The Invertebrate Macropaleontology Of The Clarke County, Mississippi, Area

DAVID T. DOCKERY III

BULLETIN 122

MISSISSIPPI DEPARTMENT OF NATURAL RESOURCES
BUREAU OF GEOLOGY

ALVIN R. BICKER, JR.
Bureau Director

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LETTER OF TRANSMITTAL

Mississippi Department of Natural Resources
Bureau of Geology

Mr. Charles Huffstatler, Chairman, and
Members of the Commission
Department of Natural Resources

Commissioners:

The Bureau of Geology is pleased to transmit to you Bulletin 122, entitled "The Invertebrate Macropaleontology of the Clarke County, Mississippi, Area" by David T. Dockery, III.

This bulletin reports on the Tertiary geology and paleontology in an interesting and complex area of the state. Fossils from eleven different formations or members of formations are illustrated by photograph. The age of the fauna range from early Eocene to Oligocene. Three hundred and forty-six species are figured, and six new species are named. The photographs are of excellent quality and will be a valuable aid in the comparison with Tertiary fauna worldwide.

For over one hundred years the State of Mississippi has been cited as an excellent source of Tertiary fossils. This contribution will be an important reference to these professionals studying the fauna or those amateurs who only wish to identify their shells.

Respectfully submitted,

Alvin R. Bicker, Jr.
Director and State Geologist

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ABSTRACT

This report concerns the paleontology and stratigraphy of the Eocene and Oligocene sedimentary units in Clarke and parts of neighboring Lauderdale, Newton, Jasper, and Wayne Counties, Mississippi. Fossils from these units are discussed systematically and are figured in plates arranged according to their stratigraphic sequence. The 346 species, subspecies, and variations discussed and figured include: 2 foraminifers, 24 corals, 5 bryozoans, 1 chiton, 188 gastropods, 1 cephalopod, 5 scaphopods, 109 bivalves, 1 barnacle, 4 decapods, and 6 echinoids. Two gastropod species and one subspecies and three bivalve species are named as new. Microfossils are not included in this report.

Measured sections and photographs are given for exceptional exposures of Clarke County and some Lauderdale County formations. The depositional environments of these formations are discussed based on a consideration of the unit's paleontology, lithology, and stratigraphic relationships. A new, fossiliferous, marine, stratigraphic unit recognized in the upper Kosciusko Formation is named the Dobys Bluff Tongue. As many of the fossiliferous Eocene and Oligocene units of Mississippi crop out in Clarke County, this report may serve as a guide to the paleontology and stratigraphy for a large part of the State's Tertiary sequence.

INTRODUCTION

The geology and paleontology of Clarke County, Mississippi, are of particular interest because of the county's excellent sequence of Tertiary formations. Several type localities for members of formations in the Claiborne and Jackson Groups (Middle and Upper Eocene) are located in the county. Due to a combination of structure and reduced stratigraphic thicknesses, the broad, arcuate, Middle and Upper Eocene outcrop belt of central Mississippi (extending from the Jackson area north into Tennessee) narrows to the east so that the entire sequence crops out within Clarke County.

The sedimentary sequence of Clarke County shows cycles of deltaic and fluvial sedimentation interrupted by marine transgressions. West of the county the deltaic and fluvial facies thicken into the Mississippi Embayment, a structural trough whose axis approximates the course of the Mississippi River. Sedimentary marine facies thicken eastward into Alabama at the expense of deltaic units, and the overall sequence is thinner. The Tertiary sediments of southern Alabama indicate a stable, marine shelf environment throughout much of the Eocene. In western Mississippi, the Eocene sequence records successive cycles of delta progradation along a subsiding coastline. Clarke County was a fluctuating transition zone between the sediment-laden coastal areas to the west and the stable marine shelf to the east. Numerous fossiliferous beds located within the county provide excellent material for the study of Tertiary marine faunas.

The fossils referenced in this report were collected during a reconnaissance survey. The number of species included should not be considered to represent an exhaustive study. Only the macrofauna is considered in this report. Certain units, such as the fossiliferous Dobys Bluff Tongue

of the Kosciusko Formation at Dobys Bluff and the Moodys Branch Formation on the Chickasawhay River and at Garland Creek, are given special attention. Several large samples of fossiliferous sand were collected from the Moodys Branch Formation at locality 16 with the help of students on a Tulane University geology field trip and were screened to examine the small fossils. For other units, such as the Red Bluff Formation, only a few representative fossils are discussed and illustrated.

This work may prove useful as a guide to the Tertiary paleontology of Mississippi, for a large portion of the State's fossiliferous Tertiary sequence crops out in Clarke County. It was with this in mind that the Bashi Formation was included; its outcrop in Clarke County is only inferred by a projection into the northeastern corner of the county from test hole information. Several collecting localities outside of the county were included so that the paleontology of certain units could be better represented and the best specimens could be illustrated in the plates. Such localities include Lauderdale County localities 19-21 (Bashi Formation), Newton County localities 64-71 (Cook Mountain Formation), and Wayne County localities 34-36 (Shubuta Clay), 32 (Pachuta Marl), 37-40 (Red Bluff Formation), and 45 (Glendon Limestone). As reports on the geology of Lauderdale, Jasper, and Wayne Counties have been published in the Mississippi Geological Survey bulletin series, it is not likely that these localities will soon be discussed in future publications. Important fossiliferous units in Mississippi's Tertiary sequence that do not crop out in Clarke County and are excluded from this work include the Clayton and Porters Creek Formations of the Midway Group (Paleocene), the Mint Spring and Byram Formations of the Vicksburg Group (Oligocene), the Chickasawhay Limestone, and the Paynes Hammock Formation.

ACKNOWLEDGMENTS

The writer gratefully acknowledges the field assistance and direction of David Ray Williamson in the early stage of this work and of William A. Gilliland in the latter stage. Dr. Emily H. Vokes, Tulane University, gave considerable assistance in reading and criticizing this work. Fossils illustrated from the Cook Mountain Formation came largely from the Tulane Geology Department's collection. Frederic F. Mellen and Michael Bograd also read this work and gave valuable advice. Paul F. Huddlestun gave advice concerning the stratigraphic correlation chart. Dr. Gale A. Bishop helped in the identification of fossil decapods. Randall Bissell drafted the illustrations. Appreciation is also extended to the students of a Tulane University geology class and others who helped carry out large sacks of sediment to be screened for fossils. The index is by Michele Morphis.

PALEONTOLOGY

Tertiary invertebrate macrofossils of Clarke County consist largely of marine molluscs, with corals, echinoids, foraminifers, bryozoans, and arthropods being of a lesser importance. Huff (1970) listed a number of ostracod species in the Jackson Group in Clarke County. In this report, ostracods are considered to be part of the microfauna and are not included.

Several invertebrate species are useful as guide fossils to formations

in Clarke County and to equivalent stratigraphic units outside Mississippi. Many of these species, with the notable exception of corals and certain molluscs, have calcitic rather than aragonitic shells. Calcitic shells withstand weathering and solution better than do aragonitic ones and are thus selectively preserved in many formations.

Two species of large foraminifers, *Lepidocyclina (Lepidocyclina) mantelli* (Morton, 1833) and *Lepidocyclina (Lepidocyclina) supera* (Conrad, 1865) are guide fossils in the Vicksburg Group. The former is a large, flat, half-dollar-sized foraminifer present in the Marianna Limestone of Mississippi, Alabama, and Florida; the latter is a nickel- or dime-sized foraminifer in the Glendon Limestone and Byram Formation of Mississippi and Alabama. Many other foraminifer species are useful as guide fossils but are too small for field identification.

Several coral species occur in Clarke County, but many of these either are not broadly distributed elsewhere or lack a restricted geologic range. The following coral species may prove useful guide fossils.

Range	Species	Distribution
Red Bluff Clay and Vicksburg Group	*Archohelia vicksburgensis*	Miss. to Ala.
Red Bluff Fm.	*Balanophyllia elongata*	Miss.
Jackson Group		
Yazoo Fm.		
Shubuta Clay Mbr.	*Flabellum rhomboideum*	Miss.
Moodys Branch Fm.	*Flabellum cuneiforme wailesi*	Tex. to Miss., Ark.
	Flabellum magnocostatum	Miss.
Claiborne Group		
Cook Mountain Fm.	*Paracyathus bellus*	La. to Miss.
	Platytrochus stokesi	Tex. to Miss.
	Flabellum cuneiforme fragile	Miss. to Ala.
	Flabellum cuneiforme pachyphyllum	Tex. to Miss.
	Endopachys lonsdalei	Miss. to Ala.
Wilcox Group		
Bashi Fm.	*Balanophyllia haleana*	Miss. to Ala.

Bryozoans are abundant in the Moodys Branch Formation, the Pachuta Marl Member of the Yazoo Formation, and the Marianna Limestone. The various species of Bryozoa must be examined under a microscope for identification. For this reason they are considered to be part of the microfauna. Only one encrusting species of Bryozoa is figured from the Cook Mountain Formation, three lunulitiform species from the

Moodys Branch Formation, and one branching species from the Marianna Limestone. According to Canu and Bassler (1920, p. 536-537), the latter species *Trigonopora grande* (Canu and Bassler, 1920) is similar to the European species *Trigonopora polymorphum* Reuss, 1869 and indicates the equivalence of the Vicksburg Group with the Tongrian. *Trigonopora grande* is very abundant in the Marianna Limestone and may be recognized without magnification by its characteristic branching zoarium.

Canu and Bassler (1920) list the following bryozoan species as occurring in Clarke County. Generic names are corrected according to those classified as valid in the *Treatise on Invertebrate Paleontology. Part G. Bryozoa*, Moore, ed. (1953).

Claiborne Group

Wautubbee Hills, 4 miles south of Enterprise, Mississippi; probably from the Cook Mountain Formation.

Conopeum lacroixii Busk, 1852 very rare

Trochopora bouei Lea, 1833 very rare

Otionella perforata Canu and Bassler, 1917 rare

Lunulites? grandipora Canu and Bassler, 1920 rare

Holoporella granulosa Canu and Bassler, 1920 very common

Schizorthosecos interstitea Lea, 1833 common

Schizorthosecos radiatum Canu and Bassler, 1920 very common

Jackson Group

Shubuta, Mississippi, "Zeuglodon zone of Moodys Marl;" possibly the Pachuta Marl Member of the Yazoo Formation.

Otionella cava Canu and Bassler, 1920 rare

Membraniporidra spissimuralis Canu and Bassler, 1920 rare

Smittipora tenuis (Canu and Bassler, 1920) rare

Hippomenella incondita Canu and Bassler, 1920 very rare

Hippomenella alifera Canu and Bassler, 1920 very rare

Metradolium labratulum Canu and Bassler, 1920 rare

Metradolium transversum Canu and Bassler, 1920 very rare

Porella jacksonica Canu and Bassler, 1920 rare

Holoporella separata Canu and Bassler, 1920 rare

Mecynoecia magnicellae Canu and Bassler, 1920 very common

Pleuronea fenestrata Busk, 1859 common

Idmonea magna Canu and Bassler, 1920 rare

Lichenopora grignonensis Milne-Edwards, 1838 rare

"Bluff on south side of Suck Creek, half-mile above its mouth,

Clarke County, Mississippi. Station No. 7377, United States Geological Survey. Zeuglodon zone of Moodys marl;" probably the Pachuta Member of the Yazoo Formation.

Otionella tuberosa Canu and Bassler, 1920 rare

Otionella cava Canu and Bassler, 1920 rare

Hippomenella incondita Canu and Bassler, 1920 rare

Metradolium grande Canu and Bassler, 1920 very common

Smittina angulata Reuss, 1865 rare

Porella jacksonica Canu and Bassler very rare

Holoporella damicornis Canu and Bassler, 1920 rare

Kleidionella grandis Canu and Bassler, 1917 common

Proboscina magniramosa Canu and Bassler, 1920 very rare

Plagioecia marginata Canu and Bassler, 1920 rare

Mecynoecia magnicellae Canu and Bassler, 1920 very common

Lichenopora grignonensis Milne-Edwards, 1838 rare

The Mollusca make up a majority of the Tertiary invertebrate macrofossils in the Gulf Coastal Plain. Though the gastropods comprise the majority of the Tertiary molluscan species, certain bivalves are more useful as guide fossils. This is due to: (1) their broad distribution, (2) restricted stratigraphic range, (3) abundance, and (4) better preservation of species having a calcitic shell. The oysters are an important bivalve element in the Upper Cretaceous and Tertiary sediments of the Gulf and Atlantic Coastal Plains. Stenzel (1952a) discusses the usefulness of various *Cubitostrea* species as index fossils in the Gulf Coast Tertiary. The pectens and venericards are also important as guide fossils, though the latter have aragonitic shells that may be preserved only as molds in some formations. The following bivalve species are useful as guide fossils:

Range	Species	Distribution
Vicksburg Group		
Vicksburg Group in general	*Lopha vicksburgensis*	Miss. to Ala.
Byram Fm. and Glendon Ls.	*Pecten byramensis*	Mex. to Fla.
Mint Spring Fm. and Marianna Ls.	*Pecten poulsoni*	Miss. to Ala.
Red Bluff Fm.	*Pecten perplanus*	Miss. to Fla.
	Spondylus dumosa	Miss. to Ala.
Jackson Group		
Jackson Group in general	*Pycnodonta trigonalis*	La. to Fla.

Yazoo Fm.		
Pachuta Marl Mbr.	*Chlamys spillmani*	Miss. to Ga.
Moodys Branch Fm.	*Chlamys nupera*	La. to Miss.
Claiborne Group		
Claiborne Group in general	*Venericardia claiboplata*	Tex. to Ala.
	Venericardia densata	Tex. to Ala.
Cook Mountain Fm.	*Cubitostrea sellaeformis*	Mex. to Ala.
Winona Fm.	*Chlamys burlesonensis*	Tex. to Miss.
	Cubitostrea perplicata	Miss. to Ala.
	Cubitostrea lisbonensis	Mex. to Ala.
Wilcox Group		
Bashi Fm.	*Venericardia bashiplata*	Miss. to Ala.

The molluscan faunas of only two Clarke County Eocene horizons have been studied in any detail. These horizons are the Cook Mountain Formation (Claiborne Group) and the Moodys Branch Formation (Jackson Group). Harris (1919) and Palmer (1937) studied, respectively, the Claiborne bivalves and gastropods in Clarke County. The majority of species they list in the county are from Wautubbee. These species most likely came from the Archusa Marl at localities 61 and 62 as the overlying Potterchitto and Gordon Creek Shale Members contain only the molds of fossils. At present these Archusa Marl localities are overgrown and weathered. To better illustrate the Cook Mountain molluscan fauna, specimens collected from adjacent Newton and Jasper Counties are figured in the plates. The following molluscan species are listed from Wautubbee by Harris (1919), Palmer (1939), and Palmer and Brann (1965 and 1966). "Type" by the species indicates Wautubbee is the type locality.

Gastropoda

Diodora tenebrosa antica Palmer, 1947

Puncturella (Altrix) altior (Meyer and Aldrich, 1886) Type

Solariella stalagmium modesta (Meyer and Aldrich, 1886) Type

Solariella tricostata (Conrad, 1835)

Architectonica textilina (Dall, 1892) Type

Architectonica amoena (Conrad, 1833)

Architectonica fungina (Conrad, 1833)

Architectonica (Solariaxis) elaborata (Conrad, 1833)

Architectonica cossmanni (Dall, 1892)

Architectonica aldrichi (Dall, 1892) Type

Architectonica leana (Dall, 1892) Type

Turritella carinata I. Lea, 1833

Turritella ghigna de Gregorio, 1890

Turritella rina Palmer, 1937

Turritella rina sabrina Palmer, 1937

Turritella dutexata Harris, 1895

Turritella obruta Conrad, 1833

Mathilda retisculpta (Meyer and Aldrich, 1886) Type

Gegania antiquata (Conrad, 1833)

Serpulorbis squamulosus (Conrad, 1834)

Tenagodus vitis (Conrad, 1833)

Cerithiella nassula (Conrad, 1834)

Cerithiella heckscheri Palmer, 1937 Type

Cerithiella preconica Palmer, 1937 Type

Triphora major (Meyer, 1886)

Cirsotrema (Coroniscala) newtonensis (Meyer and Aldrich, 1886)

Scalina trapaquara engona (Harris, 1895)

Hipponix pygmaeus I. Lea, 1833

Crepidula dumosa Conrad, 1834

Crepidula lirata Conrad, 1833

Sulcocypraea vaughani (Johnson, 1899)

"*Natica*" "*(Naticarius)*" *semilunata* I. Lea, 1833

Polinices aratus (Gabb, 1860)

Neverita sp.

Euspira newtonensis (Meyer and Aldrich, 1886)

Euspira aldrichi Palmer, 1937

Sinum beatricae Palmer, 1937

Phalium brevicostatum (Conrad, 1834)

Distorsio (Personella) septemdentata Gabb, 1860

Ficopsis penita (Conrad, 1833)

Ficopsis texana (Harris, 1895)

Hexaplex (Hexaplex) vanuxemi (Conrad, 1834)

Mitrella (Columbellopsis) mississippiensis (Meyer and Aldrich, 1886)

Pseudoliva vetusta carinata Conrad *in* Gabb, 1860

Levifusus mortoniopsis carexus (Harris, 1895)

Latirus moorei (Gabb, 1860)

Clavilithes kennedyanus Harris, 1895

Agaronia alabamensis (Conrad, 1833)

? Athleta petrosus (Conrad, 1833)

Caricella stenzeli Palmer, 1937 Type

Lapparia mooreana (Gabb, 1860)

Marginella (Dentimargo) constrictoides Meyer and Aldrich, 1886

Bonellitia tortiplica? (Conrad, 1865)

Bonellitia garvani Palmer, 1937 Type

Bonellitia (Babylonella) elevata (I. Lea, 1833)

Bullata larvata (Conrad, 1833)

Surculoma penrosei tabulella Harris, 1937 Type

Conus (Lithoconus) sauridens Conrad, 1833

Retusa (Cylichnina) galba (Conrad, 1833)

Rhizorus volutatus (Meyer and Aldrich, 1886)

Acteon pomilius Conrad, 1833

Acteon idoneus Conrad, 1833

Nucleopsis subvaricata (Conrad, 1860)

Cephalopoda

Belemnosella americana (Meyer and Aldrich, 1886) Type

Scaphopoda

Dentalium (Antalis) thalloides Conrad, 1833

Dentalium (Antalis) thalloides claibornense Palmer, 1937

Dentalium (Antalis) blandum de Gregorio, 1890

Dentalium (Antalis) minutistriatum Gabb, 1860

Dentalium incisssissimum Meyer and Aldrich, 1886 Type

Cadulus (Polyschides) newtonensis Meyer and Aldrich, 1886

Bivalvia

Nucula (Nucula) ovula Lea, 1833

Nuculana wautubbeana (Harris, 1919) Type

Hilgardia multilineata (Conrad *in* Wailes, 1854)

Barbatia (Plagiarca) rhomboidella (Lea, 1833)

Limopsis aviculoides (Conrad, 1833) var.

Glycymeris lisbonensis Harris, 1919

Glycymeris trigonella (Conrad, 1833) var.

Plicatula filamentosa Conrad, 1833

Plicatula filamentosa planata Meyer and Aldrich, 1886

Chlamys wahtubbeana Dall, 1898

Chlamys cainei (Harris, 1919) Type

Chlamys pulchricosta (Meyer and Aldrich, 1886) Type

Cubitostrea sellaeformis (Conrad, 1832)

Venericardia (Rotundicardia) rotunda Lea, 1833

Glyptoactis (Claibornicardia) trapaquara Harris, 1895

Lirodiscus (Crustuloides) psychoterus (Dall, 1900) Type

Bathytormus clarkensis (Dall, 1900) Type

Chama harrisi (Gardner, 1927)

Spisula parilis (Conrad, 1833)

Pteropsella lapidosa Conrad, 1834

Tellina (Eurytellina) papyria Conrad, 1833

Caryocorbula alabamiensis (Lea, 1833)

Cf. *Caestocorbula murchisonii* (Lea, 1833)

Caestocorbula fossata (Meyer and Aldrich, 1886)

Conrad (1865b) first described molluscs from the Moodys Branch Formation at Garland Creek in Clarke County but mistakenly gave their locality as Enterprise, Mississippi. Harris (1946), Palmer (1947), Palmer and Brann (1965 and 1966), and Dockery (1977) further described and illustrated or referenced the Garland Creek fauna. The following species are listed by the above writers as occurring at Garland Creek. "Type" by the species indicates that Garland Creek is the type locality.

Gastropoda

Turritella arenicola (Conrad, 1865)

Turritella alveata Conrad *in* Wailes, 1854

Turritella perdita Conrad, 1865 Type
Cirsotrema (Coroniscala) nassulum (Conrad, 1833)
Calyptraphorus stamineus (Conrad, 1856)
Hipponix pygmaeus I. Lea, 1833
Capulus americanus Conrad *in* Wailes, 1854
Calyptraea (Trochita) aperta (Solander, 1766)
Natica permunda Conrad *in* Wailes, 1854
Euspira jacksonensis Palmer, 1947
Galeodea petersoni (Conrad *in* Wailes, 1854)
Hexaplex (Hexaplex) marksi (Harris, 1894)
Pseudoliva vetusta perspectiva Conrad, 1860
Tritonoatractus pearlensis (Aldrich, 1885)
Clavilithes humerosus Conrad *in* Wailes, 1854
Agaronia media (Meyer, 1885)
Agaronia sp.
Caricella subangulata Conrad *in* Wailes, 1854
Lapparia dumosa (Conrad *in* Wailes, 1854)
Pleurofusia hilgardi (Casey, 1903)
Pleurofusia fluctuosa (Harris, 1937)
Scobinella louisianae Harris, 1937
Tornatellaea lata (Conrad, 1834)
Scaphander jacksonensis Palmer, 1947
Clio (Creseis) hastata (Meyer, 1886)

Scaphopoda

Dentalium (Antalis) mississippiense jacksonense Palmer, 1947

Bivalvia

Nucula (Nucula) spheniopsis Conrad, 1865 Type
Nuculana lintfera Conrad, 1865
Hilgardia multilineata (Conrad *in* Wailes, 1854)
Yoldia (Calorhadia) mater (Meyer, 1885)
Yoldia (Orthoyoldia) rubamnis Harris, 1946
Glycymeris (Glycymeris) idonea (Conrad, 1833)

Glycymeris (Glycymeris) filosa (Conrad *in* Wailes, 1854)

Arcoperna filosa Conrad, 1865 Type

Atrina jacksoniana Dall, 1898 Type

Eburneopecten (Eburneopecten) scintillatus Conrad, 1865 Type

Eburneopecten (Eburneopecten) frontalis (Dall, 1898) Type

Lucina (Callucina?) curta (Conrad, 1865) Type

Lucina (Callucina?) subcurta (Harris, 1946)

Saxolucina (Plastomiltha) gaufia Harris, 1947

Timothynus bulla (Conrad, 1865) Type

Pleuromeris inflatior jacksonensis (Meyer, 1885)

Venericardia (Rotundicardia) diversidentata Meyer, 1885

Lirodiscus (Lirodiscus) jacksonensis (Meyer, 1885)

Crassatella sp.

Bathytormus flexurus productus (Conrad, 1863) Type

Nemocardium (Nemocardium) nicolletti (Conrad, 1841)

Spisula jacksonensis Cooke, 1926

Tellina (Arcopagia) trumani garlandica Harris, 1946 Type

Tellina (Arcopaginula) eburneopsis Conrad, 1865 Type

Tellina (Eurytellina) spillmani Dall, 1900 Type

Tellina (Eurytellina) linifera Conrad, 1865 Type

Alveinus minutus Conrad, 1865 Type

Pitar (Pitar) securiformis (Conrad, 1865) Type

Callista (Callista) annexa (Conrad, 1865) Type

Corbula (Caryocorbula) densata (Conrad *in* Wailes, 1854)

Poromya mississippiensis Meyer and Aldrich, 1887

Echinoids generally are not as common throughout the stratigraphic sequence as are the previously mentioned groups. Locally and in certain stratigraphic units, however, they may be very abundant and have considerable lateral distribution. Many echinoid species have a restricted range, making them good guide fossils where they are common. The echinoid shell is made up of numerous plates, each of which is composed of a single, porous crystal of calcite. These properties aid in the shell's selective preservation in calcareous sediments. For this reason, echinoid fossils are common in many limestone units. The following echinoid species are guide fossils in Clarke County:

Range	Species	Distribution
Vicksburg Group		
Glendon Ls.	*Schizaster (Paraster) americanus*	Miss. to Ga.
Marianna Ls.	*Clypeaster rogersi*	Mex. to Fla.
Jackson Group		
Yazoo Fm.		
Pachuta Marl and Cocoa Sand Mbrs.	*Periarchus lyelli pileussinesis*	Miss. to Ga.
	Periarchus lyelli protuberans	Miss. to Ala.
Moodys Branch Fm.	*Periarchus lyelli*	La. to N.C.
Claiborne Group		
Winona Fm.	*Protoscutella mississippiensis*	Tex. to Ala.

Arthropod macrofossils in Clarke County consist of crabs (Decapoda) and barnacles (Cirripedia). Only one fossil crab in this report is identified to species, *Ranina georgiana* Rathbun, 1935. This species has a characteristic carapace that is easily recognizable and seems to be restricted to formations of the Glendon Limestone horizon. Only one barnacle species, *Euscalpellum eocenense* (Meyer, 1885), is figured in this report. Two other species, *Arcoscalpellum subquadratum* (Meyer and Aldrich, 1886) and *Euscalpellum* ? *latunculus* Cheetham, 1963, are reported to occur in Clarke County, Mississippi. Only eleven barnacle species considered here to be valid have been described from the Paleogene of the Northern Gulf Coastal Plain. These include:

Paleocene: Midway Group

Arcoscalpellum toulmini Weisbord, 1977, from the Porters Creek Formation in Alabama.

Eocene: Claiborne Group

Aporolepas americana (Withers, 1936) from the Gosport Sand in Alabama.

Arcoscalpellum subquadratum (Meyer and Aldrich, 1886) from the Wheelock Member of the Cook Mountain Formation in Texas, the Cook Mountain Formation in Mississippi, the Lisbon Formation and the Gosport Sand in Alabama, and the lower Claiborne Group in South Carolina.

Euscalpellum eocenense (Meyer, 1885) from the Weches Formation in Texas, the Cook Mountain Formation in Mississippi, and the Lisbon Formation in Alabama.

Lepas stenzeli Withers, 1953 from the Weches Formation in Texas.

Balanus antiquus (Meyer, 1886) = *Balanus* sp. aff. *B. unguiformis* Sowerby, 1846, of Ross and Newman, 1967, and probably = *Hesperibalanus gosportensis* Zullo, 1963, both from the Gosport Sand in Alabama.

Eocene: Jackson Group

Aporolepas howei Cheetham, 1963, from the Cocoa Sand Member of the Yazoo Formation in a railroad cut at Walker Springs, Clarke County, Alabama (not Clarke County, Mississippi, as in Cheetham, 1963, p. 397. This correction is by H. V. Howe in a letter to F. F. Mellen dated June 10, 1969).

Arcoscalpellum jacksonense Withers, 1953, from the Moodys Branch Formation in Mississippi and from the Pachuta Marl Member of the Yazoo Formation (Cheetham, 1963, p. 396, no locality given).

Arcoscalpellum (?) *choctawensis* Weisbord, 1977, from the North Twistwood Creek Clay Member of the Yazoo Formation in Alabama.

Euscalpellum isneyensis Weisbord, 1977, from the North Twistwood Creek Clay Member of the Yazoo Formation in Alabama.

Euscalpellum (?) *latunculus* Cheetham, 1963, from the Shubuta Clay Member of the Yazoo Formation in Mississippi.

Balanus antiquus (Meyer, 1886) from the North Twistwood Creek Member of the Yazoo Formation in Mississippi and Alabama and the Inglis Limestone in Florida.

STRATIGRAPHY

The Mississippi Embayment was a major controlling factor in determining the course of sediment dispersal systems in Mississippi during the Tertiary Period. Large fluvial and deltaic systems similar to the modern Mississippi River and Delta complex occupied the central part of the Embayment for much of this time. Flanking these deltas to the south and east were various terrigenous and carbonate shelf systems.

The modern Mississippi River Delta is flanked to the east by marine shelf environments that include the Mississippi Sound, various barrier islands, and the open Gulf shelf. As various delta lobes of the Mississippi River are abandoned, such as the Holocene St. Bernard Delta, they subside and are inundated by the ocean. The resulting sedimentary cross section shows marine shelf units off the Mississippi Coast to intertongue with thick deltaic units to the west. Periodic delta development, abandonment, and marine inundation during the Tertiary Period produced a similar cyclical sedimentary sequence within the Mississippi Embayment. Fluvial characteristics of this sequence decrease in an easterly direction from the Embayment axis. Clarke County is located on the Embayment's east flank where the fluvial-deltaic units are thinner, and the marine facies are better developed than elsewhere in the State.

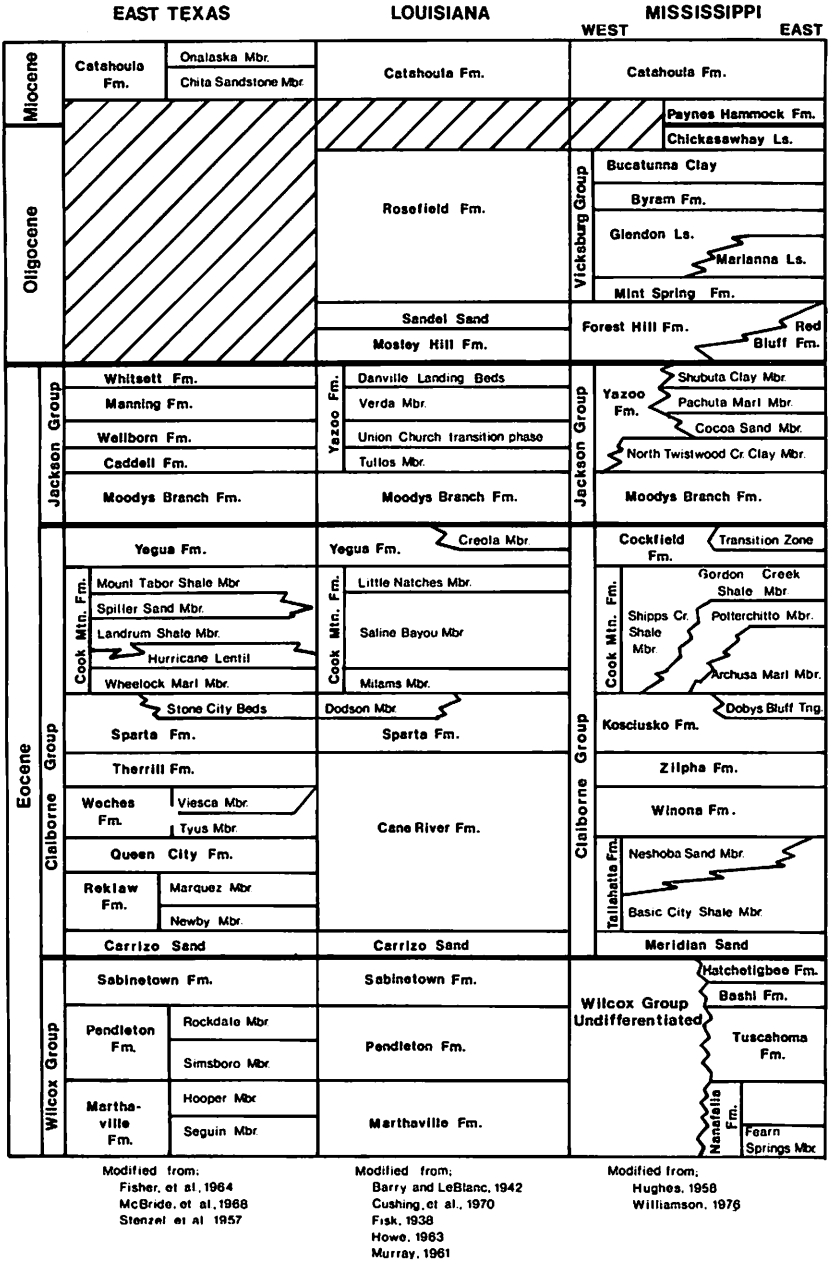

Figure 1. A correlation of Eocene, Oligocene, and lower Miocene formations in the Northern Gulf Coastal Plain.

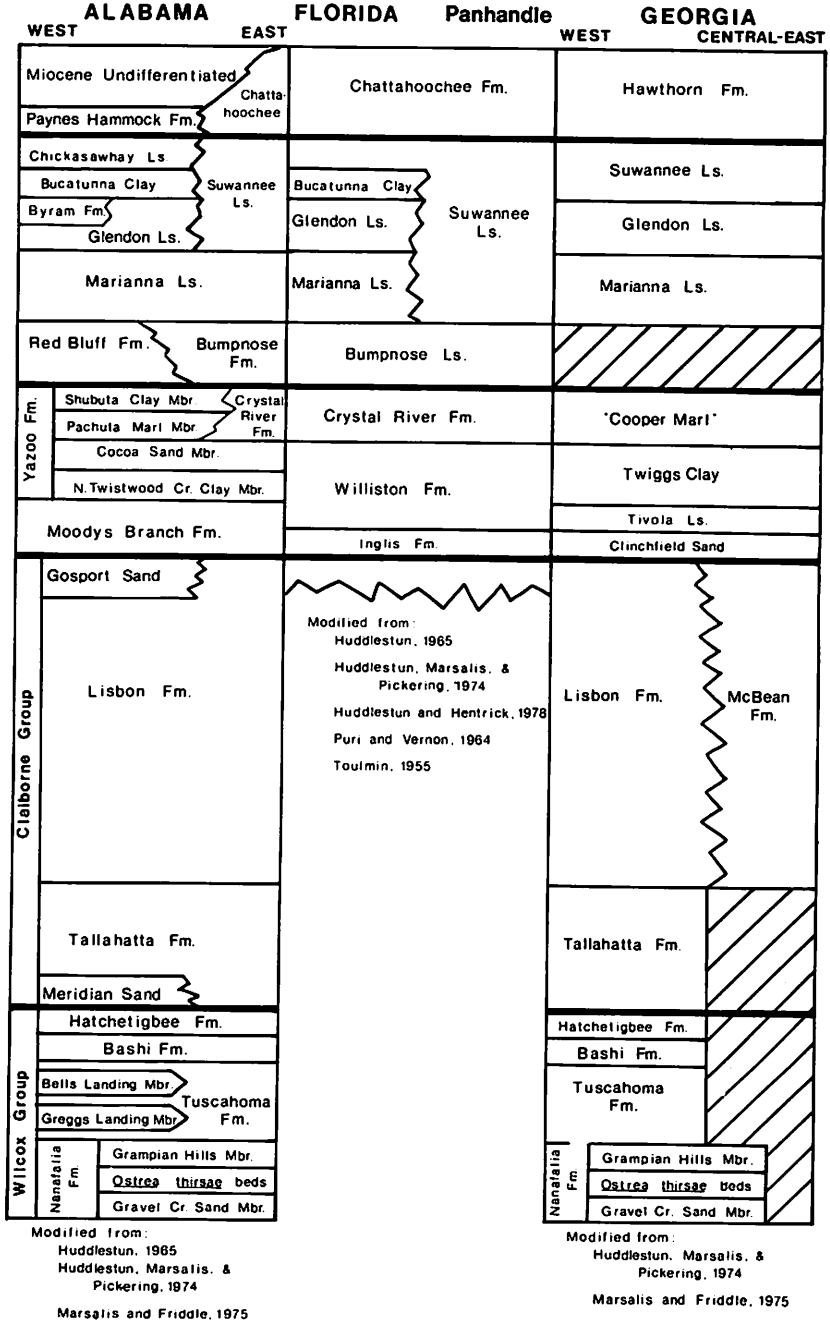

Figure 1. Continued.

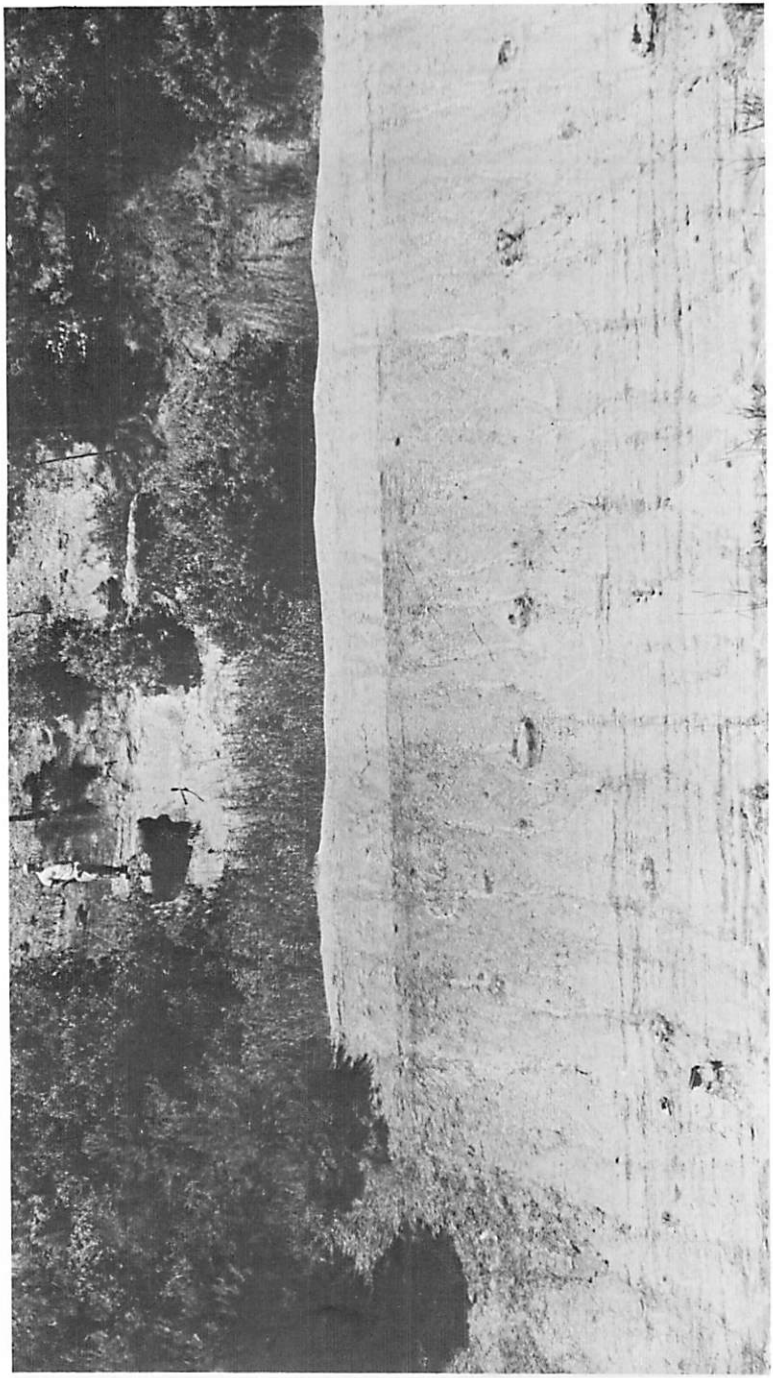

Figure 2. Tuscahoma, Bashi, and Hatchetigbee Formations at locality 21 on Highway 19 in the NE/4, SW/4, Section 22, T. 5 N., R. 18 E., Lauderdale County. Survey worker Randall Bissell is standing on a concretionary boulder in the Bashi Formation; a pick to the right marks the lower contact.

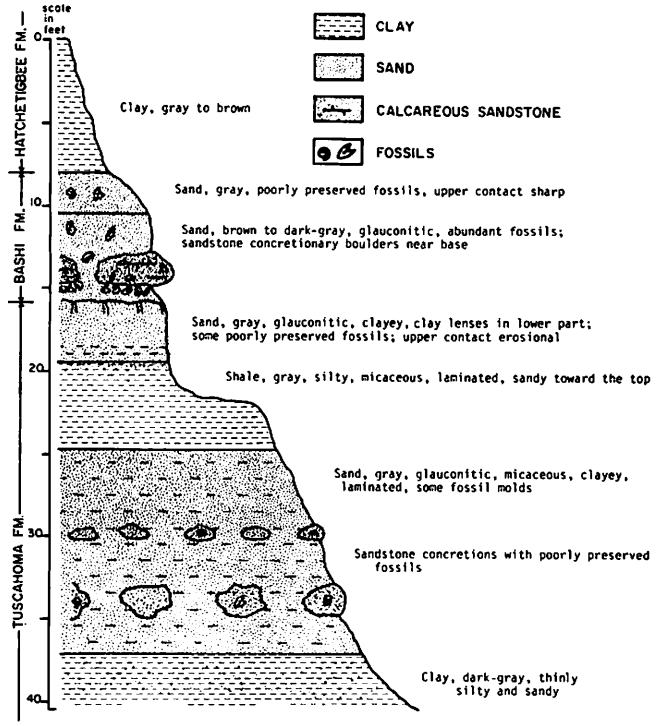

Figure 3. Measured section of the upper Tuscahoma, Bashi, and basal Hatchetigbee Formations on Highway 19 in Lauderdale County, Mississippi (locality 21).

WILCOX GROUP

The Wilcox Group in Mississippi consists largely of fluvial and deltaic sediments, while in Alabama it contains a number of marine units. The Bashi Formation is the only Wilcox unit in Mississippi with an abundance of marine fossils. In northern Mississippi, the Wilcox consists of deltaic and fluvial sequences that are usually identified as undifferentiated Wilcox Group, though several formation names have been proposed. Galloway (1968) and Duplantis (1975), in recent depositional systems studies, have recognized respectively: (1) a "Holly Springs Delta System" in the lower Wilcox of Mississippi and Louisiana, and (2) an unnamed, fine-grained, meander-belt, fluvial system for the upper Wilcox of northern Mississippi.

Only the Hatchetigbee and possibly the Bashi Formation of the Wilcox Group crop out in Clarke County, Mississippi. The Bashi Formation is exposed at Meridian, Mississippi, and on Highway 19 near the State line in Lauderdale County (figures 2 and 3). As described in the measured section in figure 3, this formation consists of fossiliferous, glauconitic sand resting disconformably on the Tuscahoma Formation. Large boulder-size concretions are characteristic of the Bashi Formation. These concretions can be seen to the south of Interstate 20 on the 31st

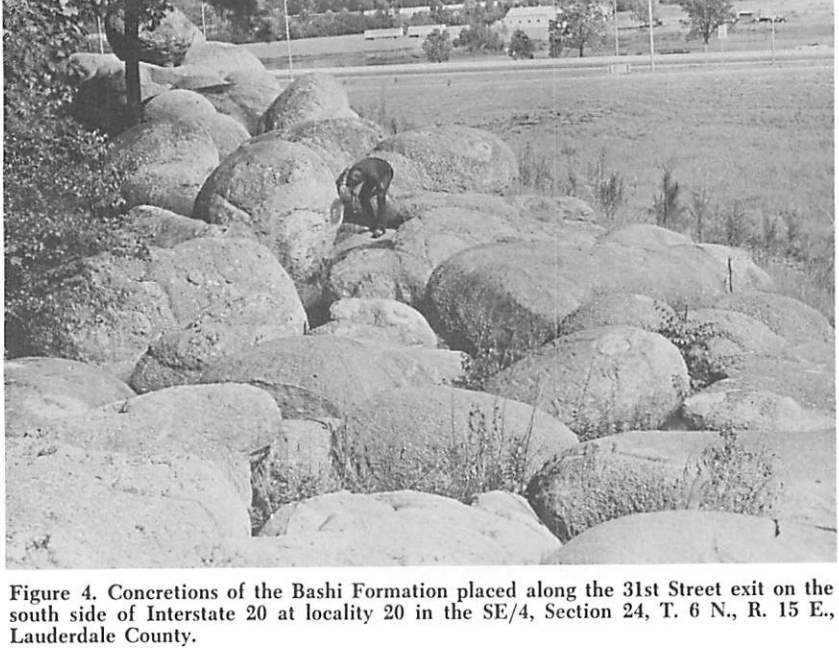

Figure 4. Concretions of the Bashi Formation placed along the 31st Street exit on the south side of Interstate 20 at locality 20 in the SE/4, Section 24, T. 6 N., R. 15 E., Lauderdale County.

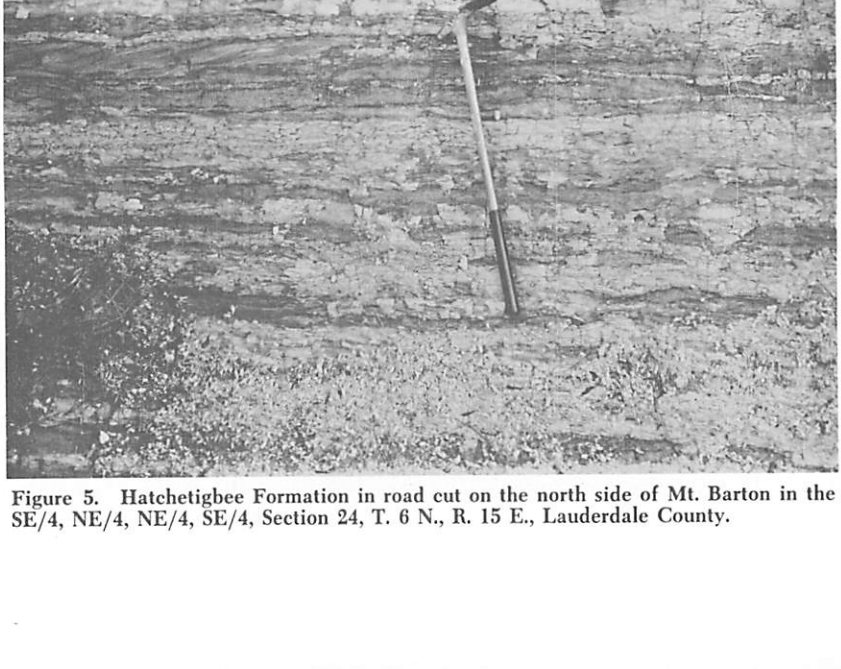

Figure 5. Hatchetigbee Formation in road cut on the north side of Mt. Barton in the SE/4, NE/4, NE/4, SE/4, Section 24, T. 6 N., R. 15 E., Lauderdale County.

Street exit at Meridian, where they were placed by the Highway Department during road construction (figure 4). The Bashi Formation is known locally by collectors for having an abundance and diversity of shark teeth, especially below the concretions. Alligator teeth and snake vertebrae are present also though less common. The more common fossils are molluscs, with the gastropods *Pseudoliva santander* (Gardner, 1945) and *Bullia callouspira* n. sp. being abundant below the concretions. The thick shells of these gastropods may have provided protection and served as ballast in a high energy, nearshore environment, as is suggested by the coarse-grained, well-sorted Bashi sediments. In Alabama the Bashi Formation contains poorly-sorted, clayey sands and a fauna with more fragile and thin-shelled molluscs, indicating a less turbulent marine shelf environment. Other prominent Bashi fossils in Mississippi include the large bivalve *Venericardia bashiplata* (Gardner and Bowles, 1939) and the oyster *Ostrea brevifronta* n. sp. The latter is similar to the Paleocene species *Ostrea sinuosa* Rogers and Rogers, 1837.

The Hatchetigbee Formation is well exposed along a dirt road on the north side of Mt. Barton, south of Meridian in Lauderdale County. Here the formation consists of thinly-bedded alternating sands and clays with a six-inch thick lignite bed in the middle part. The sand beds vary from less than an inch to a couple of inches in thickness, and some sands show cross-laminations (figure 5). These sediments are probably estuarine and deltaic in origin. The lower part of the Hatchetigbee Formation at locality 21 in Lauderdale County is fossiliferous and contains a dwarf fauna of gastropods according to E. E. Russell (personal communication). Both the Hatchetigbee and Bashi Formations grade to the north and west into the previously mentioned upper Wilcox fluvial sediments (Duplantis, 1975).

CLAIBORNE GROUP

The Claiborne Group at its type locality at Claiborne Bluff on the Alabama River, Alabama, is largely marine. In Mississippi, this group has a cyclical depositional sequence with alternating deltaic and marine sedimentation. This depositional cycle from botton to top consists of:

Formation	Member	Environment
1. Meridian Sand		Fluvial—northern Miss. "Neritic bar"—southern Miss.—Ala.
2. Tallahatta Fm.	Basic City Shale	Marine shelf and strandplain
3. Tallahatta Fm.	Neshoba Sand	Deltaic and strandplain
4. Winona Fm.		Destructional shelf (marine)
5. Zilpha Fm.		Marine shelf and prodelta
6. Kosciusko Fm.		Deltaic
7. Kosciusko Fm.	Dobys Bluff Tongue	Destructional shelf (marine)
8. Cook Mtn. Fm.	Archusa Marl	Carbonate shelf (marine)

9.	Cook Mtn. Fm.	Potterchitto Mbr.	Marine shelf
10.	Cook Mtn. Fm.	Gordon Creek Shale	Marine shelf and prodelta
11.	Cockfield Fm.	Lower sand mbr.	Delta front
12.	Cockfield Fm.	Upper shale mbr.	Delta plain
13.	Cockfield Fm.	Transition zone	Sound-lagoon
	Jackson Group	Moodys Branch Fm.	Destructional shelf (marine)

The previous sequence shows three cycles of deltaic deposition with three major marine transgressions; it is concluded by a transgression in the lower Jackson Group. Deltaic sequences consist of some or all of the following facies: (1) prodelta mud (e.g., Zilpha Formation and Gordon Creek Shale), (2) delta front sand (e.g., lower sand member of Cockfield Formation), (3) delta plain mud, sand, and lignite (e.g., upper shale member of the Cockfield Formation), (4) marginal marine—lagoonal sand and mud (e.g., transition zone at top of Cockfield Formation), and (5) destructional shelf sand (e.g., Winona Formation, Dobys Bluff Tongue, lower Jackson Group). The prodelta mud facies contains fine-grained deltaic sediments deposited in low-energy areas beyond the delta front and above previous marine or deltaic sediments. Coarser sediment (sand) is deposited in the high-energy delta front environments, which include: (1) distributary channel, (2) distributary mouth bar, (3) distal bar, and (4) delta front sheet sands (Coleman and Gagliano, 1965). The delta plain facies is generally finer-grained than that of the delta front and may include organic deposits. Environments of the delta plain are: (1) levee, (2) crevasse—splay, (3) marsh, (4) swamp, (5) interdistributary bay, (6) flood basin, (7) distributary channel fill, and (8) distributary channel sand.

Deltaic facies, which are laterally distinct along the sedimentary slope, may overlap during delta progradation to form, completely or in part, the previously mentioned deltaic sequence in the Claiborne Group. With abandonment of a delta lobe or lobe complex, subsidence without additional sediment input will result in a regression of the strandline. Deltaic sediments reworked by marine processes along the retreating strandline comprise the destructional shelf facies.

The Meridian Sand and Tallahatta Formation are resistant to erosion and form a major cuesta (ridge) through Mississippi and into Alabama. A complete section of the Meridian Sand can be seen on the west side of Mt. Barton, which is an outlier of the Tallahatta Cuesta (figure 6). There is disagreement about the stratigraphic placement of the Meridian Sand. Lowe (1933) named this unit and placed it in the Claiborne Group, citing evidence of a regional unconformity at its base. This placement has been continued by the Mississippi Geological Survey and the United States Geological Survey. Other workers (Echols and Malkin, 1948; Murray, 1961), recognizing lithologic similarities in the Meridian and Wilcox sands, have questioned this placement. Thomas (1942), O'Donnell (1974), and Duplantis (1975) placed the Meridian Sand in the Wilcox Group. They argue that the top of the Meridian Sand is a more mappable datum, and, because of the similarities in the Meridian and Wilcox sands, the base of the Meridian is difficult to establish. The writer has placed the Meridian Sand in the Claiborne Group without convictions.

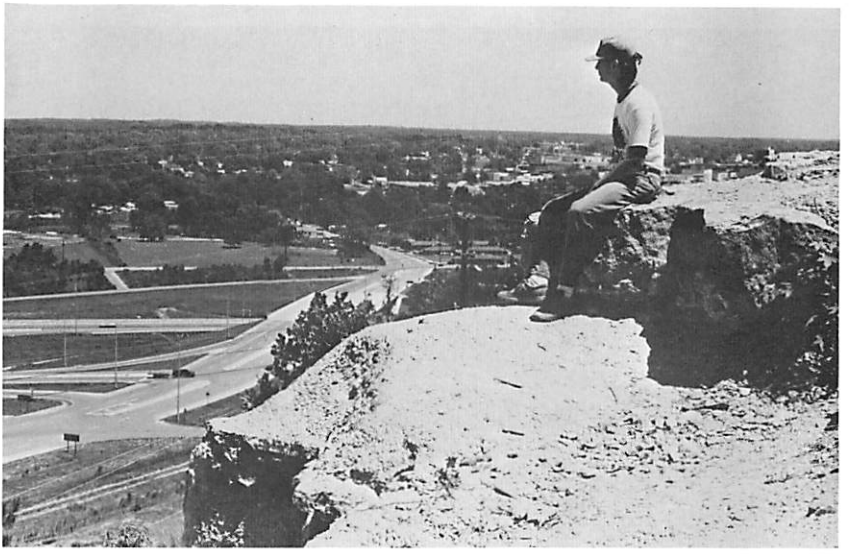

Figure 6. Tallahatta claystone on top of Mt. Barton, an outlier of the Tallahatta cuesta in the SE/4, SE/4, Section 24, T. 6 N., R. 15 E., Lauderdale County. Meridian, Mississippi, is in the background to the north.

Duplantis (1975) described the environment of the Meridian Sand as a coarse-grained, meander-belt fluvial system that was produced by a change in sedimentary slope after the deposition of the upper Wilcox, fine-grained, meander-belt system. In this respect, the Meridian is a continuation of Wilcox fluvial sedimentation. The erosional basal contact of this formation may be due to the downcutting of channels as a result of an increase in gradient.

The Meridian Sand along the southern part of its outcrop belt in Mississippi and in Alabama contains little clay and has large-scale, planar cross-bedding. Wermund (1965) cited this and the occurrence of a marine microfauna as evidence for deposition in a neritic bar. According to his description, this bar is restricted to the outcrop belt and extends from Neshoba County, Mississippi, to the Alabama River in Clarke County, Alabama. Its length is about 80 miles, and maximum width is about 12 miles. Wermund's illustration of the Meridian outcrop belt showed the Meridian Sand to pinch out in Neshoba County. He may have considered the northern extension of the Meridian Sand to be part of the Wilcox Group. The relationship of the neritic bar to Meridian fluvial sand facies in northern Mississippi was not discussed.

The Tallahatta Formation was named by Dall (1898) to refer to the siliceous claystone and lenses of silt and clay along Tallahatta Creek in Choctaw County, Alabama. Two members of this formation are recognized in Mississippi: a lower member, the Basic City Shale, and an upper member, the Neshoba Sand. The Neshoba Sand is best developed in north-central Mississippi; it thins to the southeast so that only the Basic City Shale Member is present in Clarke County, Mississippi, and in Ala-

Figure 7. The type locality of the Basic City Shale Member of the Tallahatta Formation at a railroad cut north of Basic City at locality 60 in the NE/4, NE/4, NW/4, Section 4, T. 4 N., R. 15 E., Clarke County. The lower claystone beds are sometimes called the "buhrstone." Survey worker Randall Bissell is standing on a lenticular quartzitic sandstone unit that terminates abruptly at a clastic dike to the left of him.

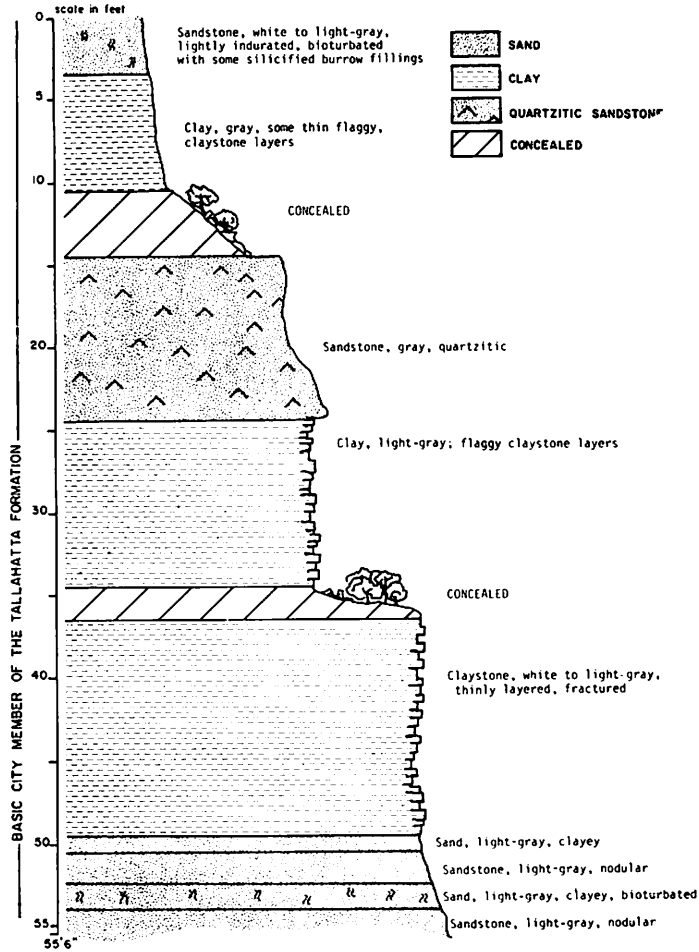

Figure 8. Measured section of the Basic City Shale Member of the Tallahatta Formation at its type locality on a railroad cut north of Basic City, Mississippi (locality 60).

bama. The Basic City type locality is on a railroad cut north of Basic City and crossing the Clarke-Lauderdale County line (figures 7 and 8).

