

face, and even produce tremendous explosions, without an actual outcome of lava, yet so intimately are vapors and lava commingled in the subterranean reservoirs, that they commonly rise together, and the explosions of the one lead to the outflow of the other. The first point at which the lava makes its appearance at the surface will largely depend upon the structure of the ground. Two causes have been assigned on a foregoing page (p. 356) for the fissuring of a volcanic cone. As the molten mass rises within the chimney of the volcano, continued explosions of vapor take place from its upper surface. The violence of these may be inferred from the vast clouds of steam, ashes, and stones hurled to so great a height into the air, and from the concussions of the ground, which may be felt at distances of more than 100 miles from the volcano. It need not be a matter of surprise, therefore, that the sides of a great vent, exposed to shocks of such intensity, should at last give way, and that large divergent fissures should be opened down the cone. Again, the hydrostatic pressure of the column of lava must, at a depth of 1000 feet below the top of the column, exert a pressure of between 70 and 80 tons on each square foot of the surrounding walls (p. 356). We may well believe that such a force, acting upon the walls of a funnel already shattered by a succession of terrific explosions, may prove too great for their resistance. When this happens, the lava pours forth from the outside of the cone. On a much-fissured cone, lava may issue freely from many points, so that a volcano so affected has been graphically described as "sweating fire."

In a lofty volcano, lava occasionally rises to the lip of the crater and flows out there; but more frequently it escapes from some fissure or orifice in a weak part of the