

astonished that fierce geological battles have raged over the old crystalline rocks. By some geologists they are almost entirely explained away, or referred to igneous action, or to the alteration of ordinary sediments. Under the treatment of another school they grow to great series of Pre-Cambrian rocks, constituting vast systems of formations, distinguishable from each other chiefly by differences of mineral character. Facts and fossils are daily being discovered, by which these disputes will ultimately be settled.

After the solitary appearance of Eozoon in the Laurentian, and of a few uncertain forms in the Huronian, we find ourselves, in the Cambrian, in the presence of a nearly complete invertebrate fauna of protozoa, polyps, echinoderms, mollusks and crustacea, and this not confined to one locality merely, but apparently extended simultaneously throughout the ocean, over the whole world. This sudden incoming of animal life, along with the subsequent introduction of successive groups of invertebrates, and finally of vertebrate animals, furnishes one of the greatest unsolved problems of geology, which geologists were wont to settle by the supposition of successive creations. In the sequel I shall endeavour to set forth the facts as to this succession, and the general principles involved in it, and to show the insufficiency of certain theories of evolution suggested by biologists to give any substantial aid to the geologist in these questions. At present I propose merely to notice some of the general principles which should guide us in studying the development of life in geological time, and the causes which have baffled so many attempts to throw light on this obscure portion of our unsolved problems.

It has been urged on the side of rational evolution—and there are both rational and irrational forms of this many-sided doctrine—that this hypothesis does not profess to give an explanation of the absolute origin of life on our planet, or even of the original organization of a single cell, or of a simple mass