O'Donnell (1974), in a depositional systems study of the Tallahatta Formation, recognized a Tallahatta Delta System of the high-destructive, wave-dominated type. The progradational phase of this delta system consists of: (1) channel-mouth bar sand facies (the undifferentiated Tallahatta Formation and part of the Neshoba Sand in north-central Mississippi), (2) strandplain sand facies (Neshoba Sand and upper part of the Basic City Shale), and (3) prodelta-shelf facies (Basic City Shale). The destructional phase of the Tallahatta Delta System was marked by marine reworking of the deltaic surface, and the deposition of the fossiliferous,

glauconitic sands and clays of the Winona and lower Zilpha Formation.

The Tallahatta Formation in Clarke County consists of Basic City marine shelf, and possibly some strandplain, muds and sands. Some thin, sparsely fossiliferous, glauconitic sands are present. The lenticular, quartzitic sandstone unit in the measured section of figure 8 may have been a barrier or a submerged bar. Silicified burrow molds are present in the upper sand unit of this section. These burrows are filled with silica (chert) and are common in the Basic City Member elsewhere in the State. Well-preserved plant fossils are locally common in the claystones of this member. A peculiar feature in the Basic City Member at its type locality and at Dunn's Falls is the presence of classic dikes. Such a dike forms a lithologic boundary for a sand unit at the type locality, dividing it into a siliceous sandstone to the north and an unconsolidated sand to the south (figure 7).

The Winona Formation was named by Lowe (1919) for the heavily glauconitic, fossiliferous sands near Winona, Mississippi. At exposures in this area, the Winona is weathered to a red-brown, ferruginous sand. Lowe mistakenly placed the Winona below the Basic City Shale and correlated it with the Meridian Sand at Meridian, Mississippi. Earlier, Lowe (1915) had named this same unit the Enterprise Green Marl for unweathered exposures at Enterprise, Mississippi. He correctly placed this unit above the Tallahatta Formation from his observations of the section at Dunn's Falls and correlated it with the basal Lisbon of Alabama. Cooke (1925) recognized that the green sands exposed at Winona and Enterprise were parts of the same formation, and he dropped the name Enterprise because it was preoccupied.

The Winona Formation at Enterprise, Mississippi, consists of: (1) a lower glauconitic sand, (2) a middle, fossiliferous, glauconitic, calcareous sandstone, and (3) an upper glauconitic sand (figure 9). The upper and lower sand units are composed almost entirely of medium- to very coarse-grained glauconite and are a greenish-gray color at fresh exposures. Though these sand units are sparsely fossiliferous, the middle, calcareous sandstone unit contains an abundance of fossils. *Protoscutella mississippiensis* (Twitchell, 1915) is so abundant at locality 22 on the Chickasawhay River that in places it forms a major constituent of the rock (figures 10 and 11). Also common at this locality is *Cubitostrea perplicata* (Dall, 1898), an oyster that occurs in the upper part of the Tallahatta Formation in Alabama. *Cubitostrea lisbonensis* (Harris, 1919), which occurs in the basal Lisbon of Alabama, is less common. The latter oyster differs from *C. perplicata* in having auricles (earlike extensions) extending outward from the beak. Though only one right valve of this species is figured (plate 12, figure 5) from locality 22, better specimens were found at the top of the calcareous sandstone unit at locality 23. Species in the Winona Formation that originally had aragonitic shells are preserved only as molds (plate 11, figures 2, 3, 5).

The lithology of the calcareous sandstone unit of the Winona Formation is similar to the basal two feet of the Lisbon Formation exposed along Little Stave Creek in Clarke County, Alabama. Each unit consists of a very glauconitic, fossiliferous, irregularly lithified, calcareous sand-

stone and sand and overlies claystones of the Tallahatta Formation. The guide fossils *Protoscutella mississippiensis* and *Cubitostrea lisbonensis* occur in both units. An interesting difference is that *C. lisbonensis*, which is abundant in the lower Lisbon, is less common in the Winona, while the upper Tallahatta (of Alabama) species *C. perplicata* is common. The presence of callianassid (mud shrimp) burrows (plate 14, figure 2) and remains along with the abundance of flat echinoids (sand dollars—*Protoscutella*) in the Winona Formation indicate a shallow nearshore or shoreface marine environment.

Good exposures of the Zilpha Formation were not seen in Clarke County by the writer. According to Thomas (1942), the Zilpha Formation is thin at outcrop localities in Clarke and Lauderdale Counties, averaging about 15 feet in thickness. O'Donnell (1974) recognized the carbonaceous clays and interbedded clays and sands of the upper Zilpha as a prodelta mud facies of a Kosciusko delta system.

There are no completed depositional systems studies of the Kosciusko Formation that the writer is aware of, but the thick, nonmarine sands and clays of this formation exposed along the outcrop indicate deposition in a high-constructive delta system of some type. An upper, fossiliferous, marine sand in the Kosciusko Formation at Dobys Bluff on the Chickasawhay River (locality 26) represents a destructional shelf facies of the Kosciusko delta system. A carbonaceous clay separates this sand from the Archusa Marl above. This clay unit is persistent in the subsurface and shows on oil well electrical logs as a break between the high resistivity curves of the Archusa Marl (Cook Mountain Limestone) and the upper Kosciusko Sand. The electrical logs of MGS test hole AN63 in figure 15 and oil well number 2 in figure 13 show this clay break. At Dobys Bluff the upper contact of this clay is sharp and erosional. A core through the contact (MGS test hole AN63) shows lime-filled burrows extending from the Archusa Marl into the underlying clay.

The carbonaceous, fossiliferous clay and fossiliferous sand below the Archusa Marl and above nonfossiliferous Kosciusko sands are designated as the Dobys Bluff Tongue of the Kosciusko Formation (figure 15). This unit is stratigraphically equivalent to the Stone City Beds of the upper Sparta Formation in Texas and probably to the middle part of the Lisbon Formation in Alabama. As shown in the cross section in figure 13, the fossiliferous, marine facies of the Dobys Bluff Tongue thickens in the subsurface at the expense of Kosciusko nonmarine deltaic facies. The sands of the Kosciusko-Dobys Bluff interval grade into fossiliferous clay in the subsurface to the south. The base of the Cook Mountain Limestone is the datum for the base of the Cook Mountain Formation in subsurface work.

Thomas (1942), in his work on the Claiborne Group, did not see the fossiliferous sands at the base of Dobys Bluff. Though he recognized Lowe's (1919) Wautubbee Formation and accepted its definition as "including all the marine section above the Kosciusko and below the Cockfield" (1942, p. 48), he did not include the Dobys Bluff Tongue in the description of his lowest Wautubbee Member, the Archusa Marl. Gardner and Bowles (1939, p. 190, 191) stated that a thin-shelled form of *Venericardia (Venericor) densata* (Conrad, 1845) with a slightly higher than

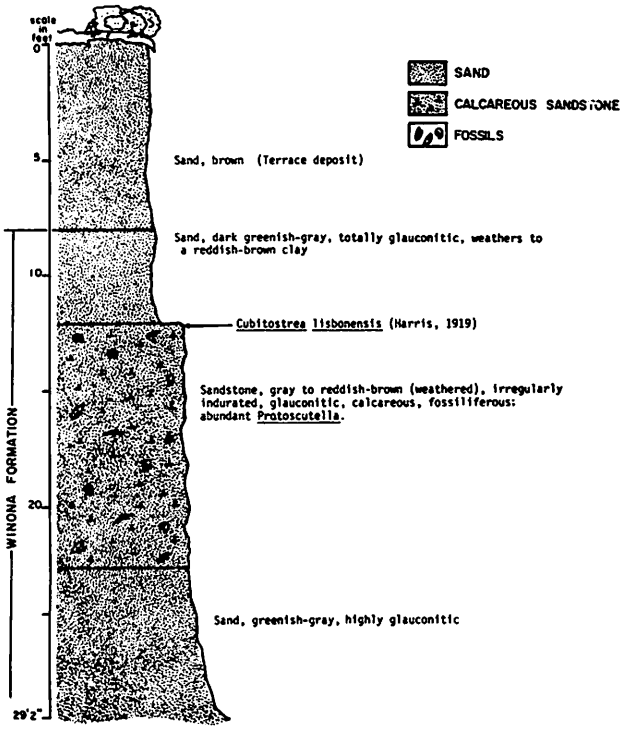

Figure 9. Measured section of the Winona Formation on Allen Branch below the Confederate Cemetery at Enterprise, Mississippi (locality 23).

average rib count was common at a bluff on the Chickasawhay River three and one-half miles southeast of Quitman. From this description it is evident that their locality is at Dobys Bluff. Here the form of *V. (V.) densata* described above (see plate 20, figures 1-3) is common in the Dobys Bluff Tongue but does not occur in the overlying Archusa Marl. Gardner and Bowles (1939) listed this locality as being in the Wautubbee Formation. Surface collecting at the base of Dobys Bluff must be done with care because the Archusa and Dobys Bluff faunas may be mixed.

DeVries (1963, p. 15) mentioned the occurrence of glauconite in the upper part of the Kosciusko Formation in Jasper County. He suggested that this represented marginal-marine conditions at the close of deltaic

Figure 10. ***Protoscutella mississippiensis*** **(Twitchell, 1915) in the middle, calcareous sandstone unit of the Winona Formation at locality 22 on the Chickasawhay River in the SW/4, NE/4, SE/4, Section 24, T. 4 N., R. 14 E., Clarke County.**

deposition. These "marginal-marine" sediments are a northwesterly continuation of the Dobys Bluff Tongue. The Dobys Bluff Tongue represents a destructional shelf phase that occurred after the abandonment of Kosciusko delta systems. It is lenticular and has a spotty occurrence in Clarke and Jasper Counties. This distribution probably reflects the irregular marine embayments that formed above a foundering delta plain.

The Dobys Bluff Tongue is placed stratigraphically in the upper Kosciusko Formation for the following reasons:

1. The upper contact with the Archusa Marl is erosional.

2. The Dobys Bluff Tongue is lithologically distinct from the Archusa Marl, which is a "persistent homogeneous unit" according to Thomas (1942, p. 51).

3. Elsewhere the Archusa Marl rests disconformably above nonfossiliferous Kosciusko sand. This suggests that the Dobys Bluff Tongue is a lenticular destructional shelf facies of the Kosciusko delta system. Thomas (1942, p. 51-52) described the Kosciusko beds below the Archusa Marl as changing lithologically over a short distance along strike from sand to carbonaceous shales to lignitic silty shales. He explains these changes in lithology below the Archusa contact as the result of a truncation of Kosciusko delta plain facies by the advancing shoreline. As the Archusa Marl rests on various Kosciusko sedimentary facies, it is inappropriate to extend the Kosciusko-Cook Mountain boundary below the base of the Archusa Marl to include those facies that are fossiliferous.

Figure 11. Winona Formation showing the lower, glauconitic sand and middle, calcareous sandstone units at locality 22 on the Chickasawhay River in the SW/4, NE/4, SE/4, Section 24, T. 4 N., R. 14 E., Clarke County.

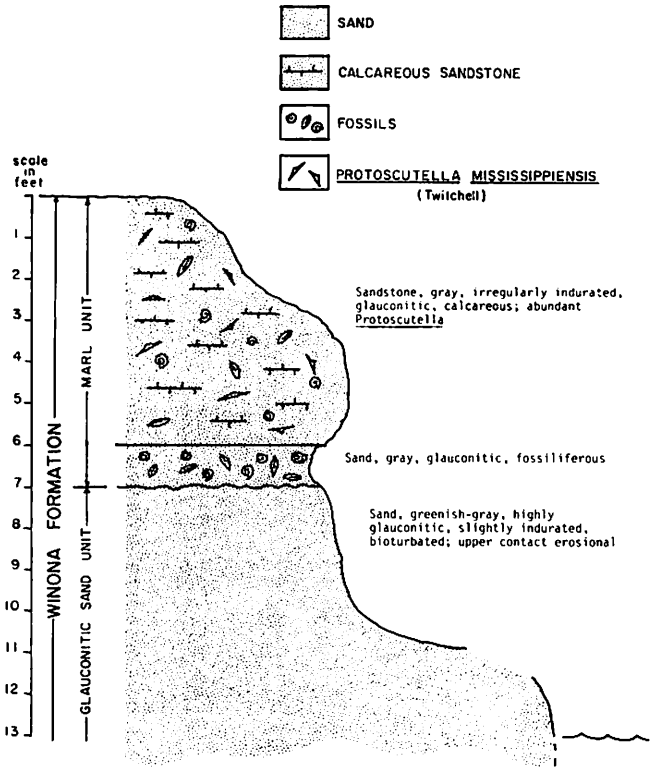

Figure 12. Measured section of the Winona Formation on the Chickasawhay River south of Enterprise, Mississippi (locality 22).

4. In the subsurface, the Archusa Marl is generally separated from the sands in the Kosciusko Formation by a shale unit, and can be easily picked on electrical logs. It would be difficult, if possible, to pick the Kosciusko-Cook Mountain boundary if it were at the contact of fossiliferous and nonfossiliferous sands below this shale unit.

5. The base of the Archusa Marl, also named both the Cook Mountain Limestone and the *Camerina* Limestone, is an important datum in subsurface work for the base of the Cook Mountain Formation (see figure 13). This datum represents the initial deposition of a widespread carbonate unit, which is distinct from the terrigenous sediments below. Also, it rests above both marine and nonmarine sediments of the lower interval.

6. The Kosciusko Formation should not be defined as nonmarine, as this interval becomes increasingly marine in the subsurface to the south (see figure 13).

7. The stratigraphic equivalent of the Kosciusko Formation in Texas, the Sparta Sand, lies disconformably below the Cook Mountain Formation and has marine beds in its upper part. These strata, the Stone City,

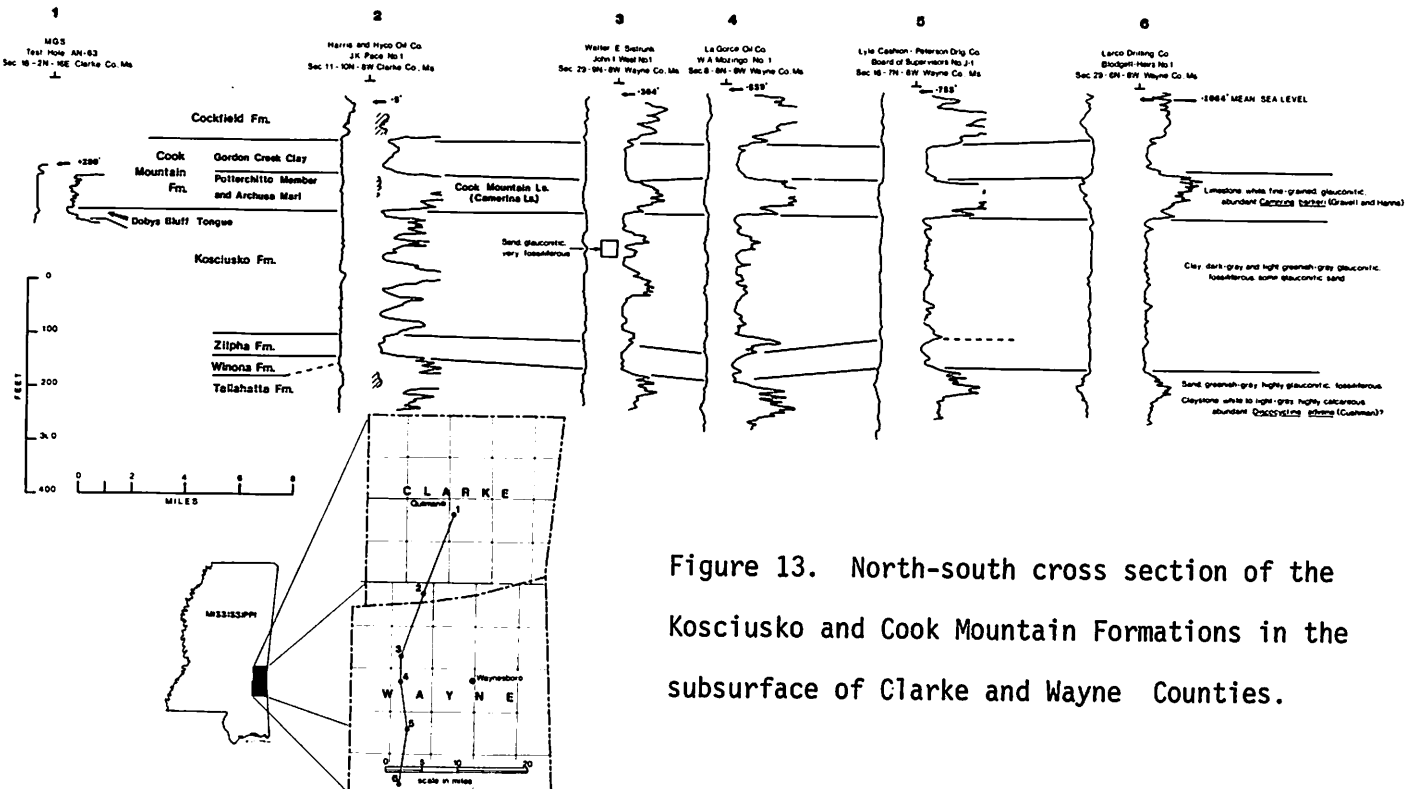

Figure 13. North-south cross section of the Kosciusko and Cook Mountain Formations in the subsurface of Clarke and Wayne Counties.

Figure 13. North-south cross section of the Kosciusko and Cook Mountain Formations in the subsurface of Clarke and Wayne Counties.

Beds, are similar to the Dobys Bluff Tongue in their stratigraphic position and in their molluscan fauna. Stenzel (1952b, p. 33) indicates that the Stone City fauna is also present in the middle part of the Lisbon Formation in Alabama below the Cook Mountain requivalent of the upper Lisbon *Cubitostrea sellaeformis* beds.

Lowe (1915, p. 77) described fossiliferous beds at the Wautubbee cut on the Northeastern Railroad (now the Southern Railroad) about six miles south of Enterprise, Mississippi, and placed them in the Lisbon Formation. Other localities given by Lowe for these beds including "Falling Creek, near Quitman, and in a zone 8 to 10 miles wide northwest" and "three miles east of Newton a cut on the A. and V. Railroad." Lowe stated that these beds are characterized by the occurrence of *Cubitostrea sellaeformis* (Conrad, 1832). Later he named this unit the Wautubbee Marls Member of the Lisbon Formation (Lowe, 1919, p. 78-79), and placed it above the Decature Sand (Kosciusko Formation) and below the Cockfield Formation.

Thomas (1942, p. 47) continued the use of the term Wautubbee, and placed it as a formation within the Claiborne Group. He cited Wautubbee Station on the Southern Railroad as the source for the name. The type locality for Lowe's Wautubbee Formation would best be placed at cuts along the Southern Railroad north of Wautubbee. These cuts are listed as localities 61 and 62 in this report. The term Wautubbee has been dropped in favor of Cook Mountain (Kennedy, 1892, p. 54-57). This latter formation is recognized in Texas (type locality in Houston County), Louisiana, and Mississippi. It has an excellent invertebrate, marine fauna that is characterized by the large saddle-shaped oyster *Cubitostrea sellaeformis*.

The Cook Mountain Formation in Clarke County contains three members named by Thomas (1942). These are, from bottom to top: (1) Archusa Marl Member, (2) Potterchitto Member, and (3) Gordon Creek Shale Member. In western Mississippi, the Archusa and Potterchitto Members merge along the outcrop into the Shipps Creek Shale Member (Thomas, 1942), a carbonaceous, laminated clay.

The Archusa Marl reaches a thickness of 60 feet in Clarke County. Thicknesses of 48 feet and 50 feet are exposed respectively at the type locality and Dobys Bluff. In the subsurface of southern Mississippi, the Archusa Marl probably comprises most or all of the interval commonly named the Cook Mountain Limestone or the *Camerina* Limestone (see figure 13). The latter name is derived from the abundance of *Camerina barkeri* (Gravell and Hanna) present within this limestone in well cuttings. The Cook Mountain Limestone thickens to over 200 feet along the northern flank of the Wiggins Uplift in southern Mississippi. Here the carbonate mudstones and wackestones grade into grainstones. This uplift was probably a positive feature on the Cook Mountain sea floor. Shallow-water carbonates deposited in shoals along this east-west structure formed a carbonate bank, which protected a fine-grained, carbonate shelf to the north from incoming wave action. An isolith map of the Cook Mountain Limestone is figured by Dockery (1976, figure 6, p. 22).

Archusa fossils were collected from three Clarke County localities

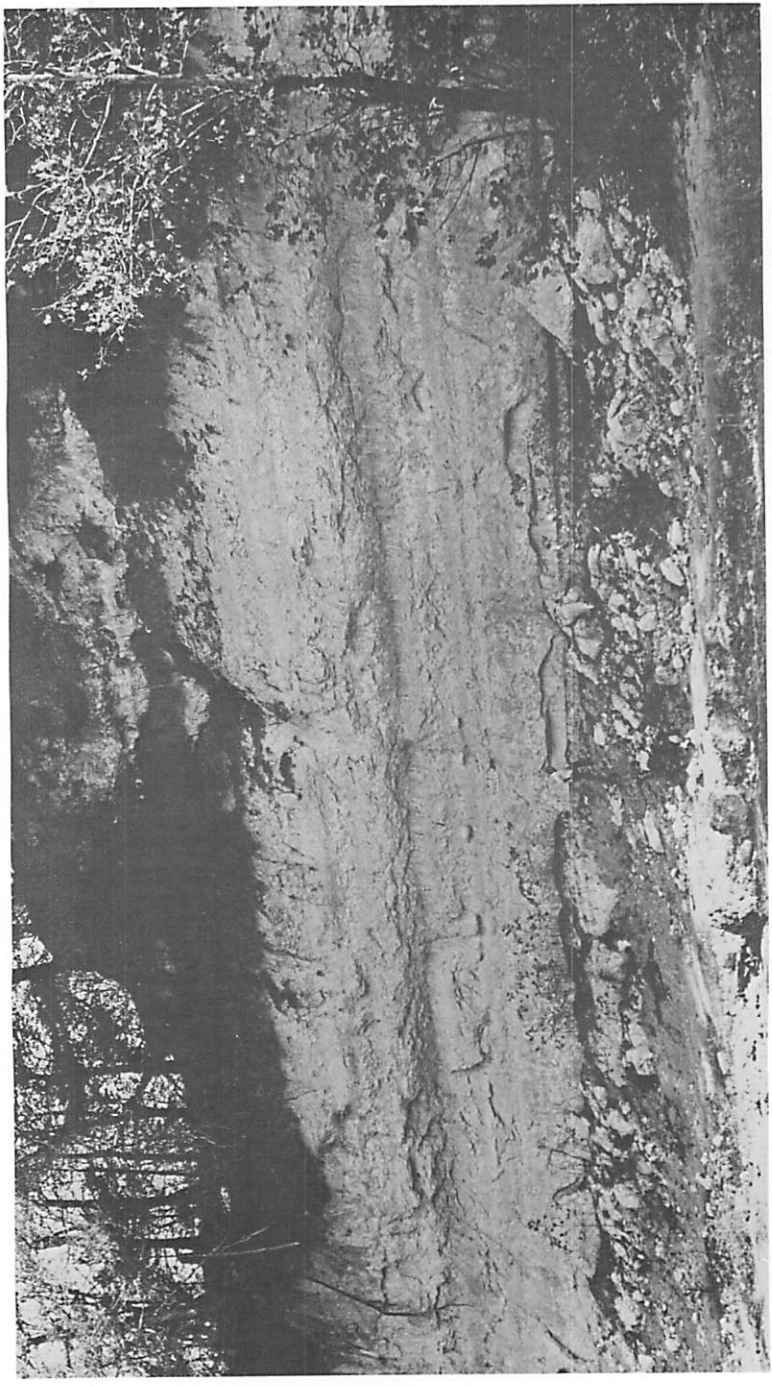

Figure 14. Dobys Bluff Tongue of the Kosciusko Formation and the Archusa Marl Member of the Cook Mountain Formation at Dobys Bluff on the Chickasawhay River at locality 26 (a and b) in the NW/4, SW/4, NW/4, Section 18, T. 2 N., R. 16 E., Clarke County. The contact is pointed out by the individual at the base of the bluff.

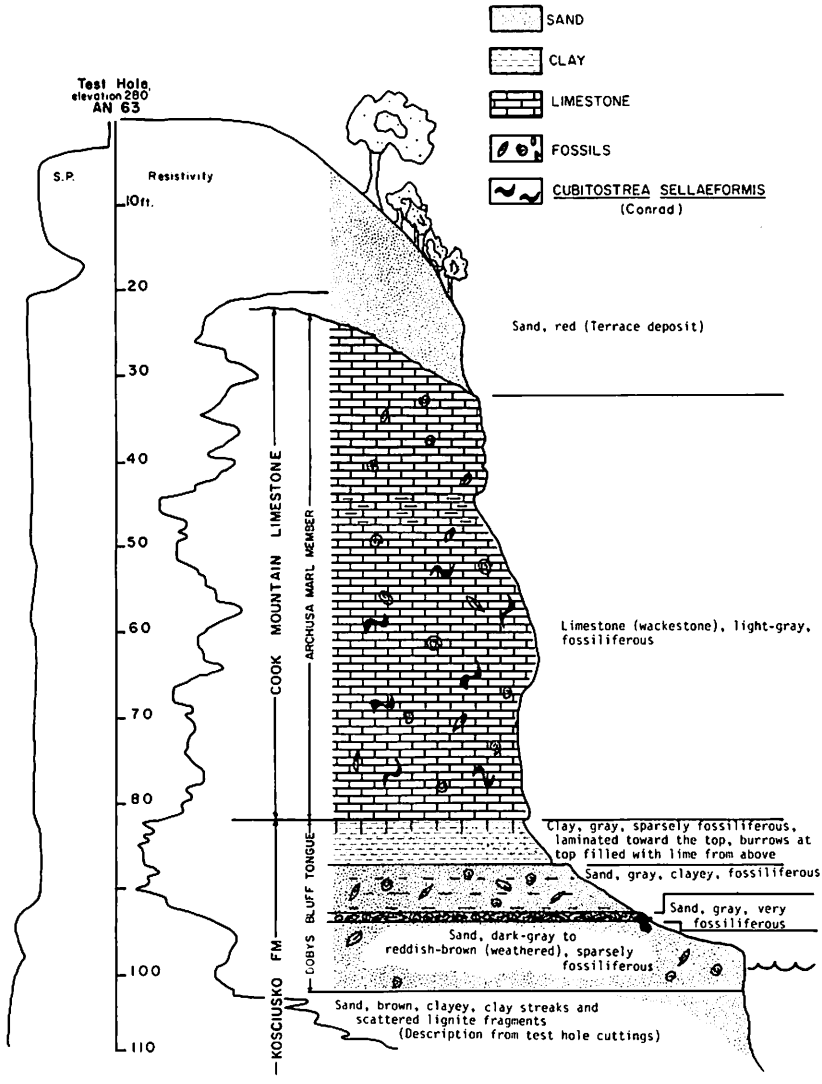

Figure 15. Measured section of the Archusa Marl Member of the Cook Mountain Formation and the Dobys Bluff Tongue of the Kosciusko Formation at Dobys Bluff on the Chickasawhay River south of Quitman, Mississippi (locality 26).

Figure 16. Dobys Bluff Tongue of the Kosciusko Formation at the base of Dobys Bluff on the Chickasawhay River at locality 26b in the NW/4, SW/4, NW/4, Section 18, T. 2 N., R. 16 E., Clarke County. The contact with the Archusa Marl is marked by the pick. The Dobys Bluff Tongue consists of fossiliferous, thinly-bedded clays in the upper part (below the Archusa Marl) and fossiliferous sand in the lower part (in the foreground).

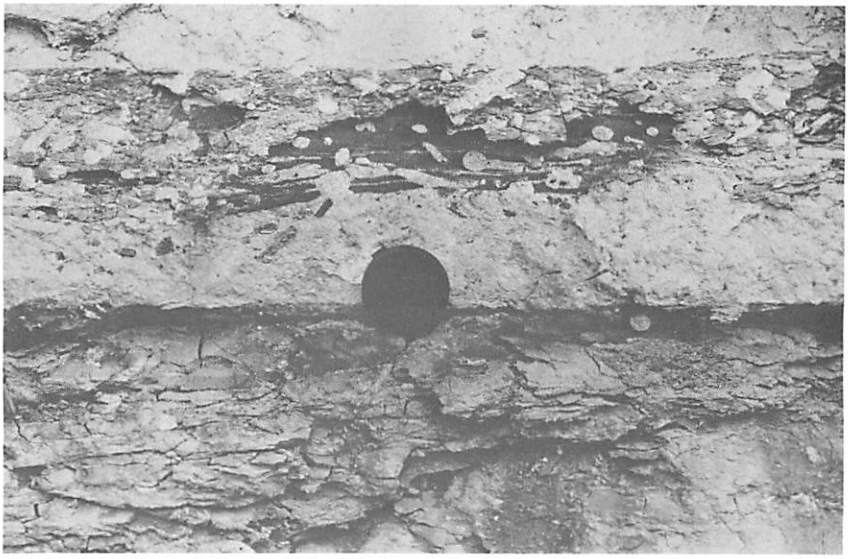

Figure 17. Disconformable contact of the Archusa Marl and Dobys Bluff Tongue at Dobys Bluff as marked by the camera lens cover. Lime-filled burrows extend from the marl into the underlying clay. A discontinuous reworked and burrowed clay lens occurs in the lower marl. This clay was probably derived from scouring of the Dobys Bluff Tongue in an adjacent area.

Figure 18. Archusa Marl on the west side of the Southern Railroad north of Wautubbee at locality 61 in the N/2, SE/4, NW/4, NE/4, Section 3, T. 3 N., R. 14 E., Clarke County, Mississippi.

Figure 19. Archusa Marl on the west side of the Southern Railroad north of Wautubbee at locality 62 in the NE/4, SW/4, NE/4, Section 3, T. 3 N., R. 14 E., Clarke County, Mississippi.

Figure 20. *Cubitostrea sellaeformis* (Conrad, 1832) weathering out of the Archusa Marl at locality 62.

Figure 21. Kosciusko Formation and weathered Archusa Marl at locality 25 in the SW/4, NE/4, SW/4, NW/4, Section 21, T. 4 N., R. 15 E., Clarke County. Survey geologist Bill Gilliland is standing on an ironstone ledge at the contact. Silicified fossils occur in the Archusa just above this ledge.

(localities 25, 26a, 27) for this report. At locality 25, the Archusa is weathered to a reddish-brown, clayey sand with a zone of silicified fossils at the base. Some of the fossils are replaced by translucent chalcedony (plate 24, figure 1). The most characteristic element of the Archusa fauna is the large, saddle-shaped oyster, *Cubitostrea sellaeformis* (Conrad, 1832).

The Archusa Marl should be noted for containing one of the few Eocene land mammal localities in the southeastern United States. At locality 52, a titanothere skull and jaw piece were found only a foot above a zone containing *Cubitostrea sellaeformis*. Gazin and Sullivan (1942) named a new genus and species for these remains. *Notiotitanops mississippiensis*, and stated their significance as follows:

"The titanothere find is particularly significant in two respects: first, in permitting a tie-in between the continental sequence of the Rocky Mountain and Great Plains areas and the marine Eocene of the Gulf Coastal Plain; and second, in the discovery of a new member of the Brontotheriidae and at a place in the southern States remote from the recorded distribution of a titanotheres, either Eocene or Oligocene."

Another recently found Eocene land mammal locality is at Dobys Bluff. Several fragments of a rib, including the head of the rib, of a large land mammal were found in talus at the bluff's base. The fossiliferous matrix on the fragments indicates that they came from the lower sand unit of the Dobys Bluff Tongue. From the location where the fragments were found and their close proximity to each other, it is probable that they had recently been eroded from the upper part of this sand unit near

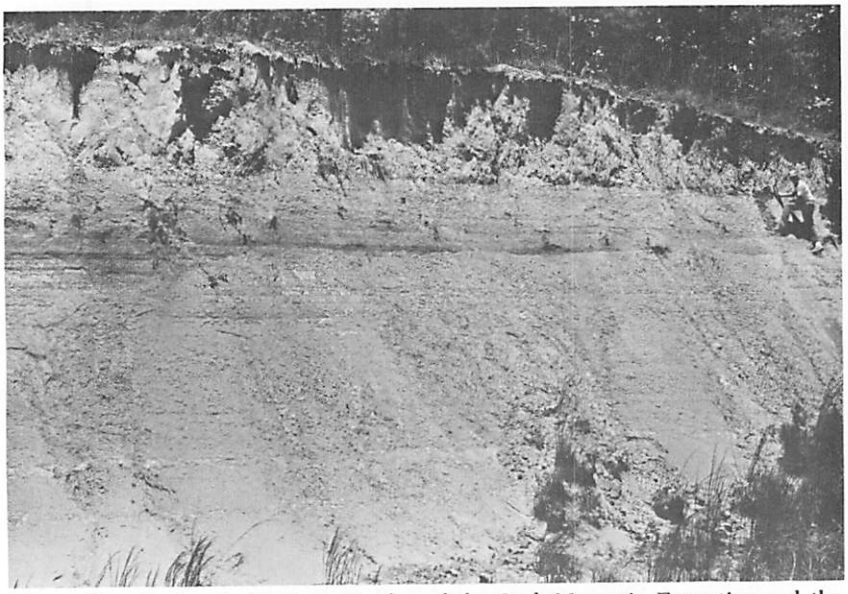

Figure 22. Gordon Creek Shale Member of the Cook Mountain Formation and the lower sand member of the Cockfield Formation at a railroad cut at locality 55 in the NE/4, NE/4, NW/4, Section 10, T. 3 N., R. 14 E., Clarke County. Survey worker Randall Bissell points to the gradational contact.

the contact with the overlying clay unit. Judith Schiebout and Robert Emry have tentatively identified this rib as belonging to a small rhinoceros.

The Potterchitto Member is a glauconitic, calcareous sand that rests conformably above the Archusa Marl. These sands indicate an increased input of terrigenous clastics onto the Cook Mountain marine shelf. The upper contact with the Gordon Creek Shale is gradational and difficult to pick. The section in figure 23 shows that glauconitic sand and fossils continue into the lower part of the Gordon Creek Shale. Potterchitto fossils collected in Clarke County consist mainly of molluscan external and internal molds and are not figured.

The Gordon Creek Shale is a glauconitic, fossiliferous, blocky clay in the lower part and a laminated, carbonaceous clay in the middle and upper parts (figure 23). A transition zone of alternating sands and clays occurs in the upper two feet below the basal Cockfield sand. Yellow sulfates leached from the clay by ground water coat some exposed surfaces.

The Cockfield Formation in Clarke County can be divided into three subunits: (1) a lower sand member, (2) an upper shale member, and (3) a transition zone. These subunits, along with the Gordon Creek Shale, represent a progradational and destructional sequence of the Cockfield delta system. The initial deltaic sediment introduced onto the Cook Mountain marine shelf was the fine-grained, prodelta mud facies (Gordon Creek Shale). As the delta system prograded southward, the delta front sand facies (lower sand member) was deposited above the prodelta mud,

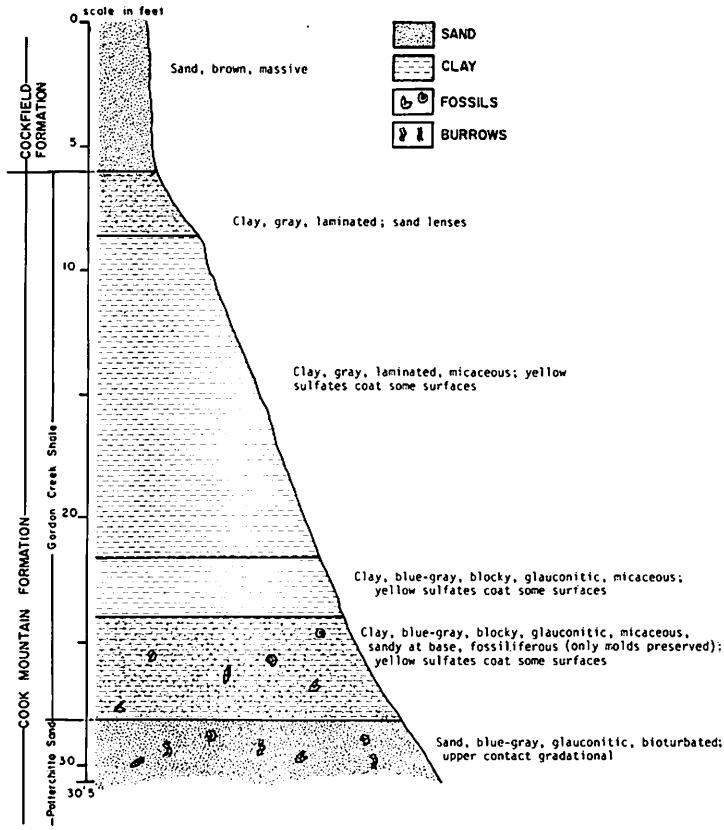

Figure 23. Measured section of the Gordon Creek Shale Member of the Cook Mountain Formation at a railroad cut below Highway 11 in Clarke County, Mississippi (locality 55).

and the delta plain shale facies (upper shale member) above the delta front sand. Marginal marine sediments (transition zone) were deposited in sounds and lagoons that formed above a subsisting delta plain after abandonment of the delta system. Eventually the delta plain surface was reworked in a marine shelf environment (Moodys Branch Formation).

Sedimentary units of the Cockfield delta system are illustrated in the following measured sections: (1) prodelta mud facies = Gordon Creek Shale (figure 23), (2) delta front sad facies = lower sand member (figures 24 and 25), (3) delta plain shale facies = upper shale member (figure 25), (4) sound-lagoon sand facies = transition zone (figure 27), and (5) destructional shelf sand facies = Moodys Branch Formation (figure 27). A net sand map for the Cockfield Formation (Dockery, 1976, figure 8, p. 30) shows bifurcating, elongate sand trends along the predicted sedimentary slope. These trends are similar to those of the modern Mississippi River Delta, a high-constructive, elongate, delta system.

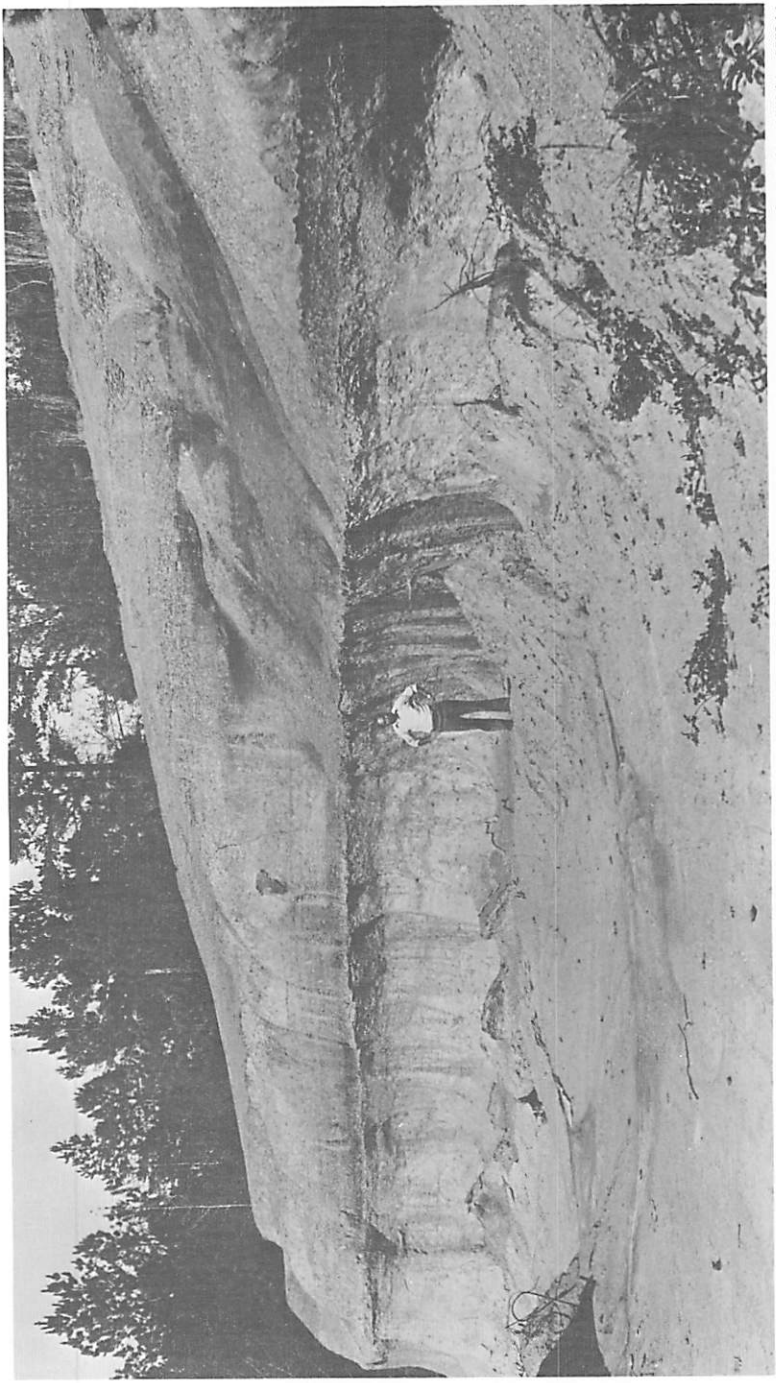

Figure 24. The lower sand and upper shale members of the Cockfield Formation on Highway 511 at locality 56 in the E/2, SW/4, SW/4, Section 6, T. 2 N., R. 16 E., Clarke County. A lignitic, channel-fill sand can be seen in the upper shale member to the right of Survey geologist Bill Gilliland.

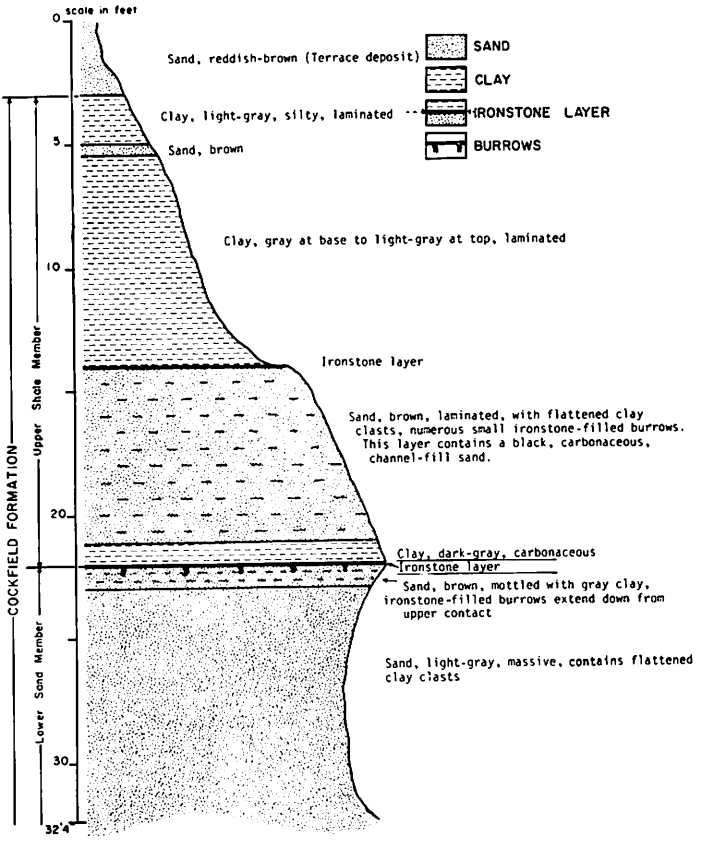

Figure 25. Measured section of the Cockfield Formation at excavation east of Quitman, Mississippi, showing the lower sand and upper shale members (locality 56).

Delta plain sediments of the Cockfield upper shale member contain lignitic clay beds and, at locality 56, a lignitic, channel-fill sand. Also at locality 56 are ironstone-filled, helical burrows at the lower sand-upper shale member contact. Above this contact is a foot-thick carbonaceous shale bed, indicating delta plain marsh deposition.

The transition zone in the upper Cockfield Formation was first described in The Shreveport Geological Society, Eleventh Annual Field Trip Guidebook (1934, p. 31) for exposures in the south bluff of Garland Creek at the NW corner of Section 28, T.1 N., R.16 E., Clarke County. At this locality and at localities 16 and 18 on the Chickasawhay River, a one-foot thick, carbonaceous clay bed is present in the top of this zone. Blanpied and Hazzard (1938, p. 313) stated that the transition zone is Jackson in age according to the foraminiferal assemblage. Tschudy (1973, p. 89) states that the palynomorphs within this zone are transitional be-

Figure 26. The transition zone of the Cockfield Formation, the Moodys Branch Formation, and the North Twistwood Creek Clay Member of the Yazoo Formation on the Chickasawhay River at locality 18 in the S/2, NE/4, SE/4, NE/4, Section 30, T. 1 N., R. 16 E., Clarke County. Some Tulane University geology students are digging at the lower contact and others are standing on the upper contact of the Moodys Branch Formation.

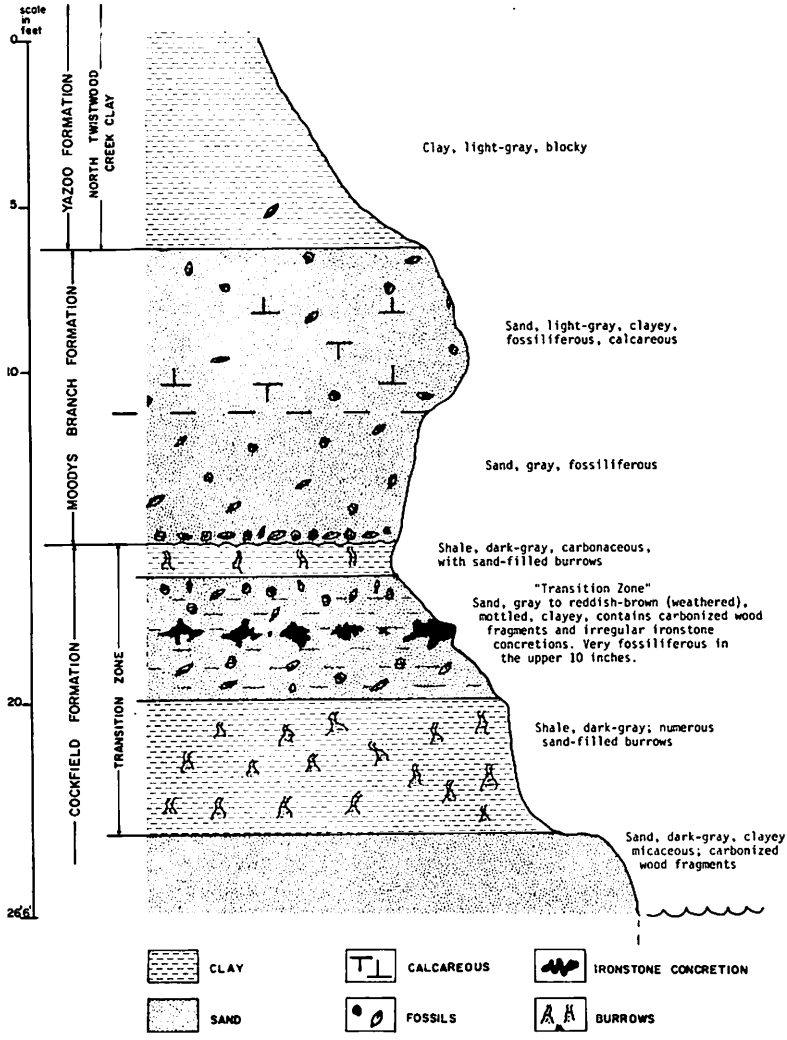

Figure 27. Measured section of the transition zone of the Cockfield Formation, the Moodys Branch Formation, and basal North Twistwood Creek Clay Member of the Yazoo Formation below the old Heard Cemetery on the Chickasawhay River north of Shubuta, Mississippi (locality 18).

tween the Claiborne and Jackson floras and more closely resemble the Jackson flora.

The transition zone sands represent over-wash deposits of a sound-lagoon environment. The sands contain a fauna similar to that of the Moodys Branch Formation above, though less diverse and with fewer individuals. The upper, foot-thick, carbonaceous clay bed of this zone suggests marsh development above overwash sands as the shallow sound-lagoon was in-filled.

JACKSON GROUP

The Jackson Group in the northern Gulf Coastal Plain marks a major marine transgression (Stenzel, 1952c). Marine Jackson sediments extend up the Mississippi Embayment as far north as the Desha Basin in east-central Arkansas. The entire Jackson sequence in Mississippi is marine and is bounded above and below by erosional contacts. In a previous Mississippi Geological Survey Bulletin, *Mollusca of the Moodys Branch Formation, Mississippi*, Bulletin 120 (Dockery, 1977, figure 2, p. 16), the writer illustrated the upper contact as gradational. The basal part of the overlying Forest Hill Formation in places is a dark carbonaceous clay. This clay was interpreted as a prodelta mud facies of the Forest Hill deltaic sequence and was inferred to grade into the bluish-gray, marine, Yazoo clay below. A recent core-hole at the Forest Hill type locality (MGS No. 1 Forest Hill Baptist Church, NW/4, SE/4, NE/4, Section 22, T.5 N., R.1 W., Hinds County) showed the contact between these clay units to be erosional. Additional test-hole and outcrop observations indicate a widespread disconformity above the Jackson Group.

Two formations are recognized in the Jackson Group of Mississippi, the Moodys Branch and Yazoo Formations. The Moodys Branch Formation is the subject of a previous Mississippi Geological Survey Bulletin (Bulletin 120, Dockery, 1977). This formation is well exposed in Clarke County along the Chickasawhay River and Garland Creek. Figures 26 and 27 show a photograph and measured section of the Chickasawhay River exposure at locality 18. In the photograph, some Tulane University geology students are picking fossils from the lower Moodys Branch contact and others are standing on the upper contact. The one-foot thick, carbonaceous clay unit at the top of the Cockfield Formation is easily visible, as are the lighter-colored, fossiliferous sands of the transition zone below it.

At locality 17, the Moodys Branch Formation can be divided into an upper marl unit and a lower sand unit (see figures 28 and 29). The lower sand contains numerous *Periarchus lyelli*. Huddleston (1965) gives this same division for the Moodys Branch Formation in Alabama.

In western Alabama, the Moodys Branch Formation lies disconformably above the fossiliferous, marine sediments of the Gosport Sand. The Moodys Branch-Gosport contact at Little Stave Creek (locality 30) near Jackson, Alabama, occurs above a concretionary zone in the upper Gosport and below a cross-bedded, sandy shell bed in the basal Moodys Branch. Here the contact zone is partially lithified by calcareous cement

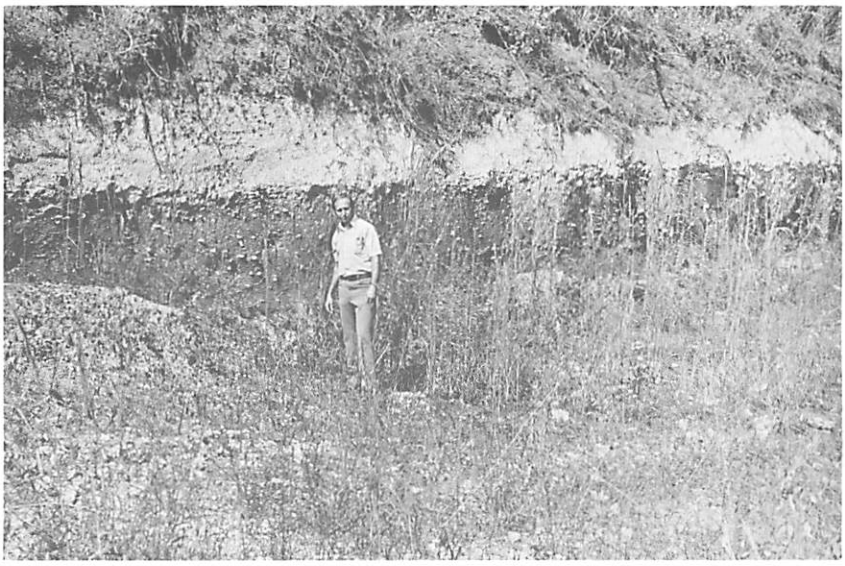

Figure 28. Moodys Branch Formation in a trench behind Getty Oil Co. well No. 1 J. Blanks 21-6 in the NE/4, SW/4, NW/4, Section 21, T. 2 N., R. 14 E., Clarke County. The light-colored, upper, calcareous sand unit of the Moodys Branch Formation is just above the head of Survey geologist Bill Gilliland.

and contains an abundance of *Periarchus lyelli*. A specimen from the lithified contact zone is illustrated in plate 73. The sabellid worm tubes occurring in this zone may have aided in the early cementation of the sediment and produced hard-grounds on the sea floor during the initial phase of Moodys Branch deposition.

The Yazoo Formation in Clarke County contains four members. These members, from bottom to top, are: (1) North Twistwood Creek Clay, (2) Cocoa Sand, (3) Pachuta Marl, and (4) Shubuta Clay. All of these units contain marine fossils. The contacts between the members are gradational.

The North Twistwood Creek Clay Member is usually weathered to a brown, calcareous clay at outcroppings. Fresh exposures can be seen along the south bank of the Chickasawhay River at a bridge north of Shubuta in the SW/4, NW/4, SW/4, Section 32, T.1 N., R.16 E., Clarke County, Mississippi (see figure 30). Here the North Twistwood Creek Member is a fossiliferous, blocky, gray clay. The fossils consist largely of bivalves, which are chalky and poorly preserved.

The Cocoa Sand is exposed along the east bank of the Chickasawhay River southeast of Shubuta in the W/2, NW/4, Section 10, T.10 N., R.7 W., Clarke County. Here it is a sand with irregular sandstone ledges and numerous flat echinoids (sand dollars). Three subspecies of *Pierarchus lyelli* (Conrad, 1834) occur together at this locality, *P. lyelli pileussinensis* (Ravenel, 1844), *P. lyelli protuberans* Twitchell, 1915, and a form that resembles *P. lyelli* s.s. Another exposure on Shubuta Creek northwest of

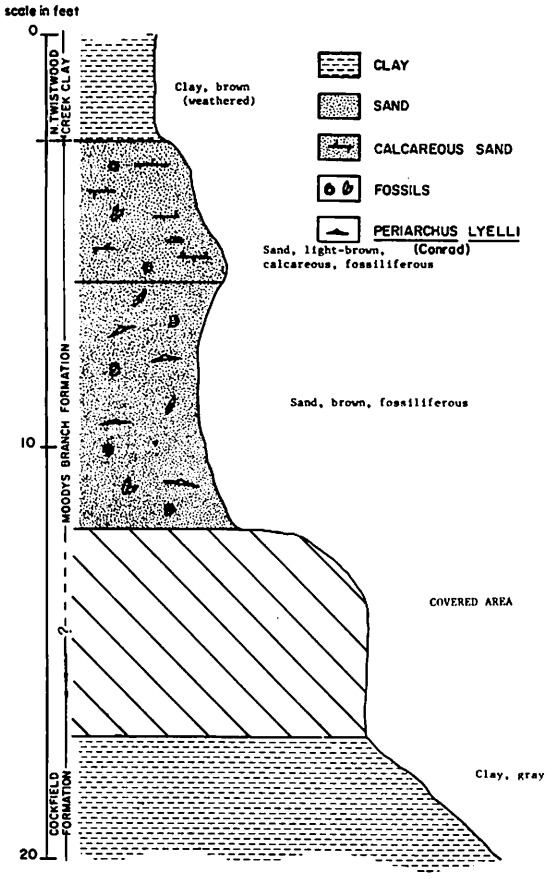

Figure 29. Measured section of the Moodys Branch Formation at an excavation behind Getty Oil Company well No. 1 J. Blanks, Clarke County (locality 17).

Shubuta at locality 31 (figure 31) contains numerous *P. lyelli pileussinensis.*

The Pachuta Marl is characterized by the fossil bivalves *Chlamys spillmani* (Gabb, 1860) and *Gryphaeostrea plicatella* (Morton, 1833). Bones, especially vertebrae, of the archaeocetian whale *Zeuglodon cetoides* (Owen, 1839) are common within this member. At a locality locally called "the bone yard" near the center of the SE/4, Section 11, T.1 N., R.17 E., numerous large *Zeuglodon* bones were exposed in gullies eroded into the weathered Pachuta Marl. Here the Pachuta is a highly calcareous, light-gray to white clay. Associated with the bones are fish spines and *Chlamys spillmani.* At most localities the Pachuta is a highly calcareous sand.

The Shubuta is a fossiliferous, blocky, bluish-gray clay. It is weath-

Figure 30. North Twistwood Creek Clay Member of the Yazoo Formation on the south bank of the Chickasawhay River below a bridge north of Shubuta at locality 72 in the SW/4, NW/4, SW/4, Section 32, T. 1 N., R. 16 E., Clarke County.

