

from the abundance of their characteristic foraminifera, have been called the Nummulitic Limestone. Unlike the thin, soft, modern-looking, undisturbed beds of the Anglo-Parisian area, these limestones attain a depth of sometimes several thousand feet of hard, compact, sometimes crystalline rock, passing even into marble; and they have been folded and fractured on such a colossal scale that their strata have been heaved up into lofty mountain crests sometimes 10,000 and in the Himalaya range more than 16,000 feet above the sea. With the limestones is associated the sandy series known as Nummulite Sandstone. The massive unfossiliferous Vienna sandstone and Flysch, already referred to as probably in part Cretaceous, are no doubt also partly referable to Eocene time.⁴³ One of the most remarkable features of these Alpine Eocene deposits is the occurrence in them of coarse conglomerates and gigantic erratics of various crystalline rocks. As far east as the neighborhood of Vienna, and westward at Bolgen near Sonthofen in Bavaria, near Habkeren and in other places, blocks of granite, granitite, and gneiss occur singly or in groups in the Eocene strata. These travelled masses appear to have most petrographical resemblance, not to any Alpine rocks now visible, but to rocks in southern Bohemia. Their presence may possibly indicate the existence of glaciers in the middle of Europe during some part of the Eocene age.⁴⁴ Another interesting Eocene deposit of the Alpine region is the coal-bearing group of Häring, in the Northern Tyrol, where a seam of coal occurs which, with its partings, attains a thickness of 32 feet.

The Nummulitic series has been divided into stages in

⁴³ The history of the Flysch has given rise to some discussion. Th. Fuchs, for instance, regarded it as having probably been derived from eruptive discharges such as those of mud volcanoes (Sitz. Akad. Wien, lxxv. 1877, p. 340; Verh. Geol. Reich. 1878, p. 135). This view was opposed by K. M. Paul, who looked on the Flysch as a normal sedimentary formation (Jahrb. Geol. Reich. 1877, p. 431; Verh. Geol. Reich. 1878, p. 179). By some geologists the rocks have been regarded as a deep-sea deposit, by others as an accumulation in shallow water, Renevier, Arch. Sci. Phys. Nat. Geneva (3) xii. 1884, p. 310. See also Mantovani, Neues Jahrb. 1877; Schardt and Favre, "Description Geol. des Prealpes du Canton de Vaud," etc. 1887. Kauffmann, "Description de la partie nord-ouest de la feuille xii. de la Carte Geol. Suisse," 1886. F. Sacco, Bull. Soc. Belge. de Geol. iii. 1889, p. 153. C. Mayer-Eymar, "Versuch einer Classification der tertiär Gebilde Europas," Verh. Schweiz. Naturf. Ges. 1857.

⁴⁴ That a glacial period occurred at the close of the Cretaceous period, again at the end of the Eocene and in the Miocene (erratics of Superga, near Turin) has been regarded by some geologists as probable: A. Vezian, Rev. Sci. xi. 1877, p. 171; Schardt, "Études Géologiques sur le pays d'Enhaut Vaudois," Bull. Soc. Vaud. 1884.