

and covers thousands of square miles of surface. Yet it is almost entirely composed of congregated stems and joints and plates of crinoids, with foraminifera, corals, bryozoans, brachiopods, lamellibranchs, gasteropods, fish-teeth, and other unequivocally marine organisms. It must have been for ages the bottom of a clear sea, over which generation after generation lived and died, until their accumulated remains had gathered into a deep and compact sheet of rock. From the internal evidence of the stratified formations we thus confidently announce a second conclusion—that a great portion of the solid land consists of materials which have been laid down on the floor of the sea.

From these familiar and obvious deductions we may proceed further to inquire under what conditions these marine formations, spreading so widely over the land, were formed. According to a popular belief, shared in perhaps by not a few geologists, land and sea have been continually changing places. It is supposed that while, on the one hand, there is no part of a continent over which sea-waves may not have rolled, so, on the other hand, there is no lonely abyss of the ocean where a wide continent may not have bloomed. That this notion rests upon a mistaken interpretation of the facts may be shown from an examination—(1) of the rocks of the land, and (2) of the bottom of the present ocean.

(1) Among the thickest masses of sedimentary rock—those of the ancient palæozoic systems—no features recur more continually than alternations of different sediments, and surfaces of rock covered with well-preserved ripple-marks, trails and burrows of annelides, polygonal and irregular desiccation marks, like the cracks at the bottom of a sun-dried muddy pool. These phenomena unequivocally point to shallow and even littoral waters. They occur