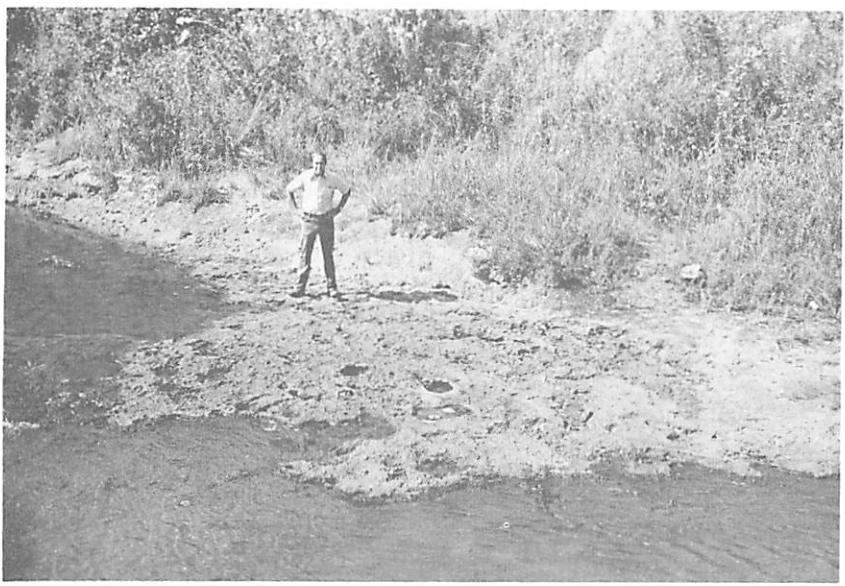

Figure 31. Cocoa Sand Member of the Yazoo Formation at locality 31 in the stream bed of Shubuta Creek at bridge in the SW/4, SW/4, NW/4, Section 35, T. 1 N., R. 15 E., Clarke County.

ered at its type locality (locality 57a), but fresh exposures can be seen along the Chickasawhay River at localities 34, 35, and 36. The most common fossil present in this unit is a coral, *Flabellum rhomboideum* Vaughan, 1900, which is abundant at locality 36 in Wayne County.

RED BLUFF AND FOREST HILL FORMATIONS

The Red Bluff Formation is a very fossiliferous, dark-gray clay which contains a diverse molluscan fauna. The lower contact with the Shubuta Clay is sharp and erosional. This contact is difficult or impossible to distinguish on electrical logs, but can be easily determined on the outcrop and in well cuttings by a color change. The upper contact with the Forest Hill Formation is gradational and difficult to pick. In Clarke County the entire Red Bluff-Forest Hill sequence is a clay. This sequence is exposed in gullies on a cleared power line right-of-way crossing Eucutta Creek at locality 46 in Clarke County. Here the lower part of the sequence contains abundant Red Bluff fossils and the upper part is nonfossiliferous. To the west in Central Mississippi, the Red Bluff Formation grades into the lower sands and clays of the Forest Hill Formation.

In Wayne County the Red Bluff-Forest Hill contact is gradational and marked by the first occurrence of silty and sandy partings in the clay. This contact is best seen on the west bank of the Chickasawhay River at a tight U-shaped bend in the NW/4, NW/4, NE/4, SW/4, Section 9, T.9 N., R.7 W., Wayne County. Here thin lenticular sands and interbedded clays of the basal Forest Hill rest on a massive clay in the upper part of the Red Bluff Formation.

The upper part of the Forest Hill Formation in Wayne County contains thick, cross-bedded, lenticular sand bodies and interbedded sands and clays. At some localities, thin sand units in the upper ten feet of the formation contain a varied molluscan fauna similar to that of the overlying Mint Spring Formation.

In western Alabama in the Pelham Quarry (north quarry) at St. Stephens, Washington County, the interval between the Shubuta Clay and the Marianna Limestone consists of a 14-foot-thick, lower, limestone and interbedded calcareous clay unit, and a 10-foot-thick, upper, dark-gray clay unit. Some workers (e.g., Glawe, 1969, p. 93) have correlated these units respectively with the Red Bluff and Forest Hill Formations. The upper clay unit, however, is lithologically similar to the Red Bluff Formation at its type locality and contains Red Bluff fossils throughout. Both the lower limestone and upper clay units should be placed as members of the Red Bluff Formation. The Forest Hill Formation apparently does not continue east of Mississippi.

The sands and clays of the Forest Hill Formation were deposited in delta systems that extended across Mississippi and Louisiana. In Louisiana the Forest Hill equivalents are the Mosley Hill Formation and the Sandel Sand (see figure 1). Fossiliferous sands in the upper Forest Hill indicate marginal marine deposition in lagoons and sounds that developed on a

subsiding delta plain in front of the advancing shoreline of the lower Vicksburg Group. The Red Bluff Formation is comprised of dark, carbonaceous clays that were distributed through the Forest Hill delta system and deposited on a marine shelf in eastern Mississippi and western Alabama. In Clarke County, the depositional environments of the Red Bluff-Forest Hill sequence probably consist of marine shelf clays overlain by interdistributary bay clays associated with Forest Hill delta systems.

VICKSBURG GROUP

The Vicksburg Group at its type locality in Vicksburg, Mississippi, consists of limestones, calcareous sands, and clays. Limestones of this group show one of the greatest extensions of a marine carbonate shelf environment into the Northern Gulf Coastal Plain during the Tertiary Period, exceeded only by the Clayton Formation (Paleocene). The following formations in sequence from bottom to top are recognized in the Vicksburg Group of Mississippi: (1) Mint Spring Formation, (2) Marianna Limestone, (3) Glendon Limestone, (4) Byram Formation, and (5) Bucatunna Clay.

The Mint Spring Formation at its type locality on Mint Spring Bayou north of Vicksburg, Mississippi, is a glauconitic, calcareous sand containing well preserved aragonitic and calcitic fossil shells. It conformably underlies the Glendon Limestone and disconformably overlies the Forest Hill Formation at this locality. In central and eastern Mississippi, the Mint Spring Formation conformably underlies the Marianna Limestone.

The Mint Spring Formation is a destructional shelf sand facies of Forest Hill delta systems. This formation was not seen at surface exposures in Clarke County. To the south in Wayne County it is a fossiliferous, highly calcareous, partially lithified sand that varies from one to two feet in thickness. This sand contains numerous rounded, lithified, clay clasts in the basal part, which were reworked from underlying clays in the Forest Hill Formation. Locally these clasts are so numerous that they must have formed a cobble bottom on the seafloor. This early lithification is evidenced by numerous *Gastrochaena* (bivalve) borings and attached corals and serpulid gastropods. Several molluscan species in the Mint Spring Formation in Wayne County do not occur in exposures of this formation in western Mississippi.

The Vicksburg limestone sequence of eastern Mississippi and Alabama consists of a lower, soft, carbonate mudstone and wackestone, the Marianna Limestone, and an upper, hard calcarenite, the Glendon Limestone. These two units can be differentiated into the lithologies mentioned above as far west as the Smith County Lime Quarry near Sylvarena, Mississippi. At the Marquette Cement Manufacturing Company's quarry in Brandon, Mississippi, the Glendon interval contains 20 feet of hard, ledge-forming, limestone units with intervening fossiliferous, calcareous sands and clays containing *Pecten byramensis* Gardner, 1945. The Marianna and Mint Spring interval contains 28 feet of highly cal-

Figure 32. The Marianna and Glendon Limestones at localities 41 and 42 in the NE/4, SW/4, SW/4, Section 8, T. 10 N., R. 8 W., Clarke County. Survey worker Randall Bissell is standing on the contact.

careous, glauconitic, fossiliferous, gray sand containing *Pecten poulsoni* Morton, 1834. This sand becomes increasingly glauconitic toward the base. The Mint Spring Formation at this locality is exposed only in dredging spoils. It can be distinguished from the Marianna Limestone in that it contains fossils with aragonitic shells and is phosphatic. At Haynes Bluff, north of Vicksburg, Mississippi, the Glendon Limestone is a 28-foot sequence of hard limestone units separated by sands and clays. This sequence rests comformably on marls and sands of the Mint Spring Formation.

The writer defines the Marianna Limestone in central and parts of eastern Mississippi as the interval between the Glendon Limestone and the Mint Spring Formation containing highly calcareous sands and marls that lack preservation of aragonitic shells. Aragonitic shells are well preserved in the underlying Mint Spring Formation because of its lower carbonate content.

Depositional environment studies by Coleman (1978) attribute the Marianna Limestone to foraminiferal-algal mudstone deposition on an open marine "platform." A continuous accumulation of these sediments produced a carbonate bank. The Glendon Limestone formed as "platform edge" carbonate sands. When the Marianna carbonate bank built up to wave base, the calcarenites of the Glendon Limestone were deposited above it. These carbonate environments were modified in western Mississippi by a periodic input of terrigenous clastic sediments.

In Clarke County only the Marianna and Glendon Limestones of the

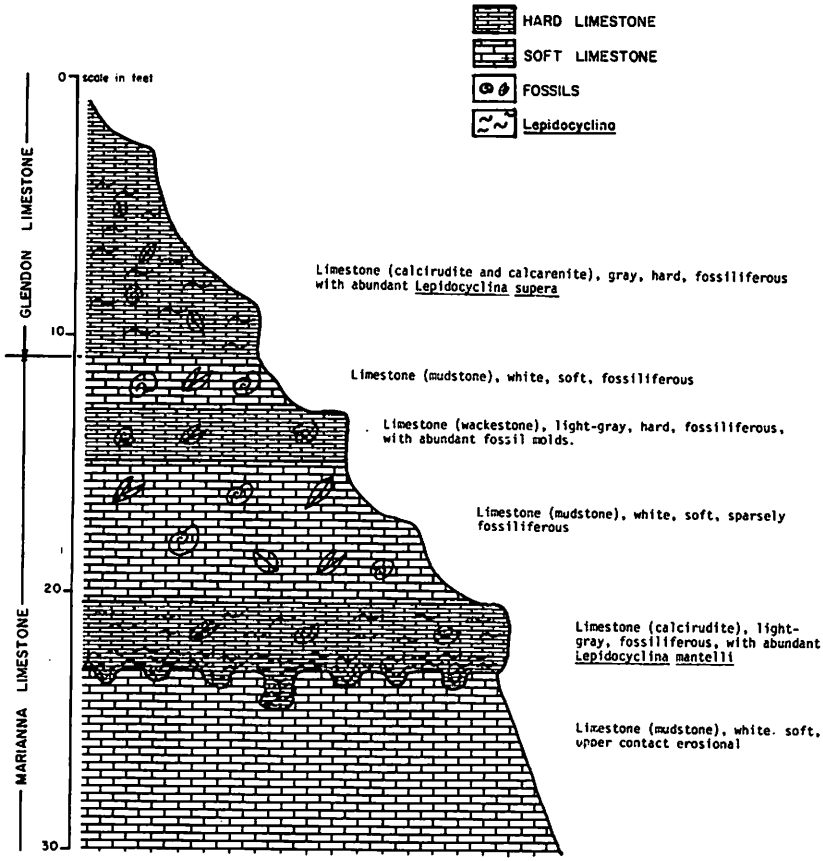

Figure 33. Measured section of the Marianna and Glendon Limestones on a road cut east of Shubuta, Mississippi, near the Shell Oil Company Goodwater Plant (localities 41 and 42).

Vicksburg Group were seen at surface exposures. Figures 32 and 33 show, respectively, a photograph and measured section of these limestone units at localities 41 and 42. Beds at these localities are dipping to the south-southeast. The Marianna Limestone has a hard, calcirudite unit in the upper part that is composed in a large part of *Lepidocyclina mantelli* (Morton, 1833), a large, circular, half-dollar-sized foraminifer. This unit forms a ledge near the base of the exposure as seen in figure 32 and has an interformational erosional lower contact. The flat echinoid *Clypeaster rogersi* (Morton, 1834) is present throughout the Marianna Limestone. The overlying Glendon Limestone is a hard calcarenite and calcirudite: a calcarenite where composed largely of *Nummulites*, and a calcirudite where composed largely of *Lepidocyclina supera* (Conrad, 1865). A heart

urchin, *Schizaster (Paraster) americanus* (Clarke, 1915), is present in the Glendon Limestone at this locality.

The Marianna and Glendon Limestones at badly weathered exposures in Clarke and Wayne Counties can be easily differentiated by the fossil *Pecten* and *Lepidocyclina* content. *Lepidocyclina mantelli* in the Marianna Limestone is the size of a half-dollar or larger while *Lepidocyclina supera* in the Glendon is the size of a nickel or dime. *Pecten poulsoni* Morton, 1834, of the Marianna Limestone, has ribs that are rounded or have a single ridge down the middle. *Pecten byramensis* Gardner, 1945, of the Glendon Limestone, has square-shouldered ribs with three ridges, one along each shoulder and a central one.

Above the Glendon Limestone is a sequence of terrigenous clastics that generally consists of fossiliferous sands and clays in the lower part and a sparsely fossiliferous clay in the upper part. The lower sandy part is named the Byram Formation, and the upper part is the Bucatunna Clay. Many workers (Marsalis and Friddell, 1975; Toulmin, 1955) consider the Glendon Limestone as a member of the Byram Formation. Puri and Vernon (1964) include the Bucatunna Clay in the Byram Formation. Each of the previously mentioned units has a broad distribution, so it seems best to restrict the term Byram and give these units an equal rank as formations. The Glendon, Byram, Bucatunna sequence has a distinct fauna that is characterized by *Lepidocyclina supera* and *Pecten byramensis*. The Byram Formation can be further distinguished by a small bivalve *Anadara lesueuri* Dall, 1898.

The Byram Formation at its type locality on the Pearl River at Byram, Mississippi, has a slightly sandy clay in its lower part. At a limestone quarry north of Redwood, Mississippi, the Byram Formation from bottom to top consists of: (1) 4 feet of fossiliferous, clayey sand, (2) 12 feet of sparsely fossiliferous, carbonaceous clay, (3) 8 feet of fossiliferous sand, (4) 2 1/2 feet of sparsely fossiliferous, carbonaceous clay, and (5) 2 1/2 feet of weathered, fossiliferous, calcareous, brown sand. This sequence is disconformably overlain by Pleistocene alluvium and loess. Along the Big Black River at Edwards, Mississippi, the Byram Formation consists of: (1) 1 foot of dark, laminated clay at low water level, (2) 3 feet of burrowed sand with concretions at the base, (3) 3 feet of dark laminated clay, and (4) 21 feet of fossiliferous sand. Seven feet of Bucatunna Clay is exposed above this sequence. In Mississippi Geological Survey Test Hole 95B-15, in the SE/4, NW/4, NW/4, Section 19, T.3 N., R.4 E, Rankin County, Mississippi, the Bucatunna Clay is missing and sands of the Catahoula Formation rest on the Byram sands. The Byram Formation here consists of a lower, 12-foot thick clay unit and an upper, 32-foot thick, fossiliferous sand unit with *Anadara lesueuri*. Though no exposures of the Byram Formation were seen in Clarke County, Mississippi, to the southeast in St. Stephens, Alabama, the Byram is a one-foot-thick, fossiliferous sand overlain by 26 feet of Bucatunna Clay. The Byram sands show considerable variation in thickness. Clay units in the Byram Formation have a similar lithology to the Bucatunna Clay. It is evident that the Byram and Bucatunna are in part facies of one another.

Figure 34. *Lepidocyclina supera* (Conrad, 1865) in the calcirudites of the Glendon Limestone at locality 42 in the NE/4, SW/4, SW/4, Section 8, T. 10 N., R. 8 W., Clarke County.

SYSTEMATICS

Phylum PROTISTA
Subphylum SARCODINA Schmarda, 1871
Class RETICULAREA Lankester, 1885
Subclass GRANULORETICULOSIA de Saedeleer, 1934
Order FORAMINIFERIDA Eichwald, 1830
Suborder ROTALINA Delage and Herouard, 1896
Superfamily ORBITOIDIDAE Schwager, 1876
Family LEPIDOCYCLINIDAE Scheffen, 1932
Genus **LEPIDOCYCLINA** Gümbel, 1870

Lepidocyclina (Lepidocyclina) mantelli (Morton)
Plate 80, figure 2

1833. *Nummulites mantelli* Morton, Amer. Jour. Sci., 1st ser., v. 23, p. 291, pl. 5, fig. 9.
1904. *Lepidocyclina mantelli* (Morton). Lemoine and R. Douville, Soc. Geol. France, Mem., Paleontologie, No. 32, p. 10, pl. 1, fig. 4; pl. 2, fig. 18; pl. 3, fig. 7, 12.
1920. *Lepidocyclina mantelli* (Morton). Cushman, U.S. Geol. Survey Prof. Paper 125, p. 57-60, pl. 12-14.

Type locality: Marianna Limestone near Claiborne, Alabama.

Occurrence: Marianna Limestone in Mississippi, Alabama, and Florida. Glendon Limestone in Mississippi and Alabama.

Discussion: This foraminifer has a thin, flattened, circular test that has a low elevation in the center and may be slightly undulate. Adult tests are from 25 to 35 millimeters in diameter, and large specimens reach 41 millimeters. This species is extremely abundant in the Marianna Limestone and is locally an important sedimentary constituent of the rock.

Lepidocyclina (Lepidocyclina) supera (Conrad)
Plate 82, figure 2

1865. *Orbitolites supera* Conrad, Acad. Nat. Sci. Philadelphia, Proc., v. 17, p. 74.
1918. *Lepidocyclina supera* (Conrad). H. Douville, Acad. Sci. Paris, Compt. Rend. 167, p. 263-264, fig. 6-8, 11.
1920. *Lepidocyclina supera* (Conrad). Cushman, U. S. Geol. Survey Prof. Paper 125, p. 69-70, pl. 26, fig. 5-7.

Type locality: Byram Formation, Vicksburg, Mississippi.

Occurrence: Glendon Limestone and Byram Formation of Mississippi and Alabama.

Discussion: This species is easily distinguished from *L. mantelli* by its smaller size, less than 20 millimeters in diameter. Also, the elevation of the center is less distinct than in *L. mantelli*. *L. supera* is abundant in the Glendon Limestone and the overlying Byram Formation and is a good guide fossil for these units. Both *L. supera* and *L. mantelli* can be distinguished from *Lepidocyclina* cf. *L. undosa* Cushman, 1919, of the Chickasawhay Limestone in that the latter is strongly folded so that it has a saddle-shaped appearance.

Phylum COELENTERATA
Subphylum CNIDARIA Hatschek, 1888
Class ANTHOZOA Ehrenberg, 1834
Subclass ZOANTHARIA van Beneden, 1898
Order SCLERACTINIA Bourne, 1900
Suborder ASTROCOENIINA Vaughan and Wells, 1943
Family POCILLOPORIDAE Gray 1842
Genus **MADRACIS** Milne-Edwards and Haime, 1849

Madracis gregorioi Vaughan
Plate 1, figure 1

1900. *Madracis gregorioi* Vaughan. U.S. Geol. Survey Monograph 39, p. 130-131, pl. 13, fig. 12, 12a.
1977. *Madracis gregorioi* Vaughan. Toulmin, Geol. Survey Alabama Monograph 13, p. 182, pl. 11, fig. 1, 2.

Type locality: ?

Occurrence: Mississippi: Bashi Formation, locality 19. Alabama: Tuscahoma Sand, Tuscahoma Landing and Greggs Landing; Hatchetigbee Formation, Hatchetigbee Bluff.

Suborder FUNGIINA Verrill, 1865
Superfamily FUNGIICAE Dana, 1846
Family FUNGIIDAE Dana, 1846
Genus **DISCOTROCHUS** Milne-Edwards and Haime, 1848

Discotrochus orbignianus Milne-Edwards and Haime
Plate 26, figures 1A, 1B, 2

1848. *Discotrochus orbignianus* Milne-Edwards and Haime, Annales Sci. Nat., 3rd ser., v. 9, p. 252, pl. 7, fig. 6.

1900. *Discotrochus orbignianus* Milne-Edwards and Haime. Vaughan, U.S. Geol. Survey, Monograph 39, p. 79-80, pl. 5, fig. 13, 13a, 14, 14a, 15, 15a, 16, 16a, 17, 18, 19, 19a.

1956. *Discotrochus orbigianus* Milne-Edwards and Haime. Moore, ed., Treatise Invert. Paleont., pt. F, Coelenterata, p. 388, fig. 281-2a, 2b, 2c, 2d.

Type locality: ?

Occurrence: Mississippi: Cook Mountain Formation, 2 miles southeast of Hickory, 3 miles northeast of Newton, 1 mile south of Hickory, 6 miles west of De Soto Station in Clarke County, 8 miles south of Hickory, railroad 4 1/2 miles east of Newton; Archusa Marl, locality 62. For other localities in Texas, Louisiana, and Alabama, see Vaughan (1900).

Discotrochus sp.?

Plate 26, figures 3A, 3B

Occurrence: Mississippi: Archusa Marl, locality 62.

Suborder FAVIINA Vaughan and Wells, 1943

Superfamily FAVIICAE Gregory, 1900

Family RHIZANGIIDAE d'Orbigny, 1851

Genus **ASTRANGIA** Milne-Edwards and Haime, 1848

Astrangia expansa Vaughan

Plate 26, figure 11

1900. *Astrangia expansa* Vaughan, U.S. Geol. Survey, Monograph 39, p. 133-135, pl. 14, fig. 3, 3a, 3b, 4, 5.

Type locality: ?

Occurrence: Mississippi: Cook Mountain Formation, locality 65; Moodys Branch Formation, Jackson. Louisiana: Moodys Branch Formation, Montgomery Landing on the Red River.

Astrangia harrisi Vaughan

Plate 26, figure 10

1900. *Astrangia harrisi* Vaughan, U.S. Geol. Survey, Monograph 39, p. 136-137, pl. 14, fig. 8, 9, 10, 10a.

Type locality: White Bluff Formation, 3/4 mile above Vinces Bluff on the Saline River, Cleveland County, Arkansas.

Occurrence: Mississippi: Cook Mountain Formation, locality 65. Arkansas: White Bluff Formation, 3/4 mile above Vinces Bluff on the Saline River.

Astrangia sp.

Plate 25, figure 13

Occurrence: Mississippi: Archusa Marl, localiy 27.

Family OCULINIDAE Gray, 1847

Genus **ARCHOHELIA** Vaughan, 1919

Archohelia vicksburgensis (Conrad)

Plate 76, figure 1

1848. *Madrepora vicksburgensis* Conrad, Acad. Nat. Sci. Philadeplhia, Proc., v. 3, p. 296.

1900. *Oculina vicksburgensis* (Conrad). Vaughan, U.S. Geol. Survey Monograph 39, p. 116-118, pl. 10, fig. 4-10.

1919. *Archohelia vicksburgensis* (Conrad). Vaughan, U.S. National Museum, Bull. 103, p. 352.

Type locality: Byram Formation, Vicksburg, Mississippi.

Occurrence: Mississippi: very common in the Byram Formation and common in the Mint Spring and Red Bluff Formations.

Suborder CARYOPHYLLIINA Vaughan & Wells, 1943

Superfamily CARYOPHYLLIICAE Gray, 1847

Family CARYOPHYLLIIDAE Gray, 1847

Genus **TROCHOCYATHUS** Milne-Edwards and Haime, 1848

Trochocyathus depressus Vaughan, 1900

Plate 26, figures 4A, 4B

1900. *Trochocyathus depressus* Vaughan, U.S. Geol. Survey, Monograph 39, p. 97-98, pl. 7, fig. 14, 14a, 15, 16, 17.

Type locality: Cook Mountain Formation, 6 miles west of De Soto Station, Clarke County, Mississippi.

Occurrence: Mississippi: Cook Mountain Formation, 6 miles west of De Soto Station; Archusa Marl, locality 26a.

Genus **PARACYATHUS** Milne-Edwards and Haime, 1848

Paracyathus bellus Vaughan

Plate 25, figures 5, 6, 9, 10A, 10B, 12

1900. *Paracyathus bellus* Vaughan, U.S. Geol. Survey, Monograph 39, p. 108-109, pl. 8, fig. 16-20.

Type locality: ?

Occurrence: Mississippi: Cook Mountain Formation, Enterprise, Newton, 2 miles southeast of Hickory in Newton County, 8 miles south of Hickory in Clarke County, 8 miles west of Enterprise, 1 mile south of Hickory, 4½ miles east of Newton; Archusa Marl, localities 27, 61, 62. Louisiana: Cook Mountain Formation, 10 miles northwest of Winfield, St. Maurice.

Paracyathus alternatus Vaughan

Plate 25, figures 7, 8, 11

1900. *Paracyathus alternatus* Vaughan, U.S. Geol. Survey, Monograph 39, p. 105-107, pl. 8, fig. 11, 11a, 12, 13, 13a, 14, 14a, 14b.

Type locality: ?

Occurrence: Mississippi: Cook Mountain Formation, locality 68, 3 miles northeast of Newton, 2 miles southeast of Hickory, 8 miles south of Hickory, 8 miles west of Enterprise, 1 mile south of Hickory, 4 1/2 miles east of Newton; Archusa Marl, locality 61. For localities in Louisiana, Texas, and Alabama, see Vaughan (1900).

Genus **PLATYTROCHUS** Milne-Edwards and Haime, 1848

Platytrochus stokesi (Lea)

Plate 26, figures 5, 8A, 8B

1833. *Turbinolia stokesii* Lea, Contr. Geol., p. 194, pl. 6, fig. 207.
1848. *Platytrochus stokesii* (Lea). Milne-Edwards and Haime, Annales Sci. Nat., 3rd ser., v. 9, p. 247, pl. 7, fig. 7.
1900. *Platytrochus stokesii* (Lea). Vaughan, U.S. Geol. Survey, Monograph 39, p. 74-76, pl. 4, fig. 20-24, pl. 5, fig. 1, 1a, 8.

Type locality: ?

Occurrence: Mississippi: Cook Mountain Formation, Newton and Wautubbee; Archusa Marl, locality 26a. Also occurs in the Claiborne Group in Texas and Alabama.

Platytrochus goldfussi (Lea)

Plate 56, figures 3A, 3B

1833. *Turbinolia goldfussi* Lea, Contr. Geol., p. 195, pl. 6, fig. 208.
1848. *Platytrochus goldfussi* (Lea). Milne-Edwards and Haime, Annales Sci. Nat., 3rd ser., v. 9, p. 248, pl. 7, fig. 9.
1900. *Platytrochus goldfussi* (Lea). Vaughan, U.S. Geol. Survey, Monograph 39, p. 76-77, pl. 5, fig. 2-7.

Type locality: Gosport Sand, Claiborne Bluff, Alabama.

Occurrence: Mississippi: Moodys Branch Formation, locality 9. Alabama: Gosport Sand, localities 28, 29.

Superfamily FLABELLICAE Bourne, 1905
Family FLABELLIDAE Bourne, 1905
Genus **FLABELLUM** Lesson, 1831

Flabellum cuneiforme acutiforme Vaughan
Plate 25, figure 3

1900. *Flabellum cuneiforme acutiforme* Vaughan, U.S. Geol. Survey, Monograph 39, p. 63, pl. 3, fig. 19, 20.

Type locality: ?

Occurrence: Mississippi: Cook Mountain Formation, locality 65. Louisiana: Cook Mountain Formation, St. Maurice.

Flabellum cuneiforme pachyphyllum Gabb and Horn
Plate 25, figures 1A, 1B, 2, 4

1860. *Flabellum pachyphyllum* Gabb and Horn, Acad. Nat. Sci. Philadelphia Jour., 2nd ser., v. 4, p. 388.
1895. *Flabellum cuneiforme* var. *pachyphyllum* Gabb and Horn. Vaughan, Amer. Geol., v. 15, p. 213.
1900. *Flabellum cuneiforme* var. *pachyphyllum* Gabb and Horn. Vaughan, U.S. Geol. Survey Monograph 39, p. 62-63, pl. 3, fig. 11, 13-18.

Type locality: ?

Occurrence: Mississippi: Cook Mountain Formation, localities 64, 65, 4 miles northeast of Quitman, McLeod's mill in Clarke County, Wautubbee Hills, 8 miles west of Enterprise, 10½ miles southwest of Enterprise, 4 miles west of Newton, 3½ miles southwest of Quitman, 2 miles southeast of Hickory; Archusa Marl, locality 26a. Also occurs in the Claiborne Group of Texas and Louisiana.

Flabellum rhomboideum Vaughan
Plate 75, figures 4A, 4B, 4C, 6A, 6B

1900. *Flabellum rhomboideum* Vaughan, U.S. Geol. Survey Monograph 39, p. 69-70, pl. 4, fig. 13-14.

Type locality: Shubuta Clay, locality 36.

Occurrence: Mississippi: Shubuta Clay at many outcrops along the Chickasawhay River.

Discussion: T. H. Aldrich's collection from Red Bluff, Mississippi,

contained specimens of this species that Vaughan described and recorded from the Red Bluff Formation. At locality 36 there is large scale slumping with fossils of the Red Bluff Formation washing out onto the underlying Shubuta Clay. *Flabellum rhomboideum* is the only common large fossil in the Shubuta Clay at this locality and was included by Aldrich in his Red Bluff collection. It occurs in thin silty lenses within the Shubuta Clay.

Suborder DENDROPHYLLINA Vaughan and Wells, 1943
Family DENDROPHYLLIIDAE Gray, 1847
Genus **BALANOPHYLLIA** Wood, 1884
Subgenus **BALANOPHYLLIA** Wood, 1884

Balanophyllia (Balanophyllia) haleana (Milne-Edwards and Haime)
Plate 1, figures 2, 3A, 3B

1848. *Euspsammia haleana* Milne-Edwards and Haime, Annales Sci. Nat., 3rd ser., v. 10, p. 80.
1900. *Balanophyllia haleana* (Milne-Edwards and Haime). Vaughan, U.S. Geol. Survey, Monograph 39, p. 178-180, pl. 20, fig. 21-23, pl. 21, fig. 1-2.

Type locality: ?

Occurrence: Mississippi: Bashi Formation, locality 20. Alabama: Bashi Formation, Knights Branch in Clarke County, near Choctaw Corner and Thomasville, 4 miles south of Mount Sterling.

Balanophyllia (Balanophyllia) elongata Vaughan
Plate 76, figure 2

1900. *Balanophyllia elongata* Vaughan, U.S. Geol. Survey, Monograph 39, p. 164, 175-176, pl. 20, fig. 11-14.

Type locality: ?

Occurrence: Mississippi: Red Bluff Formation, localities 37, 38, 39, 40.

Discussion: This species is common in the Red Bluff Formation in Wayne County, Mississippi. It is particularly abundant in thin lenses of shell hash within the basal one foot of the formation at its type locality (locality 37).

Balanophyllia sp.
Plate 26, figure 7

Occurrence: Mississippi: Archusa Marl, locality 61.

Genus ENDOPACHYS Lonsdale, 1845

Endopachys lonsdalei Vaughan

Plate 27, figures 5, 6A, 6B

1900. *Endopachys lonsdalei* Vaughan, U.S. Geol. Survey, Monograph 39, p. 189-190, pl. 22, fig. 10, 10a.

Type locality: ?

Occurrence: Mississippi: Cook Mountain Formation, Newton, 4 1/2 miles east of Newton, Wautubbee Hills; Archusa Marl, localities 27, 61. Alabama: Claiborne Group, Monroe County and Coffeeville.

Endopachys maclurii (Lea)

Plate 27, figures 1A, 1B, 2A, 2B; Plate 56, figure 1

1833. *Turbinolia maclurii* Lea, Contr. Geol., p. 193, pl. 6, fig. 206.
1848. *Endopachys maclurii* (Lea). Bronn, Index Palaeontologicus, p. 1315.
1900. *Endopachys maclurii* (Lea). Vaughan, U.S. Geol. Survey, Monograph 39, p. 186-187, pl. 21, fig. 14-16; pl. 22, fig. 1, 6

Type locality: ?

Occurrence: Mississippi: Moodys Branch Formation, localities 1-9; Cook Mountain Formation, locality 65, 4 miles northeast of Quitman, 8 miles west of Enterprise, Wautubbee Hills, 12 miles northwest of Enterprise, 1 mile south of Hickory, 2 miles southeast of Hickory; Archusa Marl, locality 61. Also from the Jackson Group in Texas and Louisiana, and the Claiborne Group in Alabama.

Endopachys sp.

Plate 27, figures 3A, 3B, 4

Occurrence: Mississippi: Cook Mountain Formation, locality 65.

Genus DENDROPHYLLIA Blainville, 1830

Dendrophyllia lisbonensis Vaughan

Plate 26, figures 6, 9

1900. *Dendrophyllia lisbonensis* Vaughan, U.S. Geol. Survey, Monograph 39, p. 191-193, pl. 22, fig. 20-20c.

Type locality: Lisbon Formation, Lisbon, Alabama.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b; Cook Mountain Formation, locality 65. Alabama: Lisbon Formation, Lisbon

and T. A. Rumley's property in Monroe County. Louisiana: Claiborne Group, Rayburn's well in Sec. 29, T.17 N., R.5 W., Bienville Parish.

Phylum BRYOZOA
Subphylum ECTOPROCTA Nitsche, 1869
Class GYMNOLAEMATA Allman, 1856
Order CHEILOSTOMATA Busk, 1852
Suborder ANASCA Levinsen, 1909
Family LUNULITIDAE Lagaaij, 1952
Genus **LUNULITES** Lamarck, 1816

Lunulites jacksonensis (Canu and Bassler)
Plate 55, figures 3A, 3B, 4A, 4B

1920. *Lunularia jacksonensis* Canu and Bassler, U.S. National Museum, Bull. 106, p. 250-251, pl. 37, fig. 19-22.

Type locality: Moodys Branch Formation, Jackson, Mississippi.

Occurrence: Mississippi: Moodys Branch Formation, common at Jackson and locality 16.

Lunulites fenestrata de Gregorio, 1890
Plate 55, figures 2A, 2B

1890. *Dimiclausa fenestrata* de Gregorio, Ann. Geol. Paleont., v. 7, p. 249, pl. 42, fig. 23-27.
1920. *Lunularia fenestrata* (de Gregorio). Canu and Bassler, U.S. National Museum, Bull. 106, p. 244-245, pl. 37, fig. 10-13.

Type locality: Moodys Branch Formation, Jackson, Mississippi.

Occurrence: Mississippi: Moodys Branch Formation, common at Jackson and locality 16.

Suborder ASCOPHORA Levinson, 1909
Family ADEONIDAE Jullien, 1903
Genus **TRIGONOPORA** Maple, 1902

Trigonopora grande (Canu and Bassler)
Plate 80, figures 1, 3

1920. *Metrarabdotos grande* Canu and Bassler, U.S. National Museum, Bull. 106, p. 537, pl. 98, fig. 11-15.

Type locality: Marianna Limestone, 3 miles southeast of Vossburg, Jasper County.

Occurrence: Very common in the Marianna Limestone of Mississippi and at St. Stephens Quarry, St. Stephens, Alabama.

Discussion: This species is abundant in the Marianna Limestone of Mississippi and locally is an important constituent of the sediment. It is a major framework element in the soft Marianna carbonate mudstone. As illustrated by the oyster attached to a branch of *T. grande* (plate 53, figure 4) this species formed an important element of the environment for larvae needing a hard substrate for settling.

Trigonopora grande is similar to the European species *T. moniliferum* Milne-Edwards, 1836, which Canu and Bassler recorded as being very common in the Marianna Limestone one mile north of Monroeville, Alabama, near Claiborne, Alabama, and in the lower beds at Vicksburg, Mississippi. According to Canu and Bassler, the appearance of *T. moniliferum* in North America is valuable for synchronism with the European section and confirms the equivalence of the Vicksburg Group with the Tongrian.

Family CELLEPORIDAE Busk, 1852
Genus **HOLOPORELLA** Waters, 1909

Holoporella granulosa Canu and Bassler
Plate 28, figure 5

1920. *Holoporella granulosa* Canu and Bassler, U.S. National Museum Bull. 106, p. 607, pl. 16, fig. 1-9.

Type locality: ?

Occurrence: Mississippi: Archusa Marl, locality 62; Moodys Branch Formation, Jackson. For localities in the Claiborne Group of Texas and Alabama, see Canu and Bassler (1920).

Family ORBITULIPORIDAE Canu and Bassler, 1923
Genus **SCHIZORTHOSECOS** Canu and Bassler, 1917

Schizorthosecos interstitia (Lea)
Plate 55, figures 1A, 1B

1833. *Orbitolites interstitia* Lea, Contri. Geol., p. 191, pl. 6, fig. 204.
1917. *Schizorthosecos interstitia* (Lea). Canu and Bassler, U.S. National Museum, Bull. 96, p. 75, pl. 6, fig. 4-5.
1920. *Schizorthosecos interstitia* (Lea). Canu and Bassler, U.S. National Museum, Bull. 106, p. 626-627, pl. 18, fig. 1-9.

Type locality: Gosport Sand, Claiborne Bluff, Alabama.

Occurrence: Mississippi: Moodys Branch Formation, very common at Jackson, common at locality 16; Cook Mountain Formation, Wautubbee Hills four miles south of Enterprise (common). Alabama: Gosport Sand, very common at Claiborne Bluff on the Alabama River, common at Gopher Hill on the Tombigbee River, and one mile southwest of Rockville in Clarke County. Texas: Cook Mountain Formation, Moseleys Ferry in Caldwell County (very rare). Georgia: Lower Jacksonian, 3½ miles southeast of Shell Bluff post office (rare).

Phylum MOLLUSCA
Class AMPHINEURA von Ihering, 1876
Subclass POLYPLACORPHORA de Blainville, 1816
Order NEOLORICATA Bergenhayn, 1955
Suborder ISCHNOCHITONINA Bergenhayn, 1930
Family CHITONIDAE Rafinesque, 1815
Genus **CHITON** Linné, 1758

Chiton sp.
Plate 28, figures 6A, 6B

Occurrence: Mississippi: Cook Mountain Formation, locality 63.

Class GASTROPODA
Subclass STREPTONEURA Spengel, 1881
Order ARCHAEOGASTROPODA Thiele, 1925
Superfamily FISSURELLACEA Fleming, 1822
Family FISSURELLIDAE Fleming, 1822
Genus **PUNCTURELLA** Lowe, 1827
Subgenus **ALTRIX** Palmer, 1942

Puncturella (Altrix) altior (Meyer and Aldrich)
Plate 28, figures 1A, 1B, 1C

1886. *Fissurella altior* Meyer and Aldrich, Cincinnati Soc. Nat. Hist., Jour., v. 9, p. 41, pl. 2, fig. 16, 16a, 16b.
1937. *Puncturella (Fissurisepta) altior* (Meyer and Aldrich). Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 30, pl. 3, fig. 1, 3, 6, 8.
1960. *Puncturella (Altrix) altior* (Meyer and Aldrich). Moore, ed., Treatise Invert. Paleont., pt. I, Mollusca 1, p. 1229.
1966. *Puncturella (Altrix) altior* (Meyer and Aldrich). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 865.

Type locality: Cook Mountain Formation, Wautubbee, Mississippi.

Occurrence: Mississippi: Cook Mountain Formation, locality 65, Newton, Hickory, Wautubbee.

Genus **DIODORA** Gray, 1821

Diodora tenebrosa antica Palmer

Plate 28, figures 2, 3, 4

1937. *Diodora tenebrosa* (Conrad). Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 28 (in part), pl. 3, fig. 2, 9.
1947. *Diodora tenebrosa antica* Palmer, Bull. Amer. Paleont., v. 30, No. 117, pt. 2, p. 218, pl. 27, fig. 11-13.
1966. *Diodora tenebrosa antica* Palmer. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 632.

Type locality: Cook Mountain Formation, Hickory, Mississippi.

Occurrence: Mississippi: Cook Mountain Formation, localities, 64, 65, 66, Hickory, Wautubbee. Louisiana: Cook Mountain Formation, Hammett's Branch in T.18 N., R.6 W., Bienville Parish, about 2 miles northeast of Mt. Lebanon. South Carolina: McBean Formation, about 6 miles west-northwest of Orangeburg.

Superfamily TROCHACEA Rafinesque, 1815

Family TROCHIDAE Rafinesque, 1815

Genus **SOLARIELLA** S. Wood, 1842

Solariella sylvaerupis Harris

Plate 1, figures 4, 5A, 5B, 6, 7

1897. *Solariella sylvaerupis* Harris, Acad. Nat. Sci. Philadelphia, Proc., v. 48, p. 477, pl. 21, fig. 6, 6a.
1966. *Solariella sylvaerupis* Harris. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 914.

Type locality: Bashi Formation, Woods Bluff on the Tombigbee River, Alabama.

Occurrence: Mississippi: Bashi Formation, localities 19, 20. Alabama: Bashi Formation, Woods Bluff on the Tombigbee River, Hatchetigbee Bluff on the Tombigbee River, 4 miles above Hamilton Bluff on the Alabama River.

Solariella stalagmium modesta (Meyer and Aldrich)

Plate 30, figures 1A, 1B, 1C

1886. *Solarium elegans* I Lea var. *modestum* Meyer and Aldrich, Cincinnati Soc. Nat. Hist., Jour., v. 9, p. 41, 47, pl. 2, fig. 6, 6a.

1892. *Solariella stalagmium modesta* (Meyer and Aldrich). Dall, Wagner Free Inst. Sci., Trans., v. 3, pt. 2, pl. 2, p. 331, 407.
1966. *Solariella stalagmium modesta* (Meyer and Aldrich). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 914.

Type locality: Cook Mountain Formation (Probably Archusa Marl Member), Wautubbee, Mississippi.

Occurrence: Mississippi: Cook Mountain Formation, locality 69, Wautubbee.

Solariella tricostata (Conrad)

Plate 30, figures 2A, 2B, 2C, 3

1833. *Solarium granulatum* I. Lea, Contri. Geol., p. 122, pl. 4, fig. 111.
1835. *Solarium tricostatum* Conrad, Fossil shells Tertiary formations, v. 1, No. 3, p. 50, pl. 17, fig. 10 new name for *S. granulatum* I. Lea.
1893. *Solariella triscostata* (Conrad). Cossmann, Ann. Soc. Roy. Malacol. Belgique, App. No. 1, p. 21.
1966. *Solariella triscostata* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 914-915.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Cook Mountain Formation, locality 69, Wautubbee. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River. For additional localities in Texas and South Carolina, see Palmer and Brann (1966, p. 915).

Family TURBINIDAE Rafinesque, 1815

Genus **TIBURNUS** de Gregorio, 1890

Tiburnus eboreus (Conrad)

Plate 33, figures 3A, 3B, 3C

1833. *Natica eborea* Conrad, Fossil shells Tertiary formations, v. 1, No. 4, p. 46.
1937. *Tiburnus eborea* (Conrad). Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 56, pl. 5, fig. 21, 22, 25, 26, 29.
1966. *Tiburnus eboreus* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 952.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Cook Mountain Formation, locality 65. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River.

Order MESOGASTROPODA
Superfamily RISSOACEA Gray, 1847
Family VITRINELLIDAE Bush, 1897
Genus **TORNUS** Turton and Kingston, 1830

Tornus infraplicatus (Johnson)
Plate 57, figures 3A, 3B

1899. *Adeorbis infraplicatus* Johnson, Acad. Nat. Sci. Philadelphia, Proc., v. 51, p. 81, pl. 2, fig. 13, 14.
1947. *Tornus infraplicatus* (Johnson). Palmer, Bull. Amer. Paleont., v. 30, No. 117, pt. 2, p. 231, pl. 27, fig. 17, 18.
1966. *Tornus infraplicatus* (Johnson). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 955.
1977. *Tornus infraplicatus* (Johnson). Dockery, Miss. Geol. Survey, Bull. 120, p. 39, pl. 1, fig. 14, 15.

Type locality: Moodys Branch Formation, Jackson, Mississippi.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 16.

Genus **CIRCULUS** Jeffreys, 1865

Circulus ottonius Palmer
Plate 57, figures 1A, 1B

1887. *Solarium delphinuloides* Meyer, Senckenberg. Naturf. Gesell., p. 4, pl. 1, fig. 1, 3a.
1947. *Circulus ottonius* Palmer, Bull. Amer. Paleont., v. 30, No. 117, pt. 2, p. 231-232, pl. 27, fig. 3, 4.
1966. *Circulus ottonius* Palmer. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 577.
1977. *Circulus ottonius* Palmer. Dockery, Miss. Geol. Survey, Bull. 120, p. 39, pl. 1, fig. 12, 13.

Type locality: Moodys Branch Formation, Jackson, Mississippi.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 9.

Superfamily ARCHITECTONICACEA Gray, 1850
Family ARCHITECTONICIDAE Gray, 1850
Genus **ARCHITECTONICA** Röding, 1798

Architectonica scrobiculata (Conrad)
Plate 30, figures 4A, 4B

1833. *Solarium scrobiculatum* Conrad, Fossil shells Tertiary formations, v. 1, No. 4, p. 44.

1865. *Architectonica scrobiculata* (Conrad). Conrad, Amer. Jour. Conch., v. 1, No. 1, p. 30.
1966. *Architectonica scrobiculata* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 507.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Cook Mountain Formation, locality 69, Hickory. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River. For localities in Texas, see Palmer and Brann (1966, p. 507).

Architectonica scrobiculata hicoria Palmer, 1937

Plate 15, figure 4; Plate 30, figures 5A, 5B

1937. *Architectonia scrobiculata hicoria* Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 172, pl. 19, fig. 5-7.
1966. *Architectonica scrobiculata hicoria* Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 508.

Type locality: Cook Mountain Formation, Hickory, Mississippi.

Occurrence: Mississippi: Cook Mountain Formation, locality 66, Hickory, 2 miles northeast of Newton on route 15; Dobys Bluff Tongue, locality 26b. Louisiana: Cook Mountain Formation, Sabine River at Columbus.

Subgenus **ARCHITECTONICA** Röding, 1798

Architectonica (Architectonica) amoena (Conrad)

Plate 31, figures 1A, 1B

1833. *Solarium amoenum* Conrad, Fossil shells Tertiary formations, v. 1, No. 4, p. 44.
1865. *Architectonica amoena* (Conrad). Conrad, Amer. Jour. Conch., v. 1, No. 1, p. 29 as *amaena*.
1966. *Architectonica amoena* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 499.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Cook Mountain Formation, locality 68, Hickory, Wautubbee, 2 miles northeast of Newton on route 15. For localities in Texas and South Carolina, see Palmer and Brann (1966, p. 499).

Subgenus **GRANOSOLARIUM** Sacco, 1892

Architectonica (Granosolarium) ornata (I. Lea)

Plate 31, figures 2A, 2B

1833. *Solarium ornatum* I. Lea, Contri. Geol., p. 120, pl. 4, fig. 108.
1865. *Architectonica ornata* (I. Lea). Conrad, Amer. Jour. Conch., v. 1, No. 1, p. 30.
1944. *Architectonica (Gransolarium) ornata* (I. Lea). Palmer, Bull. Amer. Paleont., v. 28, No. 112, p. 8, 9.
1966. *Architectonica (Granosolarium) ornata* (I. Lea). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 505-506.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Cook Mountain Formation, locality 64. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River. For localities in Texas, see Palmer and Brann (1966, p. 506).

Architectonica (Granosolarium) meekana splendida Palmer

Plate 31, figures 4A, 4B

1937. *Architectonica acuta* Conrad. Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 168 in part, pl. 20, fig. 12, 14-17. Not *A. acuta* Conrad *in* Wailes, 1854.
1944. *Architectonica (Granosolarium) meekana splendida* Palmer, Bull. Amer. Paleont., v. 28, No. 112, p. 14.
1966. *Architectonica (Granosolarium) meekana splendida* Palmer. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 505.

Type locality: Cook Mountain Formation, Sabine River, Sabine County, Texas, opposite SW corner SE/4, Section 35, T.5 N., R.13 W., Sabine Parish, Louisiana.

Occurrence: Mississippi: Cook Mountain Formation, locality 68. Texas: Cook Mountain Formation, Sabine River opposite SW corner of the SE/4, Section 35, T. 5 N., R. 13 W., Sabine Parish, Louisiana. Louisiana: Cook Mountain Formation, Sabine River at Columbus, east bank of the Ouachita River at Lapiniere Landing.

Architectonica (Granosolarium) sp.

Plate 31, figures 3A, 3B

Occurrence: Mississsippi: Cook Mountain Formation, locality 65.

Subgenus **SOLARIAXIS** Dall, 1892

Architectonica (Solariaxis) elaborata (Conrad)

Plate 15, figures 6A, 6B

1833. *Solarium elaboratum* Conrad, Amer. Jour. Sci., 1st ser., v. 23, p. 344.

1865. *Architectonica elaborata* (Conrad). Conrad, Amer. Jour. Conch., v. 1, p. 29.
1947. *Architectonica (Solariaxis) elaborata* (Conrad). Palmer, Bull. Amer. Paleont., v. 30, pt. 2, p. 273.
1966. *Architectonica (Solariaxis) elaborata* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, pt. 2, p. 502.

Type locality: Gosport Sand, Claiborne Bluff on the Alabama River, Alabama.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b. Alabama: Gosport Sand, Claiborne Bluff; Lisbon Formation, base of Claiborne Bluff.

Superfamily CERITHIACEA Fleming, 1822
Family TURRITELLIDAE Clarke, 1851
Genus **TURRITELLA** Lamarck, 1799

Turritella rina Palmer
Plate 29, figures 2, 3, 5, 7

1937. *Turritella rina* Palmer, Bull. Amer. Paleont. v. 7, No. 32, p. 192, pl. 22, fig 3, 4, 9.
1966. *Turritella rina* Palmer. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 1003.

Type locality: Lisbon Formation, base of Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Cook Mountain Formation, Indian Mound 3 miles east of Newton, Hickory, 2 miles northeast of Newton on route 15; Archusa Marl, localities 61, 62. Alabama: Lisbon Formation, base of Claiborne Bluff and at Lisbon Bluff on the Alabama River. South Carolina: McBean Formation, about 6 miles west-northwest of Orangeburg. Louisiana: Cook Mountain Formation, St. Maurice, Lapiniere Landing on the east bank of the Ouachita River. Texas: Cook Mountain Formation, Sabine River opposite SW corner SE/4, Section 35, T.5 N., R.13 W., Sabine Parish, Louisiana.

Turritella rina Palmer, var.
Plate 2, figure 1

Occurrence: Mississippi: Bashi Formation, locality 19.

Turritella gilberti Bowles
Plate 2, figure 2

1894. *Turritella carinata* I. Lea. Aldrich *in* Smith, et al., Rept. Geol. Coastal Plain Alabama, p. 235.
1899. *Turritella clevelandia* Harris var. Harris, Bull. Amer. Paleont., v. 3, No. 11, pt. 2, p. 74, pl. 10, fig. 2.
1939. *Turritella gilberti* Bowles, Jour. Paleont., v. 13, p. 302, pl. 32, fig. 16.
1966. *Turritella gilberti* Bowles. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 989.
1977. *Turritella gilberti* Bowles. Toulmin, Alabama Geol. Survey, Monograph 13, v. 1, p. 231-232, pl. 29, fig. 7.

Type locality: Bashi Formation, Woods Bluff, left of lock and dam No. 1 near Woods Bluff, Tombigbee River, Alabama.

Occurrence: Mississippi: Bashi Formation, Sowashee Creek 2 miles south of Meridian, cut on M. and M. railroad 1 1/2 miles south of Meridian, and locality 19. Alabama: Bashi Formation (see Bowles, 1939, for localities).

Turritella dobyensis n. sp.

Plate 15, figure 1

Type locality: Dobys Bluff Tongue, locality 26b.

Discussion: *T. dobyensis* has a marked decrease in the apical angle at about the 8th whorl. This same characteristic is shared by *T. lisbonensis* Bowles, of the Claiborne Group, and *T. arenicola* Conrad of the Jackson Group. Bowles divided these two species into a bicostate and a unicostate *Turritella* group, respectively, according to the number of costae on the apical whorls.

Most specimens are laterally compresed so that it is difficult to measure the true apical angles for *Turritella dobyensis*. It has weaker and more numerous lirae than does *T. arenicola* but is similar in its apical whorls. It is similar to *T. lisbonensis* in the high width to height ratio of the latter whorls, but differs in the unicostate apical whorls and the weaker, more numerous lirae on the following whorls.

Description: Unicostate, having a prominent carina of the first five apical whorls with a secondary lira below it on the third whorl. The carina is located one third the whorl's height above the suture and decreases in prominence with successive whorls to the seventh whorl where it is of equal strength with other lirae. The secondary lira increases in strength to the seventh whorl where all lirae on the lower half of the whorl are of similar strength, and those on the upper half decrease in strength toward the top. On the fifth whorl there are three lirae above the carina and one between it and the secondary lirae. Four lirae are above the carina lira on the sixth whorl, five on the seventh with one

below the secondary lira, and seven lirae with some intervening weaker ones are above the carina lira on the ninth with one below the secondary lira. The upper two lirae are of greater strength than those immediately below, and these form a collar below the suture.

The whorls have a shallow sulcus below the subsutural collar with the lower two thirds being convex. After the seventh whorl, the whorls are less inflated and have a somewhat flatter profile. On large specimens the last whorl has twelve to fourteen prominent lirae with varying numbers of secondary lirae.

Turritella nasuta Gabb

Plate 29, figures 4, 6

1860. *Turritella nasuta* Gabb, Acad. Nat. Sci. Philadelphia, Jour., 2nd ser., v. 4, p. 385, pl. 67, fig. 42.
1939. *Turritella nasuta* Gabb. Bowles, Jour. Paleont., v. 13, p. 288, pl. 32, fig. 5, 6.
1966. *Turritella nasuta* Gabb. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 997-998.

Type locality: probably the Stone City Beds, Stone City Bluff, Brazos River, Texas.

Occurrence: Mississippi: Cook Mountain Formation, localities 62, 65. Alabama: ? Gosport Sand, Claiborne Bluff on the Alabama River. Texas: Stone City Beds, Stone City Bluff on the Brazos River. For other localities in Texas, see Bowles (1939, p. 288).

Turritella carinata I. Lea

Plate 29, figure 1

1833. *Turritella carinata* I. Lea, Contr. Geol., p. 129, pl. 4, fig. 120.
1966. *Turritella carinata* I. Lea. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 983.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Cook Mountain Formation, localities 65, 67, Wautubbee, 2 miles northeast of Newton on Highway 15, Hickory. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River.

Turritella sp.

Plate 15, figure 2

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b.

Turritella arenicola (Conrad)

Plate 56, figures 7, 9, 10

1860. *Turritella plebeia* Say. Owen, Second report of a geological reconnaissance of the middle and southern counties of Arkansas, pl. 9, fig. 6.
1865. *Mesalia ? arenicola* Conrad, Amer. Jour. Conch., v. 1, p. 141, pl. 10, fig. 11.
1939. *Turritella arenicola* (Conrad). Bowles, Jour. Paleont., v. 13, p. 275, pl. 31, fig. 5-7.
1966. *Turritella arenicola* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 981.
1977. *Turritella arenicola* (Conrad). Dockery, Miss. Geol. Survey, Bull. 120, p. 43-44, pl. 3, fig. 16-17.

Type locality: Moodys Branch Formation, locality 9.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 3, 9, 16, 18. Louisiana: Moodys Branch Formation, localities P6, P10; Yazoo Formation, locality P2; Danville Landing Member, locality P20.

Turritella perdita Conrad

Plate 56, figures 8, 11, 12

1865. *Turritella perdita* Conrad, Amer. Jour. Conch., v. 1, p. 141, pl. 10, fig. 10.
1966. *Turritella perdita* Conrad. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 1000.
1977. *Turritella perdita* Conrad. Dockery, Miss. Geol. Survey, Bull. 120, p. 45, pl. 3, fig. 8-9.

Type locality: Moodys Branch Formation, locality 9.

Occurrence: Mississippi: Moodys Branch Formation, localities 9, 16, 18. Louisiana: Moodys Branch Formation, localities P10, P11, P883, P1127.

Genus **MESALIA** Gray, 1842

Mesalia claibornensis Harris

Plate 15, figure 3; Plate 24, figure 7; Plate 29, figure 8

1895. *Mesalia claibornensis* Harris *in* Dana, Manual Geol., 4th ed., p. 897, fig. 1488.
1939. *Mesalia claibornensis* Harris. Bowles, Jour. Paleont., v. 13, p. 328, pl. 34, fig. 5.
1966. *Mesalia claibornensis* Harris. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 758-759.

Type locality: Stone City Beds, bluff on right bank of Brazos River at bridge on State Highway 21 and bridge of Southern Pacific Railroad, Burleson County, Texas.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b; Cook Mountain Formation, locality 69. For other localities in Texas, Mexico, Louisiana, Alabama, and South Carolina, see Bowles (1939).

Family VERMETIDAE Rafinesque, 1815
Genus **TENAGODUS** Guettard, 1770

Tenagodus vitis (Conrad, 1833)
Plate 29, figure 10

1833. *Siliquaria vitis* Conrad, Fossil shells Tertiary formations, v. 1, No. 3, p. 36.
1860. *Tenagodus vitis* (Conrad). Mörch, Zool. Soc. London, Proc., pt. 26, p. 415.
1966. *Tenagodus vitis* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 944-945.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Cook Mountain Formation, localities 65, 67, Hickory; Archusa Marl, locality 61. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River. For other localities in Louisiana, South Carolina, and North Carolina, see Palmer (1966, p. 945).

