

a large part of the mainland. The lowest group is named by him Zanclean, and consists of marls and light-colored limestones. The Plaisancian follows in a group of blue clays or marls, while the succeeding Astian consists of yellow sands. Of these stages the first is characterized by a fauna of which nearly all are peculiar species, and only 85 out of 504 species, or about 17 per cent, belong to living forms which are nearly all found in the Mediterranean. Some of the common species of the deposit are *Janira flabelliformis*, *Terebratulina caput-serpentis*, *Rhynchonella bipartita*, *Dentalium triquetrum*, *Limopsis aurita*, *Leda dilatata*, *L. striata*, *Phill.*, *Modiola phaseolina*. Tropical genera are well represented among the shells of the Italian Pliocene beds, while some of the still living Mediterranean genera occur there more abundantly, or in larger forms than on the present sea-bottom. The newer Pliocene deposits attain in Sicily a thickness of 2000 feet or more, rising to a height of nearly 4000 feet above the present sea-level, and covering nearly half of the island. To this series, though possibly it should be regarded as Pleistocene, is assigned a yellowish limestone, sometimes remarkably massive and compact, and 700 or 800 feet thick, yet full of living species of Mediterranean shells, some of which even retain their color, and a part of their animal matter. It was during the accumulation of the Pliocene strata that the history of Etna began, the first stages being submarine eruptions, which were followed by the piling-up of the present vast subaerial cone upon the upraised Pliocene sea-bottom.

There is distinct evidence of a lowering of the climate of southern Europe during the deposition of the Italian Pliocene series. Not only did many of the distinctively southern types of shells gradually disappear from the Mediterranean, but others of markedly northern character, such as species of *Astarte*, took their place. The Italian Pliocene deposits, while chiefly of marine origin, contain also among their higher members lacustrine or fluviatile strata, in which remains of the terrestrial flora and fauna have been preserved. In the upper part of the valley of the Arno an accumulation of lacustrine beds attains a depth of 750 feet. The older portion consists of blue clays and lignites, with the abundant vegetation above referred to (p. 1648). The upper 200 feet consist of sands and a conglomerate ("sarsino"), and have yielded remains of 39 species of mammals including *Macacus florentinus*, *Mastodon arvernensis*, *Elephas meridionalis*, *Rhinoceros etruscus*, *Hippopotamus am-*