

acteristic of those tertiary strata which I have called Middle Eocene. In very few instances at least do certain species diverge from this narrow limit, whether into incumbent or subjacent tertiary formations, it being rather doubtful whether more than one of them, *Nummulites intermedia*, also a Middle Eocene fossil, ascends so high as the Miocene formation, or whether any of them descend to the level of the London clay. Certainly they have never been traced so low down as the marine beds, coeval with the Plastic clay or Lignite, in any country of which the geology has been well worked out. This conclusion is a very unexpected result of recent inquiry, since for many years it was a matter of controversy whether the nummulitic rocks of the Alps and Pyrenees ought not to be regarded as cretaceous rather than Eocene. The late M. Alex. Brongniart first declared the specific identity of many shells of the marine strata near Paris, and those of the nummulitic formation of Switzerland, although he obtained these last from the summit of the Diablerets, one of the loftiest of the Swiss Alps, which rises more than 10,000 feet above the level of the sea.

The nummulitic limestone of the Alps is often of great thickness, and is immediately covered by another series of strata of dark-colored slates, marls, and fucoidal sandstones, to the whole of which the provincial name of "flysch" has been given in parts of Switzerland. The researches of Sir Roderick Murchison in the Alps in 1847 have shown that all these tertiary strata enter into the disturbed and loftiest portions of the Alpine chain, to the upheaval of which they enable us therefore to assign a comparatively modern date.

The nummulitic formation, with its characteristic fossils, plays a far more conspicuous part than any other tertiary group in the solid framework of the earth's crust, whether in Europe, Asia, or Africa. It often attains a thickness of many thousand feet, and extends from the Alps to the Carpathians, and is in full force in the north of Africa, as, for example, in Algeria and Morocco. It has also been traced from Egypt, where it was largely quarried of old for the building of the Pyramids, into Asia Minor, and across Persia by Bagdad to the mouths of the Indus. It occurs not only in Cutch, but in the mountain ranges which separate Scinde from Persia, and which form the passes leading to Caboul; and it has been followed still farther eastward into India, as far as eastern Bengal and the frontiers of China.

Fig. 242.



Nummulites Puschi, D'Archlac. Peyrehorade, Pyrenees.

- a. External surface of one of the nummulites, of which longitudinal sections are seen in the limestone.
 b. Transverse section of same.