Family POTAMIDIDAE H. and A. Adams, 1854
Genus **POTAMIDES** Brongniart, 1810

Potamides sp. ?
Plate 36, figure 4

Occurrence: Mississippi: Cook Mountain Formation, locality 63.

Discussion: Of the *Potamides* species studied, this specimen most closely resembles *Potamides suprasulcatus* (Gabb, 1873), which occurs in the Tabara Formation (Oligocene) in the Dominican Republic and in the Chipola Formation (Miocene) in Florida.

Family CERITHIIDAE Fleming, 1822
Genus **BITTIUM** Leach *in* Gray, 1847

Bittium koeneni Meyer
Plate 57, figure 2

1886. *Bittium koeneni* Meyer, Geol. Survey Alabama, Bull. No. 1, pt. 2, p. 70, pl. 2, fig. 12.

1966. *Bittium koeneni* Meyer. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 528.
1977. *Bittium koeneni* Meyer. Dockery, Miss. Geol. Survey, Bull. 120, p. 48, pl. 3, fig. 4.

Type locality: Moodys Branch Formation, Jackson, Mississippi.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 9.

Family LITIOPIDAE H. and A. Adams, 1854
Genus **ALABA** H. and A. Adams, 1853

Alaba sp. ?
Plate 32, figure 10

Occurrence: Mississippi: Cook Mountain Formation, locality 65.

Family CERITHIOPSIDAE H. and A. Adams, 1854
Genus **CERITHIELLA** Verrill, 1882

Cerithiella nassula (Conrad)
Plate 29, figures 9, 12, 13

1834. *Cerithium nassula* Conrad, Acad. Nat. Sci. Philadelphia, Jour., v. 7, p. 156.
1937. *Cerithiella nassula* (Conrad). Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 224, pl. 29, fig. 3, 9; pl. 83, fig. 2.
1966. *Cerithiella nassula* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 569.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Cook Mountain Formation, localities 64, 65, 68, Hickory, 2 miles northeast of Newton on route 15, Wautubbee. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River.

Family TRIPHORIDAE Gray, 1847
Genus **TRIPHORA** Blainville, 1828

Triphora major (Meyer)
Plate 29, figure 11

1886. *Triforis major* Meyer, Geol. Survey Alabama, Bull. No. 1, pt. 2, p. 72, pl. 1, figure 6.
1937. *Triphora major* (Meyer). Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 229, pl. 30, fig. 1, 4, 8, 9.

1966. *Triphora major* (Meyer). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 961.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Cook Mountain Formation, locality 65, Hickory; Archusa Marl, locality 61. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River.

Superfamily EPITONIACEA S. S. Berry, 1910

Family EPITONIIDAE S. S. Berry, 1910

Genus **CIRSOTREMA** Mörch, 1852

Subgenus **CORONISCALA** de Boury, 1909

Cirsotrema (Coroniscala) newtonensis (Meyer and Aldrich)

Plate 32, figure 7

1886. *Scalaria Newtonensis* Meyer and Aldrich, Cincinnati Soc. Nat. Hist., Jour., vol. 9, p. 41, pl. 2, fig. 8.

1937. *Cirsotrema (Coroniscala) newtonensis* (Meyer and Aldrich). Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 101, pl. 10, fig. 10, 11.

1966. *Cirsotrema (Coroniscala) newtonensis* (Meyer and Aldrich). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 580.

Type locality: Cook Mountain Formation, Newton, Mississippi.

Occurrence: Mississippi: Cook Mountain Formation, locality 64, Newton, Wautubbee.

Cirsotrema (Coroniscala) linteum (Conrad)

Plate 32, figure 8

1860. *Scala lintea* Conrad, Acad. Nat. Sci. Philadelphia, Jour., 2nd ser., v. 4, p. 294.

1937. *Cirsotrema (Coroniscala) lintea* (Conrad). Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 101, pl. 10, fig. 15, 19; pl. 79, fig. 4.

1966. *Cirsotrema (Coroniscala) linteum* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 578-579.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Cook Mountain Formation, locality 65. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River.

Cirsotrema (Coroniscala) nassulum (Conrad)

Plate 32, figure 9

1833. *Scalaria nassula* Conrad, Fossil shells Tertiary formations, v. 1, No. 3, p. 31.
1937. *Cirsotrema (Coroniscala) nassula* (Conrad). Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 97, pl. 10, fig. 12-14, 18, 21, 22; pl. 80, fig. 5.
1966. *Cirsotrema (Coroniscala) nassulum* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 579.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Cook Mountain Formation, locality 63; Moodys Branch Formation, localities 1, 9. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River.

Cirsotrema (Coroniscala) nassulum creolum Palmer

Plate 58, figure 5; Plate 75, figure 2

1947. *Cirsotrema (Coroniscala) nassulum creolum* Palmer, Bull. Amer. Paleont., v. 30, No. 117, pt. 2, p. 242-243, pl. 23, fig. 17.
1966. *Cirsotrema (Coroniscala) nassulum creolum* Palmer. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 579-580.

Type locality: Moodys Branch Formation, Louisiana, locality P10.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 7, 17; Pachuta Marl, locality 33. Louisiana: Moodys Branch Formation, locality P10.

Cirsotrema (Coroniscala) danvillense Palmer

Plate 74, figure 2

1947. *Cirsotrema (Coroniscala) danvillense* Palmer, Bull. Amer. Paleont., v. 30, No. 117, pt. 2, p. 240, pl. 28, fig. 8, 16.
1966. *Cirsotrema (Coroniscala) danvillense* Palmer. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 578.
1977. *Cirsotrema (Coroniscala) danvillense* Palmer. Toulmin, Geol. Survey Alabama, Monograph 13, p. 329, pl. 61, fig. 1.

Type locality: Danville Landing Member, Yazoo Formation, Danville Landing, Ouachita River, Louisiana.

Occurrence: Mississippi: Cocoa Sand, locality 31. Louisiana: Danville Landing Member, Danville Landing on the Ouachita River; Moodys Branch Formation, Montgomery Landing on the Red River. Common at some Cocoa Sand localities in Alabama.

Cirsotrema sp.

Plate 32, figure 6

Occurrence: Mississippi: Archusa Marl, locality 61.

Genus **SCALINA** Conrad, 1865

Scalina sp.

Plate 23, figure 3

Occurrence: Cook Mountain Formation, locality 25.

Superfamily MELANELLACEA Bartsch, 1917

Family MELANELLIDAE Bartsch, 1917

Genus **MELANELLA** Bowdich, 1822

Melanella jacksonensis (de Gregorio)

Plate 60, figure 8

1890. *Eulima aciculata jacksonensis* de Gregorio, Ann. Geol. Paléont., v. 7, p. 161, pl. 16, fig. 4.
1947. *Melanella jacksonensis* (de Gregorio). Palmer, Bull. Amer. Paleont., v. 30, No. 117, pt. 2, p. 224-225, pl. 26, fig. 16.
1966. *Eulima jacksonensis* de Gregorio. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 667.
1977. *Melanella jacksonensis* (de Gregorio). Dockery, Miss. Geol. Survey, Bull. 120, p. 52, pl. 4, fig. 5.

Type locality: Moodys Branch Formation, Jackson, Mississippi.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 4, 16.

Melanella sp.

Plate 32, figures 1, 2, 3, 4

Occurrence: Mississippi: Cook Mountain Formation, localities 63, 64.

Genus **NISO** Risso, 1826

Niso umbilicata (I. Lea)?

Plate 32, figure 5

1833. *Pasithea umbilicata* I. Lea, Contri. Geol., p. 103, pl. 4, fig. 85.
1850. *Niso umbilicata* (I. Lea). d'Orbigny, Prodrome de Paleontologie Stratigraphique, v. 3, p. 343.
1937. *Niso umbilicata* (I. Lea). Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 66, pl. 6, fig. 22-25.

1966. *Niso umbilicata* (I. Lea). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, pp. 798-799.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Cook Mountain Formation, locality 65; Moodys Branch Formation, locality 1. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River. Variations of this species occur in the Wilcox and Claiborne Group of Alabama and in the Danville Landing Member of the Yazoo Formation (Jackson Group) of Louisiana.

Superfamily STROMBACEA Rafinesque, 1815

Family STROMBIDAE Rafinesque, 1815

Genus **CALYPTRAPHORUS** Conrad, 1857

Calyptraphorus sp.

Plate 11, figure 3

Occurrence: Winona Formation, locality 22.

Calyptraphorus velatus nodovelatus Palmer

Plate 15, figures 10A, 10B, 11; Plate 32, figures 11A, 11B

1937. *Calyptraphorus velatus nodovelatus* Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 243, pl. 32, fig. 1.

1966. *Calyptraphorus velatus nodovelatus* Palmer. Palmer and Brann, v. 48, No. 218, pt. 2, p. 552.

Type locality: Cook Mountain Formation, Hammett's Branch, SW/4, Section 30, T. 18 N., R.6 W., about 2 miles northeast of Mt. Lebanon, Bienville Parish, Louisiana.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b; Cook Mountain Formation, locality 69. Louisiana: Cook Mountain Formation, Hammett's Branch about 2 miles northeast of Mt. Lebanon.

Calyptraphorus stamineus (Conrad)

Plate 58, figures 2, 3A, 3B

1856. *Rostellaria staminea* Conrad, Acad. Nat. Sci. Philadephia, Proc., v. 7, p. 260.

1865. *Calyptraphorus stamineus* (Conrad). Conrad, Amer. Jour. Conch., v. 1, p. 31.

1966. *Calyptraphorus stamineus* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 550.

1977. *Calyptraphorus stamineus* (Conrad). Dockery, Miss. Geol. Survey, Bull. 120, p. 54, pl. 4, fig. 6, 10A, 10B.

Type locality: Moodys Branch Formation, Jackson, Mississippi.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 3, 7, 9, 11, 12, 16. Louisiana: Moodys Branch Formation, localities P1, P7, P8, P10, P15, P16, P883, P912, P1054, P1119; Danville Landing Member, localities P6, P886. Arkansas: White Bluff Formation, localities P894, P897, P1046.

Superfamily HIPPONICACEA Troschel, 1861
Family HIPPONICIDAE Troschel, 1861
Genus **HIPPONIX** Defrance, 1819

Hipponix pygmaeus I. Lea
Plate 57, figures 8A, 8B

1833. *Hipponix pygmaea* I. Lea, Cont. Geol., p. 95, pl. 3, fig. 75.
1966. *Hipponix*, n. sp. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 710.
1977. *Hipponix pygmaea* I. Lea. Dockery, Miss. Geol. Survey, Bull. 120, p. 55, pl. 5, fig. 3, 4.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 3, 9, 16. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River and Little Stave Creek. Louisiana: Moodys Branch Formation, locality P883.

Superfamily CREPIDULACEA Fleming, 1822
Family CREPIDULIDAE Fleming, 1822
Genus **CALYPTRAEA** Lamarck, 1799
Subgenus **TROCHITA** Schumacher, 1817

Calyptraea (Trochita) aperta (Solander *in* Brander)
Plate 57, figure 5

1766. *Trochus apertus* Solander *in* Brander, Fossilia Hantoniensia, p. 9, pl. 1, fig. 1, 2.
1899. *Calyptraea aperta* (Solander). Harris, Bull. Amer. Paleont., v. 3, No. 11, pt. 2, p. 84, pl. 11, fig. 13-16.
1966. *Calyptraea aperta* (Solander *in* Brander). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 547.
1977. *Calyptraea (Trochita) aperta* (Solander *in* Brander). Dockery, Miss. Geol. Survey, Bull. 120, p. 56-57, pl. 5, fig. 10.

Type locality: Upper Eocene, England.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 3, 9; Cook Mountain Formation, localities P726, P728, P729, P731, P803. Louisiana: Moodys Branch Formation, localities P11, P15, P883, P912; Yazoo Formation, localities P2, P913; Danville Landing Member, locality P6; Cook Mountain Formation, locality P730. Texas: Moodys Branch Formation, locality P1121; Stone City Formation, localities P725, P733. Alabama: Gosport Sand, locality P104; Lisbon Formation, localities P103, P734. South Carolina: Localities P707, P708. Europe: Eocene-Miocene.

Genus **CREPIDULA** Lamarck, 1799

Crepidula lirata Conrad

Plate 15, figures 5, 7

1833. *Crepidula lirata* Conrad, Amer. Jour. Sci, 1st Ser., v. 23, p. 344.
1966. *Crepidula lirata* Conrad. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 614.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b; Cook Mountain Formation, localities 65, P731, P803. Alabama: Gosport Sand; Claiborne Bluff on the Alabama River and Little Stave Creek; Lisbon Formation, Lisbon Bluff on the Alabama River, Lisbon Landing on west bank of Alabama River about 6 1/2 miles above bridge at Claiborne. Louisiana: Cook Mountain Formation, Hammett's Branch in SW/4, Section 30, T.18 N., R.6 W., Bienville Parish. South Carolina: McBean Formation, about 3 and 6 miles west-northwest of Orangeburg.

Crepidula dumosa Conrad

Plate 24, figures 4, 5; Plate 34, figures 5A, 5B

1834. *Crepidula dumosa* Conrad, Acad. Nat. Sci. Philadelphia, Jour., v. 7, p. 148.
1966. *Crepidula dumosa* Conrad. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 614.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Cook Mountain Formation, localities 25, 68, Wautubbee. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River. South Carolina: McBean Formation, about 3 miles west-northwest of Orangeburg.

Superfamily CYRAEACEA Rafinesque, 1815

Family OVULIDAE Fleming, 1822

Genus SULCOCYPRAEA Conrad, 1865

Sulcocypraea kennedyi (Harris)

Plate 15, figures 8, 9A, 9B

1895. *Cypraea kennedyi* Harris, Acad. Nat. Sci. Philadelphia, Proc., v. 47, p. 78, pl. 8, fig. 12a.
1932. *Sulcocypraea kennedyi* (Harris). Schilder, Fossilium Catalogus. I: Animalia. Pars. 55; Cypraeacea, p. 223.
1966. *Sulcocypraea kennedyi* (Harris). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 927-928.

Type locality: Cook Mountain Formation, Dr. Collard's farm, Town Branch, Sparks Headright, Brazos County, Texas.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b. Texas: Cook Mountain Formation, Town Branch in Sparks Headright. Cf. South Carolina: McBean Formation, about 6 miles west-northwest of Orangeburg.

Sulcocypraea vaughani (Johnson)

Plate 34, figures 6A, 6B

1899. *Cypraea vaughani* Johnson, Acad. Nat. Sci. Philadelphia, Proc., v. 51, p. 78, pl. 2, fig. 7.
1927. *Sulcocypraea vaughani* (Johnson). Schilder, Archiv Naturg., 91 Abt. A, Heft 10, p. 81.
1966. *Sulcocypraea vaughani* (Johnson). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, p. 928.

Type locality: Cook Mountain Formation, Hammett's Branch, SW/4, Section 30, T.18 N., R.6 W., Bienville Parish, about 2 miles northeast of Bienville, Louisiana.

Occurrence: Mississippi: Cook Mountain Formation, localities 65, 68, Wautubbee. Louisiana: Cook Mountain Formation, Hammett's Branch about 2 miles northeast of Bienville. South Carolina: McBean Formation, Orangeburg district.

Sulcocypraea healeyi (Aldrich)

Plate 77, figure 1

1923. *Cypraea healeyi* Aldrich, Biol. Soc. Washington, Proc., v. 36, p. 199.
1966. *Cypraea healeyi* Aldrich. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 623.
1977. *Notoluponia healeyi* (Aldrich). Dockery, Miss. Geol. Survey, Bull. 120, p. 60, pl. 6, fig. 1A, 1B.

Type locality: Red Bluff Formation, locality 37.

Occurrence: Mississippi: Red Bluff Formation, localities 37, 38, 40; Moodys Branch Formation, localities 1, 2. Louisiana: Moodys Branch Formation, localities P1, P10, P883.

Superfamily NATICACEA Gray, 1840
Family NATICIDAE Gray, 1840
Genus **NATICA** Scopoli, 1777

Natica permunda Conrad *in* Wailes
Plate 57, figure 4, 6

1854. *Natica permunda* Conrad *in* Wailes, Rept. Agr. Geol. Mississippi, p. 289, pl. 16, fig. 2.
1966. *Natica permunda* Conrad. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 791.
1977. *Natica permunda* Conrad. Dockery, Miss. Geol. Survey, Bull. 120, p. 62, pl. 7, fig. 1, 3.

Type locality: Moodys Branch Formation, locality 3.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 3, 9; Yazoo Formation, locality 15. Louisiana: Moodys Branch Formation, localities P1, P7, P8, P9, P10, P11, P15, P16, P883, P1054, P1119; Yazoo Formation, locality P2; Danville Landing Member, localities P6, P14, P886. Texas: Moodys Branch Formation, locality P922.

Subgenus **NATICARIUS** Dumeril, 1805

"Natica" "(Naticarius)" semilunata I. Lea
Plate 16, figures 2, 4

1833. *Natica semilunata* I. Lea, Cont. Geol., p. 108, pl. 4, fig. 93.
1937. *"Natica" "(Naticarius)" semilunata* I. Lea. Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 114, pl. 11, fig. 11-13, pl. 80, fig. 1.
1966. *"Natica" "(Naticarius)" semilunata* I. Lea. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 792-793.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River.

Genus **POLINICES** Montfort, 1810

Polinices weisbordi Palmer
Plate 57, figure 9

1937. *Polinices weisbordi* Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 122, pl. 12, fig. 7, 10.
1966. *Polinices weisbordi* Palmer. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 847-848.
1977. *Polinices weisbordi* Palmer. Dockery, Miss. Geol. Survey, Bull. 120, p. 62-63, pl. 7, fig. 2A, 2B.

Type locality: Moodys Branch Formation, Montgomery Landing, Red River, Louisiana.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 16; Yazoo Formation, localities 5, 15. Louisiana: Moodys Branch Formation, localities P1, P8, P10, P11, P12, P15, P23, P883, P1054, P1118; Yazoo Formation, localities P2, P913; Danville Landing Member, localities P6, P14, P886. Arkansas: White Bluff Formation, locality P897.

Genus **NEVERITA** Risso, 1826

Neverita sp.

Plate 16, figures 3A, 3B; Plate 33, figures 2A, 2B

1937. *Neverita limula* (Conrad). Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 125 in part. Not *N. limula* Conrad, 1833.
1966. *Neverita* sp. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 798.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b; Cook Mountain Formation, locality 67, Hickory; Archusa Marl, locality 61. For other localities in Texas, Louisiana, Alabama, and South Carolina, see Palmer and Brann (1966, p. 798).

Genus **EUSPIRA** Agassiz, 1839

Euspira sabina (Palmer)

Plate 1, figure 10

1937. "*Natica*" *semilunata sabina* Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 118, pl. 11, fig. 8, 9.
1947. *Euspira sabina* (Palmer). Palmer, Bull. Amer. Paleont., v. 30, No. 117, pt. 2, p. 252.
1966. *Euspira sabina* (Palmer). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 672.
1977. *Euspira sabina* (Palmer). Toulmin, Geol. Survey Alabama, Monograph 13, p. 213, pl. 25, fig. 17.

Type locality: Bashi Formation, 4 miles above Hamilton Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Bashi Formation, locality 20. Alabama: Bashi Formation, 4 miles above Hamilton Bluff on the Alabama River,

Woods Bluff on the Tombigbee River, Hatchetigbee Bluff on the Tombigbee River, 3 miles southwest of Thomasville.

Euspira newtonensis (Meyer and Aldrich)

Plate 33, figure 1

1886. *Natica newtonensis* Meyer and Aldrich, Cincinnati Soc. Nat. Hist., Jour., v. 9, p. 42, pl. 2, fig. 12.
1937. *Euspira newtonensis* (Meyer and Aldrich). Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 129, pl. 12, fig. 1, 3, 6, 11.
1966. *Euspira newtonensis* (Meyer and Aldrich). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 671.

Type locality: Cook Mountain Formation, Newton, Mississippi.

Occurrence: Mississippi: Cook Mountain Formation, locality 68, Newton, Hickory, Wautubbee, about 8 miles west of Enterprise.

Euspira jacksonensis Palmer

Plate 57, figure 7

1947. *Euspira jacksonensis* Palmer, Bull. Amer. Paleont., v. 30, No. 117, pt. 2, p. 251-252, pl. 29, fig. 16-19.
1966. *Euspira jacksonensis* Palmer. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, p. 669.
1977. *Euspira jacksonensis* Palmer. Dockery, Miss. Geol. Survey, Bull. 120, p. 63, pl. 7, fig. 5A, 5B.

Type locality: Moodys Branch Formation, locality 1.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 3, 9. Louisiana: Moodys Branch Formation, localities P1, P8, P9, P10, P11, P12, P15, P883, P1054. Texas: Moodys Branch Formation, localities P922, P1121.

Genus **SINUM** Röding, 1798

Sinum declive (Conrad)

Plate 1, figures 9A, 9B

1833. *Sigaretus declivis* Conrad, Amer. Jour. Sci., v. 1, No. 4, p. 45.
1937. *Sinum declive* (Conrad). Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 140, pl. 15, fig. 5, 6, 11, 15, 16, pl. 80, fig. 10.
1966. *Sinum declive* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 907.
1977. *Sinum declive* (Conrad). Toulmin, Geol. Survey Alabama, Monograph 13, p. 298-299, pl. 49, fig. 12.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Bashi Formation, locality 20. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River. Cf. Texas: Weches Formation, south bank of Colorado River about 200 yards west of bridge at Smithville. Cf. South Carolina: McBean Formation, about 6 miles west-northwest of Orangeburg.

Sinum bilix (Conrad)

Plate 16, figures 1A, 1B; Plate 24, figure 6; Plate 33, figures 5A, 5B, 6A, 6B

1833. *Sigaretus bilix* Conrad, Amer. Jour. Sci., 1st ser., v. 23, p. 344.
1937. *Sinum bilix* (Conrad). Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 139, pl. 15, fig. 17-20, pl. 80, fig. 7.
1966. *Sinum bilix* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 906-907.
1977. *Sinum bilix* (Conrad). Toulmin, Geol. Survey Alabama, Monograph 13, p. 298, pl. 49, fig. 13.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b; Cook Mountain Formation, localities 25, 64, 67, 69. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River and Little Stave Creek; Cf. Lisbon Formation, Lisbon Landing on west bank of Alabama River about 6 1/2 miles above bridge at Claiborne. South Carolina: McBean Formation, Orangeburg. Texas: Cook Mountain Formation, Stone City Bluff on the Brazos River.

Sinum inconstans (Meyer and Aldrich)

Plate 33, figures 4A, 4B, 7A, 7B

1886. *Sigaretus inconstans* Meyer and Aldrich, Cincinnati Soc. Nat. Hist., Jour., v. 9, p. 42, pl. 2, fig. 18, 18a.
1937. *Sinum inconstans* (Meyer and Aldrich). Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 141, pl. 15, fig. 1, 7, 8, 12.
1966. *Sinum inconstans* (Meyer and Aldrich). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 908.

Type locality: Cook Mountain Formation, Newton, Mississippi.

Occurrence: Mississippi: Cook Mountain Formation, localities 64, 69, Newton, Hickory. Cf. Texas: Stone City Beds, Stone City Bluff on the Brazos River. Cf. South Carolina: McBean Formation, Orangeburg district.

Genus **SIGATICA** Meyer and Aldrich, 1886

Sigatica clarkeana Aldrich

Plate 1, figures 8A, 8B

1887. *Sigaretus (Sigaticus [sic]) clarkeanus* Aldrich, Cincinnati Soc. Nat. Hist., Jour., v. 10, No. 2, p. 83.
1937. *Sigatica clarkeana* Aldrich. Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 142.
1966. *Sigatica clarkeana* Aldrich. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 904.
1977. *Sigatica clarkeana* Aldrich. Toulmin, Geol. Survey Alabama, Monograph 13, p. 227, pl. 28, fig. 11.

Type locality: Bashi Formation, Choctaw Corner, Alabama.

Occurrence: Mississippi: Bashi Formation, locality 20. Alabama: Bashi Formation, Choctaw Corner, Woods Bluff on the Tombigbee River, 4 miles above Hamilton Bluff on the Alabama River, Hatchetigbee Bluff on the Tombigbee River.

Superfamily TONNACEA Peile, 1926

Family CASSIDAE Swainson, 1832

Genus **GALEODEA** Link, 1807

Subgenus **MAMBRINIA** Gardner 1939

Galeodea (Mambrinia) brevidentata (Aldrich)

Plate 76, figures 5, 8

1885. *Cassidaria brevidentata* Aldrich, Cincinnati Soc. Nat. Hist., Jour., v. 8, No. 2, p. 152, pl. 3, fig. 20.
1939. *Galeodea (Mambrinia) brevidentata* (Aldrich). Gardner, U.S. Geol. Survey Prof. Paper 193-B, p. 21, 24.

Type locality: Red Bluff Formation, locality 37.

Occurrence: Mississippi: Red Bluff Formation, localities 37, 38, 39, 40. Alabama: Red Bluff Formation (the dark gray clay member between the Red Bluff limestone below and the Marianna Limestone above), Pelham Quarry at St. Stephens.

Genus **PHALIUM** Link, 1807

Phalium brevicostatum (Conrad)

Plate 16, figure 9; Plate 34, figures 2, 3

1834. *Cassis brevicostatum* Conrad, Acad. Nat. Sci. Philadelphia, Jour., v. 7, p. 146.
1937. *Phalium brevicostatum* (Conrad). Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 248, pl. 31, fig. 4, 9, 10.

1966. *Phalim brevicostatum* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 2, p. 823.

Type locality: Claiborne Group, Claiborne Bluff, Alabama River, Alabama (specific horizon is not known).

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b; Cook Mountain Formation, localities 63, 65, 67, 68, 2 miles northeast of Newton, about 8 miles west of Enterprise, Wautubbee. Alabama: Claiborne Group, Claiborne Bluff on the Alabama River. Louisiana: Cook Mountain Formation, Sabine River at Columbus, Lapiniere Landing on the east bank of the Ouachita River. Texas: Weches Formation, Smithville.

Family CYMATIIDAE Iredale, 1913

Genus **DISTORSIO** Röding, 1798

Subgenus **PERSONELLA** Conrad, 1865

Distorsio (Personella) septemdentata Gabb

Plate 19, figure 6; Plate 34, figures 1, 4

1860. *Distorsio septemdentata* Gabb, Acad. Nat. Sci. Philadelphia, Jour., 2nd ser., v. 4, pt. 4, p. 380, pl. 67, fig. 21.
1865. *Distorsio (Personella) septemdentata* Gabb. Conrad, Amer. Jour. Conch., v. 1, p. 21.
1966. *Distorsio (Personella) septemdentata* Gabb. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 635-636.
1977. *Distorsio (Personella) septemdentata* Gabb. Toulmin, Geol. Survey Alabama, Monograph 13, p. 284, pl. 48, fig. 2.

Type locality: Either the Stone City beds at Stone City Bluff, Brazos River, Texas or the Wheelock Member of the Cook Mountain Formation at Wheelock, Texas.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b; Cook Mountain Formation, localities 64, 67, Hickory, 2 miles northeast of Newton on route 15, Wautubbee; Archusa Marl, locality 62. For other localities in Texas and Louisiana, see Palmer and Brann (1966, p. 636).

Genus **SASSIA** Bellardi, 1872

Sassia conradiana (Aldrich)

Plate 76, figures 9, 10

1885. *Triton (Simpulum) Conradianus* Aldrich, Cincinnati Soc. Nat. Hist., Jour., v. 8, No. 2, p. 148, pl. 2, fig. 8.
1926. *Triton conradianus* Aldrich. Cooke, Alabama Geol. Survey, Spec. Rept. 14, p. 276.

Type locality: Red Bluff Formation, locality 37.

Occurrence: Mississippi: Red Bluff Formation, localities 37, 38, 39, 40, 46.

Family FICIDAE Conrad, 1867

Genus **FICOPSIS** Conrad, 1866

Ficopsis texana (Harris)

Plate 35, figures 6, 9

1895. *Pyrula (Fusoficula) texana* Harris, Acad. Nat. Sci. Philadelphia, Proc., v. 47, p. 77, pl. 8, fig. 11.
1927. *Ficopsis texanus* (Harris). Stewart, Acad. Nat. Sci. Philadelphia, Proc., v. 78, p. 375.
1966. *Ficopsis texana* (Harris). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 679-680.

Type locality: Stone City Beds, Stone City Bluff, Brazos River, Texas.

Occurrence: Mississippi: Cook Mountain Formation, localities 63, 67, Hickory, about 2 1/2 miles east of Newton, Wautubbee, about 8 miles west of Enterprise. Texas: Stone City Beds, Stone City Bluff on the Brazos River. For other localities in Texas, Louisiana, and South Carolina, see Palmer (1966, p. 679-680).

Ficopsis penita (Conrad)

Plate 36, figure 1

1833. *Pyrula penita* Conrad, Fossil shells Tertiary formations, v. 1, No. 4, p. 32.
1866. *Ficopsis penitus* (Conrad). Conrad, Smithsonian Misc. Coll., v. 7, No. 200, p. 15.
1966. *Fiscopsis penita* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 678-679.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Cook Mountain Formation, localities 67, 68, Hickory, 2 miles northeast of Newton on highway 15, Wautubbee, Wautubbee cut 6 miles south of Enterprise. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River; Lisbon Formation, Lisbon Bluff on the Alabama River. For localities in Louisiana, see Palmer (1966, p. 679).

Order NEOGASTROPODA Wenz, 1938

Suborder STENOGLOSSA Troschel, 1848

Superfamily MURICACEA de Costa, 1776
Family MURICIDAE de Costa, 1776
Genus **HEXAPLEX** Perry, 1810
Subgenus **HEXAPLEX** Perry, 1810

Hexaplex (Hexaplex) vanuxemi Conrad *in* Morton
Plate 35, figures 2, 3

1834. *Murex vanuxemi* Conrad *in* Morton. Synop. organic remains Cretaceous Group, Appendix 5 (list only).
1966. *Murex vanuxemi* Conrad. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 784.
1968. *Hexaplex (Hexaplex) vanuxemi* (Conrad). Vokes, Tulane Studies in Geol., v. 6, No. 3, p. 94-96, pl. 1, fig. 3a, 3b.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Cook Mountain Formation, localities 63, 64, 65, 66, 68, 69. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River. Also in the Cook Mountain Formation in Texas and Louisiana.

Hexaplex (Hexaplex) engonatus (Conrad)
Plate 35, figure 4

1833. *Murex engonatus* Conrad, Fossil shells Tertiary formations, v. 1, No. 3, p. 30.
1966. *Murex engonatus* Conrad. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 781.
1968. *Hexaplex (Hexaplex) engonatus* (Conrad). Vokes, Tulane Studies in Geol., v. 6, No. 3, p. 97-98, pl. 2, fig. 1a, 1b.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Cook Mountain Formation, localities 63, 65, 68. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River. Also in the Cook Mountain Formation in Louisiana.

Hexaplex (Hexaplex) marksi (Harris)
Plate 58, figure 8

1894. *Murex marksi* Harris, Ann. Rept. Geol. Survey Arkansas for 1892, v. 2, p. 167, pl. 6, fig. 10.
1966. *Murex (Phyllonotus) engonatus marksi* Harris. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 781.
1968. *Hexaplex (Hexaplex) marksi* (Harris). E. H. Vokes, Tulane Studies in Geol., v. 6, No. 3, p. 98, 100, pl. 2, fig. 3a, 3b.

Type locality: White Bluff Formation, one mile northeast of Pansy, Cleveland County, Arkansas.

Occurrence: Mississippi: Moodys Branch Formation, localities, 1, 2, 3, 9, 11, 16. Louisiana: Moodys Branch Formation, localities P1, P8, P10, P15, P118, P883. Arkansas: White Bluff Formation, one mile northeast of Pansy, Cleveland County.

Genus **MUROTRITON** de Gregorio, 1890

Murotriton mcglameriae Palmer

Plate 35, figures 7, 8

1937. *Murotriton mcglameriae* Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 271, pl. 36, fig. 4, 8.
1966. *Murotriton mcglameriae* Palmer. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 785-786.

Type locality: Cook Mountain Formation, Hickory, Mississippi.

Occurrence: Mississippi: Cook Mountain Formation, localities 65, 68, Hickory. South Carolina: McBean Formation, about 3 miles west-northwest of Orangeburg, about 6 miles west-northwest of Orangeburg.

Genus **TYPHIS** Montfort, 1810

Subgenus **TYPHINA** Jousseaume, 1880

Typhis (Typhina) palmerae Gertman

Plate 35, figure 1

1969. *Typhis (Typhina) palmerae* Gertman, Tulane Studies in Geol. Paleont., v. 7, No. 4, p. 148-149, pl. 1, fig. 1a, 1b.

Type locality: Weches Formation, one-half mile northeast of Wheeler Springs School, Houston County, Texas.

Occurrence: Mississippi: Cook Mountain Formation, localities 63, 64, 65, 68, 69. Texas: Weches Formation, one-half mile northeast of Wheeler Springs School in Houston County.

Subgenus **RUGOTYPHIS** Vella, 1961

Typhis (Rugotyphis) dentatus Johnson

Plate 58, figure 7

1899. *Typhis dentatus* Johnson, Acad. Nat. Sci. Philadelphia, Proc., v. 51, p. 76, pl. 1, fig. 13.
1966. *Typhis (Typhina) dentatus* Johnson. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 1009.

1969. *Typhis (Rugotyphis) dentatus* Johnson. Gertman, Tulane Studies in Geol. and Paleont., v. 7, No. 4, p. 150, pl. 2, fig. 1a, 1b.

Type locality: Moodys Branch Formation, Jackson, Mississippi.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 16.

Family CORALLIOPHILIDAE Chenu, 1859

Genus **CORALLIOPHILA** H. and A. Adams

Subgenus **TIMOTHIA** Palmer, 1938

Coralliophila (Timothia) aldrichi (Cossmann)

Plate 36, figures 5, 6

1886. *Murex cancellaroides* Meyer and Aldrich, Cincinnati Soc. Nat. Hist., Jour., v. 9, p. 44, pl. 2, fig. 15. Not *M. cancellaroides* Grateloup, 1835.
1903. *Muricopsis Aldrichi* Cossmann, Essais Paléoconch. Comp., v. 5, p. 34. New name for *M. cancellaroides* Meyer and Aldrich.
1937. *Coralliophila (Aldrichia) Aldrichi* (Cossmann). Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 262, pl. 34, fig. 1-3.
1938. *Coralliophila (Timothia) aldrichi* (Cossmann). Palmer, Bull. Amer. Paleont., v. 24, No. 80, p. 3.
1966. *Coralliophila (Timothia) aldrichi* (Cossmann). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 600.

Type locality: Cook Mountain Formation, Newton, Mississippi.

Occurrence: Mississippi: Cook Mountain Formation, localities 64, 65, Newton, Hickory. Louisiana: Cook Mountain Formation, Sabine River at Columbus.

Superfamily BUCCINACEA Rafinesque, 1815

Family COLUMBELLIDAE Swainson, 1840

Genus **MITRELLA** Risso, 1826

Subgenus **COLUMBELLOPSIS** Bucquoy, Dautzenberg, and Dollgus, 1883

Mitrella (Columbellopsis) mississippiensis (Meyer and Aldrich)

Plate 34, figure 7

1886. *Columbella mississippiensis* Meyer and Aldrich, Cincinnati Soc. Nat. Hist., Jour., v. 9, p. 43, pl. 2, fig. 17.
1937. *Mitrella (Columbellopsis) mississippiensis* (Meyer and Aldrich). Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 278, pl. 38, fig. 16, 17, 21, 22.
1966. *Mitrella (Columbellopsis) mississippiensis* (Meyer and Aldrich). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 776.

Type locality: Cook Mountain Formation, Newton, Mississippi.

Occurrence: Mississippi: Cook Mountain Formation, locality 63, Newton, Hickory, Wautubbee. Cf. Louisiana: Cook Mountain Formation, Lapiniere Landing on the east bank of the Ouachita River. Cf. South Carolina: McBean Formation, about 3 miles west-northwest of Orangeburg.

Subgenus **BASTROPIA** Palmer, 1937

Mitrella (Bastropia) bastropensis (Harris)

Plate 37, figure 8

1895. *Astyris bastropensis* Harris, Acad. Nat. Sci. Philadelphia, Proc., v. 47, p. 74, pl. 8, fig. 2.
1937. *Mitrella (Bastropia) bastropensis* (Harris). Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 283, pl. 37, fig. 1, 7.
1966. *Mitrella (Bastropia) bastropensis* (Harris). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 774.

Type locality: Weches Formation, Colorado River at Smithville, Texas.

Occurrence: Mississippi: Cook Mountain Formation, locality 63, Hickory. Texas: Weches Formation, Colorado River at Smithville; Cf. Stone City Beds, Stone City Bluff on the Brazos River, 2 1/2 miles above Stone City Bluff on the Brazos River. Cf. South Carolina: McBean Formation, Orangeburg district.

Mitrella sp.?

Plate 37, figure 4

Occurrence: Mississippi: Cook Mountain Formation, locality 68.

Family BUCCINIDAE Rafinesque, 1815

Genus **LACINIA** Conrad, 1853

Lacinia alveata (Conrad)

? Plate 11, figure 2; Plate 16, figure 10; Plate 24, figure 10

1833. *Melongena alveata* Conrad, Amer. Jour. Sci., 1st ser., v. 23, p. 344.
1865. *Lacinia alveata* (Conrad). Conrad, Amer. Jour. Conch., v. 1, p. 21.
1966. *Lacinia alveata* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 712.
1977. *Lacinia alveata* (Conrad). Toulmin, Geol. Survey Alabama, Monograph 13, p. 288, pl. 47, fig. 13, 14.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: ? Winona Formation, locality 22; Dobys Bluff Tongue, locality 26b; Cook Mountain Formation, locality 25. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River and Little Stave Creek. Cf. Texas: Queen City Formation, east bank of Gazley Creek on the south side of the Colorado River at Smithville.

Genus **BUCCITRITON** Conrad, 1865

Buccitriton sagenum (Conrad)

Plate 37, figure 6

1833. *Buccinum sagenum* Conrad, Fossil shells Tertiary formations, v. 1, No. 3, p. 34.
1865. *Buccitriton sagenum* (Conrad). Conrad, Amer. Jour. Conch., v. 1, p. 20.
1966. *Buccitriton sagenum* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 536-537.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Cook Mountain Formation, localities 65, 67, Hickory, 2 miles northeast of Newton. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River; cf Lisbon Formation, Lisbon Bluff on the Alabama River. For other localities in Texas, Louisiana, and South Carolina, see Palmer and Brann (1966, p. 536-537).

Buccitriton texanus (Gabb)

Plate 16, figures 6, 7

1860. *Phos texanus* Gabb, Acad. Nat. Sci. Philadelphia, Jour., 2nd ser., v. 4, pt. 4, p. 381, pl. 67, fig. 17.
1865. *Buccitriton texanum* (Gabb). Conrad, Amer. Jour. Conch., v. 1, No. 1, p. 20.
1966. *Buccitriton texanum* (Gabb). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 537.
1977. *Buccitriton texanum* (Gabb). Toulmin, Geol. Survey Alabama, Monograph 13, p. 275, pl. 44, fig. 10.

Type locality: Stone City Beds or Cook Mountain Formation of Texas.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b. For Texas and Louisiana localities see Palmer (1966, p. 537).

Genus **TEREBRIFUSUS** Conrad, 1865

Terebrifusus amoenus (Conrad)

Plate 18, figure 7

1833. *Buccinum amoenum* Conrad, Fossil shells Tertiary formations, v. 1, No. 4, p. 45.
1865. *Terebrifusus amoena* (Conrad). Conrad, Acad. Nat. Sci. Philadelphia, Proc., v. 7, p. 28.
1966. *Terebrifusus amoenus* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 949-950.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River. Cf. Texas: Cook Mountain Formation, Sabine River opposite SW corner SE/4, Section 35, T.5 N., R.13 W., Sabine Par., Louisiana. South Carolina: McBean Formation, Orangeburg district, about 3 miles west-northwest of Orangeburg, about 6 miles west-northwest of Orangeburg.

Terebrifusus sp.

Plate 38, figures 9, 10, 11

Occurrence: Mississippi: Cook Mountain Formation, localities 64, 65.

Genus **PSEUDOLIVA** Swainson, 1840

Pseudoliva santander Gardner

Plate 3, figures 1A, 1B, 2, 3A, 3B

1886. *Pseudoliva vetusta* Conrad. Aldrich *in* Smith, Geol. Survey Alabama, Bull. No. 1, p. 50, 56, 58. Not *P. vestusta* Conrad, 1833.
1897. *Pseudoliva vetusta* Conrad. Harris, Acad. Nat. Sci. Philadelphia, Proc., v. 48, p. 478, pl. 22, fig. 9. Not of Conrad.
1899a. *Pseudoliva vetusta* Conrad. Harris, Bull. Amer. Paleont., v. 3 No. 11, p. 31, pl. 3, fig. 16. Not of Conrad.
1899b. *Pseudoliva vetusta* Conrad "var." Harris *in* Harris and Veatch The geology of Louisiana. Part 5, p. 305, pl. 54, fig. 6, 7.
1937. *Pseudoliva vetusta* Conrad. Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 310 in part, pl. 43, fig. 5, 6. Not of Conrad.
1942. *Pseudoliva vetusta* Conrad. Le Blanc *in* Barry and LeBlanc, Louisiana Dept. Conservation, Geol. Bull. 23, p. 119, pl. 15, fig. 11. Not of Conrad.
1945. *Pseudoliva santander* Gardner, Geol. Soc. Amer., Memoir 11, p. 195-196, pl. 22, fig. 24. Not of Conrad.
1960. *Pseudoliva vetusta* Conrad. Brann and Kent, Bull. Amer. Paleont., v. 40, No. 184, p. 746.

1966. *Pseudoliva vetusta* Conrad forma. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 857-858.
1977. *Pseudoliva vetusta* Conrad forma. Toulmin, Geol. Survey Alabama, Monograph 13, p. 225, pl. 27, fig. 11, 12.

Type locality: Middle part of the Laredo Formation, 1 1/2 kilometers east of El Barrio, in Rio San Juan, Nuevo Leon, Mexico.

Occurrence: Mississippi: Bashi Formaton, localities 19, 20, 21. Alabama: Bells Landing Member, Tuscahoma Formation, Bells Landing and Yellow Bluff on the Alabama River, Tuscahoma; Nanafalia Formation, Nanafalia; Bashi Formation, near the mouth of Bashi Creek, Hatchetigbee. Louisiana: Marthaville Formation, Wilcox Group [Sabine Group], cultivated field on D. R. Caskill's farm in NW/4, SW/4, SE/4, Section 21, T.9 N., R.10 W., Natchitoches Parish, cultivated field adjacent to Louisiana Highway 607 in NW/4, SW/4, NE/4, Section 29, T.9 N., R.10 W., Natchitoches Parish, road cut on Louisiana Highway 607 in NE/4, SE/4, SW/4, Section 20, T.9 N., R.10 W., Natchitoches Parish; Pendleton Formation, Wilcox Group [Sabine Group], about 1/4 mile from Louisiana Highway 6 bridge over the Sabine River in Sabine Parish, road cut 0.1 mile northwest of old Jerusalem Church in NE/4, Section 24, T.7 N., R.11 W., Sabine Parish, hillside at end of old road in NW/4, SE/4, NW/4, Section 36, T.9 N., R.9 W., Natchitoches Parish. Mexico: Laredo Formation, for localities see Gardner (1945).

Discussion: This species is readily distinguished from *Pseudoliva vetusta* Conrad of the Claiborne Group by its greatly thickened parietal callus. This callus forms a subsutural band around the previous whorls, which envelops much or almost all of the spire. A spiral groove, having varying degrees of development, separates the subsutural band from the rest of the whorl. The whorls are inflated toward the apex and produced anteriorly. The shell is somewhat flattened at the parietal lip in the apertural view, and the columellar lip is slightly depressed toward the base. There is no umbilicus though one specimen has a slight pseudumbilicus.

Harris (1899a, p. 31) identified this species as *Pseudoliva vetusta* Conrad and noted that specimens in the Wilcox Group "are apt to have an enormous callosity of the inner lip, especially posteriorly." Because many species names have been given to variations of *P. vetusta*, some of which only represented different growth stages, Harris was unwilling to give the Wilcox species a new name. A new name is warranted as the form previously described is stratigraphically restricted and easily distinguished from *P. vetusta* of the Claiborne Group. Gardner's type specimen, from the Laredo Formation of Nuevo Leon, Mexico, is incomplete but shows the characters previously described.

Pseudoliva vetusta (Conrad)

Plate 16, figures 8, 11

1833. *Monoceros vetusta* Conrad, Fossil shells Tertiary formations, v. 1, No. 4, p. 44.
1866. *Pseudoliva (Buccinorbis) vetusta* (Conrad). Conrad, Smithsonian Misc. Coll., v. 7, No. 200, p. 17.
1966. *Pseudoliva vetusta* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, p. 855-856.
1977. *Pseudoliva vetusta* (Conrad). Toulmin, Geol. Survey Alabama, Monograph 13, p. 295, pl. 49, fig. 1, 2.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b; cf. Moody's Branch Formation, Jackson. For other localities in Texas (Weches Formation), Louisiana (Cook Mountain Formation), Alabama (Claiborne Group), and South Carolina (McBean Formation), see Palmer and Brann (1966).

Pseudoliva vetusta carinata Conrad *in* Gabb

Plate 37, figures 1, 2, 3

1860. *Pseudoliva carinata* Conrad *in* Gabb, Acad. Nat. Sci. Philadelphia, Jour., 2nd ser., v. 4, p. 381, pl. 67, fig 32.
1966. *Pseudoliva vetusta carinata* Conrad *in* Gabb. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 858.

Type locality: Either the Stone City Beds or Cook Mountain Formation in Texas as to be determined by locality of lectotype. See Palmer and Brann (1966, p. 858).

Occurrence: Mississippi: Cook Mountain Formation, localities 65, 67, Hickory, 2 miles northeast of Newton on Highway 15, about 8 miles west of Enterprise, Wautubbee; Archusa Marl, locality 62. For other localities in Texas, Louisiana, and Alabama, see Palmer and Brann (1966, p. 858).

Pseudoliva vetusta perspectiva Conrad *in* Gabb

Plate 58, figure 4

1854. *Gastridium vetustum* Conrad *in* Wailes, Rept. Agr. Geol. Mississippi, p. 289, pl. 17, fig. 4.
1860. *Pseudoliva perspectiva* Conrad *in* Gabb, Acad. Nat. Sci. Philadelphia, Jour., 2nd ser., v. 4, pt. 4, p. 381, pl. 67, fig. 29.
1937. *Pseudoliva vetusta perspectiva* Conrad *in* Gabb. Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 313, pl. 42, fig. 1, 2, pl. 85, fig. 4.
1966. *Pseudoliva vetusta perspectiva* Conrad *in* Gabb. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 859.

1977. *Pseudoliva vetusta perspectiva* Conrad *in* Gabb. Dockery, Miss. Geol. Survey, Bull. 120, p. 71, pl. 9, fig. 1A, 1B.

Type locality: Moodys Branch Formation, Jackson, Mississippi.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 3, 9; Yazoo Formation, localities 3, 15. Louisiana: Moodys Branch Formation, localities P1, P7, P8, P10, P11, P15, P16, P883, P912, P923, P1054, P1118, P1119; Yazoo Formation, localities P2, P913; Danville Landing Member, localities P6, P20, P886, P1120. Texas: Moodys Branch Formation, locality P922.

Genus **SIPHONALIA** A. Adams, 1863

Siphonalia newtonensis (Meyer and Aldrich)

Plate 36, figure 2

1886. *Fusus Newtonensis* Meyer and Aldrich, Cincinnati Soc. Nat. Hist., Jour., v. 9, p. 43, pl. 2, fig. 11.
1937. "*Siphonalia*" *newtonensis* (Meyer and Aldrich). Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 317, pl. 45, fig. 5.
1966. "*Siphonalia*" *newtonensis* (Meyer and Aldrich). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 910.

Type locality: Cook Mountain Formation, Newton, Mississippi.

Occurrence: Mississippi: Cook Mountain Formation, locality 65, Newton.

Siphonalia sp.?

Plate 37, figure 9

Occurrence: Mississippi: Cook Mountain Formation, locality 65.

Genus **PENION** Fischer, 1884

Penion sp.?

Plate 35, figure 5

Occurrence: Mississippi: Cook Mountain Formation, locality 64.

Family MELONGENIDAE Gill, 1867

Genus **CORNULINA** Conrad, 1853

Cornulina minax compressa n. subsp.

Plate 2, figures 5A, 5B; Plate 9, figures 2A, 2B

1886. *Cornulina armigera* (Conrad). Aldrich *in* Smith, Geol. Survey 1833. Alabama, Bull. No. 1, p. 50, 53. Not *C. armigera* (Conrad, 1833).

1899. *Cornulina armigera* (Conrad). Harris, Bull. Amer. Paleont., v. 3, No. 11, p. 63 in part, pl. 8, fig. 8-11. Not of Conrad.
1924. *Cornulina armigera* (Conrad). Deussen, U.S. Geol. Survey Prof. Paper 126, pl. 15, fig. 5. Not of Conrad.
1932. *Cornulina armigera* (Conrad). Trowbridge, U.S. Geol. Survey Bull. No. 837, pl. 18, fig. 6 copy Deussen. Not of Conrad.
1960. *Cornulina armigera* (Conrad). Brann and Kent, Bull. Amer. Paleont., v. 40, No. 184, p. 277. Not of Conrad.
1966. *Cornulina* sp. ? Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, p. 605.
1977. *Cornulina* sp. Toulmin, Geol. Survey Alabama, Monograph 13, p. 209-210, pl. 25, fig. 1, 2, 10.

Type locality: Bashi Formation, locality 21.

Occurrence: Mississippi: Bashi Formation, localities 19, 20, 21. Alabama: Nanafalia Formation, Nanafalia; Greggs Landing Member, Tuscahoma Sand, Greggs Landing and Yellow Bluff on the Alabama River; Bashi Formation, mouth of Bashi Creek, Woods Bluff on the Tombigbee River. Texas: Pendleton Ferry Formation, Pendleton Bluff on the Sabine River about 1/4 mile upstream from bridge.

Discussion: This subspecies differs from *Cornulina minax* (Solander *in* Brander, 1766), from the Bartonian of Europe, in that it has a more compressed spire and siphonal canal. The designated type for this subspecies has two rows of spines as does the European species, but some specimens from the Greggs Land Member at Greggs Landing lack the lower row (see Harris, 1899, pl. 8, fig. 8). One specimen figured by Harris (1899, pl. 8, fig. 9) from the Bashi Formation has an incipient, intervening third row of spines. *C. armigera* (Conrad) is more inflated and spinous than this species.

Description: Whorls of *C. minax compressa* generally impinge upon the upper row of spines on the previous whorls and may envelop them. Below the basal row of spines is a strong spiral groove followed by others of decreasing strength toward the base. Less prominent spiral grooves occur on the upper portions of the whorls.

Family NASSARIIDAE Iredale, 1916

Genus NASSARIUS Duméril, 1806

Nassarius exilis (Conrad)

Plate 2, figure 3

1860. *Simpulum (Epidromus) exilis* Conrad, Acad. Nat. Sci. Philadelphia, Jour., 2nd ser., v. 4, p. 293, pl. 47, fig. 31.
1942. *Nassarius exilis* (Conrad). Le Blanc, Louisiana Dept. of Conservation, Geol. Bull. 23, p. 122, pl. 15, fig. 7, 8.

1966. *Nassarius exilis* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 787.

Type locality: Type not designated.

Occurrence: Mississippi: Bashi Formation, locality 19. Alabama: Wilcox Group, Greggs Landing and Hamilton Bluff on the Alabama River, Hatchetigbee Bluff on the Tombigbee River. Also in the Wilcox Group in Louisiana and Texas.

Genus **BULLIA** Gray, 1834

Bullia calluspira n. sp.

Plate 3, figures 4, 5A, 5B, 6A, 6B, 7A, 7B

1886. *Ancillaria subglobosa* Conrad. Aldrich, Geol. Survey Alabama, Bull. No. 1, pt. 1, p. 50, 51, 58. Not *A. subglobosa* Conrad, 1832.

1937. *Bullia altilis subglobosa* (Conrad). Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 289-290 in part, pl. 40, fig. 1, 2, 3. Not of Conrad.

1977. Cf. *Bullia altilis subglobosa* (Conrad). Toulmin, Geol. Survey Alabama, Monograph 13, p. 205 in part, pl. 24, fig. 2, 3. Not of Conrad.

Type locality: Bashi Formation, locality 19.

Occurrence: Mississippi: Bashi Formation, localities 19, 20. Alabama (localities from Aldrich, 1886): Nanafalia Formation, exposures on the Tombigbee River; Bashi Formation, Woods Bluff on the Tombigbee River, Knight's Branch; Hatchetigbee Formation, Hatchetigbee Bluff on the Tombigbee River.

Discussion: *B. calluspira* and *P. santander* are very abundant below the concretionary boulders in the Bashi Formation at Meridian. It would seem that environmental stresses are responsible for the convergent morphology of these two species and also for *Athleta tuomeyi* (Conrad, 1853), which has a thickened parietal callus. The Bashi Formation at Meridian appears to have been a high energy, near-shore deposit, which would explain the local environmental pressures favoring a thickened shell. However, this morphology is persistent for specimens from various localities at this horizon, and must represent a genotypic characteristic rather than a phenotypic trait due to localized pressures.

Description: This species differs from *Bullia altilis subglobosa* (Conrad, 1832), to which it has previously been referred, in that it has a depressed spire, is dorso-ventrally flattened, is less inflated anteriorly and more inflated posteriorly, and has a thickened parietal callus that forms a subsutural collar. The subsutural collar is similar to that of *Pseudoliva*

santander in that it envelops most of the spire and is separated from the body whorl by a shallow groove.

Bullia cf. **B. (Anbullina) ancillops** (Heilprin)

Plate 17, figure 4

1891. *Ancillaria ancillops* Heilprin, Acad. Nat. Sci. Philadelphia, Proc., v. 42, p. 398, 406, pl. 11, fig. 4.
1937. *Bullia (Anbullina) ancillops* (Heilprin). Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 292, pl. 40, fig. 4, 6.
1966. *Bullia (Anbullina) ancillops* (Heilprin). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 544.

Type locality: Weches Formation, Colorado River at Smithville, Texas.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b. Texas: Weches Formation, south bank of the Colorado River at Smithville.

Bullia sp.

Plate 37, figure 7

Occurrence: Mississippi: Cook Mountain Formation, locality 68.

Family FASCIOLARIIDAE Gray, 1853

Genus **LEVIFUSUS** Conrad, 1865

Levifusus mortoniopsis (Gabb)

Plate 17, figure 2

1860. *Fusus mortoniopsis* Gabb, Acad. Nat. Sci. Philadelphia, Jour., 2nd ser., v. 4, pt. 4, p. 377, pl. 67, fig. 15.
1937. *Levifusus mortoniopsis* (Gabb). Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 330, pl. 49, fig. 7, 8, 12; pl. 87, fig. 7.
1966. *Levifusus mortoniopsis* (Gabb). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, p. 733.
1977. *Levifusus mortoniopsis* (Gabb). Toulmin, Geol. Survey Alabama, Monograph 13, p. 290, pl. 48, fig. 6.

Type locality: Stone City Beds, Stone City Bluff, Brazos River, Texas.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b. Texas: Stone City Beds, Stone City Bluff on the Brazos River. For other Texas localities in the Stone City Beds and Weches Formation see Palmer (1966). Cf. Alabama: Lisbon Formation, Lisbon Bluff on the Alabama River.

Levifusus mortoniopsis carexus (Harris)

Plate 36, figure 3

1895. *Fusus mortoni* var. *carexus* Harris, Acad. Nat. Sci. Philadelphia, Proc., v. 47, p. 72, pl. 7, fig. 5.
1937. *Levifusus mortoniopsis carexus* (Harris). Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 331, pl. 49, fig. 11, 13, 14.
1966. *Levifusus mortoniopsis carexus* (Harris). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 733.

Type locality: Cook Mountain Formation, between Orell's and Evergreen Crossing on Elm Creek in Lee County, Texas.

Occurrence: Mississippi: Cook Mountain Formation, locality 64, about 8 miles west of Enterprise, Wautubbee, Hickory, 2 miles northeast of Newton on route 15. Texas: Cook Mountain Formation, between Orell's and Evergreen Crossing on Elm Creek in Lee County, 2 1/2 miles above Stone City on the Brazos River. Alabama: Lisbon Formation, Lisbon Bluff on the Alabama River. For localities in the Cook Mountain Formation in Louisiana, see Palmer and Brann (1966).

Levifusus sp.

Plate 36, figures 7, 8

Occurrence: Mississippi: Cook Mountain Formation, localities 64, 69.

Levifusus sp. ?

Plate 42, figure 1

Occurrence: Mississippi: Cook Mountain Formation, locality 65.

Genus **LATIRUS** Montfort, 1810

Latirus moorei (Gabb)

Plate 17, figures 5, 6; Plate 38, figures 1, 2

1860. *Fasciolaria Moorei* Gabb, Acad. Nat. Sci. Philadelphia, Jour., 2nd ser., v. 4, pt. 4, p. 382, pl. 67, fig. 27.
1891. *Latirus (Cordiera) Moorei* (Gabb). Heilprin, Acad. Nat. Sci. Philadelphia, Proc., v. 42, p. 396.
1937. *Latirus moorei* (Gabb). Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 342, pl. 54, fig. 2, 5, 9, 10, 14, 18; pl. 87, fig. 3.
1966. *Latirus moorei* (Gabb). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 724.
1977. *Latirus moorei* (Gabb). Toulmin, Geol. Survey Alabama, Monograph 13, p. 289, pl. 48, fig. 7.

