

stretch of the herbless land, and no wing of bird or insect agitated the fervid air. It was in the progress of this reign of physical forces that I expressed the opinion that vegetal life may have made its advent in the sea.

The æons of the earth's infancy rolled on; the first low presages of coming continents had been ground to sediment; the only upraised examples of the primitive chemical precipitates had been broken up and returned to the sea. Over the ocean's floor was accumulating a mud which, in a later age, should be baked to granite and gneiss—those granites and gneisses which in our times, have become forms so familiar. We have before us the evidence that at least fifty to a hundred thousand feet of such sediments accumulated. The seabottom bent down under its load. The downward protuberance reached into an intenser heat than could be endured. Besides that, the very thickening of the crust permitted the interior heat to make encroachments upward, as already explained. The water which saturated the strata of simple fragmental sediments became intensely heated under a high pressure. Alkaline substances were dissolved by the heated water, and the hot alkaline solution acted powerfully on the rock-materials. They were partly dissolved—even silica was dissolved; they were partly softened; they were brought to such a state that the atoms were free to arrange themselves according to their affinities in their new situation. The old substances were therefore made over into minerals which did not exist in the sediments before. These minerals were formed in juxtaposition to each other; and when, in a later age, the temperature subsided, the mineral mixtures which constitute Eozoic rocks of the various kinds were at hand. They formed granites, syenites, diorites, and similar rocks, in which the metamorphosis was so complete that the lines of original bedding were obliterated. They formed gneisses and schists in which the metamorphism was less complete. Of course, if there were any calcareous remains of tenants of the sea, these were completely dissolved, and we have no means of proving that they ever existed.