

various volcanic rocks, many of them being black scoriæ; but pieces of Roman pottery, together with fragments of the older underlying tuff, and some marine shells, have been obtained—doubtless part of the soil and subsoil dislocated and ejected during the explosions.

One of the most stupendous volcanic explosions on record was that of Krakatoa in the Sunda Strait on the 26th and 27th of August, 1883.<sup>51</sup> After a series of convulsions, the greater portion of the island was blown out with a succession of terrific detonations which were heard more than 150 miles away. A mass of matter, estimated at about  $1\frac{1}{8}$  cubic miles in bulk, was hurled into the air in the form of lapilli, ashes, and the finest volcanic dust. The effects of this volcanic outburst were marked both upon the atmosphere and the ocean. A series of barometrical disturbances passed round the globe in opposite directions from the volcano at the rate of about 700 miles an hour. The air-wave, travelling from east to west, is supposed to have passed three and a quarter times round the earth (or 82,200 miles) before it ceased to be perceptible.<sup>52</sup> The sea in the neighborhood was thrown into waves, one of which was computed to have risen more than 100 feet above tide-level, destroying towns, villages, and 36,380 people. Oscillations of the water were perceptible even at Aden, 1000 miles distant, at Port Elizabeth in South Africa, 5450 miles, and among the islands of the Pacific Ocean, and they are computed to have travelled with a maximum velocity of 467 statute miles in the hour.<sup>53</sup>

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<sup>51</sup> See "The Eruption of Krakatoa," by a Committee of the Royal Society, 1888. "Krakatau," R. D. M. Verbeek, Batavia, 1886.

<sup>52</sup> Scott and Strachey, Proc. Roy. Soc. xxxvi. (1883). Royal Society's Report, p. 57.

<sup>53</sup> Wharton, Royal Society's Report, p. 89. For a great Japanese explosion, see Nature, 13th Sept. 1888.