

II.

Of the interior Rock of the Globe.

In p. 179. I remarked, that *solid rocks are often supported by beds of earth, clay, or sand, which have much less specific gravity. This is the case with most hills, and is easily perceived. But, in high mountains, the summits are not only rocks, but these rocks are supported by others; and this structure runs through such an extent of country, where one mountain rises out of another, that it is difficult to determine whether they are founded on earth, or of what nature this earth is. I have seen rocks cut perpendicularly for some hundreds of feet; but these rocks rested upon other rocks, without my being able to perceive where they ended. May we not, however, be allowed to conclude from the less to the greater? Since the rocks of small mountains, the bases of which are visible, rest upon earths less heavy and less solid than stone, is it not reasonable to think, that earth is likewise the basis of high mountains?*

I acknowledge that this conjecture, derived from analogy, is sufficiently founded. The conjecture I then hazarded was written thirty-four years ago. Since that time, I have acquired ideas and collected facts which convince me, that

that the great mountains composed of vitrescent materials, and produced by the action of the primitive fire, are connected immediately with the interior rock of the globe, which is also a vitreous rock of the same kind. These great mountains are a part of this immense rock, and are only prolongations or eminences formed upon the surface of the globe, at the time of its consolidation. Hence we ought to regard them as constituent parts of the original mass of the earth. But the hills or smaller mountains, which rest upon clay or vitrifiable sand, have been formed by the motion and sediments of the waters, at a time long posterior to the formation of the great mountains by the primitive fire*. It is in these points or projections which form the nucleus of mountains, that the veins of metals, though their height be considerable,

* The internal parts of the primitive mountains which I have penetrated, either in pits or in the galleries of mines, to the depth of twelve and fifteen hundred feet, are entirely composed of pure vitreous rock, in which there are slight and irregular fissures, through which the water issues, and vitriolic and metallic solutions. From this fact we may conclude, that the whole nucleus of these mountains is a pure rock, adhering to the primitive mass of the globe. We indeed find, upon their sides, and upon the margins of the valleys, masses of clayey earth, and banks of calcareous stones, at considerable depths. But these are only the remains of those materials which filled up the cavities of the earth, and must be referred to the second epoch of Nature; *Note communicated by M. de Grignon to M. de Buffon, Aug. 6, 1777.*

are not of the highest kind, but of a mean height, and uniformly arranged, *i. e.* they rise by gradual elevations, and are connected with a considerable chain of mountains, which are occasionally interrupted by valleys.

III.

Of the Vitrification of Calcareous Substances.

In page 184. I said, that *calcareous bodies are alone incapable of being vitrified, and seem to form a distinct class. All other substances may be converted into glass.*

I had not then made those experiments which have since convinced me, that calcareous substances, like all others, may be reduced to glass. To produce this effect, nothing more is necessary than a fire more violent than that of our common furnaces. I reduced lime-stone to glass by a good burning glass. Besides, M. d'Arceet, an able chymist, melted calcareous spar, without the addition of any other matter, by means of a porcelain furnace belonging to M. le Comte de Lauragais. But these operations were performed several years after the publication of my *Theory of the Earth*. I knew only that, in the iron furnaces, the light, white, spongy matter, similar to pumice-stone, which issues from them when over-heated, is nothing

but a vitreous substance, proceeding from the calcareous bodies thrown into the furnace to assist the fusion of the iron ore. The sole difference between the vitrification of calcareous and vitrescent substances is, that the latter are immediately vitrified by the action of a violent fire alone; but calcareous bodies, before they are vitrified, pass through a state of calcination, and form a line. But, like all other substances, they vitrify, even in our common furnaces, whenever they are mixed with vitrescent matters, especially with those which, like the *aubue*, or slimy earth, yield most easily to the fire. Hence we may safely conclude, that, in general, every material of which this globe is composed, may be reduced to its primitive state of glass, if a sufficient degree of heat is applied.