Type locality: Stone City Beds, Caldwell County, Texas.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b; Cook Mountain Formation, localities 65, P728, P731, P803. For other localities

in the Stone City Beds and Weches Formation of Texas, the Cook Mountain Formation of Louisiana, and the Lisbon Formation of Alabama, see Palmer (1937, p. 342).

Genus **DOLICHOLATIRUS** Bellardi, 1884

Dolicholatirus leaensis (Harris)

Plate 58, figure 1

1897. *Latirus leaensis* Harris, Acad. Nat. Sci. Philadelphia, Proc., v. 48, p. 472, pl. 18, fig. 13.
1901. *Dolicholathirus leanus* (sic) (Harris). Cossmann, Essais Paléoconch. Comp., v. 4, p. 24.
1966. *Latirus (Dolicholatirus) leaensis* Harris, Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 724.
1977. *Dolicholatirus leaensis* (Harris). Dockery, Miss. Geol. Survey, Bull. No. 120, p. 76, pl. 18, fig. 13.

Type locality: Moodys Branch Formation, Jackson, Mississippi.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 16. Louisiana: Moodys Branch Formation, localities P1, P883. Texas: Moodys Branch Formation, locality P922.

Dolicholatirus sp.

Plate 36, figure 9

Occurrence: Mississippi: Cook Mountain Formation, locality 65.

Genus **LIROFUSUS** Conrad, 1865

Lirofusus thoracicus (Conrad)

Plate 40, figure 11

1833. *Fusus thoracicus* Conrad, Fossil shells Tertiary formations, v. 1, No. 3, p. 20.
1865. *Lirofusus thoracicus* (Conrad). Conrad, Amer. Jour. Conch., v. 1, No. 1, p. 17.
1966. *Lirofusus thoracicus* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 740.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Cook Mountain Formation, localities 65, 67, Hickory. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River. Cf. South Carolina: McBean Formation, about 3 miles west-northwest and about 6 miles west-northwest of Orangeburg. Cf. Louisiana: Cook Mountain Formation, east bank of Ouachita River at Lapiniere Landing.

Genus **TRITONOATRACTUS** Cossmann, 1901

Tritonoatractus pearlensis (Aldrich)

Plate 58, figure 9

1885. *Fusus pearlensis* Aldrich, Cincinnati Soc. Nat. Hist., Jour., v. 8, p. 152, pl. 3, fig. 17a, 17b.
1901. *Ptychatractus (Tritonoatractus) pearlensis* (Aldrich). Cossmann, Essais Palteoconch. Comp., v. 4, p. 54, pl. 4, fig. 16, 17.
1966. *Tritonoatractus pearlensis* (Aldrich). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 964.
1977. *Tritonoatractus pearlensis* (Aldrich). Dockery, Miss. Geol. Survey, Bull. No. 120, p. 76-77, pl. 10, fig. 3.

Type locality: Moodys Branch Formation, Jackson, Mississippi.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 3, 9. Louisiana: Moodys Branch Formation, localities P10, P1054, P1119; Danville Landing Member, localities P6, P886.

Genus **FALSIFUSUS** Grabau, 1904

Falsifusus bastropensis (Harris)

Plate 36, figure 10

1895. *Fusus bastropensis* Harris, Acad. Nat. Sci. Philadelphia, Proc., v 47, p. 71, pl. 7, fig. 2.
1937. *Falsifusus bastropensis* (Harris). Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 353, pl. 48, fig. 6, 10, 11.
1966. *Falsifusus bastropensis* (Harris). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 674.

Type locality: Weches Formation, Colorado River at Smithville, Texas.

Occurrence: Mississippi: Cook Mountain Formation, localities 65, 67, Hickory. Texas: Weches Formation, Colorado River at Smithville, big branch of Cedar Creek 3 miles northwest of Stone City. Louisiana· Cook Mountain Formation, Sabine River at Columbus, Lapiniere Landing on the east bank of the Ouachita River.

Genus **CLAVILITHES** Swainson, 1840

Clavilithes kennedyanus Harris

Plate 23, figure 2; Plate 37, figure 5

1895. *Clavilithes kennedyanus* Harris, Acad. Nat. Sci. Philadelphia, Proc., v. 47, p. 73, pl. 7, fig. 8.
1966. *Clavilithes kennedyanus* Harris. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 585.

Type locality: Weches Formation, Colorado River, Smithville, Texas.

Occurrence: Mississippi: Cook Mountain Formation, 2 miles northeast of Newton on Highway 15, Wautubbee, localities 25, 65; Archusa Marl, locality 61. Texas: Weches Formation, Colorado River at Smithville.

Clavilithes humerosus Conrad *in* Wailes

Plate 58, figure 6

1854. *Clavilithes humerosus* Conrad *in* Wailes, Rept. Agr. Geol. Mississippi, p. 289, pl. 15, fig. 2.
1966. *Clavilithes humerosus* Conrad. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 584.
1977. *Clavilithes humerosus* Conrad. Dockery, Miss. Geol. Survey, Bull. No. 120, p. 78, pl. 10, fig. 10, 13.

Type locality: Moodys Branch Formation, Jackson, Mississippi.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 3, 9, 12. Louisiana: Moodys Branch Formation, localities P1, P7, P8, P10, P15, P16, P883, P912, P1054, P1119. Arkansas: White Bluff Formation, locality P897.

Superfamily VOLUTACEA Rafinesque, 1815

Family OLIVIDAE Latreille, 1825

Genus ANCILLA Lamarck, 1799

Ancilla staminea punctulifera (Gabb)

Plate 17, figure 3; Plate 38, figure 5

1860. *Agaronia punctulifera* Gabb, Acad. Nat. Sci., Philadelphia, Jour., 2nd ser., v. 4, pt. 4, p. 381, pl. 67, fig. 22.
1937. *Ancilla staminea punctulifera* (Gabb). Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 429, pl. 68, fig. 10, 17.
1966. *Ancilla staminea punctulifera* (Gabb). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 493.
1977. *Ancilla staminea punctulifera* (Gabb). Toulmin, Geol. Survey Alabama, Monograph 13, p. 270-271, p. 44, fig. 5.

Type locality: Wheelock Member, Cook Mountain Formation, Wheelock, Texas.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b; Cook Mountain Formation, locality 65. See Palmer (1937) for Stone City Beds, Weches Formation, and Cook Mountain Formation localities in Texas; for Cook Mountain localities in Mississippi and Louisiana; and Lisbon localities in Alabama.

Genus **AGARONIA** Gray, 1839

Agaronia alabamensis (Conrad)

Plate 23, figure 4; Plate 38, figures 6, 7, 8, 12

1833. *Oliva alabamensis* Conrad, Fossil shells Tertiary formations, v. 1, No. 3, p. 32.
1937. *Agaronia alabamensis* (Conrad). Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 431, pl. 68, fig. 14-16; pl. 89, fig. 5.
1966. *Agaronia alabamensis* (Conrad). Palmer, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 484-485.
1977. *Agaronia alabamensis* (Conrad). Toulmin, Geol. Survey Alabama, Monograph 13, p. 269, pl. 44, fig. 3.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Cook Mountain Formation, localities 25, 63, 65, 69, P726, P728, P729, P731, P803. See Palmer (1937) for other localities in the Cook Mountain Formation of Texas and Louisiana, in the Gosport Sand and Lisbon Formation of Alabama, and in the McBean Formation of South Carolina.

Agaronia media (Meyer)

Plate 59, figure 3

1885. *Oliva media* Meyer, Amer. Jour. Sci., ser. 3, v. 29, p. 465, 468.
1966. *Agaronia media* (Meyer). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 486.
1977. *Agaronia media* (Meyer). Dockery, Miss. Geol. Survey, Bull. 120, p. 79, pl. 11, fig. 1A, 1B, 2A, 2B.

Type locality: Moodys Branch Formation, locality 3.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 3, 9, 16; Yazoo Formation, locality 3. Louisiana: Moodys Branch Formation, localities P1, P912. Texas: Moodys Branch Formation, locality P1121. Arkansas: White Bluff Formation, locality P897.

Family VOLUTIDAE Rafinesque, 1815

Genus **ATHLETA** Conrad, 1853

Athleta tuomeyi (Conrad)

Plate 2, figures 7A, 7B

1853. *Athleta tuomeyi* Conrad, Acad. Nat. Sci. Philadelphia, Proc., 1853, v. 6, p. 449.
1964. *Athleta tuomeyi* Conrad. Fisher, Rodda and Dietrich, Univ. Texas Pub. No. 6413, p. 49, pl. 8, fig. 5, 6; pl. 9, fig. 5-9.

1966. *Athleta tuomeyi* Conrad. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 517-518.
1977. *Athleta tuomeyi* Conrad. Toulmin, Geol. Survey Alabama, Monograph 13, p. 205, pl. 23, fig. 8-13.

Type locality: Bashi Formation, Bashi Creek, Clarke County, Alabama.

Occurrence: Mississippi: Bashi Formation, locality 19. See Fisher, Rodda, and Dietrich (1964) for other lower Eocene and Paleocene localities.

Athleta petrosa (Conrad)

Plate 17, figures 9, 10; Plate 39, figures 1, 4

1833. *Voluta petrosa* Conrad, Fossil shells Tertiary formations, v. 1, No. 2, p. 29.
1937. *Athleta petrosa* (Conrad). Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 372 in part, pl. 58, fig. 2-4, 6, pl. 88, fig. 7.
1966. *Athleta petrosa* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 514-515.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b; Cook Mountain Formation, localities 65, 69, P726, P728, P729, P731, P803. See Palmer (1937) for additional localities in the Claiborne Group of Texas, Louisiana, and Alabama.

Athleta symmetricus (Conrad *in* Wailes)

Plate 59, figure 5

1854. *Volutalithes (sic) symmetrica* Conrad *in* Wailes, Rept. Agr. Geol. Mississippi, p. 289, pl. 15, fig. 6; as *Volutalithes (sic) dumosa*, p. 289, pl. 16, fig. 1.
1966. *Athleta symmetricus* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 517.
1977. *Athleta symmetricus* (Conrad). Dockery, Miss. Geol. Survey, Bull. No. 120, p. 81, pl. 12, fig. 10A, 10B, 10C.

Type locality: Moodys Branch Formation, Jackson, Mississippi.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 9, 11; Yazoo Formation, locality 15. Louisiana: Moodys Branch Formation, localities P1, P7, P8, P10, P11, P15, P912, P1054, P1118, P1119; Yazoo Formation, Tullos Member, locality P12; Danville Landing Member, localities P6, P14, P886, P1120. Texas: Moodys Branch Formation, localities P922, P1121. Arkansas: White Bluff Formation, localities P896, P897, P1046.

Athleta sp. a

Plate 11, figure 5

Occurrence: Mississippi: Winona Formation, locality 22.

Athleta sp. b

Plate 39, figure 5

Occurrence: Mississippi: Cook Mountain Formation, locality 63.

Genus **CARICELLA** Conrad, 1834

Caricella pyruloides (Conrad)

Plate 17, figures 7A, 7B, 8; Plate 39, figure 2

1832. *Turbinella pyruloides* Conrad, Fossil shells Tertiary formations, v. 1, No. 2, p. 24, pl. 10, fig. 1.
1937. *Caricella pyruloides* (Conrad). Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 390, pl. 63, fig. 1-3, 6, 9-12; pl. 89, fig. 3.
1966. *Caricella pyruloides* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 564.
1977. *Caricella pyruloides* (Conrad). Toulmin, Geol. Survey Alabama, Monograph 13, p. 279, pl. 45, fig. 6.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b; Cook Mountain Formation, locality 65. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River and Little Stave Creek. South Carolina: McBean Formation, Orangeburg district.

Caricella stenzeli Palmer, 1937

Plate 39, figure 3

1937. *Caricella reticulata stenzeli* Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 397, pl. 65, fig. 17-20.
1966. *Caricella stenzeli* Palmer. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 565.

Type locality: Cook Mountain Formation, Wautubbee, Mississippi.

Occurrence: Mississippi: Cook Mountain Formation, locality 65, 2 miles northeast of Newton on Highway 15, Hickory, Wautubbee. Texas: Cook Mountain Formation, 2 1/2 miles above Stone City on the Little Brazos River. Louisiana: Cook Mountain Formation, Fisher in Sabine Parish. Alabama: Lisbon Formation, Lisbon Bluff on the Alabama River.

Caricella subangulata Conrad *in* Wailes

Plate 59, figure 4

1854. *Caricella subangulata* Conrad *in* Wailes, Rept. Agr. Geol. Mississippi, p. 289, pl. 5, fig. 8.
1966. *Caricella subangulata* Conrad *in* Wailes. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 565.
1977. *Caricella subangulata* Conrad *in* Wailes. Dockery, Miss. Geol. Survey, Bull. 120, p. 82, pl. 12, fig. 1, 2, 4, 6, 7; pl. 13, fig. 9.

Type locality: Moodys Branch Formation, Jackson, Mississippi.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 9, 11, 16. Louisiana: Moodys Branch Formation, localities P10, P883, P1054. Arkansas: White Bluff Formation, localities P897, P1046.

Subgenus ATRAKTUS Gardner, 1937
(= Reticulacella Dockery, 1977)

Caricella (Atraktus) reticulata Aldrich

Plate 77, figure 3

1885. *Turbinella (Caricella) reticulata* Aldrich, Cincinnati Soc. Nat. Hist., Jour., v. 8, No. 2, p. 147, pl. 2, fig. 4a, 4b, 4c.
1937. *Caricella (Atraktus) reticulata* Aldrich. Gardner, U.S. Geol. Survey Prof. Paper 142-F, p. 405.
1977. *Caricella (Reticulacella) reticulata* Aldrich. Dockery, Miss. Geol. Survey, Bull. 120, p. 84.

Type locality: Red Bluff Formation, Red Bluff, Chickasawhay River, Mississippi.

Occurrence: Mississippi: Red Bluff Formation, localities 37, 38, 39, 40, 46.

Discussion: Gardner's subgenus *Atraktus*, which was published in her work on the Alum Bluff Group (Miocene), was overlooked by the writer when working on the molluscs of the Moodys Branch Formation (Eocene). In Miss. Geol. Survey Bull. 120, p. 84, the subgenus *Reticulacella* was designated for *Caricella* having a reticulate ornamentation, with *Caricella fenestra* Dockery (upper Eocene) given as the type species. Though *C. fenestra* was compared with *C. reticulata*, it more closely resembles the reticulated variety of *Caricella demissa* (Conrad) from the

Byram Formation. Gardner's type species for *Atraktus* is *Caricella leana* Dall, from the Clayton Formation (Paleocene) in Alabama.

Genus **LAPPARIA** Conrad, 1855

Lapparia mooreana (Gabb)

Plate 38, figures 3, 4

1860. *Mitra mooreana* Gabb, Acad. Nat. Sci. Philadelphia, Jour., 2nd ser., v. 4, p. 383, pl. 67, fig. 24.
1865. *Lapparia mooreana* (Gabb). Conrad, Amer. Jour. Conch., v. 1, No. 1, p. 24.
1966. *Lapparia mooreana* (Gabb). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 719.

Type locality: Stone City Beds, Stone City Bluff on the Brazos River, Texas.

Occurrence: Mississippi: Cook Mountain Formation, localities 65, 67, about 8 miles west of Enterprise, Wautubbee, Hickory, about 2 miles northeast of Newton on Highway 15. Texas: Stone City Beds, Stone City Bluff on the Brazos River. For other localities in Texas and Louisiana, see Palmer and Brann (1966, p. 719).

Lapparia dumosa (Conrad *in* Wailes) var.

Plate 59, figure 6

1854. *Mitra dumosa* Conrad *in* Wailes, Rept. Agr. Geol. Mississippi, p. 289, pl. 15, fig. 4.
1865. *Lapparia dumosa* (Conrad). Conrad, Amer. Jour. Conch, v. 1, p. 24.
1966. *Lapparia dumosa* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 717-718.
1977. *Lapparia dumosa* (Conrad) var. Dockery, Miss. Geol. Survey, Bull. 120, p. 85, pl. 14, fig. 7A, 7B.

Occurrence: Moodys Branch Formation, locality 9.

Genus **LYRIA** Gray, 1847

Subgenus **LYRIA** Gray, 1847

Lyria (Lyria) nestor Casey

Plate 76, figure 7

1890. *Lyria costata* Sowerby. Dall, Wagner Free Inst. Sci., Trans., v. 3, pt. 1, p. 85, pl. 6, fig. 2. Not *L. costata* Sowerby.

1903. *Lyria nestor* Casey, Acad. Nat. Sci. Philadelphia, Proc., v. 55, p. 282.

1978. *Lyria (Lyria) nestor* Casey. Hoerle and Vokes, Tulane Studies Geol. Paleont., v. 14, No. 3, p. 109, pl. 1, fig. 1a, 1b, 1c, 1d.

Type locality: Red Bluff Formation, Red Bluff, Chickasawhay River, Mississippi.

Occurrence: Mississippi: Red Bluff Formation, localities 37, 38, 39, 40.

Genus **LYRISCHAPA** Aldrich, 1911

Lyrischapa harrisi Aldrich

Plate 39, figures 6, 7, 8, 9, 10

1890. *Lyria*? sp. Dall, Wagner Free Inst. Sci., Trans, v. 3, pt. 1, p. 69, pl. 6, fig. 5a.

1890. *Voluta* sp. Dall, Wagner Free Inst. Sci., Trans, v. 3, pt. 1, p. 77, 90, pl. 6, fig. 5a.

1911. *Lyrischapa harrisi* Aldrich, Bull. Amer. Paleont., v. 5, No. 22, p. 11, pl. 4, fig. 8.

1966. *Lyrischapa harrisi* Aldrich. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 744.

1979. *Lyrischapa harrisi* Aldrich. Givens, Tulane Studies in Geol. and Paleont., v. 15, No. 4, p. 120-122, plate 1, figures 1a, 1b, 2a, 2b, 3, 3b, 3c.

Type locality: Cook Mountain Formation, 3 1/2 miles south of Quitman, Mississippi.

Occurrence: Mississippi: Cook Mountain Formation, localities 63, 65, 3 1/2 miles south of Quitman; Archusa Marl, locality 62.

Family CANCELLARIIDAE Forbes and Hanley, 1853

Genus **TRIGONOSTOMA** Blainville, 1825

Trigonostoma sp.

Plate 40, figure 6

Occurrence: Mississippi: Cook Mountain Formation, locality 65.

Genus **SVELTELLA** Cossmann, 1889

Sveltella parva (I. Lea)
Plate 40, figure 5

1833. *Cancellaria parva* I. Lea, Cont. Geol., p. 142, pl. 5, fig. 141.
1893. *Sveltella parva* (I. Lea). Cossmann, Ann. Geol. Paleont., v. 12, p. 41.
1966. *Sveltella parva* (I. Lea). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 939.
1977. *Sveltella parva* (I. Lea). Dockery, Miss. Geol. Survey, Bull. 120, p. 86, pl. 14, fig. 2.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Archusa Marl, locality 62; Moodys Branch Formation, locality 1. Louisiana: Cook Mountain Formation, locality P741. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River. South Carolina: McBean Formation, about 3 miles west-northwest of Orangeburg.

Genus **BONELLITIA** Jousseaume, 1887

Bonellitia parilis Palmer
Plate 16, figure 5

1937. *Bonellitia parilis* Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 453, pl. 70, fig. 21-25.
1966. *Bonellitia parilis* Palmer. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 530.

Type locality: Stone City Beds, Stone City Bluff, Brazos River, Texas.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b. Texas: Stone City Beds, Stone City Bluff on the Brazos River; Cook Mountain Formation, Little Brazos River 2 1/2 miles above Stone City.

Bonellitia garvani Palmer
Plate 40, figure 10

1937. *Bonellitia garvani* Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 452, pl. 69, fig. 1-3.

1966. *Bonellitia garvani* Palmer. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 530.

Type locality: Cook Mountain Formation, about 8 miles west of Enterprise, Mississippi, or Wautubbee, Mississippi.

Occurrence: Mississippi: Cook Mountain Formation, locality 65, about 8 miles west of Enterprise, Wautubbee. South Carolina: McBean Formation, Orangeburg district.

Bonellitia sp.

Plate 40, figure 9

Occurrence: Mississippi: Cook Mountain Formation, locality 65.

Bonellitia sp.?

Plate 37, figures 10, 11,

Occurrence: Mississippi: Cook Mountain Formation, localities 65, 68.

Family MARGINELLIDAE Fleming, 1828

Genus **MARGINELLA** Lamarck, 1799

Subgenus **DENTIMARGO** Cossmann, 1899

Marginella (Dentimargo) constrictoides Meyer and Aldrich

Plate 40, figures 7, 8

1886. *Marginella constrictoides* Meyer and Aldrich, Cincinnati Soc. Nat. Hist., Jour., v. 9, p. 44, pl. 2,

1966. *Marginella (Dentimargo) constrictoides* Meyer and Aldrich. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 748.

Type locality: Cook Mountain Formation, Newton, Mississippi.

Occurrence: Mississippi: Cook Mountain Formation, localities 63, 65, 67, Newton, Hickory, 2 miles northeast of Newton on Highway 15, about 8 miles west of Enterprise, Wautubbee; Archusa Marl, locality 61. Alabama: Lisbon Formation, Lisbon Bluff on the Alabama River. Louisiana: Cook Mountain Formation, well at Monroe. Texas: Stone City Beds, Stone City Bluff on the Brazos River; Cook Mountain Formation, Texas side of Sabine River opposite the SW corner of the SE/4, Section 35, T.5 N., R.13 W., Sabine Parish, Louisiana.

Marginella sp.

Plate 40, figure 3

Occurrence: Mississippi: Cook Mountain Formation, locality 65.

Genus **CRYPTOSPIRA** Hinds, 1844

Subgenus **EURYENTOME** Cossmann, 1899

Cryptospira (Euryentome) silabra (Palmer)

Plate 40, figure 4

1833. *Marginella crassilabra* Conrad, Fossil shells Tertiary formations, v. 1, No. 3, p. 33. Not *Marginella crassilabra* Bory de St. Vincent, 1827.
1937. *Marginella silabra* Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 416, pl. 67, fig. 4, 9. New name for *Marginella crassilabra* Conrad.
1943. *Cryptospira (Euryentome) silabra* (Palmer). Wenz, Handbuch der Paläozoologie. Band 6 Gastropoda, Teil 6, p. 1374, fig. 1388.
1966. *Cryptospira (Euryentome) silabra* (Palmer). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 617-618.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Cook Mountain Formation, locality 63. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River.

Genus **BULLATA** Jousseaume, 1875

Bullata semen (I. Lea)

Plate 40, figures 1, 2

1833. *Marginella semen* I. Lea, Contr. Geol., p. 178, pl. 6, fig. 190.
1937. *Persicula (Bullata) semen* (I. Lea). Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 422, pl. 67, fig. 13, 14, 16-19; pl. 90, fig. 15.
1966. *Bullata semen* (I. Lea). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 541.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Cook Mountain Formation, locality 65, about 8 miles east of Enterprise, Wautubbee. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River. Cf. Louisiana: Cook Mountain Formation, Hammet's Branch in the SW/4, Section 30, T.18 N., R.6 W., Bienville Parish about 2 miles northeast of Mt. Lebanon, Louisiana.

Bullata semen jacksonensis (Meyer)

Plate 59, figures 1, 2A, 2B

1885. *Marginella incurva jacksonensis* Meyer, Amer. Jour. Sci., ser. 3, v. 29, p. 465.
1966. *Bullata semen jacksonensis* (Meyer). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 87, pl. 14, fig. 1A, 1B.

1977. *Bullata semen jacksonensis* (Meyer). Dockery, Miss. Geol. Survey, Bull. 120, p. 87, pl. 14, fig. 1A, 1B.

Type locality: Moodys Branch Formation, Jackson, Mississippi.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 3, 9, 16. Texas: Moodys Branch Formation, locality P1121.

Discussion: The specimen illustrated in plate 59, figure 2B, has a banded color pattern with 5 bands on the middle and anterior portion of the body whorl.

Suborder TOXOGLOSSA

Superfamily MITRACEA Swainson, 1831

Family MITRIDAE Swainson, 1831

Genus **MITRA** Lamarck, 1798

Subgenus **FUSIMITRA** Conrad, 1855

Mitra (Fusimitra) conquisita Conrad

Plate 77, figure 6

1848a. *Mitra conquisita* Conrad, Acad. Nat. Sci. Philadelphia, Proc., v. 3, p. 289.

1848b. *Mitra conquisita* Conrad. Conrad, Acad. Nat. Sci. Philadelphia, Jour., ser. 2, v. 1, p. 119, pl. 12, fig. 1.

1865. *Fusimitra conquisita* (Conrad). Conrad, Amer. Jour. Conch., v. 1, p. 25.

1947. *Fusimitra conquisita* (Conrad). Palmer, Bull. Amer. Paleont., v. 30, No. 117, p. 399-401 in part, pl. 55, fig. 7, 8.

1976. *Mitra (Fusimitra) conquisita* Conrad. Cernohorsky, Indo-Pacific Mollusca, v. 3, No. 17, p. 384, pl. 325, figure 2 copy Palmer, 1947.

Type locality: Byram Formation, Vicksburg, Mississippi.

Occurrence: Mississippi: Common in the Byram Formation; Mint Spring Formation; and the Red Bluff Formation, localities 37, 38, 39, 40, 46. This species is very abundant in the basal one foot of the Red Bluff Formation at locality 37.

Genus **VOLVARIA** Lamarck, 1801

Subgenus **VOLVARIELLA** P. Fischer, 1883

Volvaria (Volvariella) reticulata Johnson

Plate 43, figure 7

1899. *Volvaria reticulata* Johnson, Acad. Nat. Sci. Philadelphia, Proc., v. 51, p. 71, pl. 1, fig. 1.

1966. *Volvaria reticulata* Johnson. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 1023.

Type locality: Stone City Beds, Stone City Bluff, Brazos River, Texas.

Occurrence: Mississippi: Cook Mountain Formation, locality 64. Texas: Stone City Beds, Stone City Bluff on the Brazos River. Louisiana: Cook Mountain Formation, Lapiniere Landing on the Ouachita River.

Superfamily CONACEA Rafinesque, 1815

Family TURRIDAE Swainson, 1840

Genus **MICHELA** Gardner, 1945

Michela trabeatoides (Harris)

Plate 17, figure 1

1895. *Levifusus trabeatoides* Harris, Acad. Nat. Sci. Philadelphia, Proc., v. 47, p. 69, pl. 6, fig. 12, 12a.
1945. *Michela trabeatoides* (Harris). Gardner, Geol. Soc. Amer. Memoir 11, p. 231, pl. 24, fig. 13.
1966. *Michela trabeatoides* (Harris). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 766.

Type locality: Stone City Beds, Stone City Bluff, Brazos River, Texas.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b. For other localities in the Stone City Beds, Weches Formation, and Cook Mountain Formation in Texas, and the Cook Mountain Formation in Louisiana, see Palmer (1966).

Genus **CORONIA** de Gregorio, 1890

Coronia childreni (I. Lea) var. a

Plate 2, figure 6

1966. *Coronia childreni* (I. Lea) var. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, p. 607.
1977. *Coronia childreni* (I. Lea) var. Toulmin, Geol. Survey Alabama, Monograph 13, p. 210, pl. 25, fig. 8.

Occurrence: Mississippi: Bashi Formation, locality 6. Alabama: Greggs Landing Member, Greggs Landing on the Alabama River; Bashi Formation, Woods Bluff on the Tombigbee River.

Coronia childreni (I. Lea) var b.

Plate 18, figure 11

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b.

Coronia childreni novoppidi (Harris)

Plate 41, figures 1, 2, 3, 4

1937. *Gemmula childreni novoppidi* Harris, Paleont. Amer., v. 2, No. 7, p. 12, pl. 1, fig. 19, 20.
1966. *Coronia childreni novoppidi* (Harris). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 2, pt. 2, p. 607.

Type locality: Cook Mountain Formation, Newton, Mississippi.

Occurrence: Mississippi: Cook Mountain Formation, locality 65, Newton.

Coronia margaritosa (Casey)

Plate 41, figure 6

1904. *Gemmula margaritosa* Casey, Acad. Sci. St. Louis, Trans., v. 14, No. 5, p. 135.
1945. ? *Coronia margaritosa* (Casey). Gardner, Geol. Soc. Amer., Mem. 11, p. 240, pl. 27, fig. 7.
1966. *Coronia margaritosa* (Casey). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 609.

Type locality: Weches Formation, Colorado River at Smithville, Texas.

Occurrence: Mississippi: Cook Mountain Formation, locality 65, Hickory. Texas: Weches Formation, Colorado River at Smithville. Mexico: lower Laredo Formation, Nuevo Leon.

Coronia alternata (Conrad)

Plate 41, figure 7

1833. *Pleurotoma alternata* Conrad, Fossil shells Tertiary formations, v. 1, No. 4, p. 46.
1947. *Coronia alternata* (Conrad). Harris *in* Palmer, Bull. Amer. Paleont., v. 30, No. 117, pt. 2, p. 423.
1966. *Coronia*? *alternata* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 605.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Cook Mountain Formation, locality 65, Newton, west of Decatur. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River.

Coronia? cf. **C.**? **casteri** (Harris)

Plate 41, figure 5

1937. *Gemmula* ? *casteri* Harris, Paleont. Amer., v. 2, No. 7, p. 20, pl. 3, fig. 13.

1966. *Coronia* ? *casteri* (Harris). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 606.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Cf. Mississippi: Cook Mountain Formation, locality 64. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River.

Coronia conjuncta (Casey)

Plate 59, figures 9, 10

1904. *Gemmula conjuncta* Casey, Acad. Sci. St. Louis, Trans., v. 14, No. 5, p. 135.
1966. *Coronia conjuncta* (Casey). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 608.
1977. *Coronia conjuncta* (Casey). Dockery, Miss. Geol. Survey, Bull. 120, p. 89, pl. 15, fig. 1.

Type locality: Jackson Group, south of Montgomery, Red River, T. S. Kimbrel estate, Louisiana.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 16. Louisiana: Jackson Group, south of Montgomery, Red River.

Genus **TRYPANOTOMA** Cossmann, 1893

Trypanotoma terebriformis curta Harris

Plate 41, figure 8

1937. *Trypanotoma terebriformis* var. *curta* Harris, Paleont. Amer., v. 2, No. 7, p. 21, pl. 3, fig. 17, 18.
1966. *Trypanotoma terebriformis curta* Harris. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 968.

Type locality: Cook Mountain Formation, Hickory, Mississippi.

Occurrence: Mississippi: Cook Mountain Formation, locality 65, Newton, Hickory. ? Louisiana: Danville Landing Member, Danville Landing on the Ouachita River.

Trypanotoma terebriformis cooperi Harris

Plate 19, figure 5

1937. *Trypanotoma terebriformis cooperi* Harris, Paleont. Amer., v. 2, No. 7, p. 21, pl. 3, fig. 17, 18.
1966. *Trypanotoma terebriformis cooperi* Harris. Palmer and Brann, Bull Amer. Paleont., v. 48, No. 218, pt. 2, p. 968.

Type locality: Cook Mountain Formation, Cooper's test well, Winnfield, Louisiana.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b. Louisiana: Cook Mountain Formation, Cooper's test well at Winnfield.

Genus **SINISTRELLA** Meyer, 1887

Sinistrella americana (Aldrich)

Plate 59, figure 8

1885. *Triforis americana* Aldrich, Cincinnati Soc. Nat. Hist., Jour., v. 8, No. 2, p. 151, pl. 3, fig. 16.
1887. *Sinistrella americana* (Aldrich). Meyer, Senckenberg. Naturf. Gesell, p. 18.
1966. *Sinistrella americana* (Aldrich). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 905.
1977. *Sinistrella americana* (Aldrich). Dockery, Miss. Geol. Survey, Bull. 120, p. 90, pl. 15, fig. 4.

Type locality: Moodys Branch Formation, Jackson, Mississippi.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 9. Louisiana: Jackson Group, Bunker Hill Landing on the Ouachita River; Danville Landing Member, Danville Landing on the Ouachita River. Arkansas: White Bluff Formation, 3/4 mile above Vince Bluff on the Saline River.

Genus **INFRACORONIA** Harris, 1947

Infracoronia ludoviciana (Vaughan)

Plate 41, figure 12

1896. *Pleurotoma ludoviciana* Vaughan, U.S. Geol. Survey, Bull. No. 142, p. 33, 39, pl. 2, fig. 3.
1966. *Infracoronia ludoviciana* (Vaughan). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 710-711.

Type locality: Cook Mountain Formation, Hammetts Branch 2 miles northeast of Mt. Lebanon, Louisiana.

Occurrence: Mississippi: Cook Mountain Formation, Hickory; Archusa Marl, locality 62. Louisiana: Cook Mountain Formation, Hammetts Branch 2 miles northeast of Mt. Lebanon. ? Texas: Weches Formation, Colorado River at Smithville.

Genus **HESPERITURRIS** Gardner, 1945

Hesperiturris nodocarinatus (Gabb)

Plate 18, figure 1

1860. *Turris nodocarinata* Gabb, Acad. Nat. Sci. Philadelphia, Jour., 2nd ser., v. 4, pt. 4, p. 379, pl. 67, fig. 13.

1895. *Pleurotoma (Drillia) nodocarinata* (Gabb). Harris, Acad Nat. Sci. Philadelphia, Proc., v. 47, p. 59 in part, pl. 5, fig.4.
1945. *Hesperiturris nodocarinata* (Gabb). Gardner, Geol. Soc. Amer. Memoir 11, p. 237-239 in part, pl. 24, fig. 3, 4.
1964. *Hesperiturris nodocarinata* (Gabb). Powell, Indo-Pacific Mollusca, v. 1, No. 5, p. 282.
1966. *Hesperiturris nodocarinatus* (Gabb). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 708.

Type locality: Wheelock Member, Cook Mountain Formation, Town Branch of Cedar Creek near Wheelock, Texas.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b. For localities in the Stone City Beds and Cook Mountain Formation of Texas, see Harris (1895, p. 60).

Genus **EOPLEUROTOMA** Cossmann, 1887

Eopleurotoma cainei (Harris)

Plate 2, figure 4

1899. *Pleurotoma cainei* Harris, Bull. Amer. Paleont., v. 3, No. 11, p. 22, pl. 2, fig. 16.
1937. *Eopleurotoma cainei* (Harris). Harris, Paleont. Amer., v. 2, No. 7, p. 27, pl. 4, fig. 7.
1966. *Eopleurotoma cainei* (Harris). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 647.

Type locality: Bashi Formation, Woods Bluff, Tombigbee River, Alabama.

Occurrence: Mississippi: Bashi Formation, locality 18. Alabama: Bashi Formation, Woods Bluff on the Tombigbee River, 3 miles southwest of Thomasville.

Eopleurotoma lisboncola Harris var.

Plate 18, figure 2

1937. *Eopleurotoma lisboncola* var. Harris, Paleont. Amer., v. 2, No. 7, p. 35, pl. 6, fig. 10, 11.
1966. *Eopleurotoma lisboncola* Harris. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 650 in part.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b. Alabama: Lisbon Formation, Lisbon Bluff on the Alabama River.

Eopleurotoma gemmavia Harris

Plate 42, figures 5, 6

1937. *Eopleurotoma gemmavia* Harris, Paleont. Amer., v. 2, No. 7, p. 36, pl. 6, fig. 12, 13, 14?

1966. *Eopleurotoma gemmavia* Harris. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 649.

Type locality: Cook Mountain Formation, Hickory, Mississippi.

Occurrence: Mississippi: Cook Mountain Formation, localities 63, 65, Hickory.

Eopleurotoma sayi (I. Lea)

Plate 18, figure 3

1833. *Pleurotoma Sayi* I. Lea, Contr. Geol., p. 133, pl. 4, fig. 125.
1904. *Eopleurotoma Sayi* (I. Lea). Casey, Acad. Sci. St. Louis, Trans., v. 14, No. 5, p. 158.
1966. *Eopleurotoma sayi* (I. Lea). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 653-654.
1977. *Eopleurotoma sayi* (I. Lea). Toulmin, Geol. Survey Alabama, Monograph 13, p. 285-286, pl. 47, fig. 9

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River, Little Stave Creek.

Eopleurotoma cochlea Harris

Plate 18, figure 4

1937. *Eopleurotoma cochlea* Harris, Paleont. Amer., v. 2, No. 7, p. 33, pl. 5, figure 6.
1966. *Eopleurotoma cochlea* Harris. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 649.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River.

Genus **GLYPTOTOMA** Casey, 1904

Glyptotoma crassiplicata (Gabb)

Plate 18, figure 12

1860. *Scobinella crassiplicata* Gabb, Acad. Nat. Sci. Philadelphia, Jour., 2nd ser., v. 4, pt. 4, p. 380, pl. 67, fig. 19.
1904. *Glyptotoma crassiplicata* (Gabb). Casey, Acad. Sci. St. Louis, Trans., v. 14, No. 5, p. 141.
1966. *Glyptotoma crassiplicata* (Gabb). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 702-703.

1977 *Glyptotoma crassiplicata* (Gabb). Dockery, Miss. Geol. Survey, Bull. 120, p. 91, pl. 15, fig. 14

Type locality: Gabb's type is either from the Wheelock Member (Cook Mountain Formation) at Wheelock in Robertson County, Texas, or from the Stone City Beds at Stone City Bluff, Brazos River (see Palmer and Brann, 1966, p. 703).

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b; Moodys Branch Formation, locality 1. Texas: Wheelock Member, Robertson County; Stone City Beds, Stone City Bluff, Brazos River. Louisiana: Cook Mountain Formation, Sabine River near Columbus.

Genus **PLEUROFUSIA** de Gregorio, 1890

Pleurofusia fluctuosa (Harris)

Plate 59, figure 7

1937. *Turricula fluctuosa* Harris, Paleont. Amer., v. 2, No. 7, p. 81, pl. 12, fig. 1.
1966. *Pleurofusia fluctuosa* (Harris). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 828-829.
1977. *Pleurofusia fluctuosa* (Harris). Dockery, Miss. Geol. Survey, Bull. 120, p. 91-92, pl. 15, fig. 19A, 19B.

Type locality: Moodys Branch Formation, Bunker Hill Landing, Ouachita River, Louisiana.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 9, 16. Louisiana: Moodys Branch Formation, Bunker Hill Landing, Ouachita River.

Genus **ORTHOSURCULA** Casey, 1904

Orthosurcula longiforma (Aldrich)

Plate 76, figure 6

1885. *Pleurotoma (Surcula) longiforma* Aldrich, Cincinnati Soc. Nat. Hist., Jour., v. 8, No. 2, p. 146, pl. 2, fig. 10a, 10b.
1904. *Orthosurcula longiforma* (Aldrich). Casey, Acad. Sci. St. Louis, Trans., v. 14, No. 5, p. 151.
1969. *Orthosurcula longiforma* (Aldrich). Powell, Indo-Pacific Mollusca, v. 2, No. 10, p. 222.

Type locality: Red Bluff Formation, Red Bluff, Mississippi.

Occurrence: Mississippi: Red Bluff Formation, common at localities 37, 38, 39, 40.

Genus EOSURCULA Casey, 1904

Eosurcula moorei (Gabb)

Plate 18, figure 9

1860. *Turris Moorei* Gabb, Acad. Nat. Sci. Philadelphia, Jour., 2nd ser., v. 4, pt. 4, p. 378, pl. 67, fig. 11 (not 9 as in text and plate).
1904. *Eosurcula moorei* (Gabb). Casey, Acad. Sci. St. Louis, Trans., v. 14, No. 5, p. 146 in part.
1966. *Eosurcula moorei* (Gabb). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 656.
1969. *Eosurcula moorei* (Gabb). Powell, Indo-Pacific Mollusca, v. 2, No. 10, p. 222.
1977. *Eosurcula moorei* (Gabb). Toulmin, Geol. Survey Alabama, Monograph 13, p. 286, pl. 47, fig. 8.

Type locality: Stone City Beds, Stone City Bluff, Brazos River, Texas.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b. Texas: Stone City Beds, Stone City Bluff on the Brazos River; Cook Mountain Formation, Colorado River at Smithville; Weches Formation, Drell's Crossing of Elm Creek and Sunnyside Church in Lee County. Louisiana: Cook Mountain Formation, St. Maurice. Alabama: Lisbon Formation, Lisbon Bluff on the Alabama River.

Eosurcula pulcherrima (Heilprin)

Plate 42, figure 4

1879. *Conus pulcherrimus* Heilprin, Acad. Nat. Sci. Philadelphia, Proc., v. 31, p. 213, pl. 13, fig. 8.
1904. *Eosurcula pulcherrima* (Heilprin). Casey, Acad. Sci. St. Louis, Trans., v. 14, No. 5, p. 146.
1966. *Eosurcula pulcherrima* (Heilprin). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt., p. 657.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Cook Mountain Formation, locality 65, Newton. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River. Cf. South Carolina: McBean Formation, Orangeburg.

Genus PROTOSURCULA Casey, 1904

Protosurcula gabbii (Conrad)

Plate 18, figures 5, 6

1865. *Surcula Gabbii* Conrad, Amer. Jour. Conch., v. 1, p. 18.
1904. *Protosurcula gabbi* (Conrad). Casey, Acad. Sci. St. Louis, Trans., v. 14, No. 5, p. 145.

1966. *Protosurcula gabbii* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 851.
1969. *Protosurcula gabbii* (Conrad). Powell, Indo-Pacific Mollusca, v. 2, No. 10, p. 392, pl. 301.

Type locality: ?

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b. Texas: Eocene (horizon not definite), Brazos River, cf. Colorado River at Smithville. Louisiana: Eocene, Sabine River near Columbus. Mexico: lower part of the Laredo Formation, Nuevo Leon.

Genus **HEMISURCULA** Casey, 1904

Hemisurcula hicoricola Harris

Plate 43, figures 1, 2

1937. *Hemisurcula hicoricola* Harris, Paleont. Amer., v. 2, No. 7, p. 66, pl. 11, fig. 23-25.
1966. Cf. *Sullivania hicoricola* (Harris). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 929.

Type locality: Cook Mountain Formation, Hickory, Mississippi.

Occurrence: Mississippi: Cook Mountain Formation, locality 63, Hickory, 1 1/2 miles south of Hickory.

Genus **PSEUDOTOMA** Bellardi, 1875

Pseudotoma sp.?

Plate 42, figure 12

Occurrence: Mississippi: Cook Mountain Formation, locality 63.

Genus **COCHLESPIRA** Conrad, 1865

Cochlespira columbaria (Aldrich)

Plate 60, figure 11

1886. *Pleurotoma (Ancistrosyrinx) columbaria* Aldrich, Geol. Survey Alabama, Bull. No. 1, pt. 1, p. 31, pl. 6, fig. 9.
1904. *Cochlespira columbaria* (Aldrich). Casey, Acad. Sci. St. Louis, Trans., v. 14, No. 5, p. 144.
1966. *Ancistrosyrinx columbaria* Aldrich. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 495.
1977. *Cochlespira columbaria* (Aldrich). Dockery, Miss. Geol. Survey, Bull. 120, p. 95, pl. 15, fig. 18A, 18B.

Type locality: Moodys Branch Formation, Dry Creek, Jackson, Mississippi.

Occurrence: Mississippi: Moodys Branch Formation, Dry Creek in Jackson, localities 1, 2, 16. Louisiana: Moodys Branch Formation, Bunker Hill Landing on the Ouachita River.

Cochlespira sp.

Plate 42, figure 3

Occurrence: Mississippi: Cook Mountain Formation, locality 64.

Cochlespira bella Conrad

Plate 42, figure 2

1865. *Cochlespira bella* Conrad, Amer. Jour. Conch., v. 1, No. 3, p. 210, pl. 21, fig. 6.
1966. Cf. *Ancistrosyrinx bella* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 494.

Type locality: ? Weches Formation, Colorado River at Smithville, Texas.

Occurrence: Mississippi: Cook Mountain Formation, locality 65. Texas: Weches Formation, Colorado River at Smithville.

Genus **COCHLESPIROPSIS** Casey, 1904

Cochlespiropsis engonata (Conrad)

Plate 18, figure 8

1865. *Cochlespira engonata* Conrad, Amer. Jour. Conch, v. 1, p. 20.
1966. *Cochlespira engonata* Conrad. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 589-590.
1969. *Cochlespiropsis engonata* (Conrad). Powell, Indo-Pacific Mollusca, v. 2, No. 10, p. 410, pl. 321.

Type locality: Stone City Beds, Texas.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b. Texas: Stone City Beds, Moseley's Ferry on the Brazos River; Cook Mountain Formation, Colorado River at Smithville.

Genus **SCOBINELLA** Conrad, 1847

Scobinella cf. **S. ferrosilica** Harris

Plate 18, figure 10

1937. *Scobinella ferrosilica* Harris, Paleont. Amer., v. 2, No. 7, p. 71, pl. 12, fig. 26.
1966. *Scobinella ferrosilica* Harris. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 898.

Type locality: McBean Formation, old Columbia road 5 miles north of Orangeburg, South Carolina.

Occurrence: cf. Mississippi: Dobys Bluff Tongue, locality 26b. South Carolina: McBean Formation, 5 miles north of Orangeburg.

Scobinella newtonensis Aldrich

Plate 41, figure 9

1911. *Scobinella newtonensis* Aldrich. Bull. Amer. Paleont., v. 5, No. 22, p. 899.
1966. *Scobinella newtonensis* Aldrich. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 899.

Type locality: Cook Mountain Formation, Newton, Mississippi.

Occurrence: Mississippi: Cook Mountain Formation, locality 65, Newton.

Scobinella louisianae Harris

Plate 60, figure 10

1937. *Scobinella louisianae* Harris, Paleont. Amer., v. 2, No. 7, p. 93, pl. 13, fig. 21.
1966. *Scobinella louisianae* Harris. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 899.
1977. *Scobinella louisianae* Harris. Dockery, Miss. Geol. Survey, Bull. 120, p. 95-96, pl. 15, fig. 15A, 15B.

Type locality: Moodys Branch Formation, Montgomery Landing, Red River, Louisiana.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 9. Louisiana: Moodys Branch Formation, Montgomery Landing on the Red River.

Scobinella pluriplicata Casey

Plate 76, figure 3

1903. *Scobinella pluriplicata* Casey, Acad. Nat. Sci. Philadelphia, Proc., v. 55, p. 273-274.

Type locality: Red Bluff Formation, Red Bluff, Mississippi.

Occurrence: Mississippi: Red Bluff Formation, localities 37, 38.

Scobinella caelata Conrad var.

Plate 76, figure 4

1848a. *Scobinella caelata* Conrad, Acad. Nat. Sci. Philadelphia, Proc., v. 3, p. 290.

1848b. *Scobinella caelata* Conrad. Conrad, Acad. Nat. Sci. Philadelphia, Jour., v. 1, 2nd ser., art. 9, p. 120, pl. 12, fig. 8, 9.

Type locality for *S. caelata* s.s.: Byram Formation, Vicksburg, Mississippi.

Occurrence of *S. caelata* var.: Mississippi: Red Bluff Formation, locality 38.

Subgenus **MONILIOPSIS** Conrad, 1865

Scobinella (Moniliopsis) hammettensis Harris

Plate 41, figure 10

1937. *Scobinella (Moniliopsis) hammettensis* Harris, Paleont. Amer., v. 2, No. 7, p. 68, pl. 12, fig. 5-7.
1966. *Scobinella (Moniliopsis) hammettensis* Harris. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 898.

Type locality: Cook Mountain Formation, probably Hammett's Branch, 2 miles northeast of Mt. Lebanon, Louisiana.

Occurrence: Mississippi: Archusa Marl, locality 62. Louisiana: Cook Mountain Formation, Hammett's Branch 2 miles northeast of Mt. Lebanon, Louisiana.

Genus **CORDIERA** Rouault, 1848

Cordiera biconica newtonensis Harris

Plate 42, figures 7, 8, 9, 11

1937. *Cordieria* [sic] *biconica newtonensis* Harris, Paleont. Amer., v. 2, No. 7, p. 62, pl. 11, fig. 8.
1966. *Cordiera biconica newtonensis* Harris. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 600-601.

Type locality: Cook Mountain Formation, Newton, Mississippi.

Occurrence: Mississippi: Cook Mountain Formation, localities 63, 65, Newton; Archusa Marl, locality 62.

Cordiera biconica curta Harris

Plate 42, figure 10

1937. *Cordieria* [sic] *biconica curta* Harris, Paleont. Amer., v. 2, No. 7, p. 61, pl. 11, fig. 7, 7a.
1966. *Cordiera biconica curta* Harris. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 600.

Type locality: Cook Mountain Formation, Hickory, Mississippi.

Occurrence: Mississippi: Cook Mountain Formation, locality 65, Hickory.

Genus RAPHITOMA Bellardi, 1848

Raphitoma sp.?

Plate 41, figure 11

Occurrence: Mississippi: Cook Mountain Formation, locality 70.

Family CONIDAE Rafinesque, 1815

Genus CONUS Linné, 1758

Subgenus LITHOCONUS Mörch, 1852

Conus (Lithoconus) sauridens Conrad

Plate 19, figures 1, 2, 3

1833. *Conus sauridens* Conrad, Fossil shells Tertiary formations, v. 1, No. 4, p. 33.
1966. *Conus (Lithoconus) sauridens* Conrad. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 597-598.
1977. *Conus (Lithoconus) sauridens* Conrad. Toulmin, Geol. Survey Alabama, Monograph 13, p. 281, pl. 46, fig. 10.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b; Cook Mountain Formation, Wautubbee, Hickory. For other localities in the Cook Mountain Formation of Texas and Louisiana, and the McBean Formation in South Carolina, see Palmer (1966, p. 598).

Conus (Lithoconus) smithvillensis Harris

Plate 43, figure 8

1895. *Conus smithvillensis* Harris, Acad. Nat. Sci. Philadelphia, Proc., v. 47, p. 55, pl. 4, fig. 2.
1937. *Conus (Lithoconus) smithvillensis* Harris. Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 464, pl. 73, fig. 17, 21.
1966. *Conus (Lithoconus) smithvillensis* Harris. Palmer and Brann, Bull Amer. Paleont., v. 48, No. 218, pt. 2, p. 598.

Type locality: Weches Formation, Colorado River at Smithville, Texas.

Occurrence: Mississippi: Cook Mountain Formation, locality 65. Texas: Weches Formation, Colorado River at Smithville.

Family TEREBRIDAE H. and A. Adams, 1854

Genus **HASTULA** H. and A. Adams, 1853

Hastula houstonia (Harris)

Plate 19, figure 4; Plate 43, figure 6

1895. *Terebra houstonia* Harris, Acad. Nat. Sci. Philadelphia, Proc., v. 47, p. 55, pl. 3, fig. 11; pl. 4, fig. 11 as "var."
1937. *Hastula houstonia* (Harris). Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 471, pl. 72, fig. 12-14.
1966. *Hastula houstonia* (Harris). Palmer, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 705.

Type locality: Hurricane Member, Landrum lentil, Cook Mountain Formation, Hurricane Bayou, near Crockett, Texas.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b; Cook Mountain Formation, locality 65. Texas: Hurricane Member, Hurricane Bayou near Crockett. For additional localities see Harris (1895).

Subclass EUTHYNEURA Spengel, 1881

Order ENTOMOTAENIATA Cossmann, 1896

Superfamily PYRAMIDELLACEA Gray, 1840

Family PYRAMIDELLIDAE Gray, 1840

Genus **TURBONILLA** Leach *in* Risso, 1826

Subgenus **STRIOTURBONILLA** Sacco, 1892

Turbonilla (Strioturbonilla) major Meyer

Plate 60, figure 7

1887. *Turbonilla major* Meyer, Acad. Nat. Sci. Philadelphia, Proc., v. 39, p. 51, pl. 3, fig. 3.
1966. *Turbonilla (Strioturbonilla) major* Meyer. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 973.
1977. *Turbonilla (Strioturbonilla) major* Meyer. Dockery, Miss. Geol. Survey, Bull. 120, p. 100, pl. 17, fig. 16, 17, 18.

Type locality: Moodys Branch Formation, Jackson, Mississippi.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 3, 9.

Genus **ODOSTOMIA** Fleming, 1817

Subgenus **EVALEA** A. Adams, 1860

Odostomia (Evalea) melanella alveata (H. C. Lea)

Plate 32, figure 12

1833. *Acteon striatus* I. Lea, Contri. Geol., p. 114, pl. 4, fig. 100. Not *A. striatus* Sowerby, 1824.

1841. *Acteon alveatus* H. C. Lea, Amer. Jour. Sci., 1st ser., v. 40, p. 94 new name.
1937. *Odostomia (Evalea) melanella alveata* (H. C. Lea). Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 85, pl. 7, fig. 6-8; pl. 79, fig. 18.
1966. *Odostomia (Evalea) melanella alveata* (H. C. Lea). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 805.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Cook Mountain Formation, locality 64. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River.

Order CEPHALASPIDEA P. Fischer, 1883
Superfamily ACTEONACEA d'Orbigny, 1842
Family ACTEONIDEA d'Orbigny, 1842
Genus **ACTEON** Montfort, 1810

Acteon idoneus Conrad

Plate 43, figure 5

1833. *Acteon idoneus* Conrad, Fossil shells Tertiary formations, v. 1, No. 3, p. 45.
1966. *Acteon idoneus* Conrad. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 481.
1977. *Acteon idoneus* Conrad. Dockery, Miss. Geol. Survey, Bull. 120, p. 101, pl. 17, fig. 2.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Cook Mountain Formation, locality P731; Archusa Marl, locality 61; Moodys Branch Formation, localities 1, 3. Louisiana: Cook Mountain Formation, locality P741. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River. Texas: Claiborne Group, localities P723, P725, P727. Arkansas: White Bluff Formation, localities P896 (var.), P897.

Genus **TORNATELLAEA** Conrad, 1860

Tornatellaea bella Conrad

Plate 2, figure 8

1860. *Tornatellaea bella* Conrad, Acad. Nat. Sci. Philadelphia, Jour., 2nd ser., v. 4, pt. 3, p. 294, pl. 47, fig. 23.
1899. *Tornatellaea bella* Conrad. Harris, Bull. Amer. Paleont., v. 3, No. 11, p. 6-7, pl. 1, fig. 6.

1966. *Tornatellaea bella* Conrad. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 953.
1977. *Tornatellaea bella* Conrad. Toulmin, Geol. Survey Alabama, Monograph 13, p. 230, pl. 29, fig. 1.

Type locality: Bashi Formation, Woods Bluff, Tombigbee River, Alabama.

Occurrence: Mississippi: Bashi Formation, localities 19, 20. Alabama: Bashi Formation, Woods Bluff on the Tombigbee River, mouth of Bashi Creek, 1½ miles west-southwest of Choctaw Corner, Hatchetigbee Bluff on the Tombigbee River. See Harris (1899, p. 7) for other Alabama localities.

Tornatellaea lata (Conrad in Morton)

Plate 60, figures 1, 2

1834. *Actaeon latus* Conrad *in* Morton, Synopsis Organic Remains Cretaceous Group, Appendix, p. 4.
1865. *Tornatellaea lata* (Conrad). Conrad, Amer. Jour. Conch., v. 1, p. 145, 192, 212, pl. 20, fig. 13.
1966. *Tornatellaea lata* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 953-954.
1977. *Tornatellaea lata* (Conrad). Dockery, Miss. Geol. Survey, Bull. 120, p. 102, pl. 17, fig. 19A, 19B, 20A, 20B.

Type locality: Claiborne Group, Alabama (type locality not differentiated).

Occurrence: Mississippi: Moodys Branch Formation, localities 7, 9, 16. Alabama: Gosport Sand, Little Stave Creek, Baker's Bluff in Washington County, Bladon Springs Road 3/4 mile east of Fail Post Office. Cf. New Jersey: Middle Eocene, Shark River, Monmouth County.

Discussion: The specimens figured (plate 60, figures 1, 2) show considerable variation in the inflation of the whorls and in the punctate appearance of the spiral grooves.

Genus NUCLEOPSIS Conrad, 1865

Nucleopsis subvaricata (Conrad)

Plate 43, figure 3

1860. *Acteonina subvaricata* Conrad, Acad. Nat. Sci. Philadelphia, Jour., 2nd ser., v. 4, pt. 3, p. 294, pl. 47, fig. 22.
1893. *Nucleopsis subvaricatus* (Conrad). Cossmann, Ann. Geol. et Paleont., v. 12, p. 166, pl. 16, fig. 37.
1966. *Nucleopsis subvaricata* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 801.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Cook Mountain Formation, locality 65, Wautubbee. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River.

Superfamily CYLICHACEA A. Adams, 1850

Family CYLICHNIDAE A. Adams, 1850

Genus **SCAPHANDER** Montfort, 1810

Scaphander jacksonensis Palmer

Plate 60, figure 9

1947. *Scaphander jacksonensis* Palmer, Bull. Amer. Paleont., v. 30, No. 117, pt. 2, p. 449-450, pl. 64, fig. 6, 7.
1966. *Scaphander jacksonensis* Palmer. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 893.
1977. *Scaphander jacksonensis* Palmer. Dockery, Miss. Geol. Survey, Bull. 120, p. 102-103, pl. 18, fig. 10A, 10B.

