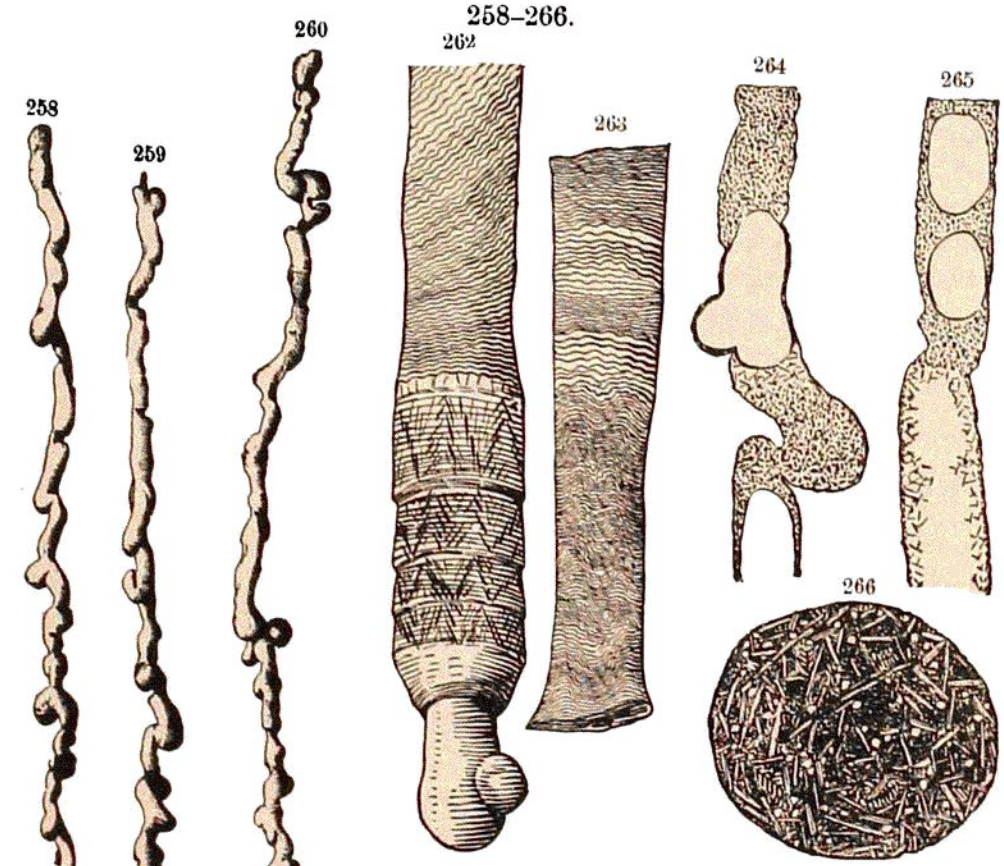
out, which becomes hydrochloric acid as it leaves the liquid lava, and is evidence, as has been stated, that sea water aids in the action of that volcano.

Through the sulphurous acid (SO_2), sulphur and various sulphates are made; e.g., alums by combination of sulphuric acid (SO_3) with alumina and potash or soda; and



Lava stalactites: Figs. 258–260 ($\frac{1}{2}$); 261, stalagmite ($\frac{1}{2}$); 262, 263, portions showing exterior surface ($\frac{2}{3}$); 264, 265, sections, showing inside cavities; 266, transverse section (4). E. S. Dana.

gypsum ($CaO.SO_3 + 2$ aq) by combination with the lime, as well as Glauber salt or sodium sulphate ($Na_2O.\ SO_3.\ 10$ aq) by combination with the soda; and also potassium sulphate ($K_2O.SO_3$) by combination with the potash. Glauber salt and gypsum are common about the fumaroles and in the caverns of the crater and lava-streams of Hawaii, and the aluminum salts or alums with some gypsum, at Vesuvius.

Besides these, numerous chlorides occur in the Vesuvian fumaroles; e.g., common salt or sodium chloride (NaCl), iron chloride ($FeCl_3$), and potassium, ammonium, copper, manganese, and other chlorides.

Magnetite (Fe_3O_4) and hematite (Fe_2O_3) are also fumarole products. At Vesuvius the crystals of these iron oxides are attributed to the reaction of the steam on the iron chloride. Deville and Fouqué also report hydrogen and hydrocarbon gas as given out at Torre del Greco in 1861. The hydrocarbon gas could well come from organic materials taken in with the sea water.