

Indeed, M. Elie de Beaumont has himself been obliged to modify his generalizations considerably, as will appear from the following extract from the *Bulletin de la Société Géologique de France*. M. Reboul, in a memoir on the structure of the Pyrenees, read to the society in December, 1831, states, that several distinct axes of elevation may be observed in different parts of these extensive mountain ranges, inclined in different directions to each other, and that the lines of bearing of the strata are also different in each. There are, he observes, indications in the Pyrenees, of the elevation of rocks at different epochs, both before and after the most recent secondary depositions, that rise to the summit of Mont Perdu. He also states instances of the tertiary beds of molasse, being elevated near the central range of the Pyrenees, whereas in the Alps they occupy only the central parts of the range, which would imply that the period of elevation of that part of the Pyrenees, was more recent than that of the Alps. It appears, however, in the same report, that M. Elie de Beaumont now admits four epochs of elevation in the Pyrenees: the most ancient immediately succeeded the formation of the transition rocks. The second took place between the deposition of the green sand, and that of the upper chalk. The third epoch of elevation was posterior to the chalk formation. The fourth, which gave birth to the serpentines, (*ophites*,) and to the gypsum with rock salt, is more recent than the tertiary epoch.*

M. Beaumont, however, contends, that notwithstanding the four different directions of the ranges in the Pyrenees, of which traces may be observed in several of the valleys, the great chain of the Pyrenees, owes its actual elevation and general direction, to the third system or epoch of elevation, which was posterior to the chalk formation; the two former epochs of elevation, discoverable in this chain, having been modified by the great elevation of this third epoch. The fourth epoch of elevation is only perceivable, in the localities where serpentine rocks appear.

I wish to press upon the attention of geologists the consideration, that the arched stratification implies a very limited extent of operation. Where it is confined to one mountain, as at Crich Cliff, (see the cut, p. 96.) the elevating force may be said to act at one point. Where the arched stratification extends through a range, it may be said to act along narrow lines, forming mountain ridges, with valleys between them. From what I observed in the Alps, I was convinced that the explosive force which upheaved Mont Blanc, and the central range of the Alps, did not extend its action very far from the

* The formation of serpentine (which was formerly considered as a primary rock) after the tertiary epoch, will cease to surprise geologists, since the identity of basalt, green stone, and serpentine, has been ascertained by Dr. Macculloch. Serpentine, like basalt and volcanic rocks, may have been formed among any class of rocks. It was stated in Chapter XI., that some of the rock salt deposits in Poland were in tertiary strata.