

General sequence of events in an Eruption.—The approach of an eruption is not always indicated by any premonitory symptoms, for many tremendous explosions are recorded to have taken place in different parts of the world without perceptible warning. Much in this respect would appear to depend upon the condition of liquidity of the lava, and the amount of resistance offered by it to the passage of the escaping vapors through its mass. In Hawaii, where the lavas are remarkably liquid, vast outpourings of them have taken place quietly without earthquakes during the present century. But even there, the great eruption of 1868 was accompanied by violent earthquakes.

The eruptions of Vesuvius are often preceded by failure or diminution of wells and springs. But more frequent indications of an approaching outburst are conveyed by sympathetic movements of the ground. Subterranean rumblings and groanings are heard; slight tremors succeed, increasing in frequency and violence till they become distinct earthquake shocks. The vapors from the crater grow more abundant, as the lava-column in the pipe or funnel of the volcano ascends, forced upward and kept in perpetual agitation by the passage of elastic vapors through its mass. After a long previous interval of quiescence, there may be much solidified lava toward the top of the funnel, which will restrain the ascent of the still molten portion underneath. A vast pressure is thus exercised on the sides or the cone, which, if too weak to resist, will open in one or more rents, and the liquid lava will issue from the outer slope of the mountain; or the energies of the volcano will be directed toward clearing the obstruction in the chief throat, until with tremendous explosions, and the rise of a vast cloud of dust and fragments, the bottom and sides of the crater are finally