the elastic force becomes sufficient to lift the column of water. The commencement of escape now diminishes pressure, and a large volume of steam is instantly formed, which causes the violent eruption. The heavy thumps sometimes heard before and during the action are due to collapses of steam in contact with the water, and are strictly the same in principle as the sharp detonations frequently heard in the steam-pipes employed for warming buildings.

XV. AMONG THE VOLCANOES.

INDICATIONS OF INTERNAL FIRES.

VESUVIUS and Ætna are the two volcanoes familiarly known to classical antiquity. They offer for our observation nearly all the characters with which the geological reader and student should become acquainted in prosecuting his inquiries into the present and past temperatures of the earth. Let us make the ascent of Vesuvius, taking the usual route from Naples. Driving a couple of hours down the coast to Resi'na, on the site of the ancient Herculaneum, we begin the ascent either on foot or on mule or horse back. For thirty minutes we follow a rough road through vineyards. The road then turns to the north and we enjoy a lovely view of the landscape and the bay. Here stretch two dark streams of cold lava—presenting somewhat the aspect of enormous beds of enormous cinders—fibrous and twisted and waxy. They are the lava streams of 1858 and 1868. Next appears the huge lava wall of 1858. In two hours from Resina, we reach the Observatory, 2,218 feet above sea-level, erected in 1844 for meteorological and seismic observations. Here Professor Palmieri, the celebrated vulcanologist, is engaged in making the most minute studies of the incidents in the history of the mountain. From this station and the "Hermitage" just below, where the traveler procures refreshments, the view over the black and herbless lava slope is desolate beyond description. Soon the road becomes impracticable for quadrupeds. Crossing the lava flood of 1871, we now reach the Atrio del Cavallo, at the foot of