

but unless he had also enjoyed opportunities of studying the rocks of the earth in detail and close at hand, or had been favoured by some mundane friend with a perusal of "Lyell's Elements," or "Dana's Manual," he would not be able to appreciate as we can the changes which the Atlantic has seen in geological time, and in which it has been a main factor. Nor could he learn from such superficial observation certain secrets of the deep sea, which have been unveiled by the sounding lead, the inequalities of the ocean basin, its few profound depths, like inverted mountains or table-lands, its vast nearly flat abyssmal floor, and the sudden rise of this to the hundred fathom line, forming a terrace or shelf around the sides of the continents. These features, roughly represented in the map prefixed, he would be unable to perceive.

Before leaving this broad survey, we may make one further remark. An observer, looking at the earth from without, would notice that the margins of the Atlantic and the main lines of direction of its mountain chains are north-east and south-west, and north-west and south-east, as if some early causes had determined the occurrence of elevations along great circles of the earth's surface tangent to the polar circles.

We are invited by the preceding general glance at the surface of the earth to ask certain questions respecting the Atlantic. (1) What has at first determined its position and form? (2) What changes has it experienced in the lapse of geological time? (3) What relations have these changes borne to the development of life on the land and in the water? (4) What is its probable future?

Before attempting to answer these questions, which I shall not take up formally in succession, but rather in connection with each other, it is necessary to state, as briefly as possible, certain general conclusions respecting the interior of the earth. It is popularly supposed that we know nothing of this beyond a superficial crust perhaps averaging 50,000 to 100,000 feet in