LOWER MIOCENE BIOSTRATIGRAPHY ALONG THE SAVANNAH RIVER, GEORGIA

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ABSTRACT

The Georgia Geological Survey is presently undertaking a complete reevaluation of the Tertiary stratigraphy of the Coastal Plain of the state. The overall objective is to establish a solid stratigraphic framework for Tertiary sediments within the state, and to be able to correlate with precision and confidence to standard provincial sections in Mississippi, Alabama, and Florida. The first step in this program is to construct a detailed biostratigraphic cross-section along the Savannah River in Screven, Effingham, and Chatham Counties, Georgia (Fig. 1). This paper deals with the Lower Miocene part of this cross-section (Fig. 2). The Lower Miocene section is being reported on separately since beds of this age have not been recognized previously from outcrop or the shallow subsurface in the southeast.

The Lower Miocene in eastern Georgia consists of beds that were originally called "Alum Bluff Formation" and Marks Head Marl. Subsequently these units were lumped into what was considered to be the Middle Miocene Hawthorn Formation. The basal updip Miocene beds originally called "Alum Bluff" have been found to contain planktonic foraminifers associated with the *Globorotalia kugleri* Zone of earliest Miocene age. This zone in eastern Georgia is characterized by the overlapping of ranges of *Globorotalia kugleri*, *Globigerina angulisuturalis*, and *Globigerinoides primordius*.

Only the basal beds of the old Marks Head Marl are calcareous and microfossiliferous. These beds range in age from upper *Globorotalia kugleri* Zone to apparently the *Catapsydrax dissimilis* Zone and are characterized by the presence of *Globorotalia kugleri*, *Globigerinoides quadrilobata quadrilobata*, *Globigerinoides quadrilobata altiapertura*, and *Globigerinoides* cf. *subquadrata*. No single core, however, appears to contain the entire time span of the formation.

The "Alum Bluff Formation" and the lower Marks Head Marl appear to represent two real stratigraphic units. However, the stratigraphic relationships are not clear at the present time, due to both insufficient core control in the small area where the two units are superposed and to the characteristic noncalcareous nature of the younger unit. The favored interpretation is that the two units represent distinct transgression-regression cycles separated by a diastem. The possibility exists that they are joined by continuous sedimentation, differing only in environmental characteristics and by a slight but important difference in time.

Typically, the Lower Miocene beds unconformably overlie limestone of Vicksburgian age. In the vicinity of Savannah, Georgia, however, the Lower Miocene overlies younger Oligocene, Chickasawhayan beds, indicating stratigraphic offlap for the Oligocene units.

In their extreme updip occurrence in southern Screven County, the Lower Miocene beds are unconformably overlain by the Duplin Formation of Pliocene age. Elsewhere, the Lower Miocene is overlain with apparent unconformity by the upper part of the old Marks Head Marl of Middle Miocene, Shoal River age.

Laterally, the marine Lower Miocene grades updip into arenaceous beds that have been mapped in the past as the Hawthorn Formation. Paralleling depositional strike to the northeast in South Carolina, along the Savannah River, the upper part of the Cooper Marl is a calcareous, relatively deep-water facies of the Lower Miocene. The "Hawthorn Formation" of southwestern Georgia and Florida appears to be stratigraphically younger than the deposits described here.

