (whatever may be their difference of origin) being that the constituent minerals, instead of being confusedly aggregated, as in granite, assume a foliated texture in gneiss. This foliated structure leads sometimes to gneiss being called *stratified granite*. "The term gneiss originated with the Freiberg miners, who from ancient times have used it to designate the rock in which their veins of silver-ore were found."*

The felspar, which enters into the composition of granite, is a mineral that is easily decomposed by water, either cold or boiling, or by the water of springs rich in carbonic acid. The chemical action of carbonic acid and water, and the action (at once chemical and mechanical) of the hot water in the primitive seas, powerfully modified the granitic rocks which lay beneath them. The warm rains which fell upon the mountain-peaks and granitic pinnacles, the torrents of rain which fell upon the slopes or in the valleys, dissolved the several alkaline silicates which constitute felspar and mica, and swept them away to form elsewhere strata of clay and sand; thus were the first modifications in the primitive rocks produced by the united action of air and water, and thus were the first sedimentary rocks deposited from the oceanic waters.

The argillaceous deposits produced by this decomposition of the felspathic and micaceous rocks would participate in the still heated temperature of the globe—would be again subjected to long continued heat; and when they became cool again, they would assume, by a kind of semi-crystallisation, that parallel structure which is called foliation. All foliated rocks, then, are metamorphic, and the result of a metamorphic action to which sedimentary strata (and even some eruptive rocks) have been subjected subsequently to their deposition and consolidation, and which has produced a re-arrangement of their component mineral particles, and frequently, if not always, of their chemical elements also.

In this manner would the first beds of crystalline *schist*, such as mica-schist, be formed, probably out of sandy and clayey muds, or arenaceous and argillaceous shales.

At the end of this first phase of its existence, the terrestrial globe was, then, covered, over nearly its whole surface, with hot and muddy water, forming extensive but shallow seas. A few islands, raising their granitic peaks here and there, would form a sort of archipelago, surrounded by seas filled with earthy matter in suspension. During a long series of ages the solid crust of the globe went on increasing in

* Cotta's "Rocks Classified and Described," by P. H. Lawrence, p. 232.