

Calvert. The first of these is the absence of the cooler water element so characteristic of the latter. In Maryland, the northern component comprises 56% of the Calvert forms available as diagnostic species outside of the State, the more abundant species being *Muricidea shilohensis*, *Turritella aequistriata*, *Corbula elevata*, *Venus ducatelli*, *Cytherea staminea*, and *Crassatellites melinus*. This, the dominant feature of the Calvert, is entirely lacking in the North Carolina deposits, and its absence can scarcely be explained by the mere difference in geographic position. The Choptank, which is intimately related to the Calvert, disappears before reaching the Maryland-Virginia line. "The second and equally important criterion is the presence, in great abundance, of typical St. Marys forms. Species which in Maryland are diagnostic of the upper Chesapeake are among the most profuse in the North Carolina formation. *Turritella variabilis* and *Pecten jeffersonius* and its varieties are possibly the most conspicuous examples, while *Scaphella mutabilis*, *Scalaspira strumosa*, *Ecphora quadricostata*, *Ensis directus*, *Phacoides cribrarius*, *Pandora crassidens*, and *Anomia simplex*, are far from rare.

"The St. Marys fauna of Maryland and that of North Carolina, while co-existent, are not identical. It is possible that the dissimilarity in the faunas may involve not only a range in latitude, but a slight chronologic range as well, and that the North Carolina formation may represent a slightly longer period of deposition than does the Maryland. There are certain species common in the North Carolina Chesapeake and in the later south Atlantic coast Tertiaries which in Maryland are confined to the Calvert and Choptank. Among these may be mentioned the common species *Venus rileyi*, *Asaphis centenaria*, *Nucula proxima*, *Divaricella quadrisulcata*, *Chama congregata*, *Tellina declivis*, *Tellina dupliniana*, and *Glycymeris subovata*. Their presence may, perhaps, be ascribable to a migration from the northeast—the probable direction of the advancing shore line. There is some evidence for believing that between late Calvert time and the initiation of the St. Marys in the north there was a shifting of the axis of elevation from approximately the latitude of the Virginia-North Carolina boundary towards the southward to the latitude of the present Hatteras axis. This would cause not only the submergence of the intermediate area, but would probably affect the ocean currents as well. By the lowering of the barriers to the northward free access would be given to the colder waters, while by an elevation to the southward an effective barrier might be raised against southern currents such as the Gulf Stream. The waters in the North Carolina area of deposition were not sufficiently cooled, however, to permit the existence of the strictly boreal forms, and only those species adapted to endure a wide range in temperature survived. Thus the migrants from the New Jersey fauna were cut out, while *Venus rileyi*, *Nucula proxima*, *Chama congregata*, etc., flourished in increasing numbers in the warmer waters of their new environment. In view of the individuality of the St. Marys fauna, it is not probable that a later migration to the northward took place, but rather that there was a contemporaneous evolution in Maryland and in North Carolina along slightly divergent lines."

#### YORKTOWN FORMATION.

The Yorktown formation overlies the St. Marys unconformably, both in Virginia and in North Carolina. It has been traced from river