Type locality: Moodys Branch Formation, locality 1.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 3, 9, 16; Yazoo Formation, localities 3, 5.

Genus **ABDEROSPIRA** Dall, 1896

Abderospira oviformis (Meyer)

Plate 60, figure 6

1886. *Cylichna oviformis* Meyer, Geol. Survey Alabama, Bull. No. 1, pt. 2, p. 77, pl. 2, fig. 32.
1947. *Abderospira oviformis* (Meyer). Palmer, Bull. Amer. Paleont., v. 30, No. 117, pt. 2, p. 457, pl. 64, fig. 21, 22.
1966. *Abderospira oviformis* (Meyer). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, p. 474.
1977. *Abderospira oviformis* (Meyer). Dockery, Miss. Geol. Survey, Bull. 120, p. 103-104.

Type locality: Moodys Branch Formation, Jackson, Mississippi.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 3, 9. Louisiana: Moodys Branch Formation, locality P10.

Superfamily BULLACEA Rafinesque, 1815

Family RETUSIDAE Thiele, 1926

Genus **RETUSA** Brown, 1827

Subgenus **CYLICHNINA** Monterosato, 1884

Retusa (Cylichnina) galba (Conrad)

Plate 19, figure 7; Plate 43, figure 4

1833. *Volvaria galba* Conrad, Fossil shells Tertiary formations, v. 1, No. 3, p. 34.
1962. *Retusa (Cylichnina) galba* (Conrad). Glibert, Inst. Roy. Sci. Nat. Belgique, Mem., 10th ser., fasc. 70, p. 57.
1966. *Retusa (Cylichnina) galba* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 878.
1977. *Retusa (Cylichnina) galba* (Conrad). Toulmin, Geol. Survey Alabama, Monograph 13, p. 296-297, p. 49, fig. 6.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b; Cook Mountain Formation, locality 65, Hickory, Wautubbee. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River, Little Stave Creek; Lisbon Formation, Lisbon Bluff on the Alabama River. Louisiana: Cook Mountain Formation, Lapiniere Landing on the east bank of the Ouachita River in Ouachita Parish. Texas: Cook Mountain Formation, Little Brazos River 2½ miles above Stone City, Sabine River opposite middle line of SE/4, Section 35, T.5 N., R.13 W., Sabine Parish, Louisiana.

Retusa (Cylichnina) jacksonensis (Meyer)

Plate 60, figure 5

1886. *Cylichna jacksonensis* Meyer, Geol. Survey Alabama, Bull No. 1, pt. 2, p. 77, pl. 2, fig. 25.
1966. *Retusa (Cylichnina) jacksonensis* (Meyer). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 878.
1977. *Retusa (Cylichnina) jacksonensis* (Meyer). Dockery, Miss. Geol. Survey, Bull. 120, p. 104-105, pl. 17, fig. 9, 10.

Type locality: Moodys Branch Formation, locality 3.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 3, 16. Louisiana: Moodys Branch Formation, localities ? P10, ? P883, P912. Texas: Moodys Branch Formation, locality P922.

Order NOTASPIDEA

Superfamily TYLODINACEA Gray, 1847

Family UMBRACULIDAE Dall, 1889

Genus **UMBRACULUM** Schumacher, 1817

Umbraculum cf. **U. planulatum** (Conrad *in* Wailes)

Plate 43, figure 9

1854. *Umbrella planulata* Conrad *in* Wailes, Rept. Agr. Geol. Mississippi, p. 289, pl. 14, fig. 1a, 1b.
1896. *Umbraculum planulatum* (Conrad). Tyron and Pilsbry, Manual Conch., v. 16, p. 177.
1977. *Umbraculum planulatum* (Conrad). Dockery, Miss. Geol. Survey, Bull. 120, p. 105, pl. 18, fig. 11A, 11B.

Type locality: Moodys Branch Formation, locality 1.

Occurrence: Mississippi: cf. Cook Mountain Formation, locality 63; Moodys Branch Formation, localities 1, 2, 11. Louisiana: Moodys Branch Formation, localities P10, P11, P883.

Class CEPHALOPODA

Subclass NAUTILOIDEA Agassiz, 1847

Order NAUTILIDA Agassiz, 1847

Superfamily NAUTILACEA de Blainville, 1825

Family ATURIIDAE Chapman, 1857

Genus **ATURIA** Bronn, 1838

Aturia cf. **A. alabamensis** (Morton)

Plate 77, figures 7A, 7B

1834. *Nautilus Alabamensis* Morton, Synopsis Org. Remains Cretaceous Group, p. 33, pl. 18, fig. 3.
1865. *Aturia alabamensis* (Morton). Conrad, Amer. Jour. Conch., v. 1, p. 15.
1947. *Aturia alabamensis* (Morton). Miller, Geol. Soc. America Memoir 23, p. 81, pl. 56, fig. 7-9; pl. 57, fig. 1, 2; pl. 58, fig. 1, 2; pl. 59, fig. 1; pl. 60, fig. 1, 2; pl. 61, fig. 1; pl. 62, fig. 2; pl. 63, fig. 1, 2; pl. 64, fig. 1, 2; pl. 65, fig. 1-5; pl. 66, fig. 1, 2.
1966. *Aturia alabamensis* (Morton). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 373.
1977. *Aturia alabamensis* (Morton). Dockery, Miss. Geol. Survey, Bull. 120, p. 106-107, pl. 19, fig. 1-4.

Type locality: Jackson Group, near Claiborne, Monroe County, Alabama.

Occurrence: Mississippi: Cf. Red Bluff Formation, locality 38; Moodys Branch Formation, localities 1, 2, 7, 14. Other occurrences include: The Yazoo Formation in Alabama, the Ocala Group in Florida, and the Castle Hayne Formation in North Carolina (see Miller. 1947, p. 82-83).

Discussion: It is difficult to compare this well-preserved *Aturia* specimen to various species described from internal molds. The suture pattern on the molds, formed by the conjunction of the internal septa and the

outer shell, are important in identification. The Red Bluff specimen is similar to well-preserved specimens of *A. alabamensis* from the Moodys Branch Formation at Jackson, Mississippi (see Dockery 1977, pl. 19, fig. 3A, 3B, 3C). Miller (1947, p. 82-83) records *A. alabamensis* as occurring only in the Jackson Eocene horizon. Comparisons with the Oligocene species *Aturia berryi* Stenzel, 1940, from the Vicksburg Group at Vicksburg, Mississippi, is difficult because it is known from a single specimen preserved as a slightly compressed and distorted internal mold.

Class SCAPHOPODA

Family DENTALIIDAE Gray, 1834

Genus **DENTALIUM** Linné, 1758

Subgenus **ANTALIS** H. and A. Adams, 1854

Dentalium (Antalis) thalloides Conrad

Plate 43, figure 10

1833. *Dentalium thalloides* Conrad, Fossil shells Tertiary formations, v. 1, No. 3, p. 34.
1937. *Dentalium (Antalis) thalloides* Conrad. Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 12, pl. 1, fig. 16, 18-26.
1965. *Dentalium (Antalis) thalloides* Conrad. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 369.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Archusa Marl, locality 61. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River.

Dentalium (Antalis) minutistriatum Gabb

Plate 43, figure 11

1860. *Dentalium minutistriatum* Gabb, Acad. Nat. Sci. Philadelphia, Jour., 2nd ser., v. 4, p. 386, pl. 67, fig. 46.
1937. *Dentalium (Antalis) minutistriatum* Gabb. Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 17, fig. 33-36, 38, 41.
1966. *Dentalium (Antalis) minutistriatum* Gabb. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 368.

Type locality: Wheelock Member, Town Branch of Cedar Creek near Wheelock, Texas.

Occurrence: Mississippi: Cook Mountain Formation, localities 67, 69, P728, P732. Texas: Wheelock Member, Town Branch of Cedar Creek near Wheelock. For other localities in Texas, Louisiana, Alabama, and South Carolina, see Palmer (1937, p. 18).

Dentalium (Antalis) mississippiense jacksonense Palmer

Plate 60, figure 4

1947. *Dentalium (Antalis) mississippiense jacksonense* Palmer, Bull. Amer. Paleont., v. 30, No. 117, pt. 2, p. 212-213, pl. 26, fig. 20-22.
1966. *Dentalium (Antalis) mississippiense jacksonense* Palmer. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 366.
1977. *Dentalium (Antalis) mississippiense jacksonense* Palmer. Dockery, Miss. Geol. Survey, Bull. 120, p. 107, pl. 18, fig. 1.

Type locality: Moodys Branch Formation, Jackson, Mississippi.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 3, 9; Yazoo Formation, localities 3, 5. Louisiana: Moodys Branch Formation, localities P1, P7, P8, P883, P912, P1119. Texas: Moodys Branch Formation, locality P1121.

Family SIPHONODENTALIIDAE Simroth, 1894

Genus **CADULUS** Philippi, 1844

Cadulus sp.

Plate 10, figure 2

1895. *Cadulus subcoarctatus* [*sic*] Gabb. Aldrich, Bull. Amer. Paleont., v. 1, No. 2, p. 4, pl. 1, fig. 4. Not *C. subcoarcuatus* (Gabb, 1860).
1899. *Cadulus abruptus* Meyer and Aldrich. Harris, Bull. Amer. Paleont., v. 3, No. 11, p. 5 in part, pl. 1, fig. 3. Not *C. abruptus* Meyer and Aldrich, 1886.
1965. *Cadulus* sp. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 365.
1977. *Cadulus* sp. Toulmin, Geol. Survey Alabama, Monograph 13, p. 202, pl. 23, fig. 2.

Occurrence: Mississippi: Bashi Formation, localities 19, 20. Alabama: Bashi Formation, Woods Bluff on the Tombigbee River, 1¼ miles west-southwest of Choctaw Corner; Hatchetigbee Formation, 4 miles below Hamilton Bluff on the Alabama River. Texas: Sabinetown Formation, bluff ¼ mile downstream from Sabinetown Ferry Landing on the Sabine River.

Subgenus **POLYSCHIDES** Pilsbry and Sharp, 1898

Cadulus (Polyschides) jacksonensis Meyer

Plate 60, figure 3

1885. *Cadulus jacksonensis* Meyer, Amer. Jour. Sci., ser. 3, v. 29, p. 462, 468.

1965. *Cadulus (Polyschides) jacksonensis* Meyer. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 362.
1977. *Cadulus (Polyschides) jacksonensis* Meyer. Dockery, Miss Geol. Survey, Bull. 120, p. 109, pl. 18, fig. 4.

Type locality: Moodys Branch Formation, Jackson, Mississippi.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 3, 9. Louisiana: Moodys Branch Formation, localities P10, P883.

Class BIVALVIA
Subclass PALAEOTAXODONTA Korobkov, 1954
Order NUCULOIDA Dall, 1889
Superfamily NUCULACEA Gray, 1824
Family NUCULIDAE Gray, 1824
Genus **NUCULA** Lamarck, 1799
Subgenus **NUCULA** Lamarck, 1799

Nucula (Nucula) mauricensis Harris

Plate 19, figures 8A, 8B

1919. *Nucula magnifica mauricensis* Harris, Bull. Amer. Paleont., v. 6, No. 31, p. 74, pl. 26, fig. 4-6.
1957. *Nucula (Nucula) mauricensis* Harris. Stenzel, Krause, and Twining, Univ. Texas Pub. 5704, p. 43, pl. 4, fig. 1-4.
1965. *Nucula (Nucula) mauricensis* Harris. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 210.

Type locality: Cook Mountain Formation, Orell's Crossing, Elm Creek, Lee County, Texas.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b. Texas: Cook Mountain Formation, Orell's Crossing on Elm Creek; also occurs in the Stone City Beds and the Weches Formation.

Nucula (Nucula) spheniopsis Conrad

Plate 61, figures 1A, 1B, 2A, 2B

1865. *Nucula spheniopsis* Conrad, Amer. Jour. Conch., v. 1, p. 140, pl. 10, fig. 13.
1965. *Nucula (Nucula) spheniopsis* Conrad. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 213.
1977. *Nucula (Nucula) spheniopsis* Conrad. Dockery, Miss. Geol. Survey, Bull. 120, p. 110, pl. 20, fig. 6, 7.

Type locality: Moodys Branch Formation, locality 9.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 9, 16.

Nucula sp.

Plate 44, figures 3A, 3B

Occurrence: Mississippi: Cook Mountain Formation, locality 65.

Superfamily NUCULANACEA H. & A. Adams, 1858

Family NUCULANIDAE H. & A. Adams, 1858

Genus **HILGARDIA** Harris, 1946

Hilgardia multilineata (Conrad *in* Wailes)

Plate 44, figures 4A, 4B; Plate 61, figures 3, 5, 6A, 6B

1854. *Leda multilineata* Conrad *in* Wailes, Rept. Agr. Geol. Mississippi, p. 289, pl. 14, fig. 4.
1946. *Nuculana (Hilgardia) multilineata* (Conrad). Harris, Bull. Amer. Paleont., v. 30, No. 117, pt. 1, p. 59, pl. 14, fig. 2-6.
1965. *Nuculana (Hilgardia) multilineata* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 221.
1969. *Hilgardia multilineata* (Conrad). Puri, Treatise Invert. Paleont., pt. N, v. 1, p N237, fig. A7, 7a, 7b, 7c.
1977. *Hilgardia multilineata* (Conrad). Dockery, Miss. Geol. Survey, Bull. 120, p. 110-111, pl. 20, fig. 3A, 3B, 4A, 4B.

Type locality: Moodys Branch Formation, Jackson, Mississippi.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 9, 16; Cook Mountain Formation, locality 65. Louisiana: Moodys Branch Formation, Montgomery Landing on the Red River and at various localities on the Ouachita River. Arkansas: White Bluff Formation, Vince Bluff on the Saline River and Cross Roads Church about 5 miles northwest of Kingsland.

Genus **YOLDIA** Möller, 1842

Subgenus **CALORHADIA** Stewart, 1930

Yoldia (Calorhadia) compsa Gabb

Plate 22, figure 3

1860. *Leda compsa* Gabb, Acad. Nat. Sci. Philadelphia, Jour., 2nd ser., v. 4, p. 387, pl. 67, fig. 57.
1945. *Calorhadia (Litorhadia) compsa* (Gabb). Gardner, Geol. Soc. Amer. Memoir 11, p. 45.
1957. *Calorhadia (Calorhadia) compsa* (Gabb). Stenzel, Krause, and Twining, Univ. Texas. Pub. 5704, p. 47, pl. 4, fig. 8, 9, 12-14.

Type locality: Stone City Beds, Stone City Bluff, Brazos River, Texas.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b. Texas: Stone City Beds, Stone City Bluff on the Brazos River.

Yoldia (Calorhadia) mater (Meyer)

Plate 61, figures 4A, 4B

1885. *Leda mater* Meyer, Amer. Jour. Sci., 3rd ser., v. 29, p. 460.
1939. *Calorhadia mater* (Meyer). Gardner, Jour. Paleont., v. 13, p. 341.
1965. *Calorhadia* (? *Calorhadia) mater* (Meyer). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 65.
1977. *Yoldia (Calorhadia) mater* (Meyer). Dockery, Miss. Geol. Survey, Bull. 120, p. 111, pl. 20, fig. 1A, 1B.

Type locality: Moodys Branch Formation, Jackson, Mississippi.

Occurrence: Mississippi: Moodys Branch Formation, localities 7, 9, 16. Arkansas: White Bluff Formation, Vince Ferry on the Saline River and Cross Roads Church about 5 miles northwest of Kingston. Texas: Rio Grande Embayment.

Subclass PTERIOMORPHIA Beurlen, 1944

Order ARCOIDA Stoliczka, 1871

Superfamily ARCACEA Lamarck, 1809

Family ARCINAE Lamarck, 1809

Genus **BARBATIA** Gray, 1842

Subgenus **PLAGIARCA** Conrad, 1875

Barbatia (Plagiarca) rhomboidella Lea

Plate 21, figures 4, 5A, 5B

1833. *Arca rhomboidella* Lea, Contr. Geol., p. 74, pl. 2, fig. 52.
1935. *Barbatia (Plagiarca) rhomboidella* (Lea). Reinhart, Mus. Roy. Hist. Nat. Belgique, Bull., v. 11, No. 13, p. 30.
1965. *Barbatia (Plagiarca) rhomboidella* (Lea). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 46-47.
1977. *Barbatia (Plagiarca) rhomboidella* (Lea). Toulmin, Geol. Survey Alabama, Monograph 13, p. 240, pl. 32, fig. 1, 2.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b; Cook Mountain Formation, Newton, Wautubbee. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River; Lisbon Formation, base of Claiborne Bluff and Lisbon Bluff on the Alabama River. Louisiana: Cook Mountain Formation, St. Maurice, Hammetts Branch in Bienville Parish, 3 miles

northeast of Negreet. Texas: Cook Mountain Formation, Lee County. South Carolina: McBean Formation, Orangeburg.

Subgenus **ACAR** Gray, 1857

Barbatia (Acar) aspera (Conrad *in* Wailes)

Plate 44, figures 5A, 5B

1854. *Navicula aspera* Conrad *in* Wailes, Rept. Agri. Geol. Mississippi, p. 298, pl. 14, fig. 5.
1946. *Barbatia (Acar) aspera* (Conrad). Harris, Bull. Amer. Paleont., v. 30, No. 117, pt. 1, p. 47-48, pl. 11, fig. 12, 13.
1965. *Barbatia (Acar) aspera* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 43.
1977. *Barbatia (Acar) aspera* (Conrad). Dockery, Miss.' Geol. Survey, Bull. 120, p. 112, pl. 20, fig. 2A, 2B.

Type locality: Moodys Branch Formation, Jackson, Mississippi.

Occurrence: Mississippi: Cook Mountain Formation, locality 63, Hickory; Moodys Branch Formation, locality 2. Texas: Weches Formation, Colorado River at Smithville.

Subgenus **CUCULLAEARCA** Conrad, 1865

Barbatia (Cucullaearca) ludoviciana (Harris)

Plate 21, figures 6A, 6B; Plate 62, figures 1A, 1B, 2A, 2B

1919. *Arca (cuculloides ?) ludoviciana* Harris, Bull. Amer. Paleont., v. 6, No. 31, p. 54, pl. 22, fig. 8-16.
1957. *Barbatia (Cucullaearca) ludoviciana* (Harris). Stenzel, Krause, and Twining, Univ. Texas Pub. 5704, p. 58.
1965. *Barbatia (Cucullaearca) ludoviciana* (Harris). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, p. 46.
1977. *Barbatia (Cucullaearca) ludoviciana* (Harris). Toulmin, Geol. Survey Alabama, Monograph 13, p. 184, pl. 13, fig. 1, 2.

Type locality: Pendleton Ferry Formation, right bank of Sabine River at Pendleton, Texas.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b; Moodys Branch Formation, locality 16. Texas: Pendleton Ferry Formation, Sabine River at Pendleton. Louisiana: Cook Mountain Formation, Roberta in Bossier Parish. Alabama: Gosport Sand locality 29. For other localities, see Harris (1919, p.54) and Toulmin (1977, p. 184).

Barbatia sp.

Plate 75, figure 5

Occurrence: Shubuta Clay Member, Yazoo Formation, locality 35.

Genus **ANADARA** Gray, 1847

Anadara vaughani (Casey)

Plate 44, figures 1A, 1B, 2A, 2B

1896. *Arca rhomboidella* Lea var. Vaughan, U.S. Geol. Survey, Bull. 142, p. 37, pl. 3, fig. 8.
1903. *Arca vaughani* Casey, Acad. Nat. Sci. Philadelphia, Proc., v. 55, p. 265.
1917. *Arca (Scapharca) vaughani* Casey. Sheldon, Paleont. Amer., v. 1, No. 1, p. 31, pl. 7, fig. 11.
1945. *Anadara* sp. cf. *A. vaughani* (Casey). Gardner, Geol. Soc. Amer. Memoir 11, p. 55.
1965. *Barbatia (Plagiarca) vaughani* (Casey). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 48.

Type locality: Cook Mountain Formation, St. Maurice, Winn Parish, Louisiana.

Occurrence: Mississippi: Cook Mountain Formation, locality 65; Archusa Marl, locality 27. Louisiana: Cook Mountain Formation, St. Maurice. Texas: Cook Mountain Formation, Sabine River in Sabine County.

Family NOETIIDAE Stewart, 1930

Genus **PACHECOA** Harris, 1919

Subgenus **PACHECOA** Harris, 1919

Pachecoa (Pachecoa) declivis (Conrad, 1833)

Plate 22, figures 5A, 5B

1833. *Pectunculus declivis* Conrad, Fossil shells Tertiary formations, v. 1, No. 4, p. 39.
1957. *Pachecoa (Pachecoa) declivis* (Conrad). Stenzel, Krause, and Twining, Univ. Texas Pub. 5704, p. 69.
1965. *Pachecoa (Pachecoa) declivis* (Conrad). Palmer and Brann, Bull. Amer Paleont., v. 48, No. 218, pt. 1, p. 245-246.

Type locality: Lisbon Formation, base of Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b; Cook Mountain Formation, Wautubbee. Alabama: Lisbon Formation, base of Claiborne Bluff and Lisbon Bluff on the Alabama River.

Superfamily LIMOPSACEA Dall, 1895

Family LIMOPSIDAE Dall, 1895

Genus **LIMOPSIS** Sassi, 1827

Limopsis aviculoides (Conrad) var.

Plate 45, figures 1A, 1B, 2A, 2B, 3A, 3B

1919. *Limopsis aviculoides* (Conrad). Harris, Bull. Amer. Paleont., v. 6, No. 31, p. 36 in part, pl. 18, fig. 2.
1965. *Limopsis aviculoides* (Conrad) "var." Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 172.

Occurrence: Mississippi: Cook Mountain Formation, locality 65, Hickory, Wautubbee, 8 miles northeast of Enterprise; Archusa Marl, locality 26a. Louisiana: Cook Mountain Formation, Sabine River in the SE corner of Section 36, T.5 N., R.13 W., Sabine Parish and Winnfield.

Family GLYCYMERIDIDAE Newton, 1922

Genus **GLYCYMERIS** da Costa, 1778

Subgenus **GLYCYMERIS** da Costa, 1778

Glycymeris (Glycymeris) lisbonensis Harris

Plate 45, figures 4A, 4B, 5

1919. *Glycymeris lisbonensis* Harris, Bull. Amer. Paleont., v. 6, No. 31, p. 48, pl. 20, fig. 12-15.
1965. *Glycymeris lisbonensis* Harris. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 153.

Type locality: Lisbon Formation, Lisbon Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Cook Mountain Formation, Wautubbee; Archusa Marl, localities 26a, 27. Cf. Florida: Upper Eocene, 2.9 miles south of Gulf Hammock in Levy County.

Glycymeris (Glycymeris) idonea (Conrad)

Plate 62, figures 3A, 3B

1833. *Pectunuculus idoneus* Conrad, Fossil shells Tertiary formations, v. 1, No. 4, p. 39.
1901. *Glycymeris idoneus* (Conrad). Clark and Martin, Systematic paleontology, Eocene, Mollusca *in* Maryland Geol. Survey, Eocene, p. 152.
1965. *Glycymeris idonea* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 152.
1977. *Glycymeris (Glycymeris) idonea* (Conrad). Dockery, Miss. Geol. Survey, Bull. 120, p. 113-114, pl. 21, fig. 1A, 1B, 5A, 5B.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 9,

10, 11, 14, 16. Louisiana: Moodys Branch Formation, Montgomery Landing on the Red River. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River and Little Stave Creek.

Glycymeris (Glycymeris) filosa (Conrad *in* Wailes)

Plate 61, figures 7A, 7B; Plate 62, figures 4A, 4B

1854. *Glossus filosus* Conrad *in* Wailes, Rept. Agr. Geol. Mississippi, p. 289, pl. 14, fig. 8.
1898. *Glycymeris filosa* (Conrad). Dall, Wagner Free Inst. Sci., Trans., v. 3, pt. 4, p. 607.
1965. *Glycymeris filosa* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 151.
1977. *Glycymeris (Glycymeris) filosa* (Conrad). Dockery, Miss. Geol. Survey, Bull. 120, p. 114-115, pl. 21, fig. 3, 4A, 4B, 6, 7A, 7B.

Type locality: Moodys Branch Formation, Jackson, Mississippi.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 7, 9. Louisiana: Moodys Branch Formation, Montgomery Landing on the Red River.

Glycymeris arctata (Conrad)

Plate 82, figure 4

1848. *Pectunculus arctatus* Conrad, Acad. Nat. Sci. Philadelphia, Proc., v. 3, p. 294.
1848. *Pectunculus arctatus* Conrad. Conrad, Acad. Nat. Sci. Philadelphia, Jour., 2nd ser., v. 1, pt. 2, p. 125, pl. 13, fig. 24.
1898. *Glycymeris arctata* (Conrad). Dall, Wagner Free Inst. Sci., Trans., v. 3, pt. 4, p. 607.

Type locality: Probably the Byram Formation, Vicksburg, Mississippi.

Occurrence: Mississippi: Byram Formation, Vicksburg; Glendon Limestone, locality 42.

Order MYTILOIDA Ferussac, 1822

Superfamily MYTILACEA Rafinesque, 1815

Family MYTILIDAE Rafinesque, 1815

Genus **CRENELLA** Brown, 1827

Crenella isocardioides (Lea)

Plate 68, figures 3A, 3B

1833. *Hippagus isocardioides* Lea, Contr. Geol., p. 72, pl. 2, fig. 50.
1898. *Crenella isocardioides* (Lea). Dall, Wagner Free Inst. Sci., Trans., v. 3, pt. 4, p. 803.

1965. *Crenella isocardioides* (Lea). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 114.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Moodys Branch Formation, locality 16. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River.

Order PTERIOIDA Newell, 1965

Suborder PTERIINA Newell, 1965

Superfamily PECTINACEA Rafinesque, 1815

Family PECTINIDAE Rafinesque, 1815

Genus **EBURNEOPECTEN** Conrad, 1865

Subgenus **EBURNEOPECTEN** Conrad, 1865

Eburneopecten (Eburneopecten) scintillatus Conrad

Plate 63, figures 1, 2

1865. *Pecten (Eburneopecten) scintillatus* Conrad, Amer. Jour., Conch., v. 1, p. 140, pl. 10, fig. 4.
1939. *Eburneopecten scintillatus* Conrad. Gardner, Jour. Paleont., v. 13, p. 341.
1965. *Eburneopecten scintillatus* Conrad. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 135.
1969. *Eburneopecten (Eburneopecten) scintillatus* Conrad. Hertlein, Treatise Invert. Paleont., pt. N, v. 1, p. N352, fig. C75, 1a, 1b.
1977. *Eburneopecten (Eburneopecten) scintillatus* Conrad. Dockery, Miss. Geol. Survey, Bull. 120, p. 116, pl. 22, fig. 3A, 3B, 4A, 4B.

Type locality: Moodys Branch Formation, locality 9.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 9, 16.

Eburneopecten sp.

Plate 47, figure 3

Occurrence: Mississippi: Archusa Marl Member, Cook Mountain Formation, locality 26a.

Genus **CHLAMYS** Röding, 1798

Chlamys choctavensis (Aldrich)

Plate 5, figure 3

1895. *Pecten choctavensis* Aldrich, Bull. Amer. Paleont., v. 1, No. 2, p. 16, pl. 5, fig. 7.

1897. *Chlamys choctavensis* (Aldrich). Harris, Bull. Amer. Paleont., v. 2, No. 9, p. 46, pl. 7, fig. 6.
1965. *Chlamys choctavensis* (Aldrich). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 82.
1977. *Chlamys choctavensis* (Aldrich). Toulmin, Geol. Survey Alabama, Monograph 13, p. 185-186 pl. 13, fig. 3, 4.

Type locality: Bashi Formation, Choctaw Corner, Clarke County, Alabama.

Occurrence: Mississippi: Bashi Formation, locality 19. Alabama: Bashi Formation, Choctaw Corner, Woods Bluff on the Tombigbee River. Maryland: Nanjemoy Formation, Popes Creek in Charles County, 1 1/2 miles above Popes Creek in Charles County.

Chlamys clarkeana (Aldrich)

Plate 11,figures 1, 4A, 4B; Plate 13, figure 1

1895. *Pecten clarkeanus* Aldrich, Bull. Amer. Paleont.. v. 1, No. 2, p. 16, pl. 5, fig. 7.
1936. *Chlamys (Chlamys) clarkeanus* (Aldrich). Tucker, Amer. Midland Nat., v. 17, p. 990 in part, pl. 5, fig. 1; pl. 7, fig. 6, pl. 10, fig. 5, 12.
1965. *Chlamys clarkeana* (Aldrich). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 82.
1977. *Chlamys clarkeana* (Aldrich). Toulmin, Geol. Survey Alabama, Monograph 13, p. 245, pl. 33, fig. 15, 16.

Type locality: Lisbon Formation, Sowilpa Creek, Choctaw County, Alabama.

Occurrence: Mississippi: Winona Formation, locality 22. Alabama: Lisbon Formation, Sowilpa Creek, Hamilton Bluff on the Alabama River, Lisbon Bluff on the Alabama River; Tallahatta Formation (see Toulmin, 1977, p. 245).

Chlamys burlesonensis (Harris)

Plate 13, figures 2, 4

1898. *Pecten (Chlamys) clarkeanus* Aldrich. Dall, Wagner Free Inst. Sci., Trans., v. 3, pt. 4, p. 739 in part.
1919. *Pecten (clarkeanus* ? var.) *burlesonensis* Harris, Bull. Amer. Paleont., v. 6, No. 31, p. 26, pl. 14, fig. 11-13.
1965. *Chlamys burlesonensis* (Harris). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 81.

Type locality: Weches Formation, Burleson Shell Bluff, Brazos River, Burleson County, Texas.

Occurrence: Mississippi: Tallahatta Formation, locality 24; Winona

Formation, locality 23. Texas: Weches Formation, Burleson Shell Bluff on the Brazos River, Colorado River at Smithville.

Chlamys cainei (Harris)

Plate 47, figures 4A, 4B

1919. *Pecten willcoxi cainei* Harris, Bull. Amer. Paleont., v. 6, No. 31, p. 24, pl. 14, fig. 8.
1936. *Chlamys (Chlamys) cainei* (Harris). Tucker, Amer. Midland Nat., v. 17, p. 987, pl. 5, fig. 11.
1965. *Chlamys cainei* (Harris). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 81.

Type locality: Cook Mountain Formation, Wautubbee, Mississippi.

Occurrence: Mississippi: Cook Mountain Formation, Wautubbee, Hickory; Archusa Marl, locality 26a.

Chlamys wahtubbeana Dall

Plate 47, figures 1, 2, 5

1898. *Pecten (Chlamys) wahtubbeanus* Dall, Wagner Free Inst. Sci., Trans., v. 3, pt. 4, p. 736, pl. 34, fig. 9.
1936. *Chlamys (Chlamys) wautubbeanus* Dall. Tucker, Amer. Midland Nat., v. 17, p. 992, pl. 5, fig. 7-9; pl. 9, fig. 4.
1965. *Chlamys wahtubbeana* Dall. Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 88-89.

Type locality: Cook Mountain Formation, Indian Mound 3 miles east of Newton on the A. and V. Railroad.

Occurrence: Mississippi: Cook Mountain Formation, Wautubbee, Hickory, 8 miles west of Enterprise, Indian Mound on the A. and V. Railroad; Archusa Marl, localities 27, 61. Alabama: Lisbon Formation, base of Claiborne Bluff on the Alabama River, Coffeeville. Louisiana: Cook Mountain Formation, St. Maurice, Simpkins place 3 miles southeast of Negreet.

Subgenus **AEQUIPECTEN** Fischer, 1886

Chlamys (Aequipecten) nupera (Conrad *in* Wailes)

Plate 63, figure 4

1854. *Pecten nuperus* Conrad *in* Wailes, Rept. Agr. Geol. Mississippi, p. 289, pl. 14, fig. 11.
1936. *Chlamys (Chlamys) nuperus* (Conrad). Tucker, Amer. Midland Nat., v. 17, p. 1000, pl. 10, fig. 6.
1965. *Chlamys nupera* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 86.
1977. *Chlamys (Aequipecten) nupera* (Conrad). Dockery, Miss. Geol. Survey, Bull. 120, p. 117, pl. 22, fig. 1A, 1B, 2A, 2B.

Type locality: Moodys Branch Formation, Jackson, Mississippi.

Occurrence: Mississippi: Moodys Branch Formation, common at Jackson, locality 9. Louisiana: Moodys Branch Formation, Montgomery Landing. Georgia: lower Jackson Group, Russell Springs. Florida: lower Jackson Group, Arrendondo.

Chlamys spillmani (Gabb)

Plate 75, figures 1A, 1B

1860. *Pecten spillmani* Gabb, Acad. Nat. Sci. Philadelphia, Jour., 2nd ser., v. 4, pt. 4, p. 402, pl. 68, fig. 3.
1965. *Chlamys spillmani* (Gabb). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 87.
1977. *Chlamys spillmani* (Gabb). Toulmin, Geol. Survey Alabama, Monograph 13, p. 315, pl. 56, fig. 1-3.

Type locality: Yazoo Formation, Alabama.

Occurrence: Mississippi: Pachuta Marl Member, localities 32, 57b. Alabama: common in the Pachuta Marl at St. Stephens Quarry in Washington County. Florida: upper Jackson Group, east of Kendrick, 6 miles southwest of Ocala, Dixie Lime Products Company at Reddick. Georgia: upper Jackson Group, Clinchfield Quarry 2.9 miles south of Perry, Georgia Lime Rock Quarry about 4 miles from Perry.

Chlamys sp.

Plate 74, figure 4

Occurrence: Cocoa Sand Member, Yazoo Formation, locality 31.

Genus **PECTEN** Müller, 1776

Subgenus **PECTEN** Müller, 1776

Pecten (Pecten) perplanus Morton

Plate 78, figure 3

1833. *Pecten perplanus* Morton, Amer. Jour. Sci., ser. 1, v. 23, p. 293, pl. 5, fig. 5.
1834. *Pecten perplanus* Morton. Morton, Synop. organic remains, Cretaceous Group, p. 58, pl. 5, fig. 5, pl. 15, fig. 8.
1933. *Pecten perplanus* Morton. Cooke, Amer. Assoc. Petroleum Geol. Bull., v. 17, No. 11, p. 1388.
1969. *Pecten perplanus perplanus* Morton. Glawe, Geol. Survey Alabama, Bull. 91, p. 40-44, pl. 2, fig. 1-10.

Type locality: Neotype (Louisiana State University Geology Museum No. 8053, right valve. Glawe, 1969, p. 41): Red Bluff Formation, Pelham Quarry, St. Stephens, Alabama.

Occurrence: Mississippi: Red Bluff Formation, localities 37, 38, 40. Alabama: Red Bluff Formation and lower Marianna Limestone of western Alabama. Florida: Bumpnose Limestone.

Discussion: Glawe (1969, p. 41) designated a neotype from the Red Bluff Formation because the type of *P. perplanus* was missing. Morton in his original description said that *P. perplanus* was found with *Chlamys anatipes* Morton in the "overlying limestone of Claiborne, Alabama." *C. anatipes* has been found by the writer in the lower part of the Marianna Limestone; Glawe (1969, p. 94) records it from the Red Bluff Formation. According to Cooke (1933, p. 1388), *P. perplanus* was originally applied to the flat valve of *P. poulsoni* Morton and is, therefore, a synonym of *P. poulsoni*.

Pecten (Pecten) poulsoni Morton

Plate 80, figure 8; Plate 81, figures 1-8; Plate 82, figure 3

1834. *Pecten poulsoni* Morton, Synop. organic remains, Cretaceous Group, p. 59, pl. 19, fig. 2.
1969. *Pecten perplanus poulsoni* Morton. Glawe, Geol. Survey Alabama, Bull. 91, p. 44, 48-51, pl. 1, fig. 3; pl. 3, fig. 1, 3, 4, 6.

Type locality: ?

Occurrence: Mississippi: Common in the Mint Spring Formation and Marianna Limestone, also found in the upper part of the Forest Hill Formation in Wayne County and in the lower part of the Glendon Limestone. Alabama: Marianna Limestone and lower Glendon Limestone.

Pecten (Pecten) byramensis Gardner

Plate 82, figures 5, 6

1945. *Pecten (Pecten) byramensis* Gardner, Geol. Soc. Amer. Memoir 11, p. 62-63, pl. 10, fig. 1-4.
1969. *Pecten perplanus byramensis* Gardner. Glawe, Geol. Survey Alabama, Bull. 91, p. 51-54, pl. 1, fig. 7; pl. 3, fig. 2, 5, 7, 8; pl. 4, fig. 3, 6.

Type locality: Cotypes: Right valve, U.S. Nat. Mus. 370818, Byram Formation, Pearl River just above bridge at Byram; Left valve, U.S. Nat. Mus. 370819, Byram Formation, Vicksburg, Mississippi.

Occurrence: Mississippi: Common in the Byram Formation and Glendon Limestone. Mexico: Oligocene beds of Tamaulipas. Louisiana: Rosefield Formation. Alabama: Byram Formation and Glendon Limestone. Florida: Suwannee Limestone.

Discussion: This species can be distinguished from *P. poulsoni* by its

square shouldered and trilirate ribs. The ribs of *P. poulsoni* are rounded or unilirate.

Superfamily ANOMIACEA Rafinesque, 1815
Family ANOMIIDAE Rafinesque, 1815
Genus **ANOMIA** Linné, 1758

Anomia sp.
Plate 47, figure 9

Occurrence: Mississippi: Archusa Marl, locality 26a

Family PLICATULIDAE Watson, 1930
Genus **PLICATULA** Lamarck, 1801

Plicatula filamentosa concentrica Dall
Plate 47, figures 6A, 6B, 8A, 8B

1898. *Plicatula filamentosa concentrica* Dall, Wagner Free Inst. Sci., Trans., v. 3, pt. 4, p. 762.
1965. *Plicatula filamentosa concentrica* Dall. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 281.

Type locality: Cook Mountain Formation, Wautubbee, Mississippi.

Occurrence: Mississippi: Archusa Marl, locality 62. Louisiana: Cook Mountain Formation, Columbus, Negreet. Texas: Cook Mountain Formation, Cherokee, Anderson, Houston, and Robertson Counties.

Plicatula filamentosa planata Meyer and Aldrich
Plate 23, figure 6; Plate 48, figures 1, 2, 3

1886. *Plicatula planata* Meyer and Aldrich, Cincinnati Soc. Nat. Hist., Jour., v. 9, No. 2, p. 45, pl. 2, fig. 20.
1898. *Plicatula filamentosa concentrica* Meyer and Aldrich. Dall, Wagner Free Inst. Sci., Trans., v. 3, pt. 4, p. 762 as mutatium *P. filamentosa* Conrad.
1965. *Plicatula filamentosa planata* Meyer and Aldrich. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 281.

Type locality: Cook Mountain Formation, Newton, Mississippi.

Occurrence: Mississippi: Cook Mountain Formation, locality 25, Newton, Hickory, Wautubbee; Archusa Marl, locality 27. Louisiana: Cook Mountain Formation, Cooper's well depth 1000 feet at Winnfield, St. Maurice.

Plicatula filamentosa Conrad, 1833 var.?
Plate 47, figure 7

Occurrence: Archusa Marl, locality 27.

Family SPONDYLIDAE Gray, 1826
Genus **SPONDYLUS** Linné, 1758
Subgenus **SPONDYLUS** Linné, 1758

Spondylus (Spondylus) dumosus (Morton)
Plate 78, figures 1, 2, 5A, 5B; Plate 79, figures 1A, 1B, 2, 3A, 3B

1834. *Plagiostoma dumosum* Morton, Synop. organic remains Cretaceous Group, p. 59, pl. 16, fig. 8, text fig. p. 60.
1865. *Spondylus dumosus* (Morton). Conrad, Amer. Jour. Conch., v. 1, No. 1, p. 14.
1965. *Spondylus dumosus* (Morton). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 300.

Type locality: Red Bluff Formation, St. Stephens Bluff, Tombigbee River, Alabama.

Occurrence: Mississippi: Red Bluff Formation, localities 37, 38, 39, 40. Alabama: Red Bluff Formation, St. Stephens Bluff on the Tombigbee River, Pelham Quarry at St. Stephens.

Suborder OSTREINA Ferussac, 1822
Superfamily OSTREACEA Rafinesque, 1815
Family GRYPHAEIDAE Vyalov, 1936
Genus **PYCNODONTE** Fischer de Waldheim, 1835
Subgenus **PYCNODONTE** Fischer de Waldheim, 1835

Pycnodonte (Pycnodonte) trigonalis (Conrad *in* Wailes)
Plate 63, figure 3

1854. *Ostrea trigonalis* Conrad *in* Wailes, Rept. Agr. Geol. Mississippi, p. 14, fig. 10.
1965. *Gigantostrea trigonalis* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 149-150.
1977. *Pycnodonte (Pycnodonte) trigonalis* (Conrad *in* Wailes). Dockery, Miss. Geol. Survey, Bull. 120, p. 118, pl. 22, fig. 6A, 6B, 7, 8A, 8B.

Type locality: Moodys Branch Formation, Jackson, Mississippi.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 6, 7, 8, 9, 14; Yazoo Formation, common in the lower portion throughout its

outcrop belt; Pachuta Marl, locality 57b. Louisiana: Moodys Branch Formation, Creola Bluff on the Red River at Montgomery. Cf. North Carolina: lower Jackson Group, two miles south of Kornegay in Duplin County, Broadhurst Bridge in Wayne County. Cf. Florida: lower Jackson Group, Dixie Lime Products quarry at Reddick in Marion County.

Genus **GRYPHAEOSTREA** Conrad, 1865

Gryphaeostrea plicatella (Morton)

Plate 75, figure 3

1833. *Gryphaea plicatella* Morton, Amer. Jour. Sci., 1st ser., v. 23, p. 293.
1946. *Gryphaea vomer* var. *plicatella* (Morton). Harris, Bull. Amer. Paleont., v. 30, No. 117, pt. 1, p. 16, pl. 1, fig. 5, 7-13.
1965. *Gryphaea vomer plicatella* (Morton). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1.
1977. *Gryphaea vomer plicatella* (Morton). Toulmin, Geol. Survey Alabama, Monograph 13, p. 319, pl. 57, fig. 1, 2.

Type locality: Jackson Group (probably Pachuta Marl), Alabama.

Occurrence: Mississippi: Pachuta Marl, 2-3 miles east of Shubuta, locality 33. Alabama: Pachuta Marl, Pelham quarry at St. Stephens, south of Silas—Waynesboro Road 5 miles west of Silas. See Toulmin (1977, p. 319) for other Alabama localities.

Family OSTREIDAE Rafinesque, 1815

Genus **CRASSOSTREA** Sacco, 1897

Crassostrea sp.

Plate 4, figures 3A, 3B

1977. *Crassostrea* sp. Toulmin, Geol. Survey Alabama, Monograph 13, p. 187, pl. 14, fig. 5, 6; pl. 15, fig. 1, 2.

Occurrence: Mississippi: Bashi Formation, locality 19. Alabama: Hatchetigbee Formation (upper member), Hatchetigbee Bluff on the Tombigbee River.

Genus **OSTREA** Linné, 1758

Ostrea brevifronta n. sp.

Plate 4, figures 1A, 1B, 2A, 2B, 4

Type locality: Bashi Formation, locality 19.

Occurrence: Mississippi: Bashi Formation, localities 19, 21.

Discussion: This species is similar to *Ostrea sinuosa* Rogers and Rogers, 1837, of the Lower Eocene, Nanjemoy Formation of Virginia, but differs in its constricted anterior and produced posterior.

Description: Right valve slightly inflated, exterior sculptured only by growth lines and rugae. The left valve is strongly inflated along the anterior margin and below the hinge. The left valve exterior has radiating folds that terminate at growth rugae. Adductor muscle scars on both valves are reniform.

Genus **CUBITOSTREA** Sacco, 1897

Cubitostrea perplicata (Dall)

Plate 11, figures 6, 7; Plate 12, figures 1A, 1B, 2, 3, 4, 6, 7, 8; Plate 14, figure 4

1898. *Ostrea sellaeformis perplicata* Dall, Wagner Free Inst. Sci., Trans., v. 3, pt. 4, p. 678.
1965. *Cubitostrea (Cubitostrea) perplicata* (Dall). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 116.
1971. *Cubitostrea perplicata* (Dall). Stenzel, Treatise Invert. Paleont., pt. N., v. 3 (of 3), p. N1143, fig. J116, 2 a-h; p. 1144, fig. J117, 1 a-h.
1977. *Cubitostrea (Cubitostrea) perplicata* (Dall). Toulmin, Geol. Survey Alabama, Monograph 13, p. 249, pl. 36, fig. 1-3.

Type locality: Tallahatta Formation, Caton's Bluff, Conecuh River, west-northwest of Andalusia, Alabama.

Occurrence: Mississippi: Winona Formation, locality 22. Alabama: Tallahatta Formation, Caton's Bluff on the Conecuh River. For other localities, see Toulmin (1977, p. 249).

Cubitostrea lisbonensis (Harris)

Plate 12, figure 5

1919. *Ostrea sellaeformis* (?) var. *lisbonensis* Harris, Bull. Amer. Paleont., v. 6, No. 31, p. 12, pl. 19, fig. 1-6.
1965. *Cubitostrea (_____) lisbonensis* (Harris). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 116.
1977. *Cubitostrea (_____) lisbonensis* (Harris). Toulmin, Geol. Survey Alabama, Monograph 13, p. 248, pl. 36, fig. 8-10.

Type locality: Cook Mountain Formation, Chestnut, Natchitoches Parish, Louisiana (Palmer and Brann, 1965, p. 116). According to Toulmin (1977, p. 248), the reported occurrence in the Cook Mountain Formation may be erroneous.

Occurrence: Mississippi: Winona Formation, localities 22, 23. Also reported from the Weches Formation and equivalent beds in Texas and Louisiana and from the lower Lisbon Formation in Alabama (Toulmin, 1977, p. 248).

Cubitostrea sellaeformis (Conrad)

Plate 24, figures 1, 2, 3; Plate 45, figures 6, 7; Plate 46, figures 1A, 1B, 2A, 2B

1832. *Ostrea sellaeformis* Conrad, Fossil shells Tertiary formations, v. 1, No. 2, p. 27, pl. 13, fig. 2.
1965. *Cubitostrea* (cf. *Cubitostrea) sellaeformis* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 117-118.
1977. *Cubitostrea* (cf. *Cubitostrea) sellaeformis* (Conrad). Toulmin, Geol. Survey Alabama, Monograph 13, p. 249, pl. 37, fig. 1, 2; pl. 38, fig. 1.

Type locality: Lisbon Formation, "*Ostrea sellaeformis* zone," Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Cook Mountain Formation, locality 65, Newton, Wautubbee; Archusa Marl, localities 26a, 27, 50, 61, 62. Also reported from the Laredo Formation in Mexico, the Wheelock Member of the Cook Mountain Formation in Mexico, the Wheelock Member of the Cook Mountain Formation in Texas, the Lisbon Formation in Alabama, and the Claiborne Group of South Carolina and Virginia.

Discussion: This large saddle-shape oyster is a good guide fossil for the Cook Mountain Formation in Mississippi.

Cubitostrea sp.

Plate 21, figure 3

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b.

Genus **ODONTOGRYPHAEA** Ihering, 1903

Odontogryphaea sp.

Plate 5, figures 1A, 1B, 1C, 2A, 2B

1897 *Ostrea trigonalis* var. *sylvaerupis* Harris, Bull. Amer. Paleont., v. 2, No. 9, p. 38 in part, pl. 6, fig. 3, 3a, 4, not pl. 4 and 5.
1977 *Odontogryphaea* ? sp. A. Toulmin, Geol. Survey Alabama, Monograph 13, p. 192, pl. 17, fig. 7-9.

Occurrence: Mississippi: Bashi Formation, locality 19. For localities in the Bashi Formation in Alabama, see Toulmin (1977, p. 192).

Genus **LOPHA** Röding, 1798

Subgenus **LOPHA** Röding, 1798

Lopha (Lopha) vicksburgensis (Conrad)

Plate 78, figures 4A, 4B; Plate 80, figures 4, 5, 9

1848a. *Ostrea Vicksburgensis* Conrad, Acad. Nat. Sci. Philadelphia, Proc., v. 3, p. 296.

1848b. *Ostrea vicksburgensis* Conrad. Conrad, Acad. Nat. Sci. Philadelphia, Jour., 2nd ser., v. 1, pt. 2, p. 126, pl. 13, fig. 5, 37.

1974. *Alectryonia vicksburgensis* (Conrad). May, Miss. Geol. Survey, Bull. 117, p. 54, 56, 61, 69, 80, 85, 96.

Type locality: Byram Formation, Vicksburg, Mississippi.

Occurrence: Common in the Byram Formation, Glendon and Marianna Limestones, and Red Bluff Formation of Mississippi and Alabama, and the upper Forest Hill Formation in Wayne County, Mississippi. Also reported from the Oligocene of Mexico.

Subclass HETERDONTA Neumayr, 1884

Order VENEROIDA H. & A. Adams, 1856

Superfamily LUCINACEA Fleming, 1828

Family LUCINIDAE Fleming, 1828

Genus **LUCINA** Brugière, 1797

Subgenus **CALLUCINA** Dall, 1901

Lucina (Callucina?) curta (Conrad)

Plate 64, figures 3A, 3B, 4A, 4B

1865. *Cyclas curta* Conrad, Amer. Jour. Conch, v. 1, p. 138, 212, pl. 20, fig. 14.

1946. *Lucina (Myrtea ?) curta* (Conrad). Harris, Bull. Amer. Paleont., v. 30, No. 117, pt. 1, p. 89, pl. 19, fig. 19-23.

1965. *Myrtea ? curta* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 202.

1976. *Lucina (Callucina ?) curta* (Conrad). Bretsky, Paleont. Amer., v. 8, No. 50, p. 258, 259-260.

1977. *Gonimyrtea curta* (Conrad). Dockery, Miss. Geol. Survey, Bull. 120, p. 119, pl. 23, fig. 3A, 3B, 4A, 4B.

Type locality: Moodys Branch Formation, locality 9.

Occurrence: Mississippi: Moodys Branch Formation, common at Jackson and localities 9 and 16. Arkansas: White Bluff Formation, Vince Bluff on the Saline River. Texas: Jackson beds on the Sabine River.

Lucina (Callucina?) subcurta (Harris)

Plate 63, figures 6A, 6B; Plate 64, figures 1A, 1B, 2A, 2B

1946. *Lucina (Myrtea ?) subcurta* Harris, Bull. Amer. Paleont., v. 30, No. 117, pt. 1, p. 89-90, pl. 20, fig. 1-5.
1965. *Myrtea ? subcurta* Harris. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 202.
1976. *Lucina (Callucina ?) subcurta* (Conrad). Bretsky, Paleont. Amer., v. 8, No. 50, p. 258, 259-260.
1977. *Gonimyrtea subcurta* (Harris). Dockery, Miss. Geol. Survey, Bull. 120, p. 119, pl. 23, fig. 1A, 1B.

Type locality: Moodys Branch Formation, Jackson, Mississippi.

Occurrence: Mississippi: Moodys Branch Formation, common at Jackson and localities 9 and 16.

Subgenus **CAVILINGA** Chavan, 1937

Lucina (Cavilinga) pomilia smithi (Meyer)

Plate 5, figures 4A, 4B, 5A, 5B

1886. *Lucina Smithi* Meyer, Geol. Survey Alabama, Bull. 1, p. 81, pl. 1, fig. 23.
1919. *Lucina pomilia smithi* Meyer. Harris, Bull. Amer. Paleont., v. 6, No. 31, p. 114, pl. 38, fig. 1.
1965. *Linga (Cavilinga) pomilia smithi* (Meyer). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 175.
1976. *Lucina (Cavilinga) pomilia* Conrad. Bretsky, Paleont. Amer., v. 8, No. 50, p. 266, 269-270.

Type locality: Meyer (1886, p. 81) gave the Gosport Sand at Claiborne Bluff on the Alabama River, Alabama, as the type locality. Harris (1919, p. 114, pl. 38) illustrated specimens from the Wilcox Group and stated that they compared better with Meyer's figure.

Occurrence: Mississippi: Bashi Formation, locality 19. Alabama: Bashi Formation, Woods Bluff on the Tombigbee River; Gosport Sand, Claiborne Bluff on the Alabama River. For locality in Virginia, see Palmer and Brann (1965, p. 175).

Genus **CODAKIA** Scopoli, 1777

Subgenus **CLAIBORNITES** Stewart, 1930

Codakia ? (Claibornites) sp.

Plate 6, figures 1A, 1B, 3A, 3B, 6

1886. *Lucina rotunda* Lea. Aldrich, Geol. Survey Alabama, Bull., No. 1, pt. 1, p. 50.

1897. *Lucina symmetrica* ? Conrad. Harris, Bull. Amer. Paleont., v. 2, No. 9, p. 71, pl. 14, fig. 4.
1965. *Epilucina* sp. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 141.
1976. *Codakia* ? *(Claibornites)* sp. Bretsky, Paleont. Amer., v. 8, No. 50, p. 287.
1977. *Epilucina* sp. Toulmin, Geol. Survey Alabama, Monograph 13, p. 188, pl. 15, fig. 3, 4.

Occurrence: Mississippi: Bashi Formation, localities 19, 20. Also reported from the Nanafalia Formation and the Hatchetigbee Formation in Alabama (Toulmin, 1977, p. 188).

Genus **SAXOLUCINA** Stewart, 1930
Subgenus **PLASTOMILTHA** Stewart, 1930

Saxolucina (Plastomiltha) sp. ?
Plate 75, figure 7

Occurrence: Mississippi: Shubuta Clay Member, Yazoo Formation, locality 34.

Family UNGULINIDAE Adams and Adams, 1857
Genus **DIPLODONTA** Bronn, 1831

Diplodonta sp. ?
Plate 21, figure 2

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b.

Genus **FELANIELLA** Dall, 1899

Felaniella sp.
Plate 10, figures 1A, 1B, 1C

Occurrence: Mississippi: Bashi Formation, locality 19.

Felaniella palmerae n. sp.
Plate 72, figures 1A, 1B, 1C

Type locality: Moodys Branch Formation, locality 2.

Occurrence: Mississippi: Moodys Branch Formation, localities 2, 16.

Discussion: . This species differs from the type species *F. usta* (Gould, 1861) in its quadrate outline and in having a nymph below the marginal ligament groove. It is similar to the *Felaniella* sp. above in its outline and

inflation. The hinge of the Bashi specimen has a shorter and thicker 2, and is missing the 4b, which seems to have been broken or worn away.

The species is named for the former director of the Paleontological Research Institution at Ithaca, New York, Dr. Katherine Van Winkle Palmer.

Description: hinge with a strongly oblique and narrow 4b just below the nymph, and a prominent, bifid 2 that is vertical below the beak. The shell is moderately inflated, and somewhat produced in the posterior-ventral direction. The exterior has fine growth lines.

Superfamily CHAMACEA Lamarck, 1809

Family CHAMIDAE Lamarck, 1809

Genus **CHAMA** Lamarck, 1809

Subgenus **CHAMA** Lamarck, 1809

Chama (Chama) monroensis Aldrich

Plate 48, figures 4A, 4B, 5A, 5B, 8

1903. *Chama monroensis* Aldrich, Nautilus, v. 16, No. 9, p. 200, pl. 4, fig. 15.

1965. *Chama monroensis* Aldrich. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 79.

Type locality: Lisbon Formation, "*Ostrea sellaeformis* bed," Monroe County, Alabama.

Occurrence: Mississippi: Cook Mountain Formation, localities 63, 65. Alabama: Lisbon Formation, Monroe County.

Chama harrisi (Gardner)

Plate 48, figures 6, 7

1919. *Chama monroensis* Aldrich. Harris, Bull. Amer. Paleont., v. 6, No. 31, p. 100, pl. 4, fig. 15. Not *C. monroensis* Aldrich, 1903.

1927. *Pseudochama harrisi* Gardner, Washington Acad. Sci., Jour., v. 17, No. 14, p. 372, fig. 43, 44.

1965. *Chama harrisi* (Gardner). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 79.

Type locality: Cook Mountain Formation, 8 miles west of Enterprise, Mississippi.

Occurrence: Mississippi: Cook Mountain Formation, locality 63, 8 miles west of Enterprise; Archusa Marl, locality 26a.

Superfamily LEPTONACEA Gray, 1847
Family ERYCINIDAE Deshayes, 1850
Genus **ERYCINA** Lamarck, 1805

Erycina zitteli Meyer
Plate 63, figures 5A, 5B

1887. *Erycina zitteli* Meyer, Senckenberg. Naturf. Gesell, p. 11, pl. 2, fig. 9.
1965. *Erycina zitteli* Meyer. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 142-143.
1977. *Erycina zitteli* Meyer. Dockery, Miss. Geol. Survey, Bull. 120, p. 122.

Type locality: Moodys Branch Formation, Jackson, Mississippi.

Occurrence: Mississippi: Moodys Branch Formation, Jackson and locality 16.

