

in some places transgress them onto older formations. They are unconformable to the underlying Eocene. The Miocene deposits consist of sands, clays, marls, and diatomaceous earth beds. Glauconitic materials are rarely found, and when found are probably derived from older formations. The diatomaceous earth is most strikingly developed in the basal Miocene formations of Virginia and Maryland, where it has been known as "Richmond earth." The calcareous marls are at times cemented into limestone ledges. The fossils consist chiefly of littoral and infralittoral forms in which the cetacea, mollusca, bryozoa, echinodermata, zoantharia, foraminifera, and diatomacea are chiefly represented.

The Miocene deposits of North Carolina belong to the later facies of Miocene sedimentation, the littoral phase being well developed in the Yorktown formation to the north of the Hatteras axis and in the Duplin formation to the south of the Hatteras axis, where the shell remains are much broken by wave action. In the underlying St. Marys formation of the former area—the only other Miocene formation found in North Carolina—the moderately fine argillaceous sands are of a distinctly infralittoral character. They rest unconformably on Eocene or Cretaceous beds as the case may be. The fossils of the North Carolina Miocene are varied and numerous.

Pliocene.

Pliocene or supposed Pliocene deposits of two very marked types occur in the Coastal Plain region. The first is an infralittoral marine deposit not known with certainty to occur to the north of Cape Hatteras, although a detailed study of well borings may show it to overlie the Miocene beds toward the coast beneath the mantle of Pleistocene deposits. To the southward this phase of the Pliocene is, however, well developed and its characters are not unknown. The deposits of this type, however, lie as far as known along the eastern margin of the subaërial division of the Coastal Plain in somewhat detached basins. It is called the Waccamaw formation in North Carolina, where it is chiefly found in the region near the mouths of the Neuse and Cape Fear rivers. The isolated outcrops are probably remnants of a once continuous deposit. Whether the poorly developed Croatan deposits should be included cannot be determined with our present knowledge of those beds.

The second phase is a littoral and sublittoral phase, the exact age of which in the absence of fossils has never been satisfactorily determined. It is evidently of late Tertiary or early Quaternary time. It consists of gravels, sands, and loams which were evidently laid down close to