

places is one of the most remarkable of these. It is found that the temperature of the earth rises one degree for every sixty or seventy feet of descent from its surface. Again : if the mine be examined vertically, it is found to consist of a series of layers or beds, sometimes horizontal, but more frequently inclined, upright, or contorted and undulating—even folded back upon themselves. Then, instances are numerous where horizontal and parallel beds have been penetrated, and traversed vertically or obliquely by veins of ores or minerals totally different in their appearance and nature from the surrounding rocks. All these undulations and varying inclinations of strata are indications that some powerful cause, some violent mechanical action, has intervened to produce them. Finally, if the interior of the beds be examined more minutely—if, armed with the miner's pick and hammer, the rock is carefully broken up—it is not impossible that the very first efforts at mining may be rewarded by the discovery of some fossilised organic form no longer found in the living state. The remains of plants and animals belonging to the earlier ages of the world, are, in fact, very common ; entire strata are sometimes formed of them ; and in some localities the rocks can scarcely be disturbed without yielding fragments of bones and shells, or the impressions of fossilised animals and vegetables—the buried remains of extinct creations.

These bones—these remains of animals or vegetables which the hammer of the geologist has torn from the rock—belong possibly to some organism which no longer any where exists : it may not be identical with any animal or plant living in our times : but it is evident that these beings, whose remains are now so deeply buried, have not always been so covered ; they once lived on the surface of the earth as plants and animals do in our days, for their organisation is essentially the same. The beds in which they now repose must, then, in older times have formed the surface of the earth ; and the presence of these fossils proves that the earth has suffered great mutations at some former period of its history.

Geology explains to us the various transformations which the earth has passed through before it arrived at its present condition. We can determine, with its help, the comparative epoch to which any beds belong, as well as the order in which others have been superimposed upon them. Considering that the stratigraphical crust of the earth with which the geologist has to deal may be some ten miles thick, and that it has been deposited in distinct layers in a definite order of succession, the dates or epochs of each formation may well be approached with hesitation and caution.