

sents. When we have step by step pursued a long series of observations modified by the localities of a place, we love to stop and raise our views to general considerations. Do the great cavities, which are exclusively called caverns, owe their origin to the same causes as those which have produced the lodes of veins and of metalliferous strata, or the extraordinary phenomenon of the porosity of rocks? Do grottoes belong to every formation, or to that period only when organized beings began to people the surface of the globe? These geological questions can be solved only so far as they are directed by the actual state of things, that is, of facts susceptible of being verified by observation.

Considering rocks according to the succession of eras, we find that primitive formations exhibit very few caverns. The great cavities which are observed in the oldest granite, and which are called *fours* (ovens) in Switzerland and in the south of France, when they are lined with rock crystals, arise most frequently from the union of several contemporaneous veins of quartz,* of feldspar, or of fine-grained granite. The gneiss presents, though more seldom, the same phenomenon; and near Wunsiedel,† at the Fichtelgebirge, I had an opportunity of examining crystal *fours* of two or three feet diameter, in a part of the rock not traversed by veins. We are ignorant of the extent of the cavities which subterranean fires and volcanic agitations may have produced in the bowels of the earth in those primitive rocks, which, containing considerable quantities of amphibole, mica, garnet, magnetic iron-stone, and red schorl (titanite), appear to be anterior to granite. We find some fragments of these rocks among the matters ejected by volcanoes. The cavities can be considered only as partial and local phenomena; and their existence is scarcely any contradiction to the notions we have acquired from the experiments of Maskelyne and Cavendish on the mean density of the earth.

* Gleichzeitige Trümmer. To these stone veins which appear to be of the same age as the rock, belong the veins of talc and asbestos in serpentine, and those of quartz traversing schist (Thonschiefer). Jameson on Contemporaneous Veins, in the Mem. of the Wernerian Soc.

† In Franconia, south-east of Luchsburg.