

Consequently, Mammalian life is much less perfectly represented in the European Tertiary than in the North American.

#### ROCKS—KINDS AND DISTRIBUTION.

In England, beds of the Eocene occur in the London and Hampshire basins, resting on the Chalk. The *Lower* Eocene consists of beds of sand, with marine fossils called the Thanet sands, with some clay-beds above, and the London Clay, an estuarine deposit, 500 feet in maximum thickness, which has afforded many species of fossil leaves and Eocene Mammals, besides marine shells. The *Middle* and *Upper* Eocene consist of marine fossiliferous sands called the Bagshot beds, with some leaf-bearing clay-beds. Among the fossils occur some Nummulites, species that were abundant farther south over Europe.

In northern France and Belgium there is a general resemblance in the Eocene strata to those of the British part of the London-Paris basin. The Lower are clay-beds, marlytes, and sand-beds, partly marine, but containing in some parts Plants and Mammals. The Middle Eocene in France consists largely of a coarse limestone, the *Calcaire grossier*, partly glauconitic and Nummulitic; and the Upper is a series of sand-beds, sandstones, and marls, with some limestones, having at top a bed containing gypsum 100 to 160 feet thick, containing in some layers nodules of opal-silica (menilite).

In southern Europe the Eocene beds are largely Nummulitic limestones of great thickness; and they range widely from southern France, the Pyrenees, and Spain, over much of the region, eastward to Asia Minor and beyond, indicating a pure sea of great extent. The Nummulitic beds are 3000 feet thick in southern France. In the Alps they constitute the summits of the Dent du Midi, 10,531 feet, of Diablerets, 10,670 feet in elevation, and of other heights. They occur in the Apennines and the Carpathians. They extend into Egypt (where the Pyramids were in part made of Nummulitic limestone); also through Algeria and Morocco, parts of Asia Minor, Persia, Caucasus, India, the mountains of Afghanistan, the southern slopes of the Himalayas, and to a height of 20,000 feet in middle Tibet. They occur also in Japan, on Luzon in the Philippine Islands, and in Java.

*Oligocene* beds of alternate salt and fresh water origin are found in the Isle of Wight and the Hampshire basin. In the Paris basin, in France, they are largely of freshwater origin. They include the Grès de Fontainebleau in the Paris basin, and below, marlytes, with gypsum, affording remains of Mammals at the quarries of Montmartre. They have wide distribution in north Germany, and hold in the lower part beds of brown coal with remains of plants. In Switzerland they constitute the lower lacustrine part of the sandstone formation called *Molasse*, having a thickness of 7000 feet. The beds called Flysch are at the base of the Oligocene.

Miocene Tertiary beds are not recognized in England or in the Paris basin, and are mostly confined to scattered areas which are only in part