

limits himself to a compilation from data recorded in literature, Lyell adds his own observations in confirmation of, or opposition to, received opinions. The geological action of water is first discussed. The destructive and transporting agency of running water is demonstrated by numerous examples, amongst others particular interest attaches to the admirable exposition of the channeling of the Simeto bed at Etna, and the erosion of the Niagara ravine. Lyell, in the earlier editions of this volume, was of opinion that in addition to stream erosion the formation of valleys had been in many cases assisted by the occurrence of earthquakes or landslips, or controlled by local inequalities in the rate of withdrawal of the ocean, but in the later editions he attributed the large majority of valley cuttings to river erosion alone.

Again, in the earlier editions of this volume, ice and glaciers received little attention, but in later editions a special chapter was devoted to them, and Lyell endeavoured to explain the occurrence of erratic blocks as a result of the transportation of rock-material by icebergs and floes.

The chapter on volcanoes and earthquakes includes not only a summary of their distribution and manifestations, but also detailed descriptions of the district of Naples and Etna. In describing Monte Somma, and the volcanoes of the Canary Isles and Santorin, Lyell opposes the theory of "Elevation-craters," and explains the circular walls of inclined strata round a central crater as the ruins of former cones of ejected material. In connection with earthquakes, attention is especially directed to the accompanying phenomena of crust-fissures and alternations of level. The variations at the temple of Serapis, near Pozzuoli, are instanced in illustration of the frequency with which changes of level may take place in opposite senses.

The slower variations of level, independent of volcanism, and affecting large areas, were not fully treated by Lyell in the early editions of the *Principles*; but after his travels in Scandinavia, a chapter on this subject was introduced, and in it Lyell supported the view that the northern portion of Scandinavia was slowly rising.

Lyell attributed volcanoes and earthquakes to the high pressure exerted upon the crust by subterranean vapours and gases which become heated and endeavour to expand. Chemical, electrical, and magnetic influences cause, according