

to a certain fixity of the continents in their position, notwithstanding the submergences and emergences which they have experienced.

Sir Charles Lyell, more than forty years ago, published in his "Principles of Geology" two imaginary maps which illustrate the extreme effects of various distribution of land and water. In one all the continental masses are grouped around the equator. In the other they are all placed around the poles, leaving an open equatorial ocean. In the one case the whole of the land and its inhabitants would enjoy a perpetual summer, and scarcely any ice could exist in the sea. In the other the whole of the land would be subjected to an arctic climate, and it would give off immense quantities of ice to cool the ocean. Sir Charles remarks on the present apparently capricious distribution of land and water, the greater part being in the northern hemisphere, and, in this, placed in a very unequal manner. But Lyell did not suppose that any such distribution as that represented in his maps had actually occurred, tho this supposition has been sometimes attributed to him. He merely put what he regarded as an extreme case to illustrate what might occur under conditions less exaggerated. Sir Charles, like all other thoughtful geologists, was well aware of the general fixity of the areas of the continents, tho with great modifications in the matter of submergence and of land conditions. The union, indeed, of these two great principles of fixity and diversity of the continents lies at the foundation of theoretical geology.

We can now more precisely indicate this than was possible when Lyell produced his "Principles," and can reproduce the conditions of our continents in even the more ancient periods of their history. An example of this may be given from the American continent, which is more simple in its arrangements than the double continent of Eurasia. Take, for instance, the early Devonian or Erian period, in which the magnificent flora of that age, the earliest certainly known to us, made its appearance. Imagine the whole interior plain of North America submerged, so that the continent is reduced to two strips on the east and west, connected by a belt of Laurentian land on the north. In the great mediterranean sea thus produced the tepid water of the equatorial current was circulated, and it swarmed