

the Black Creek in North Carolina has been already pointed out. It is evident, therefore, that open-sea conditions prevailed much more widely in the far north and gradually became less pronounced southward. It is possible that the same conditions in the reverse order occurred to the southward of North Carolina toward the Gulf, where the intercalated marine sediments of the Eutaw succeed the Tuscaloosa. The close of this epoch saw the establishment of marine conditions throughout the Atlantic and Gulf borders. The barriers, whatever they were, had largely disappeared and the open sea probably covered the greater part of the Coastal Plain.

The remainder of the Upper Cretaceous period is everywhere characterized by marine sedimentation in which greensand marls predominate. Micaceous sands and clays also occur interstratified with the greensands, while shells of various marine organisms are at times present in such large quantities as to form beds rich in calcareous matter. The deposits are distinctly infralittoral in character, while the widespread presence of greensand shows that the area of deposition received its sediments slowly from the adjacent land. To-day greensand is found at some distance from the coast, where land-derived materials are deposited in small amounts. The conditions necessary for the production of greensand may have existed in Upper Cretaceous time nearer the coast if the adjacent land was low and the streams transported little sediment into the sea, as seems probable.

This epoch of Upper Cretaceous time represented along the South Atlantic coast by the Peedee beds of North and South Carolina, and by the greater portion of the Ripley formation in the Gulf border, saw the deposition of the Monmouth and Rancocas formations in Maryland, Delaware, and New Jersey, while in the latter State still more recent Cretaceous deposits appear in the Manasquan, which evidently represent the closing epoch of Upper Cretaceous time. To the southward elevation of the Coastal Plain began earlier as depression had started later, so that we have a much longer record of Cretaceous sedimentation in Maryland, Delaware, and New Jersey than elsewhere along the Atlantic border.

EOCENE.

The opening of Eocene time in the northern portions of the Coastal Plain found little change, as the oldest Eocene deposits of New Jersey (Shark River formation) apparently overlies the latest Cretaceous beds (Manasquan formation) conformably and are similar to them in being highly glauconitic. Depression extended gradually southward as Eocene time advanced, for in Maryland we have glauconitic strata of a later epoch of the Eocene, known as the Aquia and Nanjemoy formations,