The eruptions of Vesuvius are generally heralded by earthquakes. The ejected lavas commonly bear evidence, in the various chlorides among the ingredients deposited by vapors on the lavas, that the waters of the sea had gained access to the fires. The accompanying projection of cinders is often to great heights, and over a wide reach of country. Those of 1779, according to Sir William Hamilton, were thrown to a height of 10,000 feet.

The sketch of Vesuvius in Fig. 225, page 266, represents its condition a few weeks before an eruption, when the crater was filled to the summit plain there shown, and a cinder-cone on this plain (see sketch) was the most active feature; but there was a sluggish stream of lava in the summit plain, and red heat was visible a foot down in cracks. The eruption, as described by Abich, took place in August, 1834; two streams of lava flowed out, the chief one from the base of the old cone, and it was accompanied by flames, which, according to Abich, were produced by hydrogen; it was half a mile wide, 18 to 30 feet deep, and 9 miles long. It engulfed the village of Caporeco, sparing only 4 houses out of 500. The old cone was laid open by the eruption, and the top plain, that was the floor walked over by the author, had sunk into a deep abyss. (Abich, *Vues Illustr. sur le Vésuve et l'Etna*, Berlin, 1837.)

6. *Lava-streams.* — (*a*) *Their general characteristics.* — Lava-streams seldom make more than three miles of flow a day, and sometimes take a year for 30 miles. This is true even of the basaltic kinds. They flow rapidly when unobstructed, but often become dammed by coolings, especially at the frequent interruptions. As the stream of basaltic lava moves, it becomes crusted over its exterior surface, and then flows on in the lava-tunnel so made, which, at the end, it may leave empty. Owing to the obstructions, the lavas often break their bounds, and one stream becomes piled over another. The surface of the stream has ropy lines and other marks

249.

View of the *aa* lava-stream, with a "bomb," *a*, 10 feet in breadth upon it. D. '87.

made by the flowing movement. This ordinary lava is called by the Hawaiians *pahoehoe*, alluding to a relatively smooth and shining or satin-like luster. Another kind, the *aa*, into which the *pahoehoe* sometimes abruptly changes, shows over its surface no evidence of flow; the stream consists of broken, ragged masses, large and small, bristled all over with points (Fig. 249); and, owing to the masses being piled loosely together, the