

only the top, of which are depicted on our maps of the world. If we can, then, suppose the water to be entirely absent from our globe, it is evident that about three-fourths of the surface would be on a level with the present ocean floor, while the remaining one-fourth would consist of masses of land elevated to a great height above this level. It is evident, also, that the real outline of a continent is very different from its apparent outline. Take the case of Europe, for example. If the north-western corner of that continent were raised one hundred fathoms, Great Britain would cease to be an island. It would be joined to Denmark, Holland, Belgium and France, as well as to Ireland and the Orkney and Shetland Islands. Not only would the English Channel be laid dry, but nearly the whole of the North Sea also; while the Irish coast would be extended one hundred miles west of its present position.

We commonly say that three-fourths of the earth's surface is covered with water, and that the remaining one-fourth is land. This statement, however, does not convey a correct idea of the relative volumes of the dry land and the water. Professor Carpenter has shown that the total volume of ocean water is as nearly as possible thirty-six times that of the dry land, because the average depth of the ocean is about twelve times the average height of the land. This immense disproportion between the amounts of land and water utterly does away with Lyell's idea of an interchange between a continental area and an ocean floor. It is clear, from what has been said, that if the whole of the present dry land should be submerged it would only require one thirty-sixth of the present ocean floor to rise above the surface to counterbalance this submersion. There have been risings and sinkings of the land areas, and doubtless, also, risings and sinkings of the ocean floor, but the point now established is, that the elevated masses which form what Carpenter calls the "continental platforms," and also the depressed areas covered by deep sea, were formed as such when the earth began to solidify in the first instance. The deep ocean floor has never been above the surface.

It may be pointed out that the argument from the disproportion between the volumes of land and water is supported by other considerations. The strongest point of all, however, has been brought out by the observers on the *Challenger*. It is this: that the deposits which are now being formed on the deep sea floor have little or no connection with the land masses—they do not result from the disintegration of land. Deposits formed by the wearing away of the land were found only in the comparatively shallow water which immediately surrounds the continents, while on the deep sea bottom were found volcanic clay, formed out of pumice or lava which had floated out to sea, and after becoming water-logged had sunk; quantities of manganese, traceable also to volcanic action; globigerina-ooze, the chief ingredient in chalk; and fragments of iron, which, there is little doubt, are of meteoric origin. It is almost impossible to imagine the slowness with which these deep sea deposits are made. Professor Geikie says: "I know of no recent discovery in physical geography more calculated to impress deeply the imagination, than the testimony of this meteoric iron from the most distant abysses of the ocean. To be told that mud gathers on the floor of these abysses at an extremely slow rate, conveys but a vague notion of the tardiness of the process. But to learn that it gathers so slowly that the very star dust which falls from outer space forms an appreciable part of it, brings home to us, as hardly anything else could do, the idea of undisturbed and excessively slow accumulation."

Everything, then, seems to point to the conclusion that the high land masses and the deep ocean areas were so formed in the beginning, and that they have maintained substantially the same relations to each other from that time to the present, but that in each separately changes of elevation and depression have occurred and are still occurring. To quote again from Professor Geikie: "From all this evidence we may legitimately conclude that the present land of the globe, though composed in great measure of marine formations, has never lain under the deep sea, but that its site must always