

taceous fauna, numbering 584 genera and 2270 species, became totally extinct prior to the deposition of the lower Tertiary series. All history of the change, geographically and palæontologically, is lost; but the alteration of fauna was complete, resulting in the introduction or appearance of no less than 4270 new species, which now constitute the known British Tertiary fauna. Numerically the species in the several (17) horizons are:—The Thanet sands  $\frac{45}{73}$ , Woolwich and Reading beds  $\frac{72}{123}$ , London clay  $\frac{247}{840}$ , Bracklesham beds  $\frac{201}{85}$ , Barton  $\frac{123}{351}$ , Upper Bagshot  $\frac{17}{22}$ , Headon beds  $\frac{112}{288}$ , Osborne beds  $\frac{10}{12}$ , Bembridge beds  $\frac{30}{58}$ , Hempstead  $\frac{26}{55}$ , Miocene  $\frac{32}{58}$  (Plantæ), Coralline crag  $\frac{295}{871}$ , Red crag  $\frac{203}{801}$ , Norwich crag  $\frac{156}{329}$ , Pleistocene freshwater  $\frac{165}{254}$ , Pleistocene marine  $\frac{211}{538}$ .

### I. Eocene Strata.

The most familiar European types of Eocene deposits occur in the Anglo-Parisian, Anglo-Belgian, and Franco-Belgian basins, which contain alternations of marine, estuarine, and freshwater strata.

**Flora and Fauna.**—In the English Eocene series several distinct floras have successively occurred, those of the London clay (15 genera and 110 species), and the Bagshot beds (34 genera and 47 species), being the richest both in types and species. The plants of the London Clay indicate a hot and humid climate, and include species of palms, *Nipadites*, &c., also Leguminosæ through 12 species, *Leguminosites* 18, and *Faboidea* 25 species; Sapindaceæ through *Cupanoides* and *Tricarpelloides* 15, Malvaceæ through *Hightea* 10, the Proteaceæ through *Pterophylloides* and *Comptonia* 9 species.<sup>1</sup>

The Eocene fauna shows that in Central Europe tropical or subtropical conditions prevailed. The Nummulites of the Nummulite Limestones, with other Foraminifera in vast numbers, attest their importance in the construction of the Middle Eocene rocks of Europe, Persia, and India.

The Mollusca played a most important part in the fauna of the Eocene and other or later rocks of the Tertiary period. Most of the genera now living commenced their career in the sea that laid down the London Clay, Bracklesham and Barton beds; and no less than 300 genera and 1000 species appeared in the British Lower Eocene sea.

Most of the Gasteropoda are now confined to the warmer seas of the globe. The most abundant genera in these older Tertiary strata were *Nautilus*, *Voluta*, *Conus*, *Mitra*, *Melania*, *Cerithium*, *Rostellaria*, *Turritella*, *Pleurotoma*, *Cypræa*, *Natica*, *Fusus*, *Cancellaria*, *Oliva*, *Pseudoliva*, *Pyrula*, *Murex*, *Ancillaria*, &c., &c. Amongst the Pelecypoda may be mentioned *Pholadomya*, *Cytherea*, *Cardita*, *Cardium*, *Crassatella*, *Cyprina*, *Cyrena*, *Modiola*, *Nucula*, *Pectunculus*, *Psammobia*, &c. The London Clay and Bracklesham beds yield

<sup>1</sup> See Bowerbank: "Fossil Fruits of the London Clay." J. S. Gardner: "British Eocene Flora," Palæontographical Soc., 1879.