

phases of volcanism which could not be studied in any modern volcano. Hence an acquaintance only with active volcanoes will not afford a complete knowledge of volcanic action. It must be supplemented and enlarged by an investigation of the traces of ancient volcanoes preserved in the crust of the earth. (Book IV. Part VII.)

The word "volcano" is applied to a conical hill or mountain (composed mainly or wholly of erupted materials), from the summit and often also from the sides of which, hot vapors issue, and ashes and streams of molten rock are intermittently expelled. The term "volcanic" designates all the phenomena essentially connected with one of these channels of communication between the surface and the heated interior of the globe. Yet there is good reason to believe that the active volcanoes of the present day do not afford by any means a complete type of volcanic action. The first effort in the formation of a new volcano is to establish a fissure in the earth's crust. A volcano is only one vent or group of vents established along the line of such a fissure. But in many parts of the earth, alike in the Old World and the New, there have been periods in the earth's history when the crust was rent into innumerable fissures over areas thousands of square miles in extent, and when the molten rock, instead of issuing, as it does at a modern volcano, in narrow streams from a central elevated cone, welled out from numerous small vents along the rents, and flooded enormous tracts of country without forming any mountain or conspicuous volcanic cone in the usual sense of these terms. Of these "fissure-eruptions," apart from central volcanic cones, no examples appear to have occurred within the times of human history, except in Iceland, where vast lava-floods issued from a fissure in 1783 (pp. 378, 434). They can best