

The absence of these is nowhere more clearly exemplified than in the bare rocks over which passed the great "Willey slide" of 1826.*

But the catastrophes in the White Mountains are insignificant, when compared to those which are occasioned by earthquakes, when the boundary hills, for miles in length, are thrown down into the hollow of a valley. I shall have opportunities of alluding to inundations of this kind, when treating expressly of earthquakes, and shall content myself at present with selecting an example of modern date, of a flood caused by the bursting of a temporary lake, the facts having been described, with more than usual accuracy, by scientific observers.

Flood in the valley of Bagnes, 1818.—The valley of Bagnes is one of the largest of the lateral embranchments of the main valley of the Rhone, above the Lake of Geneva. Its upper portion was, in 1818, converted into a lake by the damming up of a narrow pass, by avalanches of snow and ice, precipitated from an elevated glacier into the bed of the river Dranse. In the winter season, during continued frost, scarcely any water flows in the bed of this river to preserve an open channel, so that the ice barrier remained entire until the melting of the snows in spring, when a lake was formed above, about half a league in length, which finally attained in some parts a depth of about two hundred feet, and a width of about seven hundred feet. To prevent or lessen the mischief apprehended from the sudden bursting of the barrier, an artificial gallery, seven hundred feet in length, was cut through the ice, before the waters had risen to a great height. When at length they accumulated and flowed through this tunnel, they dissolved the ice, and thus deepened their channel, until nearly half of the whole contents of the lake were slowly drained off. But at length, on the approach of the hot season, the central portion of the remaining mass of ice gave way with a tremendous crash, and the residue of the lake was emptied in half an hour. In the course of its descent, the waters encountered several narrow gorges, and at each of these they rose to a great height, and then burst with new violence into the next basin, sweeping along rocks, forests, houses, bridges, and cultivated land. For the greater part of its course the flood resembled a moving mass of rock and mud, rather than of water. Some fragments of granitic rocks, of enormous magnitude, and which from their dimensions, might be compared without exaggeration to houses, were torn out of a more ancient alluvion, and borne down for a quarter of a mile. One of the fragments moved was sixty paces in circumference.† The velocity of the water, in the first part of its course was thirty-three feet per second, which diminished to six feet before it reached the Lake of Geneva, where it arrived in six hours and a half, the distance being forty-five miles.‡

* See Lyell's Second Visit to the U. S. vol. i. p. 69.

† This block was measured by Capt. B. Hall, R.N.

‡ See an account of the inundation of

the Val de Bagnes, in 1818, in Ed. Phil. Journ., vol. i. p. 187., drawn up from the memoir of M. Escher, with a section, &c.