Superfamily CARDITACEA Fleming, 1820
Family CARDITIDAE Fleming, 1820
Genus **PLEUROMERIS** Conrad, 1867

Pleuromeris inflatior jacksonensis (Meyer)
Plate 67, figures 4A, 4B, 5A, 5B, 6

1885. *Venericardia inflatior* var. *Jacksonensis* Meyer, Amer. Jour., Sci., ser. 3, v. 29, p. 460.
1946. *Venericardia (Pleuromeris) inflatior* Meyer. Harris, Bull. Amer. Paleont., v. 30, No. 117, pt. 1, p. 75-76, pl. 17, fig. 18-18b.
1965. *Venericardia inflatior jacksonensis* Meyer. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 332.
1977. *Pleuromeris inflatior jacksonensis* (Meyer). Dockery, Miss. Geol. Survey, Bull. 120, p. 122, pl. 23, fig. 7, 8.

Type locality: Moodys Branch Formation, Jackson, Mississippi.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 9, 16.

Discussion: There is considerable variation in the inflation of the umbo and the elevation of the beak within this species (compare figures 4a and 6 of plate 67).

Pleuromeris quadrata n. sp.
Plate 67, figures 2A, 2B, 3A, 3B

1885. *Venericardia parva* var. *Jacksonensis* Meyer, Amer. Jour. Sci., ser. 3, v. 29, p. 460.

1946. *Venericardia (Pleuromeris) parva* var. *jacksonensis* Meyer. Harris, Bull. Amer. Paleont., v. 30, No. 117, pt. 1, p. 75, pl. 17, fig. 19-21.
1965. *Venericardia (Pleuromeris)* sp. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 348.
1977. *Pleuromeris* sp. Dockery, Miss. Geol. Survey, Bull. 120, p. 122.

Type locality: Moodys Branch Formation, locality 16.

Occurrence: Mississippi: Moodys Branch Formation, Jackson and locality 16.

Discussion: Meyer (1885, p. 460) used *V. jacksonensis* twice as a "variety" of *Venericardia* on the same page, first for *V. parva* and second for *V. inflatior*. The descriptions of these forms are inadequate for positive identification, and only the type of *V. inflatior jacksonensis* was later illustrated by Harris (1946, pl. 17, fig. 18-18b). Palmer and Brann (1965, p. 332) chose to retain the name *jacksonensis* as a subspecies of *V. inflatior* because of its better identification. Meyer's description of *V. parva jacksonensis*, as follows, corresponds fairly well to the species named here as new:

"*Venericardia parva* Lea occurs in Jackson in a small form with straighter lateral margins. These two qualities are not constant in Claiborne and the distinction is properly made by a varietal name, var. *Jacksonensis*."

A new name *Pleuromeris quadrata* is proposed as the name *jacksonensis* is preoccupied.

Description: Slightly inflated, less inflated than *P. inflatior jacksonensis* and slightly less inflated than *P. parva*. The left valve hinge has a long, prominent 4b, a curved 2, a modest 4a, a prominent triangular socket for the 3b, and a long, narrow socket for th PI. *P. quadrata* differs from *P. parva* in its quadrate outline with a truncation of the posterior-ventral margin. The type has 18 ribs, and the larger specimen figured has 26 ribs. These ribs are worn but show remnants of nodes similar to those of *P. parva*. The lunule is slightly depressed, smooth, and set off by a distinct groove.

Genus **VENERICARDIA** Lamarck, 1801
Subgenus **ROTUNDICARDIA** Heaslip, 1968

Venericardia (Rotundicardia) rotunda Lea

Plate 19, figures 9A, 9B, 10; Plate 49, figures 2A, 2B, 3A, 3B

1833. *Venericardia rotunda* Lea, Contri. Geol., p. 70, pl. 2, fig. 48.

1965. *Venericardia (Venericardia) rotunda* Lea. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, p. 341.
1968. *Venericardia (Rotundicardia) rotunda* Lea. Heaslip, Paleont. Amer., v. 6, No. 39, p. 93, pl. 22, fig. 8, 9a, 9b; pl. 23, fig. 1, 2a, 2b.
1977. *Venericardia (Rotundicardia) rotunda* Lea. Toulmin, Geol. Survey Alabama, Monograph 13, p. 267, pl. 42, fig. 3-5.

Type locality: Gosport Sand, Claiborne Bluff on the Alabama River, Alabama.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b; Cook Mountain Formation, locality 64. Also reported from the Cook Mountain Formation of Mississippi and Louisiana, the Gosport Sand and Lisbon Formation of Alabama, and the McBean Formation in South Carolina.

Venericardia (Rotundicardia) carsonensis Dall

Plate 77, figures 2A, 2B

1903. *Venericardia carsonensis* Dall, Wagner Free Inst. Sci., Trans., v. 3, pt. 6, p. 1427-1428, pl. 56, fig. 9.
1903. *Venericardia vicksburgensis* Casey, Acad. Nat. Sci. Philadelphia, Proc., v. 55, p. 264 not figured.
1968. *Venericardia (Rotundicardia) caronensis* Dall. Heaslip, Paleont. Amer., v. 6, No. 39, p. 97-98, text fig. 26, pl. 23, fig. 9a, 9b, 10a-c.

Type locality: Red Bluff Formation, Carson's Creek, Wayne County, Mississippi.

Occurrence: Mississippi: Red Bluff Formation and Mint Spring Formation.

Subgenus **LEUROACTIS** Stewart, 1930

Venericardia (Leuroactis) horatiana, Gardner

Plate 9, figures 1A, 1B

1897. *Venericardia planicosta* form α Harris, Bull. Amer. Paleont., v. 2, No. 9, p. 55 (in part), pl. 10, fig. 1-4.
1927. *Venericardia horatiana* Gardner, Washington Acad. Sci., Jour., v. 17, p. 369, fig. 28, 29.
1939. *Venericardia (Venericor) horatiana* Gardner. Gardner and Bowles, U.S. Geol. Survey Prof. Paper 189-F, p. 177, pl. 39, fig. 1-3, 5; pl. 40, fig. 1, 2, 5.
1953. *Venericardia (Leuroactis) horatiana* Gardner. Verastegui, Paleont. Amer., v. 3, No. 25, p. 15, 16, 48, 59.
1965. *Venericardia (Leuroactis) horatiana* Gardner. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 331-332.

Type locality: Sabinetown Formation, 1 1/2 miles west of Sabinetown, Sabine County, Texas.

Occurrence: Mississippi: Bashi Formation, locality 21. Texas: 1 1/2 miles west of Sabinetown, Sabinetown Bluff 300 feet to 1/4 mile below Sabinetown Ferry on the Sabine River. For localities in the Hatchetigbee Formation of Alabama, see Gardner and Bowles (1939, p. 177).

Subgenus **VENERICOR** Stewart, 1930

Venericardia (Venericor ?) greggiana Dall

Plate 6, figure 4

1903. *Venericardia greggiana* Dall, Wagner Free Inst. Sci., v. 3, pt. 6, p. 1425.
1939. *Venericardia (Venericor ?) greggiana* Dall. Gardner and Bowles, U.S. Geol. Survey Prof. Paper 189-F, p. 194, pl. 46, fig. 9.
1965. *Venericardia (Venericor ?) greggiana* Dall. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 329-330.
1977. *Venericardia (Venericor ?) greggiana* Dall. Toulmin, Geol. Survey Alabama, Monograph 13, p. 198, pl. 20, fig. 8, 9.

Type locality: Greggs Landing Member, Tuscahoma Formation, Greggs Landing, Alabama River, Alabama.

Occurrence: Mississippi: Bashi Formation, locality 19. Alabama: Greggs Landing Member, Greggs Landing on the Alabama River. For other Alabama localities see Palmer and Brann (1977, p. 330).

Venericardia cf. **V. nanaplata nanna** Gardner and Bowles

Plate 6, figures 2A, 2B, 5A, 5B

1939. *Venericardia (Venericor) nanaplata nanna* Gardner and Bowles, U.S. Geol. Survey Prof. Paper 189-F, p. 169, pl. 33, fig. 4, 5, 10, 11.
1965. *Venericardia (Venericor) nanaplata nanna* Gardner and Bowles. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 335.
1977. *Venericardia (Venericor) nanaplata nanna* Gardner and Bowles. Toulmin, Geol. Survey Alabama, Monograph 13, p. 200, pl. 22, fig. 9-11.

Type locality: Greggs Landing Member, Tuscahoma Formation, Greggs Landing, Alabama River, Alabama.

Occurrence: Mississippi: Bashi Formation, locality 19. Alabama: Greggs Landing Member, Greggs Landing on the Alabama River.

Venericardia (Venericor) bashiplata Gardner and Bowles

Plate 7, figures 1, 2; Plate 8, figures 1, 2

1897. *Venericardia planicosta* Lamarck. Harris, Bull. Amer. Paleont., v. 2, No. 9, p. 55 in part, pl. 9, fig. 3; pl. 10, fig. 5. Not *V. planicosta* Lamarck, 1801.
1939. *Venericardia (Venericor) bashiplata* Gardner and Bowles, U.S. Geol. Survey Prof. Paper 189-F, p. 171, pl. 33, fig. 9; pl. 34, fig. 3-6.
1965. *Venericardia (Venericor) bashiplata* Gardner and Bowles. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 324.
1977. *Venericardia (Venericor) bashiplata* Gardner and Bowles. Toulmin, Geol. Survey Alabama, Monograph 13, p. 198, pl. 21, fig. 1-3.

Type locality: Bashi Formation, Beaver Creek 1/4 mile east of Choctaw Corner, Alabama.

Occurrence: Mississippi: Bashi Formation, localities 19, 20. For additional localities in Alabama and Texas, see Gardner and Bowles (1939, p. 171).

Venericardia (Venericor) claiboplata Gardner and Bowles

Plate 20, figure 4

1895. *Venericardia planicosta* Lamarck. Dana, Manual of geology, 4th ed., p. 897, fig. 1481. Not *V. planicosta* Lamarck, 1801.
1939. *Venericardia (Venericor) claiboplata* Gardner and Bowles, U.S. Geol. Survey Prof. Paper 189-F, p. 173, pl. 36, fig. 1-4.
1965. *Venericardia (Venericor) claiboplata* Gardner and Bowles. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 325-326.
1977. *Venericardia (Venericor) claiboplata* Gardner and Bowles. Toulmin, Geol. Survey Alabama, Monograph 13, p. 264, pl. 42, fig. 7, 8.

Type locality: upper Lisbon Formation, Clarksville, Alabama.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b. For other localities in the Recklaw and Weches Formations of Texas, the Cook Mountain Formation of Louisiana, Lisbon and Gosport Formations of Alabama, and the McBean Formation of South Carolina, see Gardner and Bowles (1939, p. 173).

Venericardia (Venericor) densata (Conrad)

Plate 20, figures 1A, 1B, 2A, 2B, 3

1845. *Cardita densata* Conrad, Acad. Nat. Sci. Philadelphia, Proc., v. 2, p. 173.
1865. *Venericardia densata* (Conrad). Conrad, Amer. Jour. Conch., v. 1, p. 8.
1939. *Venericardia (Venericor) densata* (Conrad). Gardner and Bowles,

U.S. Geol. Survey Prof. Paper 189-F, p. 189-192, pl. 37, fig. 7; pl. 45, fig. 1-11, 14.

1965. *Venericardia (Venericor) densata* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 327.

1977. *Venericardia (Venericor) densata* (Conrad). Toulmin, Geol. Survey Alabama, Monograph 13, p. 265, pl. 42, fig. 1, 2.

Type locality: Lisbon Formation, base of Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b. For other localities see Gardner and Bowles (1939, p. 191-192).

Discussion: This species is common at locality 26b, but is thinner-shelled, more inflated, and with a greater number of ribs than the typical form from the Lisbon of Alabama.

Venericardia (Venericor) apodensata Gardner and Bowles

Plate 68, figures 1A, 1B

1939. *Venericardia (Venericor) apodensata* Gardner and Bowles, U.S. Geol. Survey Prof. Paper 189-F, p. 192-193, pl. 37, fig. 13; pl. 43, fig. 8; p. 45, fig. 15, 16.

1965. *Venericardia (Venericor) apodensata* Gardner and Bowles. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 323.

1977. *Venericardia (Venericor) apodensata* Gardner and Bowles. Dockery, Miss. Geol. Survey, Bull. 120, p. 123, pl. 24, fig. 15A, 15B, 16A, 16B.

Type locality: Moodys Branch Formation, locality 3.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 3, 7, 9, 11, 13, 16, gully south of the road east of flag station on Yazoo and Mississippi Valley Railroad. For localities in Arkansas, Louisiana, and Texas see Gardner and Bowles (1939, p. 193).

Genus **GLYPTOACTIS** Stewart, 1930

Subgenus **CLAIBORNICARDIA** Stenzel and Krause, 1957

Glyptoactis (Claibornicardia) alticostata (Conrad) var.

Plate 49, figures 1A, 1B

Occurrence: Mississippi: Cook Mountain Formation, locality 63.

Discussion: *Glyptoactis (Claibornicardia) alticostata* (Conrad, 1833) s.s. occurs in the Gosport Sand in Alabama.

Glyptoactis (Claibornicardia) trapaquara (Harris) var.

Plate 49, figures 4A, 4B, 5

1919. *Venericardia rotunda* varying towards *trapaquara* Harris, Bull. Amer. Paleont., v. 6, No. 31, p. 80, pl. 29, fig. 6, 7.
1965. *Venericardia (Venericardia) rotunda* Lea, subsp. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 342.

Occurrence: Mississippi: Cook Mountain Formation, locality 65; Archusa Marl, localities 26a, 61, 62.

Discussion: *Glyptoactis (Claibornicardia) trapaquara* (Harris, 1895) s.s. occurs in the Stone City Beds in Texas.

Superfamily CRASSATELLACEA Ferussac, 1822
Family ASTARTIDAE d'Orbigny, 1844
Genus **ASTARTE** J. Sowerby, 1816

Astarte triangulata Meyer
Plate 77, figures 4A, 4B, 5A, 5B

1886. *Astarte triangulata* Meyer, Geol. Survey Alabama, Bull. 1, p. 80, pl. 3, fig. 21, 21a.
1893. *Astarte triangulata* Meyer. Cossmann, Ann. Soc. roy. Malacol. Belgique., v. 28, p. 13.
1903. *Astarte triangulata* Meyer. Dall, Wagner Free Inst. Sci., Philadelphia, Trans., v. 3, pt. 4, p. 1488.
?1921. *Astarte* cf. *A. triangulata* Meyer. Cooke, U.S. Geol. Survey Prof. Paper 129, p. 85.
1946. *Astarte triangulata* Meyer. Harris, Bull. Amer. Paleont., v. 30, No. 117, p. 76, pl. 18, fig. 14; ? fig. 11-13.

Type locality: Red Bluff Formation, Red Bluff, Mississippi.

Occurrence: Mississippi: Red Bluff Formation, common at localities 37, 38, 39, 40; Byram Formation, one specimen found in the east bluff of the Big Black River west of Edwards.

Discussion: This species is common in the Red Bluff Formation in Mississippi but is not restricted to this horizon. Cooke (1921, p. 85) reported an *Astarte* cf. *A. triangulata* in a check list of fossils in the Byram Formation. One good specimen of this species has been found in the Byram Formation at Edwards, Mississippi. A variety of *A. triangulata*, which is smaller in size than those from the Red Bluff Formation, is common in the Mint Spring Formation at Cleary, Mississippi. Harris and Palmer (1946, p. 76) reported the possible occurrence of *A. triangulata* in the Jackson Group of Alabama.

Genus **LIRODISCUS** Conrad, 1869
Subgenus **LIRODISCUS** Conrad, 1869

Lirodiscus (Lirodiscus) cf. L. (L.) smithvillensis (Harris)

Plate 50, figures 2A, 2B, 3A, 3B

1895. *Astarte smithvillensis* Harris, Acad. Nat. Sci. Philadelphia, Proc., v. 47, p. 48, pl. 1, fig. 8, 8a, 9 a-c.
1919. *Lirodiscus smithvillensis* (Harris). Harris, Bull. Amer. Paleont., v. 6, No. 31, p. 89, pl. 31, fig 17-23.
1965. *Lirodiscus smithvillensis* (Harris). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 177.

Type locality: Weches Formation, Colorado River at Smithville, Texas.

Occurrence: Cf. Mississippi: Cook Mountain Formation, localities 65, 69. Texas: Weches Formation, Colorado River at Smithville. For other Texas localities, see Palmer and Brann (1965, p. 177).

Lirodiscus (Lirodiscus) smithvillensis (Harris) var.

Plate 6, figures 7A, 7B

1897. *Astarte smithvillensis* (Harris) var. Harris, Acad. Nat. Sci., Philadelphia, Proc., v. 48, p. 475 in part, pl. 20, fig. 6.
1965. *Lirodiscus smithvillensis* "var." (Harris). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 177.

Occurrence: Mississippi: Bashi Formation, locality 19. Alabama: Bashi Formation, Woods Bluff on the Tombigbee River. Louisiana: Lower Eocene, La Nana Bayou, near Many.

Lirodiscus (Lirodiscus) pretriangulata (Dockery)

Plate 65, figures 3A, 3B, 4A, 4B, 5A, 5B, 6A, 6B

?1946. *Astarte* sp. Harris, Bull. Amer. Paleont., v. 30, No. 117, pt. 1, pl. 18, fig. 15, 16.
1977. *Astarte pretriangulata* Dockery, Miss. Geol. Survey, Bull. 120, p. 124, pl. 24, fig. 3, 5.

Type locality: Moodys Branch Formation, locality 1.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 16. ? Lousiana: Moodys Branch Formation, Montgomery Landing on the Red River.

Discussion: *Astarte triangulata* differs from this species in its greater inflation (especially at the umbo) and in its deeply impressed lunule. The hinge plate of *L. pretriangulata* is gently curved and moderately broad rather than angular and narrow as in *A. triangulata*. This species is smaller than *L. jacksonensis*, and differs from the young of that form in lacking a planular umbo.

Lirodiscus (Lirodiscus) jacksonensis (Meyer)

Plate 65, figures 1A, 1B

1854. *Astarte parilis* Conrad *in* Wailes, Rept. Agr. and Geol. Mississippi, p. 289, pl. 14, fig. 2. Not A. *parilis* Conrad, 1853.
1885. *Astarte Sulcata* var. *jacksonensis* Meyer, Amer. Jour. Sci., ser. 3, v. 29, p. 460.
1946. *Lirodiscus jacksonensis* (Meyer). Harris, Bull. Amer. Paleont., v. 30, No. 117, pt. 1, p. 77-78, pl. 18, fig. 1-5, 8-10.
1965. *Lirodiscus jacksonensis* (Meyer). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 175.
1977. *Lirodiscus jacksonensis* (Meyer). Dockery, Miss. Geol. Survey, Bull. 120, p. 124, pl. 24, fig. 1A, 1B, 2A, 2B, 4.

Type locality: Moodys Branch Formation, locality 3.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 3, 9, 16. Louisiana: Moodys Branch Formation, Montgomery Landing on the Red River, along the Ouachita River (Gibson, Bunker Hill, and Grand View landings). Arkansas: White Bluff Formation, Vince Bluff, Cleveland County. Alabama: Moodys Branch Formation, Claiborne Bluff.

Lirodiscus (Lirodiscus) sp.

Plate 65, figures 2A, 2B

Occurrence: Moodys Branch Formation, locality 16.

Discussion: The elongate outline of this form with its prominent posterior-ventral truncation is similar to that of *Lirodiscus (Lirodiscus) tellinoides* (Conrad, 1833) from the Gosport Sand in Alabama.

Family CRASSATELLIDAE Ferussac, 1822

Genus **CRASSATELLA** Lamarck, 1799

Crassatella texalta Harris

Plate 23, figures 1A, 1B; Plate 50, figures 1A, 1B, 4A, 4B;
Plate 51, figures 1A, 1B, 5, 6, 7

1895. *Crassatella texalta* Harris, Acad. Nat. Sci. Philadelphia, Proc. 1895, v. 47, p. 49, pl. 2, fig. 2.
1965. *Crassatella texalta* Harris. Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 104.
1977. *Crassatella texalta* Harris. Toulmin, Geol. Survey Alabama, Monograph 13, p. 247, pl. 34, fig. 3, 4.

Type locality: Hurricane lentil, base of Landrum Member, Cook Mountain Formation, Hurricane Bayou, Houston County, Texas.

Occurrence: Mississippi: Cook Mountain Formation, localities 63, 69,

Wautubbee, 4 miles west of Enterprise, 2 1/2 miles east of Newton; Archusa Marl, localities 25, 26a. Texas: Cook Mountain Formation, Hurricane Bayou, Alabama Bluff on the Trinity River. ? South Carolina: Claiborne Group, Eutaw Springs. ? North Carolina: Claiborne Group, 17 miles above Newbern on the Neuse River.

Crassatella cf. **C. negreetensis** (Harris)

Plate 51, figures 2A, 2B, 3, 4

1919. *Crassatellites negreetensis* Harris, Bull. Amer. Paleont., v. 6, No. 31, p. 97, pl. 33, fig. 6-8.
1965. *Crassatella negreetensis* (Harris). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 102.

Type locality: Cook Mountain Formation, 200 yards below the mouth of Negreet Bayou, Louisiana.

Occurrence: Cf. Mississippi: Cook Mountain Formation, locality 63. Louisiana: Cook Mountain Formation, 200 yards below the mouth of Negreet Bayou.

Crassatella sp.

Plate 14, figure 5

Occurrence: Winona Formation, locality 22.

Genus **BATHYTORMUS** Stewart, 1930

Bathytormus clarkensis ludovicianus (Kent)

Plate 23, figure 5; Plate 52, figures 1A, 1B, 2A, 2B

1919. *Crassatellites clarkensis* var. *ludovicianus* Harris, Bull. Amer. Paleont., v. 6, No. 31, p. 101 *nomen nudum.*
1960. *Crassatella clarkensis ludovicianus* Kent, Bull. Amer. Paleont., v. 40, No. 184, p. 986, pl. 1, fig. 3-8.
1965. *Crassatella clarkensis ludovicianus* Kent. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 50.

Type locality: Cook Mountain Formation, Lapiniere Landing on the Ouachita River, Louisiana.

Occurrence: Mississippi: Cook Mountain Formation, localities 25, 65, 69, 8 miles west of Enterprise. Louisiana: Cook Mountain Formation, Lapiniere Landing on the Ouachita River.

Bathytormus flexurus productus (Conrad)

Plate 66, figures 2A, 2B, 3A, 3B, 4A, 4B, 5A, 5B, 6A, 6B; Plate 67, figures 1A, 1B

1863. *Crassatella producta* Conrad, Acad. Nat. Sci. Philadelphia, Proc., v. 14, p. 289.
1919. *Crassatellites flexurus productus* (Conrad). Harris, Bull. Amer. Paleont., v. 6, No. 31, p. 100.
1965. *Bathytormus flexurus productus* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 51.
1977. *Bathytormus flexurus productus* (Conrad). Dockery, Mississippi Geol. Survey, Bull. 120, p. 125-126.

Type locality: Moodys Branch Formation, locality 9.

Occurrence: Mississippi: Moodys Branch Formation, localities 9, 16.

Discussion: A growth sequence is illustrated in plates 66 and 67 from the juvenile (plate 66, figure 2) to the adult (plate 67, figure 1).

Genus **CRASSINELLA** Guppy, 1874

Crassinella pygmaea (Conrad, 1865)

Plate 66, figures 1A, 1B

1865. *Gouldia pygmaea* Conrad, Amer. Jour. Conch., v. 1, No. 3, p. 139.
1946. *Crassinella pygmaea* (Conrad). Harris, Bull. Amer. Paleont., v. 30, No. 117, pt. 1, p. 76, pl. 18, fig. 17, 18.
1965. *Crassinella pygmaea* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 111.

Type locality: Moodys Branch Formation, Garland Creek, Clarke County, Mississippi.

Occurrence: Mississippi: Moodys Branch Formation, localities 3, 9, 16.

Superfamily CARDIACEA Lamarck, 1809

Family CARDIIDAE Lamarck, 1809

Genus **NEMOCARDIUM** Meek, 1876

Subgenus **NEMOCARDIUM** Meek, 1876

Nemocardium (Nemocardium) nicolletti (Conrad)

Plate 68, figures 2A, 2B

1841. *Cardium nicolletti* Conrad, Acad. Nat. Sci. Philadelphia, Proc., v. 1, p. 33.
1946. *Protocardia (Nemocardium) nicolletti* (Conrad). Harris, Bull. Amer. Paleont., v. 30, No. 117, pt. 1, p. 92-94, pl. 20, fig. 16-19.
1965. *Nemocardium (Nemocardium) nicolletti* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 205.
1977. *Nemocardium (Nemocardium) nicolletti* (Conrad). Dockery, Miss. Geol. Survey, Bull. 120, p. 126, pl. 25, fig. 13A, 13B, 14A, 14B, 15.

Type locality: Moodys Branch Formation, Ouachita River and Monroe, Louisiana.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 9; Yazoo Clay, locality 15. Louisiana: Moodys Branch Formation, Bunker Hill and Gibson Landing on the Ouachita River; Danville Landing Member, Danville Landing on the Ouachita River.

Nemocardium sp.

Plate 14, figure 3

Occurrence: Mississippi: Winona Formation, locality 22.

Superfamily MACTRACEA Lamarck, 1809

Family MACTRIDAE Lamarck, 1809

Genus **SPISULA** Gray, 1837

Spisula jacksonensis Cooke

Plate 68, figures 4A, 4B, 5

1926. *Spisula jacksonensis* Cooke, Washington Acad. Sci., Jour., v. 16, p. 137, fig. 14a, b, c.
1965. *Spisula jacksonensis* Cooke. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 298.
1977. *Spisula jacksonensis* Cooke. Dockery, Miss. Geol. Survey, Bull. 120, p. 127, pl. 25, fig. 4, 5.

Type locality: Moodys Branch Formation, Jackson, Mississippi.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 9, 16.

Subgenus **SYMMORPHOMACTRA** Dall, 1894

Spisula (Symmorphomactra) praetenuis (Conrad)

Plate 68, figures 6, 7

1833. *Mactra praetenuis* Conrad, Fossil shells Tertiary formations, v. 1, No. 4, p. 42.
1898. *Spisula praetenuis* (Conrad). Dall, Wagner Free Inst. Sci., Trans., v. 3, pt. 4, p. 896.
1965. *Spisula* cf. *S. praetenuis* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 299.
1977. *Spisula praetenuis* (Conrad). Dockery, Miss. Geol. Survey, Bull. 120, p. 127-128, pl. 25, fig. 11.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Moodys Branch Formation, localities 2, 16.

Louisiana: Moodys Branch Formation, Montgomery Landing on the Red River. Arkansas: White Bluff Formation, Crow Creek. White Bluff on the south bank of the Arkansas River. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River. Florida: Ocala Group, Ocala Lime Rock Corp. quarry east side of Highway 314 east of Kendrick. Georgia: Ocala Group, 4 miles from Perry in Houston County, Fort Gaines.

Superfamily SOLENACEA Lamarck, 1809
Family SOLENIDAE Lamarck, 1809
Genus **SOLEN** Linné, 1758
Subgenus **EOSOLEN** Stewart, 1930

Solen (cf. **Eosolen) abruptus** (Dall)
Plate 53, figure 4

1900. *Solen (Plectosolen) lisbonensis abruptus* Dall, Wagner Free Inst. Sci., Trans., v. 3, pt. 5, p. 953.
1965. Cf. *Eosolen abruptus* (Dall). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 140-141, pl. 3, fig. 7, 8.

Type locality: Cook Mountain Formation, Clarke County, Mississippi.

Occurrence: Mississippi: Cook Mountain Formation, McLeods Mill on Souinlovey Creek in Clarke County 6 miles west of Desoto Station on railroad; Archusa Marl, locality 27.

Superfamily TELLINACEA de Blainville, 1814
Family TELLINIDAE de Blainville, 1814
Genus **TELLINA** Linné, 1758
Subgenus **ARCOPAGIA** Brown, 1827

Tellina (Arcopagia) raveneli Conrad, 1846
Plate 21, figures 1A, 1B

1834. *Tellina Raveneli* Conrad, *in* Morton, Synop. Organic Remains Cretaceous Group, App., p. 7.
1865. *Tellina (Arcopagia) Raveneli* Conrad. Conrad, Amer. Jour. Conch., v. 1, No. 1, p. 5.
1965. *Tellina (Arcopagia) raveneli* Conrad. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 309.

Type locality: Lisbon Formation, base of Lisbon Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b. Alabama:

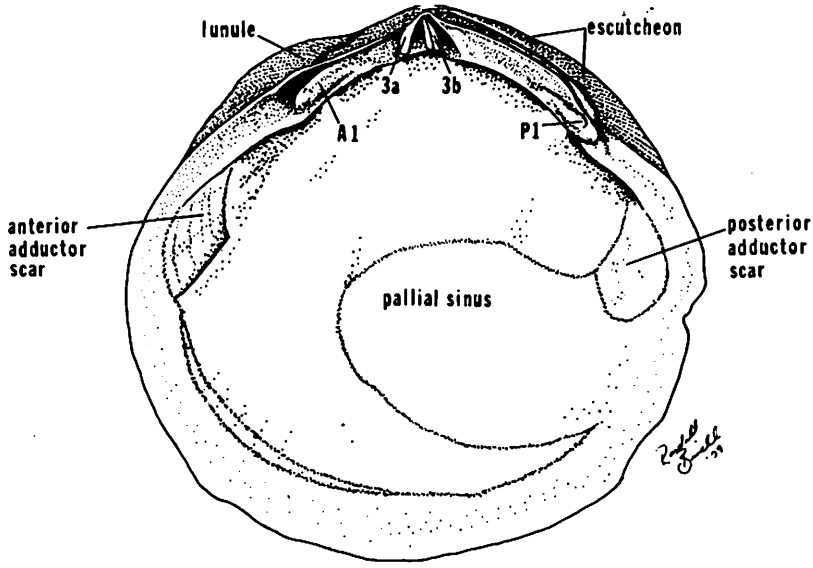

Figure 35. ***Tellina (Arcopagia) raveneli*** **Conrad, 1848, illustrated by Randall Bissell.**

Lisbon Formation, base of Lisbon Bluff on the Alabama River. South Carolina: McBean Formation, Orangeburg district.

Discussion: This species has strongly developed lateral teeth (as illustrated in text figure 35) that are similar to those of *Tellina (Scutarcopagia) scobinata* Linné (Recent-Indo Pacific). The major difference between these two species is in the external ornamentation. The latter species is sculptured with closely spaced, curved, short scales oriented to form a reticulate pattern of intersecting circles. *T. (A.) raveneli* has only concentric growth lines on the exterior.

Subgenus **ARCOPAGINULA** Lamy, 1918

Tellina (Arcopaginula) eburneopsis Conrad

Plate 70, figure 2

1865. *Tellina (Angulus) eburneopsis* Conrad, Amer. Jour. Conch., v. 1, p. 138, pl. 10, fig. 17.
1965. *Tellina eburneopsis* Conrad. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 304.
1977. *Tellina (Arcopaginula) eburneopsis* Conrad. Dockery, Miss. Geol. Survey, Bull. 120, p. 128, pl. 25, fig. 10.

Type locality: Moodys Branch Formation, locality 9.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 9,

11, 16. Louisiana: Moodys Branch Formation, Bunker Hill Landing on the Ouachita River. Arkansas: White Bluff Formation, Cleveland County.

Tellina vicksburgensis moodiana Cooke

Plate 69, figures 4A, 4B, 5A, 5B

1926. *Tellina vicksburgensis* var. *moodiana* Cooke, Washington Acad. Sci., Jour., v. 16, No. 5., p. 137, fig. 15a, b.
1965. *Tellina vicksburgensis moodiana* Cooke. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 312.
1977. *Tellina vicksburgensis moodiana* Cooke. Dockery, Miss. Geol. Survey, Bull. 120, p. 128-129, pl. 25, fig. 6, 7.

Type locality: Moodys Branch Formation, locality 3.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 3, 16.

Subgenus **EURYTELLINA** Fischer, 1887

Tellina (Eurytellina) vaughani Cooke

Plate 70, figures 1A, 1B

1926. *Tellina vaughani* Cooke, Washington Acad. Sci. Jour., v. 16, p. 138, fig. 16a, b.
1965. *Tellina vaughani* Cooke. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 312.
1977. *Tellina (Eurytellina) vaughani* Cooke. Dockery, Miss. Geol. Survey, Bull. 120, p. 129, pl. 25, fig. 2A, 2B, 3A, 3B.

Type locality: Moodys Branch Formation, locality 3.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 3, 16.

Tellina (Eurytellina) linifera Conrad

Plate 69, figures 1A, 1B, 3A, 3B

1865. *Tellina (Tellinella) linifera* Conrad, Amer. Jour. Conch., v. 1, p. 138, pl. 10, fig. 16, 18.
1965. *Tellina linifera* Conrad. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 306.
1977. *Tellina (Eurytellina) linifera* Conrad. Dockery, Miss. Geol. Survey, Bull. 120, p. 129-130, pl. 25, fig. 1A, 1B.

Type locality: Moodys Branch Formation, locality 9.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 9, 16. Louisiana: Moodys Branch Formation, Montgomery Landing on the Red River. Arkansas: White Bluff Formation, Vince Ferry on the Saline River. Alabama: Jackson Group, Little Stave Creek.

Subgenus **MOERELLA** Fischer, 1887

Tellina (Moerella) petropolitana Stenzel and Krause

Plate 22, figure 4

1957. *Tellina (Moerella) petropolitana* Stenzel and Krause *in* Stenzel, Krause, and Twining, Univ. Texas Pub. 5704, p. 123, pl. 22, fig. 10, 11.
1965. *Tellina (Moerella) petropolitana* Stenzel and Krause. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, p. 308.

Type locality: Stone City Beds, Sparta Formation, Stone City Bluff, Brazos River, Texas.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b. Texas: Stone City Beds, Stone City Bluff on the Brazos River.

Family SEMELIDAE Stoliczka, 1870

Genus **ABRA** Lamarck, 1818

Subgenus **ABRA** Lamarck, 1818

Abra (Abra) cf. **A. perovata** (Conrad)

Plate 69, figures 2A, 2B

1848. *Amphidesma perovata* Conrad, Acad. Nat. Sci. Philadelphia, Jour., 2nd ser., v. 1, pt. 2, p. 121, pl. 12, fig. 21.
1865. *Abra perovata* (Conrad). Conrad, Amer. Jour. Conch., v. 1, p. 5.

Type locality: Vicksburg Group, Vicksburg, Mississippi.

Occurrence: Mississippi: Vicksburg Group, Vicksburg area; Byram Formation, Big Black River west of Edwards, Mint Springs Formation, Cleary; cf. Moodys Branch Formation, locality 16.

Superfamily ARCTICACEA Newton, 1891

Family KELLIELLIDAE Fischer, 1887

Genus **ALVEINUS** Conrad, 1865

Alveinus minutus Conrad

Plate 71, figures 8A, 8B

1865. *Alveinus minutus* Conrad, Amer. Jour. Conch., v. 1, p. 138, pl. 10, fig. 2
1965. *Alveinus minutus* Conrad. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 27.
1969. *Alveinus minutus* Conrad. Keen, Treatise Invert. Paleont., pt. N, v. 2, p. N653, fig. E130, 11.
1977. *Alveinus minutus* Conrad. Dockery, Miss. Geol. Survey, Bull. 120, p. 131.

Type locality: Moodys Branch Formation, locality 9.

Occurrence: Mississippi: Moodys Branch Formation, locality 9, 16. Louisiana: Jackson Group, Gibson Landing on the Ouachita River. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River, Little Stave Creek, Gopher Hill on the Tombigbee River.

Superfamily VENERACEA Rafinesque, 1815

Family VENERIDAE Rafinesque, 1815

Genus **PITAR** Romer, 1857

Subgenus **PITAR** Romer, 1857

Pitar (Pitar) nuttalliopsis (Heilprin)

Plate 10, figure 5

1881. *Cytherea Nuttaliopsis* Heilprin, Acad. Nat. Sci. Philadelphia, Proc., v. 32, p. 370, pl. 20, fig. 1.
1965. *Pitar (Pitar) nuttalliopsis* (Heilprin). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 270.

Type locality: Bashi Formation, Knight's Branch, Clarke County, Alabama.

Occurrence: Mississippi: Bashi Formation, locality 20. Alabama: Bashi Formation, Knight's Branch, Thomasville, near the mouth of Bashi Creek, Woods Bluff on the Tombigbee River; Tuscahoma Formation, Greggs Landing and Bells Landing on the Alabama River.

Pitar (Pitar) securiformis (Conrad)

Plate 70, figures 6A, 6B

1865. *Dione securiformis* Conrad, Amer. Jour. Conch., v. 1, p. 137, pl. 10, fig. 1.
1946. *Pitar securiformis* Conrad. Harris, Bull. Amer. Paleont., v. 30, No. 117, pt. 1, p. 94, pl. 21, fig. 1-3.
1965. *Pitar (Pitar) securiformis* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 274.
1977. *Pitar (Pitar) securiformis* (Conrad). Dockery, Miss. Geol. Survey, Bull. 120, p. 132, pl. 26, fig. 5A, 5B, 6A, 6B.

Type locality: Moodys Branch Formation, locality 9.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 9, 10, 16; Yazoo Formation, locality 15. Louisiana: Jackson Group, Bunker Hill on the Ouachita River, one-half mile below Gibson's Landing on the Ouachita River; Danville Landing Member, Danville Landing on the Ouachita River. Arkansas: White Bluff Formation, Vince Bluff on the Saline River.

Subgenus **CALPITARIA** Jukes-Browne, 1908

Pitar (Calpitaria) cf. **P. (C.) petroplitanus** Stenzel and Krause

Plate 22, figures 1A, 1B, 2

1957. *Pitar (Calpitaria) petropolitanus* Stenzel and Krause *in* Stenzel, Krause and Twining, Univ. Texas Pub. 5704, p. 143-145, pl. 17, fig. 3-8.
1965. *Pitar (Calpitaria) petropolitanus* Stenzel and Krause. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 272.

Type locality: Stone City Beds, Stone City Bluff on the Brazos River, Texas.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b. Texas: Stone City Beds, Stone City Bluff on the Brazos River. For other localities in the Cook Mountain Formation of Texas, see Stenzel, Krause and Twining (1957, p. 145).

Pitar (Calpitaria) texacola (Harris)

Plate 52, figures 4A, 4B

1895. *Meretrix texacola* Harris, Acad. Nat. Sci. Philadelphia, Proc., v. 47, p. 50 in part, pl. 2, fig. 5, 5a.
1927. *Pitaria (Pitaria) texacola* (Harris). Palmer, Paleont. Amer., v. 1, No. 5, p. 15 in part.
1957. *Pitar (Calpitaria) texacola* (Harris). Stenzel, Krause, and Twining, Univ. Texas Pub. 5704, p. 145-147, pl. 18, fig. 3, 4; pl. 22, fig. 7-9.
1965. *Pitar (Calpitaria) texacola* (Harris). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 274.

Type locality: Tyus Member, Weches Formation, Berryman's place, H. Kimble headright, about 4 miles northeast of Alto, Cherokee County, Texas.

Occurrence: Mississippi: Archusa Marl, localities 26a, 27. For localities in Texas, see Stenzel, Krause, and Twining (1957, p. 147).

Genus **CALLISTA** Poli, 1791

Subgenus **CALLISTA** Poli, 1791

Callista (Callista) annexa (Conrad)

Plate 70, figures 3, 4A, 4B, 5A, 5B

1865. *Dione annexa* Conrad, Amer. Jour. Conch., v. 1, p. 137, pl. 10, fig. 5.
1929. *Callista annexa* (Conrad). Palmer, Paleont. Amer. v. 1, p. 283, pl. 45, fig. 17, 20.

1965. *Callista (Callista) annexa* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 58.
1977. *Callista (Callista) annexa* (Conrad). Dockery, Miss. Geol. Survey, Bull. 120, p. 133-134, pl. 26, figures 1A, 1B, 2, 3A, 3B, 3C, 4, 7.

Type locality: Moodys Branch Formation, locality 9.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 9, 11. Louisiana: Moodys Branch Formation, Montgomery Landing on the Red River; Jackson Group, Gibson Landing and Bunker Hill on the Ouachita River; Danville Landing Member, Danville Landing on the Ouachita River. Florida: Ocala Group, New Lebanon dolomite pit in the SW/4, NE/4, Section 12, T.16 S., R.16 E., Levy County, roadmetal pit 2.9 miles south of north limits of Gulf Hammock, just southwest of State Road 55 in SW/4, Section 34, T.14 S., R.16 E., Levy County.

Subgenus **COSTACALLISTA** Palmer, 1927

Callista (Costacallista) cf. **C. (C.) mortoni** (Conrad)

Plate 52, figures 3A, 3B

1834. *Cytherea Mortoni* Conrad, Acad. Nat. Sci. Philadelphia, Jour., v. 7, p. 150.
1927. *Callista (Costacallista) mortoni* (Conrad). Palmer, Paleont. Amer., v. 1, No. 5, p. 88.
1965. *Callista (Costacallista) mortoni* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 58-59.

Type locality: Gosport Sand, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Cf. Mississippi: Cook Mountain Formation, locality 69. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River.

Subgenus **MACROCALLISTA** Meek, 1876

Callista (Macrocallista) sylvaerupis (Harris)

Plate 10, figures 6, 7A, 7B

1886. *Cytherea perovata* ? Conrad. Aldrich, Geol. Survey Alabama, Bull. 1, p. 53. Not *C. perovata* Conrad, 1833.
1919. *Meretrix sylvaerupis* Harris, Bull. Amer. Paleont., v. 6, No. 31, p. 136, pl. 43, fig. 1.
1965. *Macrocallista sylvaerupis* (Harris). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 188.
1977. *Macrocallista sylvaerupis* (Harris). Toulmin, Geol. Survey Alabama, Monograph 13, p. 190, pl. 16, fig. 3, 4.

Type locality: Bashi Formation, Woods Bluff, Tombigbee River, Alabama.

Occurrence: Mississippi: Bashi Formation, locality 19. Alabama: Bashi Formation, Woods Bluff on the Tombigbee River. For other Alabama localities, see Toulmin (1977, p. 190).

Order MYOIDA Stoliczka, 1870
Suborder MYINA Stoliczka, 1870
Superfamily MYACEA Lamarck, 1809
Family CORBULIDAE Lamarck, 1818
Genus **CORBULA** Bruguiere, 1797

Corbula subengonata Dall
Plate 10, figures 3, 4A, 4B

1886. *Corbula engonata* Conrad. Aldrich, Geol. Survey Alabama, Bull. 1, p. 58.
1897. *Corbula alabamiensis* Lea var. Harris, Bull. Amer. Paleont., v. 2, No. 9, p. 68.
1898. *Corbula subengonata* Dall, Wagner Free Inst. Sci., Trans., v. 3, pt. 4, p. 841.
1919. *Corbula subengonata* Dall. Harris, Bull. Amer. Paleont., v. 6, No. 31, p. 185, pl. 56, fig. 1-4, 7; 6, 8 vars.
1965. *Corbula subengonata* Dall. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 96-97.

Type locality: Greggs Landing Member, Tuscahoma Formation, Greggs Landing, Alabama River.

Occurrence: Mississippi: Bashi Formation, locality 19. Alabama: Tuscahoma Formation, Greggs Landing and Bells Landing on the Alabama River, Tuscahoma Landing on the Tombigbee River; Bashi Formation, Woods Bluff on the Tombigbee River.

Discussion: Harris (1919, p. 56) mentions a variety of this species in the Bashi Formation that approaches the form of *Caryocorbula alabamiensis* (Lea, 1833). The specimen illustrated in plate 10, figures 4A and 4B fits this description.

Subgenus **CARYOCORBULA** Gardner, 1926

Corbula (Caryocorbula) deusseni (Gardner *in* Deussen)
Plate 22, figures 7A, 7B, 8A, 8B

1896. *Corbula alabamiensis* Lea, small var. Vaughan, U.S. Geol. Survey Bull. No. 142, p. 47.
1924. *Corbula (Cuneocorbula) deusseni* Gardner *in* Deussen, U.S. Geol. Survey Prof. Paper 126, p. 68, pl. 22, fig. 8, 8a.
1957. *Caryocorbula deusseni* (Gardner). Stenzel, Krause, and Twining, Univ. Texas Pub. 5704, p. 166, pl. 20, fig. 4-8, 11-21.

1965. *Caryocorbula deusseni* (Gardner). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 77.

Type locality: Viesca Member, Weches Formation, Colorado River at Smithville, Texas.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b. Texas: Viesca Member, Colorado River at Smithville; Stone City Beds, Stone City Bluff on the Brazos River.

Corbula (Caryocorbula) densata (Conrad *in* Wailes)

Plate 71, figures 4, 5A, 5B, 7A, 7B

1854. *Corbula densata* Conrad *in* Wailes, Rept. Agr. Geol. Mississippi, p. 289, pl. 13, fig. 9.
1946. *Corbula (Caryocorbula) densata* (Conrad). Harris, Bull. Amer. Paleont., v. 30, No. 117, pt. 1, p. 115-116, pl. 24, fig. 11-15, 17-21.
1965. *Caryocorbula densata* (Conrad). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 76.
1977. *Corbula (Caryocorbula) densata* (Conrad). Dockery, Miss. Geol. Survey, Bull. 120, p. 135, pl. 27, fig. 11A, 11B, 12, 13A, 13B.

Type locality: Moodys Branch Formation, Jackson, Mississippi.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 9, 10, 16. Louisiana: Moodys Branch Formation, Montgomery Landing on the Red River; Jackson Group, Gibson's Landing on the Ouachita River. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River. Arkansas: White Bluff Formation, Crow Creek. Florida: Ocala Group, Inglis, Gulf Hammock.

Corbula (Caryocorbula) willistoni arkansia Harris

Plate 71, figure 9

1946. *Corbula (Caryocorbula) willistoni*, var. *arkansia* Harris, Bull. Amer. Paleont., v. 30, No. 117, pt. 1, p. 116-117, pl. 25, fig. 22-25.
1965. *Caryocorbula willistoni arkansia* Harris. Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 78.
1977. *Corbula (Caryocorbula) willistoni arkansia* Harris. Dockery, Miss. Geol. Survey, Bull. 120, p. 135, pl. 27, fig. 5A, 5B, 6A, 6B.

Type locality: White Bluff Formation, White Bluff, Arkansas River, Arkansas.

Occurrence: Mississippi: Moodys Branch Formation, localities 11, 16. Louisiana: Jackson Group, Bayou Toro. Arkansas: White Bluff Formation, White Bluff on the Arkansas River, Crow Creek.

Corbula (Caryocorbula) sp.

Plate 22, figures 6A, 6B

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b.

Genus **CAESTOCORBULA** Vincent, 1910

Caestocorbula fossata (Meyer and Aldrich)

Plate 53, figures 1A, 1B, 2, 3A, 3B

1886. *Corbula Murchisoni* var. *fossata* Meyer and Aldrich, Cincinnati Soc. Nat. Hist., Jour., v. 9, No. 2, p. 45, pl. 2, fig. 22.
1965. *Caestocorbula fossata* (Meyer and Aldrich). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 56.

Type locality: Cook Mountain Formation, Newton, Mississippi.

Occurrence: Mississippi: Cook Mountain Formation, Newton, Hickory, Wautubbee, 8 miles west of Enterprise; Archusa Marl, localities 27, 62. Louisiana: Cook Mountain Formation, Mt. Lebanon. Alabama: Gosport Sand, Claiborne Bluff on the Alabama River; Lisbon Formation, Lisbon Bluff on the Alabama River.

Caestocorbula wailesiana Harris *in* Dall

Plate 71, figures 1A, 1B, 3A, 3B

1854. *Corbula bicarinata* Conrad *in* Wailes, Rept. Agr. Geol. Mississippi, p. 289, pl. 14, fig. 3. Not *C. bicarinata* G. B. Sowerby, 1833.
1898. *Corbula wailesiana* Harris *in* Dall, Wagner Free Inst. Sci., Trans., v. 3, pt. 4, p. 846.
1965. *Caestocorbula wailesiana* (Harris *in* Dall). Palmer and Brann, Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 57.
1977. *Caestocorbula wailesiana* (Harris *in* Dall). Dockery, Miss. Geol. Survey, Bull. 120, p. 136, pl. 27, fig. 7, 8, 9, 10.

Type locality: Moodys Branch Formation, Jackson, Mississippi.

Occurrence: Mississippi: Moodys Branch Formation, localities 1, 2, 9, 16; Yazoo Clay, locality 15. Louisiana: Moodys Branch Formation, Montgomery Landing on the Red River; Jackson Group, Gibson Landing on the Ouachita River; Danville Landing Member, Danville Landing on the Ouachita River. Texas: Jackson Group, Wolley's Bluff on the Sabine River below Robinson's Ferry. Arkansas: White Bluff Formation, Vince Bluff on the Sabine River.

Phylum ARTHROPODA
Superclass CRUSTACEA

Class CIRRIPEDIA Burmeister, 1834
Order THORACICA Darwin, 1854
Suborder LEPADOMORHA Pilsbry, 1916
Family SCALPELLIDAE Pilsbry, 1916
Genus **EUSCALPELLUM** Hoek, 1907

Euscalpellum eocenense (Meyer)

Plate 24, figures 8, 9; Plate 54, figures 1A, 1B, 2A, 2B, 3, 4A, 4B, 5, 6, 7A, 7B

1885. *Scalpellum Eocenense* Meyer, Amer. Jour. Sci., Ser. 3, v. 30, p. 69-70.
1951. *Euscalpellum eocenense* (Meyer). Withers, Bull. British Mus. (Nat. Hist.) Geol., v. 1, No. 5, p. 158-161, figured p. 154.
1953. *Euscalpellum eocenense* (Meyer). Withers, Catalogue Fossil Cirripedia, v. 3, Tertiary, p. 186-189, pl. 21, fig. 1-10; pl. 22, fig. 7-10; text fig. 79.
1969. *Euscalpellum eocenense* (Meyer). Newman, Zullo, and Withers, Cirripedia, *in* Treatise Invert. Paleont., pt. R, Arthropoda 4, v. 1, p. R277, fig. 115A-1a.

Type locality: Lisbon Formation, Claiborne Bluff, Alabama River, Alabama.

Occurrence: Mississippi: Cook Mountain Formation, Newton exit on I-20 behind gas station just south of interstate on west side of road, railroad cut one mile north of Wautubbee, Indian mound 3 miles east of Newton on the A. and V. Railroad; Archusa Marl, localities 25, 27. Alabama: Lisbon Formation, Claiborne Bluff on the Alabama River, Coffeeville Landing on the Tombigbee River. For localities in the Weches Formation of Texas, see Withers (1951).

Order DECAPODA Latreille, 1803
Suborder PLEOCYEMATA Burkenroad, 1963
Infraorder ANOMURA H. Milne-Edwards, 1832
Superfamily THALASSINOIDEA Latreille, 1831
Family CALLIANASSIDAE Dana, 1852
Genus **CALLIANASSA** Leach, 1814

Callianassa sp.

Plate 14, figures 1A, 1B

Occurrence: Winona Formation, locality 22.

Callianassa sp. ?
Plate 71, figure 2

Occurrence: Moodys Branch Formation, localities 9, 17.

Genus **OPHIOMORPHA** Lundgren, 1891

Ophiomorpha sp.
Plate 14, figure 2

Occurrence: Winona Formation, locality 22.

Discussion: *Ophiomorpha* is a trace fossil (ichnofossil) of a "mud shrimp" burrow possibly belonging to *Callianassa*.

Infraorder BRACHYURA Latreille, 1803
Section OXYSTOMATA H. Milne-Edwards, 1834
Superfamily RANINOIDEA de Haan, 1841
Family RANINIDAE de Haan, 1841
Genus **RANINA** Lamarck, 1801
Subgenus **LOPHORANINA** Fabiani, 1910

Ranina (Lophoranina) georgiana Rathbun
Plate 82, figure 2

1935. *Ranina georgiana* Rathbun, Geol. Soc. Amer. Spec. Paper No. 2, p. 97-98, fig. 2 on p. 98, pl. 21, fig. 7, 8.

Type locality: Glendon Limestone, old factory about 1 1/2 miles above Bainbridge, Decatur County, Georgia.

Occurrence: Mississippi: Glendon Limestone, locality 45. Alabama: Glendon Limestone, St. Stephens Bluff on the Tombigbee River. Georgia: Glendon Limestone, old factory about 1 1/2 miles above Bainbridge.

Section BRACHYRHYNCHA Borradaile, 1907
Superfamily XANTHOIDEA Dana, 1851
Family XANTHIDAE Dana, 1851
Genus **HARPACTOCARCINUS** A. Milne-Edwards, 1862

Harpactocarcinus sp.
Plate 53, figures 5A, 5B

Occurrence: Archusa Marl, locality 26a.

Phylum ECHINODERMATA
Subphylum ECHINOZOA
Class ECHINOIDEA Leske, 1778
Subclass EUECHINOIDEA Bronn, 1860
Superorder ECHINACEA Claus, 1876
Order CLYPEASTEROIDA A. Agassiz, 1872
Family CLYPEASTERIDAE L. Agassiz, 1835
Genus **CLYPEASTER** Lamarck, 1801

Clypeaster rogersi (Morton, 1834)
Plate 80, figures 6, 7

1834. *Scutella rogersi* Morton, Synopsis organic remains Cretaceous Group, p. 77, pl. 13, fig. 3.
1866. *Clypeaster rogersi* (Morton). Conrad, Smithsonian Misc. Coll., v. 7, p. 22.
1959. *Clypeaster rogersi* (Morton). Cooke, U.S. Geol. Survey Prof. Paper 321, p. 36-37, pl. 12, fig. 4-6.

Type locality: Probably Marianna Limestone, east of Claiborne, Alabama.

Occurrence: Mississippi: Common in the Marianna Limestone and rare in the Glendon Limestone and Byram Formation. For other localities in the Marianna Limestone in Alabama, the Flint River Formation of Georgia, the Suwannee Limestone of Florida, and the Oligocene of Cuba and Mexico, see Cooke (1959, p. 37).

Family PROTOSCUTELLIDAE Durham, 1955
Genus **PROTOSCUTELLA** Stefanini, 1924

Protoscutella mississippiensis (Twichell)
Plate 13, figures 3, 5, 6

1915. *Scutella mississippiensis* Twichell, U.S. Geol. Survey Monograph 54, p. 124, pl. 59, fig. 1a-f.
1924. *Protoscutella mississippiensis* (Twichell). Stefanini, Geol. Soc. Amer. Bull., v. 35, p. 843.
1959. *Protoscutella mississippiensis* (Twichell). Cooke, U.S. Geol. Survey Prof. Paper 321, p. 38-39, pl. 15, fig. 12, 13.
1977. *Protoscutella mississippiensis* (Twichell). Toulmin, Geol. Survey Alabama, Monograph 13, p. 306-307, pl. 51, fig. 1, 2.

Type locality: Winona Formation, locality 23.

Occurrence: Mississippi: Winona Formation, localities 22, 23, about 3/4 mile south of Basic City, Highway 11 1 1/4 miles south of Lauderdale County. For other localities in basal Lisbon Formation and upper

Tallahatta Formation in Alabama and the Mount Selman Formation in Texas, see Cooke (1959, p. 39).

Genus **PERIARCHUS** Conrad, 1866

Periarchus lyelli (Conrad)

Plate 71, figure 6; Plate 72, figure 2; Plate 73

1834. *Scutella lyelli* Conrad, Acad. Nat. Sci. Philadelphia, Jour., ser. 1, v. 7, p. 152.
1915. *Periarchus lyelli* (Conrad). Clark and Twitchell, U.S. Geol. Survey Monograph 54, p. 131, pl. 61, fig. 2a-f; pl. 62, fig. 1a-c, 2a-d.
1959. *Periarchus lyelli* (Conrad). Cooke, U.S. Geol. Survey Prof. Paper 321, p. 41-42, pl. 13, fig. 1; pl. 14, fig. 1-3.
1977. *Periarchus lyelli* (Conrad). Toulmin, Geol. Survey Alabama, Monograph 13, p. 344, pl. 68, fig. 4-6.

Type locality: Moodys Branch Formation, Alabama River a few miles south of Claiborne, Alabama.

Occurrence: Mississippi: Common in the Moodys Branch Formation. For other localities in the Moodys Branch Formation of Alabama, and the Jackson Group in North Carolina, South Carolina, Georgia, Florida, Louisiana, and Texas, see Cooke (1959, p. 42). *Periarchus lyelli* is present in the Gosport Sand (upper Claiborne) at Little Stave Creek in Alabama. Cooke (1959, p. 42) states that this species may also occur in the Cook Mountain Formation and equivalents.

Periarchus lyelli pileussinensis (Ravenel)

Plate 74, figures 1A, 1B, 1C, 3

1844. *Scutella pileus-sinensis* Ravenel, Acad. Nat. Sci. Philadelphia, Proc., v. 2, p. 97.
1942. *Periarchus lyelli pileus-sinensis* (Ravenel). Cooke, Jour. Paleont., v. 16, No. 1, p. 15.
1959. *Periarchus lyelli pileus-sinensis* (Ravenel). Cooke, U.S. Geol. Survey Prof. Paper 321, p. 42, pl. 13, fig. 2, 3.
1977. *Periarchus lyelli pileussinensis* (Ravenel). Toulmin, Geol. Survey Alabama, Monograph 13, p. 344-345, pl. 69, fig. 1-3.

Type locality: unnamed formation in South Carolina.

Occurrence: Mississippi: Cocoa Sand, locality 31. Also occurs in the Jackson Group of South Carolina, Georgia, and Alabama. For Alabama localities, see Toulmin (1977, p. 345).

