

cone. According to Sir W. Hamilton, cinders were thrown by Vesuvius, during the eruption of 1779, to a height of 10,000 feet. Instances are known where large stones, ejected obliquely, have described huge parabolic curves in the air, and fallen at a great distance. Stones 8 lbs. in weight occur among the ashes which buried Pompeii. The volcano of Antuco in Chile is said to send stones flying to a distance of 36 (?) miles, Cotopaxi is reported to have hurled a 200-ton block 9 miles,⁵⁵ and the Japanese volcano, Asama, is said to have ejected many blocks of stone, measuring from 40 to more than 100 feet in diameter.⁵⁶

But in many great eruptions, besides a constant shower of stones and scorixæ, a vast column of exceedingly fine dust rises out of the crater, sometimes to a height of several miles, and then spreads outward like a sheet of cloud. The remarkable fineness of this dust may be understood from the fact that during great volcanic explosions no boxes, watches, or close-fitting joints have been found to be able to exclude it. Mr. Whymper collected some dust that fell 65 miles away from Cotopaxi, and which was so fine that from 4,000 to 25,000 particles were required to weigh a grain.⁵⁷ So dense is the dust-cloud as to obscure the sun, and for days together the darkness of night may reign for miles around the volcano. In 1822, at Vesuvius, the ashes not only fell thickly on the villages round the base of the mountain, but travelled as far as Ascoli, which is 56 Italian miles distant from the volcano on one side, and as Casano, 105 miles on the other. The eruption of Cotopaxi, on 26th

⁵⁵ D. Forbes, *Geol. Mag.* vii. p. 320.

⁵⁶ J. Milne, *Seism. Soc. Japan*, ix. p. 179, where an excellent account of the volcanoes of Japan is given. See also "The Volcanoes of Japan," by J. Milne and W. K. Burton.

⁵⁷ *Royal Society Report on Krakatoa*, p. 183.