[1]Georgia Geological Survey

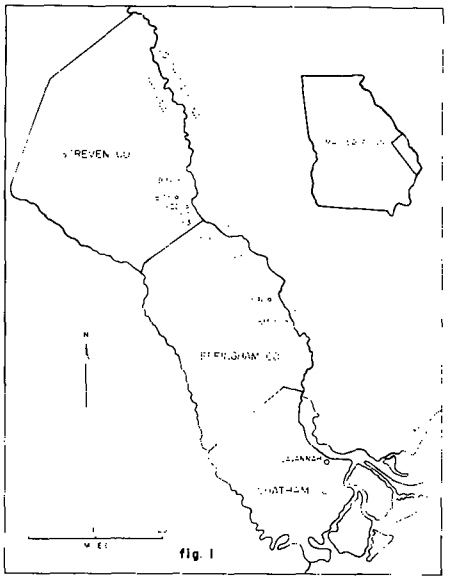
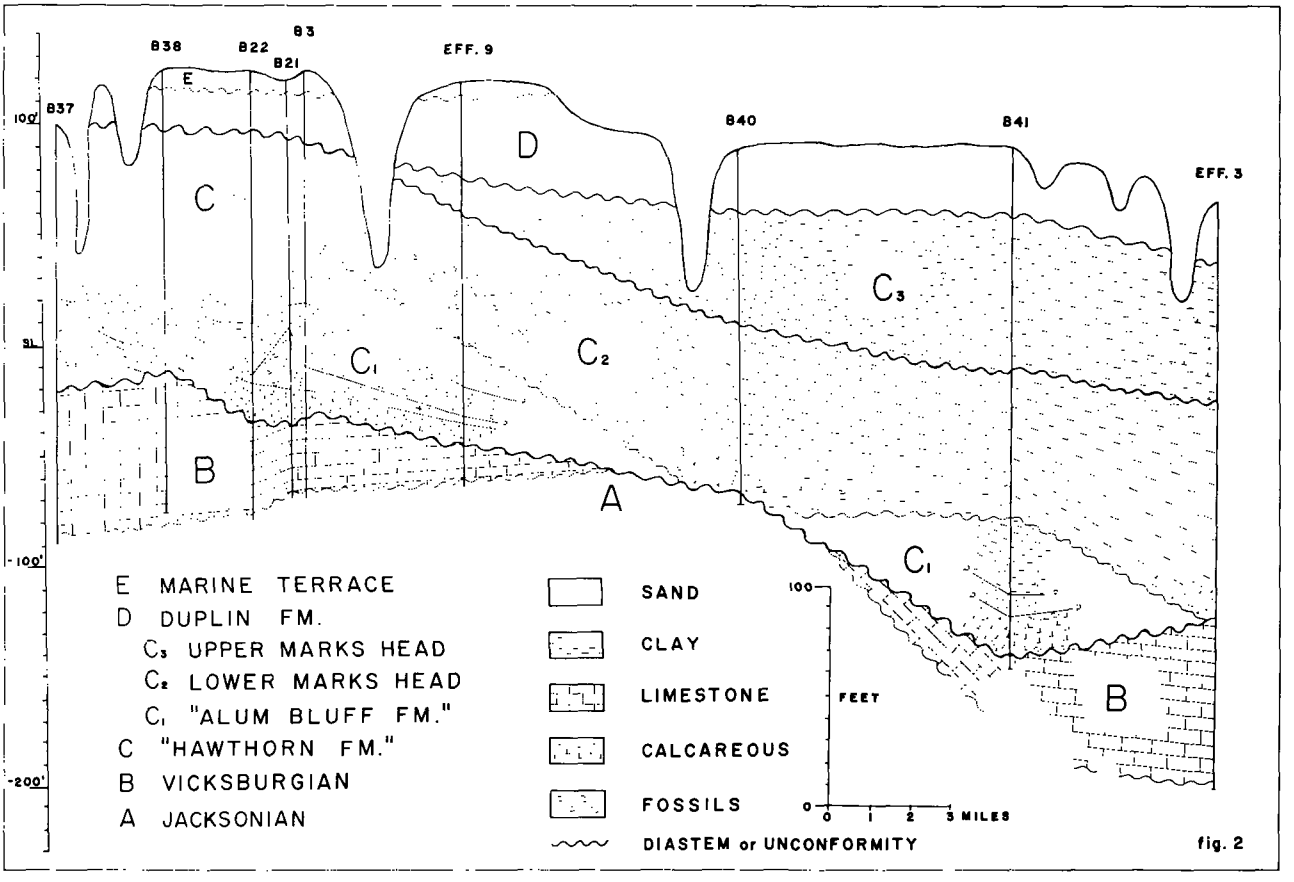


fig. 1


B38
B22
B3
B21
EFF. 9
E
B37
100'
C
D
B40
B41
EFF. 3
C3
SL
C1
C2
B
A
-100'
-200'
E MARINE TERRACE
D DUPLIN FM.
C3 UPPER MARKS HEAD
C2 LOWER MARKS HEAD
C1 "ALUM BLUFF FM."
C "HAWTHORN FM."
B VICKSBURGIAN
A JACKSONIAN
SAND
CLAY
LIMESTONE
CALCAREOUS
FOSSILS
DIASTEM or UNCONFORMITY
100
FEET
0
0 1 2 3 MILES
fig. 2