

exposed to subaerial weathering, and that some of the fine, loose clays had afterwards sunk into the erosive and pitted surface of the nagelflue rock. In many cases, however, the sand or clay in the pipes undoubtedly represents the insoluble residue left after the removal in solution of the calcareous material in the conglomerate.

Subterranean caverns always formed a subject of general interest in literature, and have given rise to many traditions and superstitions. The ancients held them to be entrances into the lower world, and the home of nymphs and fauns. In later centuries literature peopled them with all kinds of imaginary beings, fairies, dragons, dwarfs, and evil spirits, and ascribed their origin to earthquakes, inthrows of the Earth's crust, subterranean fires and floods.

Towards the close of the seventeenth century, Leibnitz gave an accurate description of the Baumann cave in the Harz district, and Valvasor examined the caves in Carniola. During the following century, although the number of accurate descriptions increased, little advance was made in the explanation of their mode and origin. Kant's *Text-book of Physical Geography* (1801) attributes the origin of caves partly to the erosion of the rock by water, partly to outbreaks of fire.

A new epoch in the literature of caves began with Esper's investigation (1770-90) of fossil remains of mammalian bones discovered in the French caves. Interest then centred in the palæontological significance of the remains in cave-deposits. Cuvier's *Recherches sur les ossements fossiles* contains an able summary of all existing knowledge on the subject of cave-remains during the first two decades of the nineteenth century. The two brothers Wagner, in Germany, and Buckland by his standard work on the *Diluvial Remains of England*, worthily followed Esper's example in collecting information and examining ossiferous caverns. The work of Schmirling, in Belgium, won well-merited fame on account of its splendid illustrations; it was descriptive of the caverns in the province of Liège (1833-34). Marcel de Serres in 1838 published his interesting *Essay on the Causes which have contributed to the Accumulation of Fossil Bones in Caves*.

There is now scarcely any difference of opinion regarding the origin of caves. A few caves occur in crystalline or clastic rocks; they are the result either of tectonic disturbances, or they represent spaces that have formed during the cooling of