

bama Smith and Johnson have assigned the following thicknesses to its various subdivisions: *Buhrstone*, 300'; *Lisbon beds*, 50'; *Ostrea sellæformis beds*, about 65'; in all about 415'.

4. The *Claiborne* was named by Conrad from Claiborne, Ala. The typical development of this group is of very limited geographical extent, being confined to the drainage of the Alabama and Tombigbee rivers (Langdon); but in Arkansas at White Bluff on the Arkansas River and elsewhere, there are marly sands with a fauna showing *Jackson* affinities, though they are at present classed as uppermost *Claiborne*. The typical *Claiborne bed* is 16' thick; the *White Bluff bed* over it, 20'.

5. The *Jackson beds* were so named by Conrad from typical exposures at Jackson, Miss. They are sometimes improperly classed with the *Vicksburg*, under the name of *White Limestone*. They occur on the Gulf slope east of the Sabine River. In Arkansas and probably in Mississippi they extend some distance up the Mississippi Embayment, overlapping *Claiborne* and *Lignitic beds*. They are clayey and lignitiferous in this region; but to the east, in Alabama, become calcareous and constitute beds of impure limestone. Thickness over 50'.

6. The *Vicksburg*, named by Conrad from typical exposures at Vicksburg, Miss. This group is mainly composed of limestones, pure and impure, and like the *Jackson* is confined to the Gulf slope east of Sabine River; and unlike the preceding groups, it is little influenced by the Mississippi Embayment. According to Langdon's figures its thickness varies from 150' to 210'. The *Red Bluff group* of Hilgard is scarcely separable faunally from this.

*General Remarks.* — Although it has been said that the Cretaceous (*Chico*) and the Eocene (*Tejon*) deposits west of the Rocky intergrade without a perceptible break, their respective faunas indicate that there is a break somewhere. On the Atlantic and Gulf slopes there is abundant proof of a marked discordance, both faunal and stratigraphic, between the Cretaceous and Eocene Tertiary series. In the Mississippi Embayment, at least in eastern Arkansas, the earliest known Eocene beds pass up and over the Cretaceous, while in southwest Arkansas, Texas, Alabama, and Georgia, broad areas of Cretaceous are exposed; in Maryland and Virginia, where lowest Eocene is wanting, *Lignitic beds* rest upon the Cretaceous.

II. MIOCENE AND PLIOCENE, OR NEOCENE OF THE ATLANTIC AND GULF BORDERS. — While dredgings from the Grand Bank of Newfoundland, as well as from St. George's Shoal, off the coast of Massachusetts, render it probable that later Tertiary deposits exist beneath these shallow seas, the first distinct exposures found on the Atlantic coast are those of Martha's Vineyard at Gay Head and Chilmark, as recently proved through a study of the fossils by Dall (1894). The next is near the village of Bridgeport in New Jersey. These exhibit Miocene marls of black, yellow, and gray hues, with a thickness of from 12 to 15 feet. The sands, clays, and marls from the Artesian well at Atlantic City indicate that the thickness of the Miocene strata there is not less than 700 feet. These deposits are mainly, if not exclusively, of Upper or *Yorktown* Miocene age.

In Maryland the escarpments along the western shore of Chesapeake Bay, and along the Patuxent and Potomac rivers, show Miocene beds of sand and clay, rarely indurated, and, at base, thick deposits of diatomaceous earth, amounting in all to a thickness of 400 feet. In Virginia a similar series is exhibited along the river courses; and in the region of Dismal Swamp younger beds of Pliocene age are reported.