Discussion: This subspecies can be distinguished from *P. lyelli* s. s. by its elevated, conical petaliferous area. The margins are usually very thin.

Superorder ATELOSTOMATA Zittel, 1879
Order SPATANGOIDA Claus, 1876
Suborder HEMIASTERINA A. G. Fischer, 1966
Family SCHIZASTERIDAE Lambert, 1905
Genus **SCHIZASTER** L. Agassiz, 1836
Subgenus **PARASTER** Pomel, 1869

Schizaster (Paraster) americanus (Clark)

Plate 82, figure 1

1915. *Schizaster americana* Clark, U.S. Geol. Survey Monograph 54, p. 176, pl. 82, fig. 2a-d.
1959. *Paraster americana* (Clark). Cooke, U.S. Geol. Survey Prof. Paper 321, p. 72, pl. 30, fig. 5-8.

Type locality: Vicksburg Group, near Brandon, Mississippi.

Occurrence: Mississippi: Vicksburg Group, Yost's lime kiln near Brandon, limestone ledges forming waterfall at Mint Spring Bayou north of Vicksburg, Sylvarena road about 4 1/2 miles west of Bay Springs, Panther Creek 7 miles north of Youngton in Warren County, above the Mint Spring Formation in a creek in the NW/4, NW/4, SE/4, Sec. 22, T.4 N., R.1 E., Rankin County; Glendon Limestone, locality 42. Alabama: Vicksburg Group, Old Weaver Chute 2 or 3 miles below McGowans Bridge in Escambia County. Georgia: Oligocene, Ocmulgee River at mill 3/4 mile below Hawkinsville.

Suborder MICRASTERINA A. G. Fischer, 1966
Family SPATANGIDAE Gray, 1825
Genus **MARETIA** Gray, 1855

Maretia arguta (Clark)

Plate 53, figure 6

1915. *Hemipatagus argutus* Clark, U.S. Geol. Survey Monograph 54, p. 150, pl. 69, figs. 1a-d.
1942. *Hemipatagus argutus* Clark. Cooke, Jour. Paleont., v. 16, No. 1, p. 52.
1959. *Maretia arguta* (Clark). Cooke, U.S. Geol. Survey Prof. Paper 321, p. 81, pl. 34, fig. 1-4.

Type locality: Winona Formation, Chickasawhay River at Enterprise (probably locality 22).

Occurrence: Mississippi: Winona Formation, Chickasawhay River at Enterprise; Cook Mountain Formation, Rose Hill road 8 miles west of Enterprise; Archusa Marl, locality 62.

EXPLANATION PLATE 1

Bashi Formation (Wilcox Group)

Figure		Page
1	**Madracis gregorioi** Vaughan, 1900 Greatest diameter of corallum 13.4 mm, average diameter of corallites 3 mm; locality 19. MGS specimen 03.	64
2, 3	**Balanophyllia (Balanophyllia) haleana** (Milne-Edwards and Haime, 1848) 2. Height 21.3 mm, greatest diameter 14.2 mm, small diameter 10.4 mm; locality 20. MGS specimen 04. 3. Height 8 mm, greatest diameter 11.5 mm, small diameter 9.4 mm; locality 20. MGS specimen 05.	69
4, 5, 6, 7	**Solariella sylvaerupis** Harris, 1897 4. Height 5.3 mm, width 6 mm; locality 20. MGS specimen 06. 5. Height 4.1 mm, width 4.5 mm; locality 19. MGS specimen 07. 6. Specimen broken at aperture, height 5.3 mm, width 5.7 mm; locality 19. MGS specimen 08. 7. Height 3.7 mm, width 5.1 mm; locality 19. MGS specimen 09.	74
8	**Sigatica clarkeana** Aldich, 1887 20.7 mm, width 18.3 mm; locality 20. MGS specimen 10.	96
9	**Sinum declive** (Conrad, 1833) Height 13 mm, width 11.2 mm; locality 20. MGS specimen 11.	94
10	**Euspira sabina** (Palmer, 1937) Height 9.5 mm, width 12.7 mm; locality 20. MGS specimen 12.	93

1
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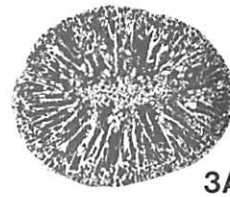
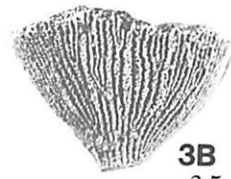
2
x 1.6



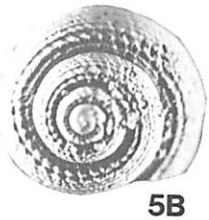
3A
x 2.5



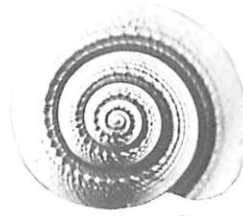
3B
x 2.5

5A
x 6

4
x 6



5B
x 6



6
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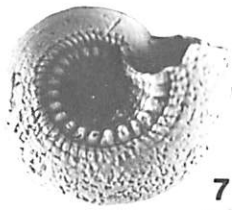

7
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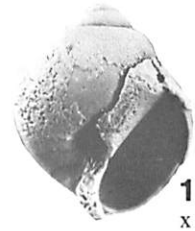
8A
x 1.5

8B
x 1.5

9A
x 2.5

9B
x 2.5



10
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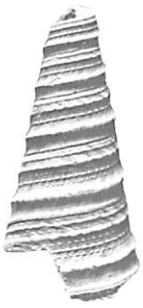
EXPLANATION PLATE 2

Bashi Formation (Wilcox Group)

Figure		Page
1	**Turritella rina** Palmer, 1937, var. Height 15.5 mm, width 7 mm; locality 19. MGS specimen 13.	79
2	**Turritella gilberti** Bowles, 1939 Height 10.2 mm, width 4 mm; locality 19. MGS specimen 14.	79
3	**Nassarius exilis** (Conrad, 1860) Height 8.3 mm, width 4.1 mm; locality 19. MGS specimen 15.	108
4	**Eopleurotoma cainei** (Harris, 1899) Incomplete specimen; height 7.7 mm, width 3.2 mm; locality 19. MGS specimen 16.	129
5	**Cornulina minax compressa** n. subsp. Height 31.4 mm, width 24.5; locality 20. MGS specimen 17.	107
6	**Coronia childreni** (I. Lea, 1833) var. a Height 9.6 mm, width 3.4 mm; locality 19. MGS specimen 18.	125
7	**Athleta tuomeyi** (Conrad, 1853) Incomplete specimen; height 29.1 mm, width 21.7 mm; locality 19. MGS specimen 19.	115
8	**Tornatellaea bella** Conrad, 1860 Height 13.6 mm, width 8 mm; locality 19. MGS specimen 20.	139



1
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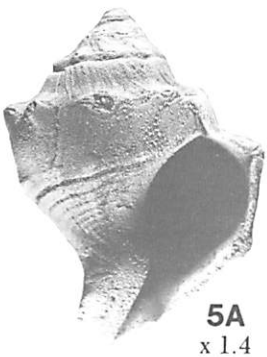
2
x 4

3
x 5

4
x 5



5A
x 1.4

5B
x 1.4

6
x 5

7A
x 1.4

7B
x 1.4

8
x 3

EXPLANATION PLATE 3

Bashi Formation (Wilcox Group)

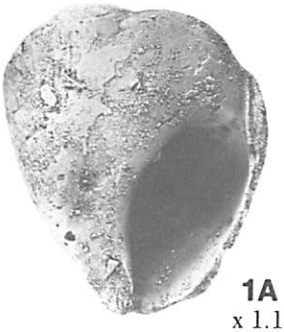
Figure — Page

1, 2, 3 **Pseudoliva santander** Gardner, 1945 104

1. Height 36 mm, width 32 mm; locality 19. MGS specimen 26.
2. Height 23.7 mm, width 18.4 mm; locality 19. MGS specimen 21.
3. Height 26.3 mm, width 21.4 mm; locality 20. MGS specimen 22.

4, 5, 6, 7 **Bullia calluspira** n. sp. 109

4. Height 24.4 mm, width 19.3 mm; locality 19. MGS specimen 23.
5. Height 28 mm, width 23.1 mm; locality 19. Holotype PRI No. 30022.
6. Height 32.5 mm, width 26 mm; locality 20. MGS specimen 24.
7. Height 29 mm, width 23.5 mm; locality 19. MGS specimen 25.

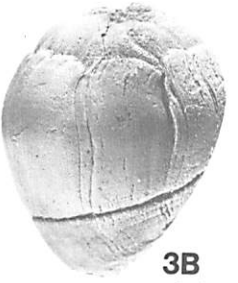


1A
x 1.1

1B
x 1.1

2
x 1.2

3A
x 1.4



3B
x 1.4

4
x 1.2

5A
x 1.4

5B
x 1.4

6A
x 1.1

7A
x 1.1

7B
x 1.1

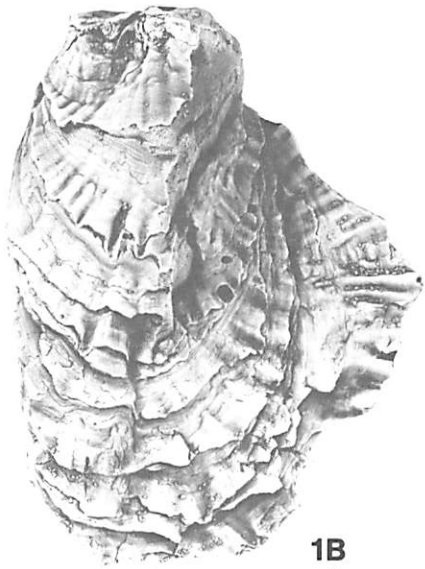
6B
x 1.1

EXPLANATION PLATE 4

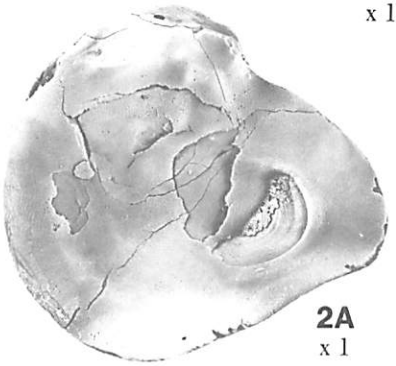
Bashi Formation (Wilcox Group)

Figure		Page
1, 2, 4	**Ostrea brevifronta** n. sp.	160
	1. Left valve; height 72.5 mm, length 55 mm, inflation 19.3 mm; locality 19. Holotype PRI No. 30023.	
	2. Right valve; height 45 mm, length 47.8 mm, inflation 10 mm; locality 19. Paratype PRI No. 30024.	
	4. Left valve; height 36.3 mm, length 31 mm, inflation 8.6 mm; locality 19. MGS specimen 28.	
3	**Crassostrea** sp.	160
	Right valve; height 51.7 mm, length 32 mm, inflation 10 mm; locality 19. MGS specimen 29.	

1A
x 1



1B
x 1



2A
x 1

2B
x 1

3A
x 1

3B
x 1

4
x 1

EXPLANATION PLATE 5

Bashi Formation (Wilcox Group)

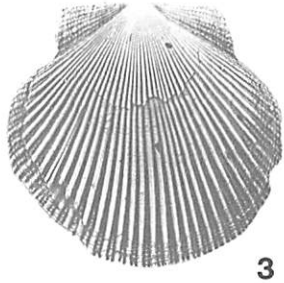
Figure		Page
1, 2	**Odontogryphaea** sp.	162
	1. Left valve (young); height 21.7 mm, length 22.4 mm, inflation 10.5 mm; locality 19. MGS specimen 30.	
	2. Right valve (young); height 17 mm, length 14.3 mm, inflation 1 mm; locality 19. MGS specimen 31.	
3	**Chlamys choctavensis** (Aldrich, 1895)	153
	Left valve; height 23 mm, length 23.5 mm, inflation 3 mm; locality 19. MGS specimen 32.	
4, 5	**Lucina (Cavilinga) pomilia smithi** (Meyer, 1866)	164
	4. Right valve; height 4.2 mm, length 4.6 mm, inflation 1.6 mm; locality 19. MGS specimen 33.	
	5. Left valve; height 4.4 mm, length 5 mm, 1.8 mm; locality 19. MGS specimen 34.	

1A
x 1.4

2A
x 2

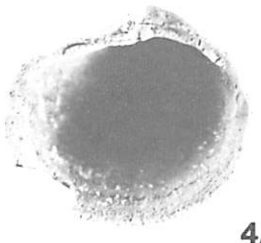
2B
x 2

1B
x 1.4

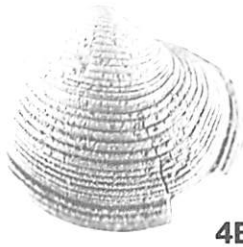


3
x 1.5

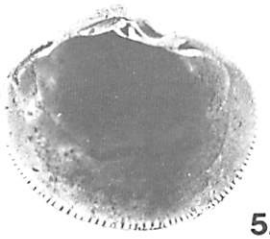
1C
x 1.4



4A
x 7



4B
x 7



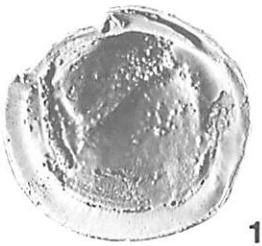
5A
x 7

5B
x 7

EXPLANATION PLATE 6

Bashi Formation (Wilcox Group)

Figure		Page
1, 3, 6	**Codakia ? (Claibornites) sp.**	164
	1. Right valve; height 15.5 mm, length 16.1 mm, inflation 3.2 mm; locality 19. MGS specimen 35.	
	3. Left valve; height 16.3 mm, length 16.5 mm, inflation 3.3 mm; locality 19.	
	6. Right valve; height 14.6 mm, length 14.6 mm, inflation 3.1 mm; locality 19.	
2, 5	**Venericardia cf. V. nanaplata nanna** Gardner and Bowles, 1934	170
	2. Left valve (young); height 11.2 mm, length 11.7 mm, inflation 3.8 mm; locality 19. MGS specimen 36.	
	5. Right valve (young); height 13 mm, length 14.6 mm, inflation 5.5 mm; locality 19. MGS specimen 37.	
4	**Venericardia (Venericor?) greggiana** Dall, 1903	170
	Left valve (young); height 5.6 mm, length 5.7 mm, inflation 2 mm; locality 19. MGS specimen 38.	
7	**Lirodiscus (Lirodiscus) smithvillensis** (Harris, 1897) var.	174
	Right valve; height 13.2 mm, length 16.4 mm, inflation 4.4 mm; locality 19. MGS specimen 39.	



1A
x 2

1B
x 2

2A
x 2

3A
x 2

3B
x 2

2B
x 2

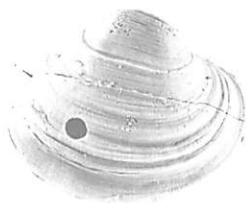
4
x 6

5A
x 2

5B
x 2

6
x 2

7A
x 2



7B
x 2

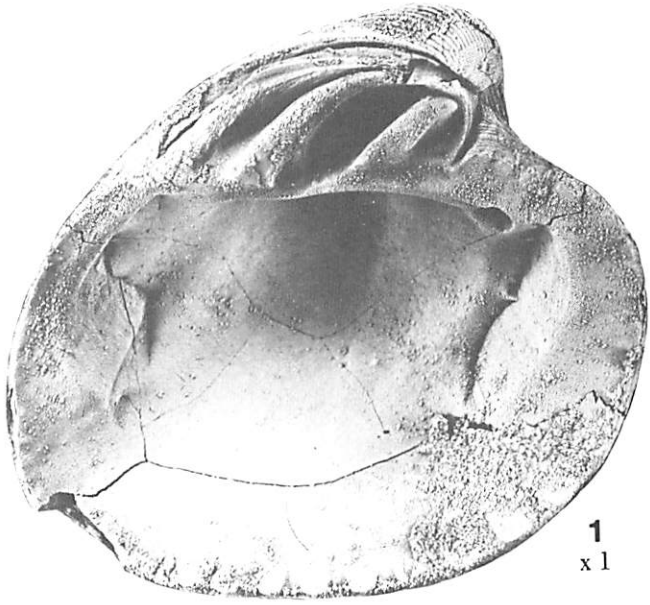
EXPLANATION PLATE 7

Bashi Formation (Wilcox Group)

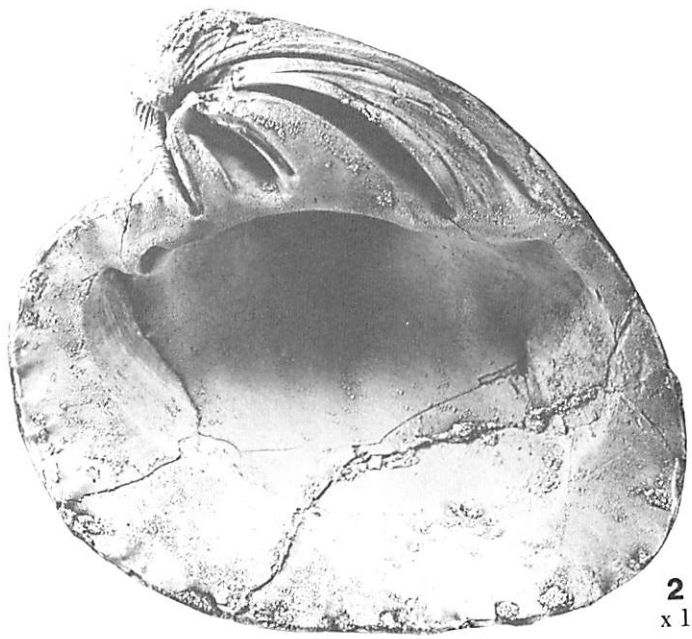
Figure — Page

1, 2 — Venericardia (Venericor) bashiplata Gardner and Bowles, 1939.....170

1. Left valve; height 78 mm, length 81 mm, inflation 27 mm; locality 20. MGS specimen 40.
2. Right valve; height 82 mm, length 88.4 mm, inflation 29 mm; locality 20. MGS specimen 41.



1
x 1



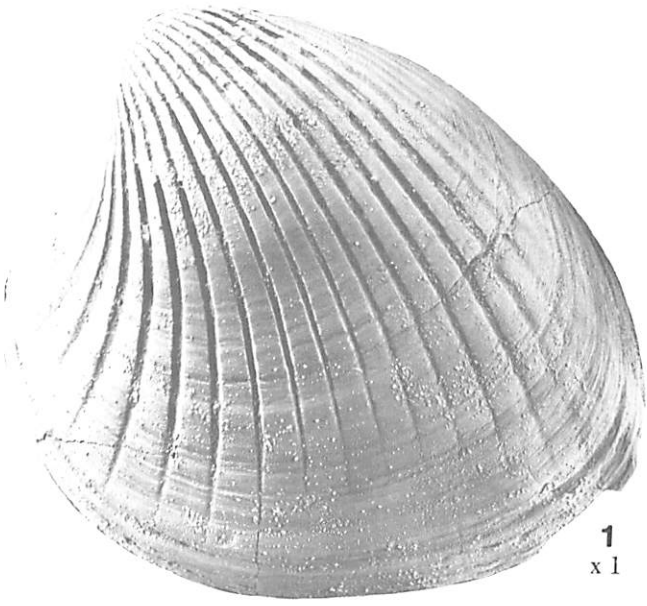
2
x 1

EXPLANATION PLATE 8

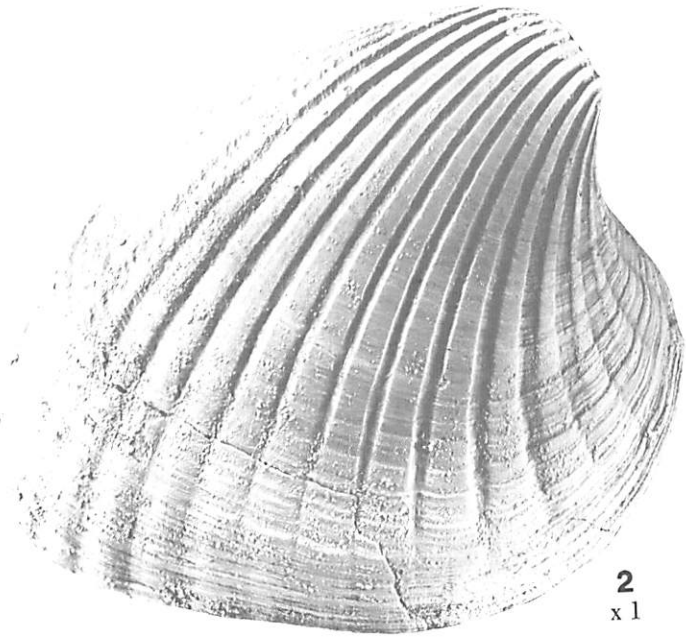
Bashi Formation (Wilcox Group)

Figure		Page
1, 2	**Venericardia (Venericor) bashiplata** Gardner and Bowles, 1939	170

1. Left valve; same specimen as in plate 7, figure 1. MGS specimen 40.
2. Right valve; same specimen as in plate 7, figure 2. MGS specimen 41.



1
x 1

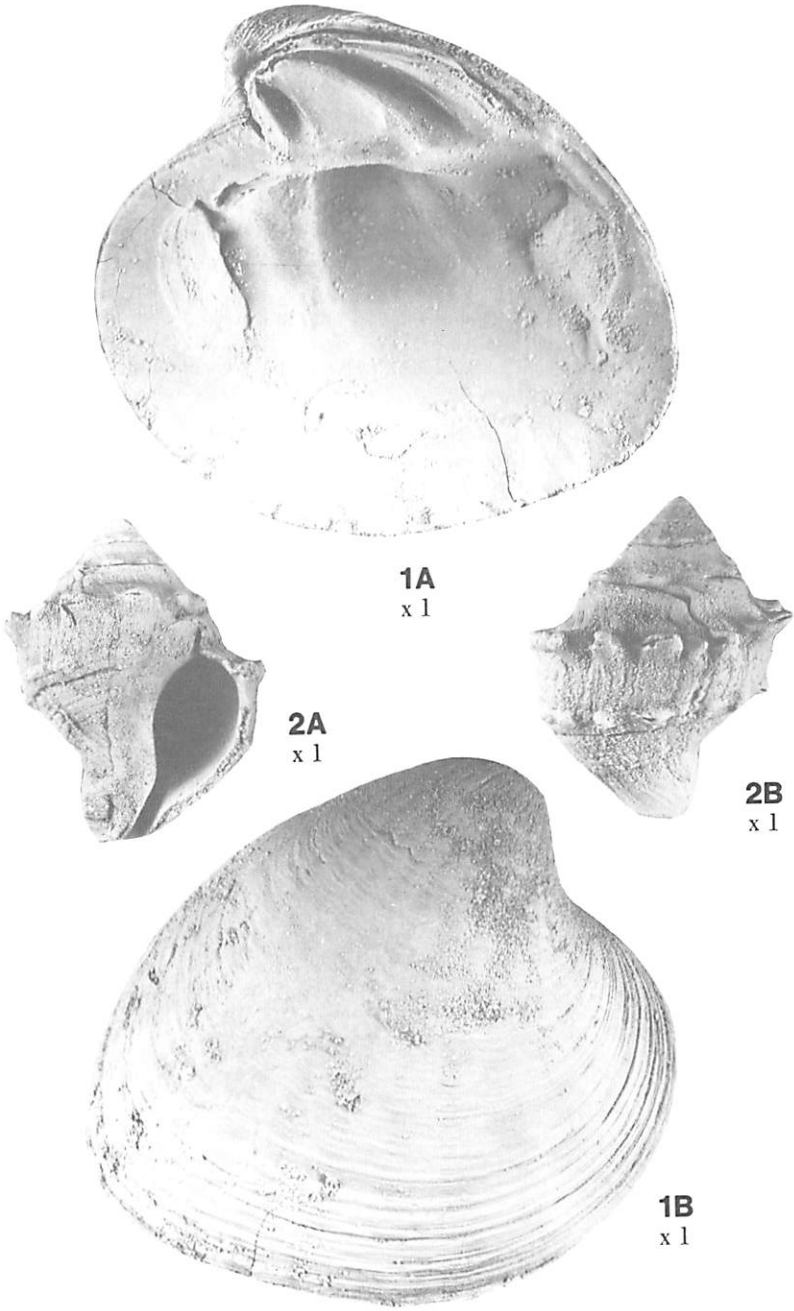


2
x 1

EXPLANATION PLATE 9

Bashi Formation (Wilcox Group)

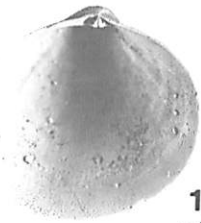
Figure		Page
1	**Venericardia (Leuroactis) horatiana** Gardner, 1936 Right valve; height 70.7 mm, length 75.4 mm, inflation 23 mm; locality 21. MGS specimen 410.	169
2	**Cornulina minax compressa** n. subsp. Height 42 mm, width 33.5 mm; locality 21. Holotype PRI No. 30021.	107


1A
x 1
2A
x 1
2B
x 1
1B
x 1

EXPLANATION PLATE 10

Bashi Formation (Wilcox Group)

Figure		Page
1	**Felaniella** sp. Left valve; height 11.4 mm, length 11.8 mm, inflation 3.4 mm; locality 19. MGS specimen 42.	165
2	**Cadulus** sp. Length 9.5 mm, greatest diameter 1.4 mm; locality 20. MGS specimen 43.	145
3, 4	**Corbula subengonata** Dall, 1898 3. Left valve; height 3.3 mm, length 5 mm, inflation 1.2 mm; locality 19. MGS specimen 44. 4. Right valve; height 4.3 mm, length 6.5 mm, inflation 1.8 mm; locality 19. MGS specimen 45.	186
5	**Pitar (Pitar) nuttalliopsis** (Heilprin, 1881) Left valve (incomplete specimen); height 24 mm, length 28 mm, inflation 9.2 mm; locality 20. MGS specimen 46.	183
6, 7	**Callista (Macrocallista) sylvaerupis** (Harris, 1919) 6. Right valve; height 14.8 mm, length 21.8 mm, inflation 4.7 mm; locality 19. MGS specimen 47. 7. Right valve; height 10.6 mm, length 15.2 mm, inflation 3.2 mm; locality 19. MGS specimen 48.	185



1A
x 2.5

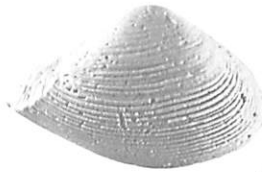
1B
x 2.5

2
x 5

1C
x 7

4A
x 7

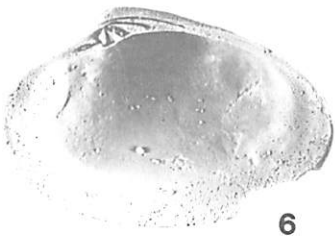
3
x 7



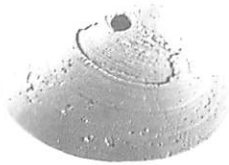
4B
x 7

5
x 1.2

7A
x 2



6
x 2

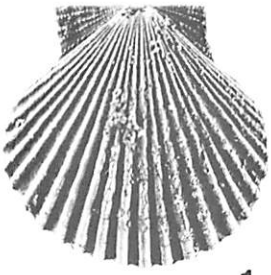


7B
x 2

EXPLANATION PLATE 11

Winona Formation (Claiborne Group)

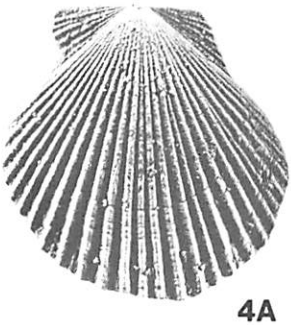
Figure		Page
1, 4	**Chlamys clarkeana** (Aldrich, 1895)	154
	1. Left valve; height 14 mm, length 13.8 mm, inflation 2.6 mm; locality 22. MGS specimen 49.	
	4. Left valve; height 19.8 mm, length 18.7 mm, inflation 3.3 mm; locality 22. MGS specimen 50.	
2	**Lacinia alveata** (Conrad, 1833) ?	102
	Internal mold; height 41 mm, width 29.5 mm; locality 22. MGS specimen 51.	
3	**Calyptraphorus** sp.	88
	Internal mold; height 45.5 mm, width 18 mm; locality 22. MGS specimen 52.	
5	**Athleta** sp. a	117
	Internal mold; height 34.7 mm, width 18.6 mm; locality 22. MGS specimen 53.	
6, 7	**Cubitostrea perplicata** (Dall, 1898)	161
	6. Left valve; height 67 mm, length 50.5 mm, inflation 9 mm; locality 22. MGS specimen 54.	
	7. Right valve; height 54.2 mm, length 46 mm, inflation 7.2 mm; locality 22. MGS specimen 55.	



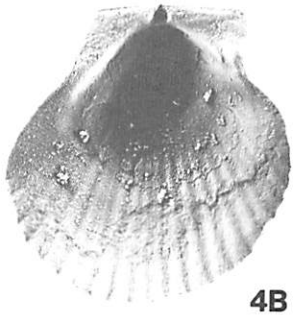
1
x 2.5

2
x 1

3
x 1



4A
x 2



4B
x 2

5
x 1

6
x 1

7
x 1

EXPLANATION PLATE 12

Winona Formation (Claiborne Group)

Figure		Page
1, 2, 3, 4, 6, 7, 8	**Cubitostrea perplicata** (Dall, 1898)	161
	1. Left valve; height 43.5 mm, length 39.2 mm, inflation 8.2 mm; locality 22. MGS specimen 56.	
	2. Left valve; height 39.3 mm, length 37.2 mm, inflation 7.7 mm; locality 22. MGS specimen 57.	
	3. Right valve; height 34 mm, length 27 mm, inflation 3.4 mm; locality 22. MGS specimen 59.	
	4. Left valve; height 41 mm, length 34 mm, inflation 8.3 mm; locality 22. MGS specimen 60.	
	6. Left valve; height 45 mm, length 44 mm, inflation 8.5 mm; locality 22. MGS specimen 61.	
	7. Left valve; height 25 mm, length 25 mm, inflation 6 mm; locality 22. MGS specimen 62.	
	8. Right valve; height 46 mm, length 38 mm, inflation 11 mm; locality 22. MGS specimen 58.	
5	**Cubitostrea lisbonensis** (Harris, 1919)	161
	Right valve; height 27 mm, length 21 mm, inflation 2.6 mm; locality 22. MGS specimen 63.	

1A
x 1

2
x 1

3
x 1

1B
x 1

4
x 1

5
x 1

6
x 1

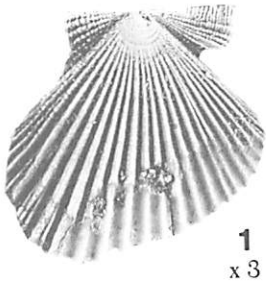
7
x 1.2

8
x 1

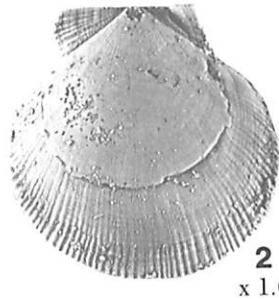
EXPLANATION PLATE 13

Winona Formation (Claiborne Group)

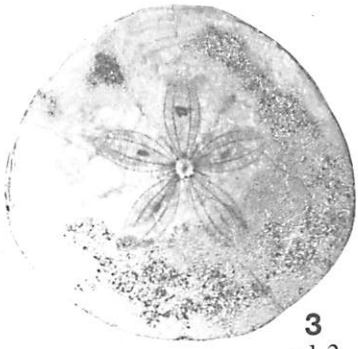
Figure		Page
1	**Chlamys clarkeana** (Aldrich, 1895)	154
	Right valve (incomplete specimen); height 11 mm, length 11.5 mm, inflation 1.5 mm; locality 22. MGS specimen 64.	
2, 4	**Chlamys burlesonensis** (Harris, 1919)	154
	2. Left valve; height 22.3 mm, length 21.9 mm, inflation 3 mm; locality 24 (Upper part of Basic City Shale Member, Tallahatta Formation). MGS specimen 65.	
	4. Right valve; height 18.2 mm, length 17 mm; inflation 2.6 mm; locality 23. MGS specimen 66.	
3, 5, 6	**Protoscutella mississippiensis** (Twitchell, 1915)	191
	3. Greatest diameter 37 mm; locality 22. MGS specimen 67.	
	5. Greatest diameter (incomplete specimen) 55 mm; locality 22. MGS specimen 68.	
	6. Greatest diameter 14.3 mm, thickness 2.3 mm; locality 22. MGS specimen 69.	



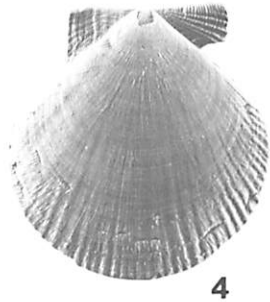
1
x 3



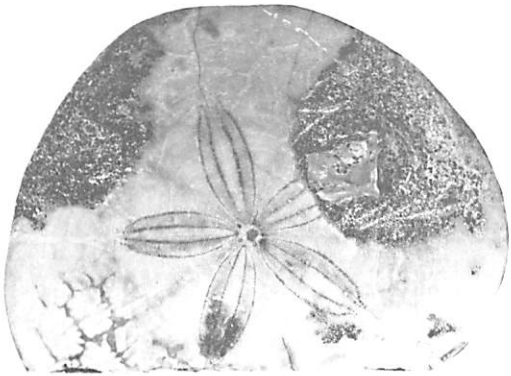
2
x 1.6



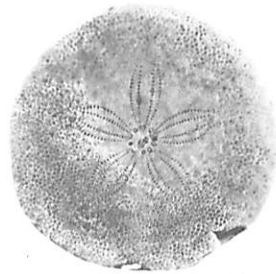
3
x 1.2



4
x 2



5
x 1.2



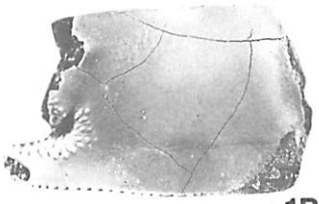
6
x 2

EXPLANATION PLATE 14

Winona Formation (Claiborne Group)

Figure		Page
1	**Callianassa** sp. Outer (1A) and inner (1B) view of right palm and fixed finger (shrimp claw), fixed finger incomplete; length 22.5 mm, height 14.7 mm, thickness 5.7 mm; locality 22. MGS specimen 70.	189
2	**Ophiomorpha** sp. Portion of callianassid shrimp burrow; length 56 mm, diameter 19 mm; locality 22. MGS specimen 71.	190
3	**Nemocardium** sp. Internal mold of right valve; height 38.5 mm, length 41 mm, inflation 15 mm; locality 22. MGS specimen 72.	178
4	**Cubitostrea perplicata** (Dall, 1898) Right valve; height 41 mm, length 34.5 mm, inflation 5.7 mm; locality 22. MGS specimen 73.	161
5	**Crassatella** sp. Internal mold of both valves viewing right valve; height 73 mm, length 89 mm, inflation 42 mm; locality 22. MGS specimen 74.	176

1A
x 1.8

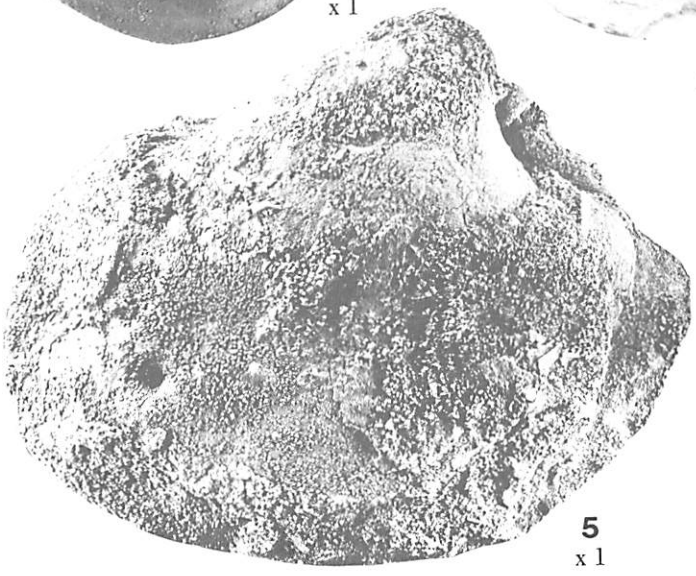


1B
x 1.8

2
x 1

3
x 1

4
x 1

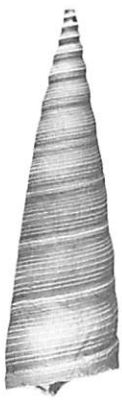


5
x 1

EXPLANATION PLATE 15

Doby's Bluff Tongue, Kosciusko Formation (Claiborne Group)

Figure		Page
1	**Turritella dobyensis** n. sp. ..... Specimen is laterally compressed; height 33.7 mm; large diameter 10 mm, small diameter 8.5 mm; locality 26b. Holotype PRI No. 30027.	80
2	**Turritella** sp. ..... Height 20 mm, width 5.5 mm; locality 26b. MGS specimen 86.	81
3.	**Mesalia claibornensis** Harris, 1895 ..... Height 27.7 mm, width 8.6 mm; locality 26b. MGS specimen 87.	82
4	**Architectonica scrobiculata hicoria** Palmer, 1937 ..... Height 6 mm; width 17 mm; locality 26b. MGS specimen 88.	77
5, 7	**Crepidula lirata** Conrad, 1833 ..... 5. Height 22 mm, width of aperture 12 mm; locality 26b. MGS specimen 89. 7. Height 12.3 mm, width of aperture 7 mm; locality 26b. MGS specimen 90.	90
6	**Architectonica (Solariaxis) elaborata** (Conrad, 1833) ..... Height 6.5 mm, width 7 mm; locality 26b. MGS specimen 91.	78
8, 9	**Sulcocypraea kennedyi** (Harris, 1895) ..... 8. Height 13.2 mm, width 8.4 mm; locality 26b. MGS specimen 92. 9. Height 11.5 mm, width 7.5 mm; locality 26b. MGS specimen 93. Specimen donated by the collector Dawn Herrington.	91
10, 11	**Calyptraphorus velatus nodovelatus** Palmer, 1937 ..... 10. Height 34.2 mm, width 16 mm; locality 26b. MGS specimen 94. 11. Height 28.2 mm, width 10.6 mm; locality 26b. MGS specimen 95.	88



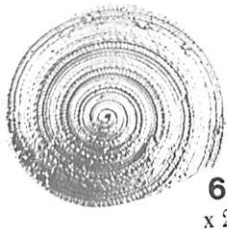
1
x 1.5

2
x 2

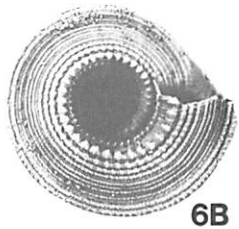
3
x 1.7

4
x 1.7

5
x 2



6A
x 2.5



6B
x 2.5

7
x 1.6

8
x 2.5

9A
x 2.5

9B
x 2.5

10A
x 1.5

10B
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EXPLANATION PLATE 16

Doby's Bluff Tongue, Kosciusko Formation (Claiborne Group)

Figure		Page
1	**Sinum bilix** (Conrad, 1833) Height 14.3 mm, width 11.7 mm; locality 26b. MGS specimen 96.	95
2, 4	**"Natica" "(Naticarius)" semilunata** I. Lea, 1833 2. Height 7 mm, width 5.7 mm; locality 26b. MGS specimen 97. 4. Height 3.7 mm, width 3.2 mm; locality 26b. MGS specimen 98.	92
3	**Neverita** sp. Height 11.7 mm, width 12.6 mm; locality 26b. MGS specimen 99.	93
5	**Bonellitia parilis** Palmer, 1937 Height 4.8 mm, width 2.7 mm; locality 26b. MGS specimen 100.	121
6, 7	**Buccitriton texanus** (Gabb, 1860) 6. Height 8.4 mm, width 4 mm; locality 26b. MGS specimen 101. 7. Height 9.2 mm, width 4.6 mm; locality 26b. MGS specimen 102.	103
8, 11	**Pseudoliva vetusta** (Conrad, 1833) 8. Height 17 mm, width 9.7 mm; locality 26b. MGS specimen 103. 11. Height 34 mm, width 29 mm; locality 26b. MGS specimen 104.	106
9	**Phalium brevicostatum** (Conrad, 1834) Height 20 mm, width 16.5 mm; locality 26b. MGS specimen 105.	96
10	**Lacinia alveata** (Conrad, 1833) Spire missing; height 23 mm; width 19 mm; locality 26b. MGS specimen 106.	102

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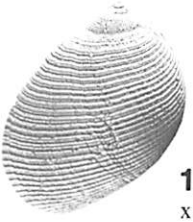

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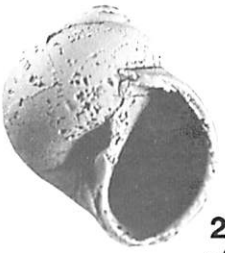

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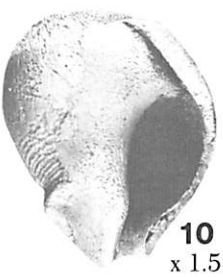

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EXPLANATION PLATE 17

Doby's Bluff Tongue, Kosciusko Formation (Claiborne Group)

Figure		Page
1	**Michela trabeatoides** (Harris, 1895) Incomplete specimen; height 22 mm, width 14 mm; locality 26b. MGS specimen 107.	125
2	**Levifusus mortoniopsis** (Gabb, 1860) Height 21.2 mm, width 10.6 mm; locality 26b. MGS specimen 108.	110
3	**Ancilla staminea punctulifera** (Gabb, 1860) Height 23.6 mm, width 9 mm; locality 26b. MGS specimen 109.	114
4	**Bucilla** cf. B. **(Anbullina) ancillops** (Heilprin, 1891) Height 20.7 mm, width 10 mm; locality 26b. MGS specimen 110.	110
5, 6	**Latirus moorei** (Gabb, 1860) 5. Height 34 mm, width 14 mm; locality 26b. MGS specimen 111. 6. Height 29.2 mm, width 12.5 mm; locality 26b. MGS specimen 112.	111
7, 8	**Caricella pyruloides** (Conrad, 1832) 7. Height 25.3 mm, width 15 mm; locality 26b. MGS specimen 113. 8. Height 30.3 mm, width 18.2 mm; locality 26b. MGS specimen 114.	117
9, 10	**Athleta petrosa** (Conrad, 1833) 9. Height 33.4 mm, width 17.4 mm; locality 26b. MGS specimen 115. 10. Height 32.2 mm, width 15.8 mm; locality 26b. MGS specimen 116.	116

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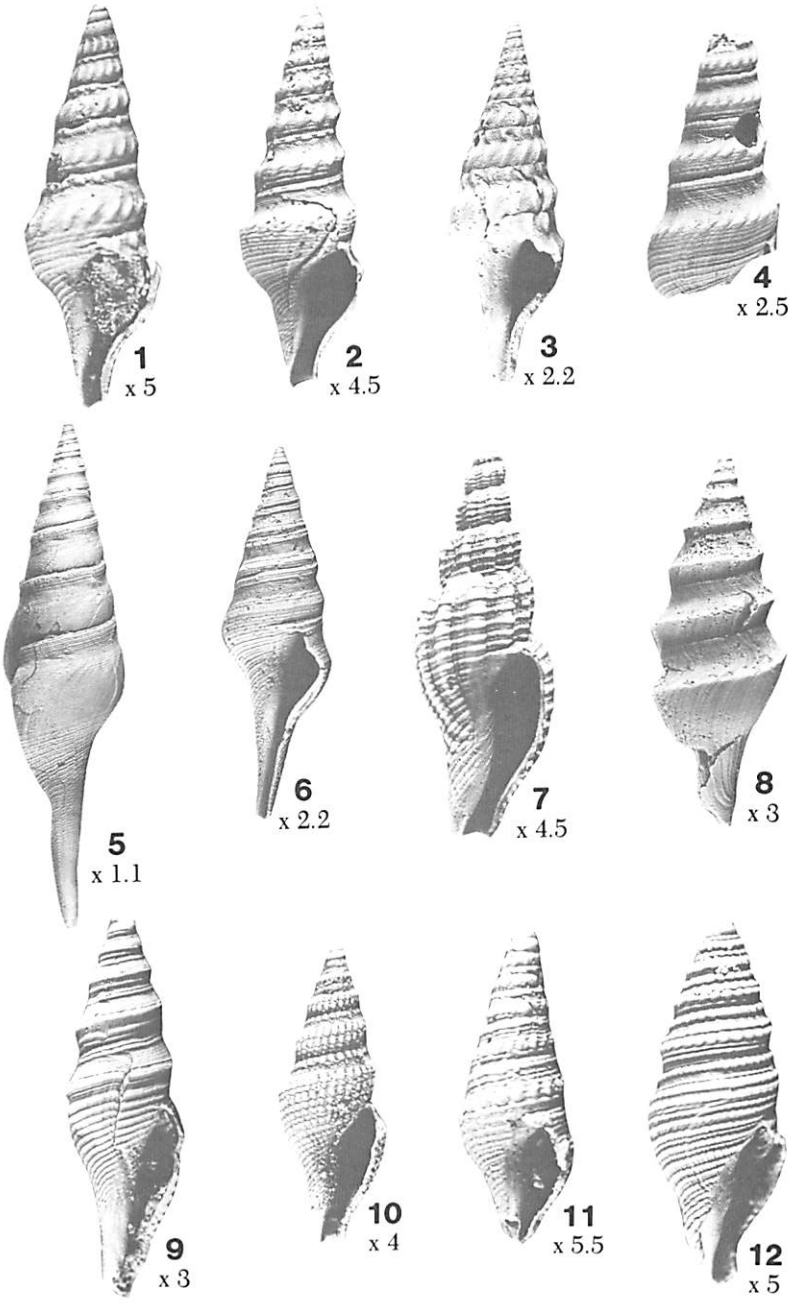
EXPLANATION PLATE 18

Doby's Bluff Tongue, Kosciusko Formation (Claiborne Group).

Figure		Page
1	**Hesperiturris nodocarinatus** (Gabb, 1860) Height 10.4 mm, width 3.5 mm; locality 26b. MGS specimen 117.	128
2	**Eopleurotoma lisboncola** Harris, 1937 var. Height 11.1 mm, width 3.5 mm; locality 26b. MGS specimen 118.	129
3	**Eopleurotoma sayi** (I. Lea, 1853) Height 22 mm, width 17.3 mm; locality 26b. MGS specimen 119.	130
4	**Eopleurotoma cochlea** Harris, 1937 Incomplete specimen; height 14 mm, width 6.4 mm; locality 26b. MGS specimen 120.	130
5, 6	**Protosurcula gabbi** (Conrad, 1865) 5. Height 22.3 mm, width 6.7 mm; locality 26b. MGS specimen 121. 6. Height 59.7 mm, width 14 mm; locality 26b. MGS specimen 122.	132
7	**Terebrifusus amoenus** (Conrad, 1833) Height 11 mm, width 4.1 mm; locality 26b. MGS specimen 123.	104
8	**Cochlespiropsis engonata** (Conrad, 1865) Specimen laterally compressed; height 24.4 mm, large diameter 9 mm, small diameter 8 mm; locality 26b. MGS specimen 124.	134
9	**Eosurcula moorei** (Gabb, 1860) Height 17 mm, width 5.2 mm; locality 26b. MGS specimen 125.	132
10	**Scobinella** cf. **S. ferrosilica** Harris, 1937 Height 10 mm, width 3.6 mm; locality 26b. MGS specimen 126.	134
11	**Coronia childreni** (I. Lea, 1833) var. b Height 7.5 mm, width 2.7 mm; locality 26b. MGS specimen 127.	125
12	**Glyptotoma crassiplicata** (Gabb, 1860) Height 10 mm, width 3.6 mm; locality 26b. MGS specimen 128.	130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EXPLANATION PLATE 19

Doby's Bluff Tongue, Kosciusko Formation (Claiborne Group)

Figure		Page
1, 2, 3	**Conus (Lithoconus) sauridens** Conrad, 1833	137
	1. Specimen laterally compressed; height 40 mm, large diameter 19.7 mm, small diameter 18 mm; locality 26b. MGS specimen 129.	
	2. Height 32.5 mm, width 19 mm; locality 26b. MGS specimen 130.	
	3. Height 28.3 mm, width 3 mm; locality 26b. MGS specimen 131.	
4	**Hastula houstonia** (Harris, 1895)	138
	Height 13.4 mm, width 3 mm; locality 26b. MGS specimen 132.	
5	**Trypanotoma terebriformis cooperi** Harris, 1937	127
	Height 8.7 mm, width 3 mm; locality 26b. MGS specimen 133.	
6	**Distorsio (Personella) septemdentata** Gabb, 1860	97
	Height of incomplete specimen 10.5 mm, width 9.6 mm; locality 26b. MGS specimen 134.	
7	**Retusa (Cylichnina) galba** (Conrad, 1833)	142
	Height 6 mm, width 2.1 mm; locality 26b. MGS specimen 135.	
8	**Nucula (Nucula) mauricensis** Harris, 1919	146
	Right valve; height 14 mm, length 18 mm, inflation 4.9 mm; locality 26b. MGS specimen 136.	
9, 10	**Venericardia (Rotundicardia) rotunda** I. Lea, 1833	168
	9. Right valve; height 13.7 mm, length 15.2 mm, inflation 5.2 mm; locality 26b. MGS specimen 137.	
	10. Right valve; height 14 mm, length 14.7 mm, inflation 5.5 mm; locality 26b. MGS specimen 138.	

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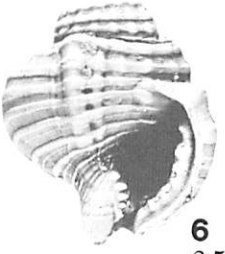

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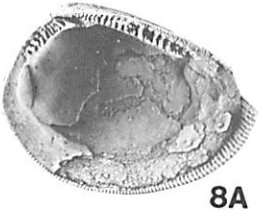

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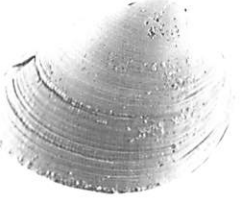

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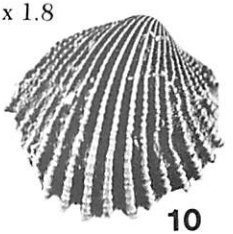

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EXPLANATION PLATE 20

Doby's Bluff Tongue, Kosciusko Formation (Claiborne Group)

Figure		Page
1, 2, 3	**Venericardia (Venericor) densata** Conrad, 1845	171
	1. Left valve; height 36.3 mm, length 36.4 mm, inflation 13.7 mm, number of ribs 29; locality 26b. MGS specimen 139.	
	2. Right valve; height 33.4 mm, length 33.8 mm, inflation 12.5 mm, number of ribs 31; locality 26b. MGS specimen 140.	
	3. Both valves; height 22 mm, length 23 mm, inflation 17.5 mm, both valves with 28 ribs; locality 26b. MGS specimen 141.	
4	**Venericardia (Venericor) claiboplata** Gardner and Bowles, 1939	171
	Right valve; height 67 mm, length 67 mm, inflation 22.7 mm; locality 26b. MGS specimen 142.	

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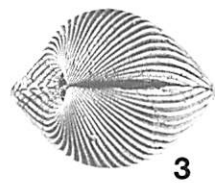

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EXPLANATION PLATE 21

Doby's Bluff Tongue, Kosciusko Formation (Claiborne Group)

Figure		Page
1	**Tellina (Arcopagia) raveneli** Conrad, 1846 Right valve; height 40.3 mm, length 42.1 mm, inflation 8.5 mm; locality 26b. MGS specimen 260.	179
2	**Diplodonta** sp. ? Incomplete right valve; height 7.6 mm, length 8.2 mm, inflation 2.4 mm; locality 26b. MGS specimen 143.	165
3	**Cubitostrea** sp. Left valve (young and incomplete); height 32.3 mm, length 34 mm, inflation 7.7 mm; locality 26b. MGS specimen 144.	162
4, 5	**Barbatia (Plagiarca) rhomboidella** (Lea, 1833) 4. Right valve; height 5.7 mm, length 10.2 mm, inflation 2.2 mm; locality 26b. MGS specimen 145. 5. Right valve; height 11.2 mm, length 21.3 mm, inflation 4.6 mm; locality 26b. MGS specimen 146.	148
6	**Barbatia (Cucullaearca) ludoviciana** (Harris, 1919) Right valve; height 12.8 mm, length 23.2 mm, inflation 5 mm; locality 26b. MGS specimen 147.	149

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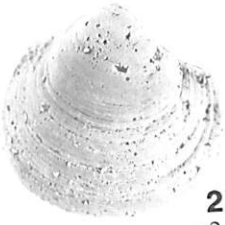

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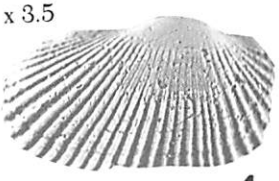

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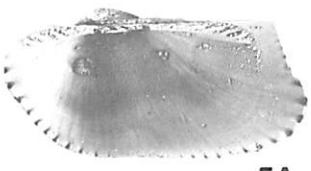

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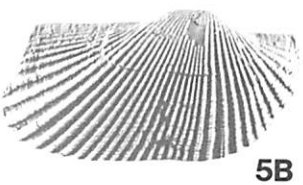

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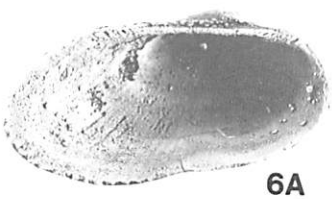

6A
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EXPLANATION PLATE 22

Doby's Bluff Tongue, Kosciusko Formation (Claiborne Group)

Figure — Page

1, 2 **Pitar (Calpitaria) cf. P. (C.) petroplitanus** Stenzel and Krause, 1957 184
1. Left valve; height 29.5 mm, length 37 mm, inflation 11.7 mm; locality 26b. MGS specimen 148.
2. Right valve; height 27.2 mm, length 33 mm, inflation 10.3 mm; locality 26b. MGS specimen 149.

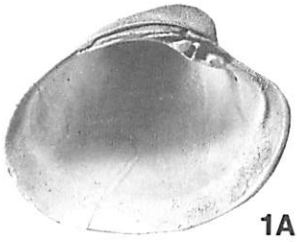
3 **Yoldia (Calorhadia) compsa** Gabb, 1860 147
Incomplete left valve; length 13 mm, inflation 2 mm; locality 26b. MGS specimen 152.

4 **Tellina (Moerella) petropolitana** Stenzel and Krause, 1957 182
Left valve with hinge missising; height (incomplete) 15 mm, length 27 mm; locality 26b. MGS specimen 151.

5 **Pachecoa (Pachecoa) declivis** (Conrad, 1833) 150
Right valve; height 13.2 mm, length 18.2 mm, inflation 5 mm; locality 26b. MGS specimen 412.

6 **Corbula (Caryocorbula) sp.** 188
Left valve; height 3.8 mm, length 6.4 mm, inflation 1.7 mm; locality 26b. MGS specimen 150.

7, 8 **Corbula (Caryocorbula) deusseni** (Gardner in Deussen, 1924) 186
7. Right valve; height 3.5 mm, length 4.5 mm, inflation 1.7 mm; locality 26b. MGS specimen 153.
8. Left valve; height 4.2 mm, length 6.2 mm, inflation 1.9 mm; locality 26b. MGS specimen 154.



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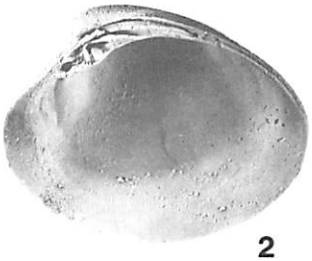

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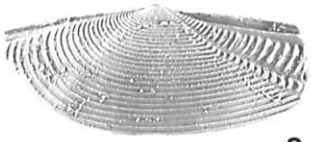

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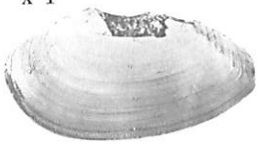

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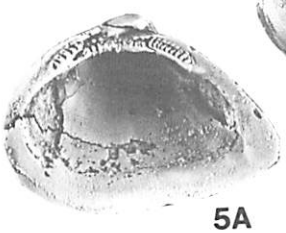

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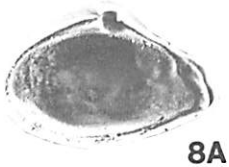

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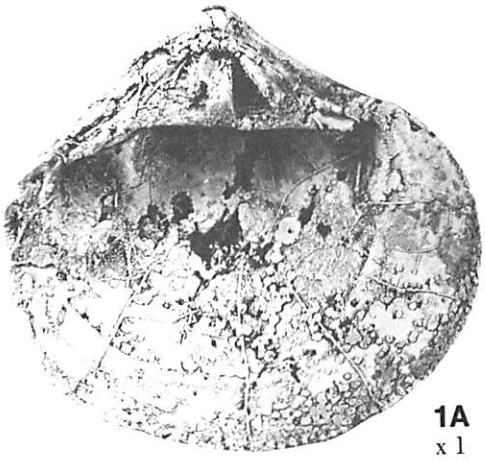
EXPLANATION PLATE 23

Cook Mountain Formation (Claiborne Group)

Figure		Page
1	**Crassatella texalta** Harris, 1895 Left valve; height 58.5 mm, length 61 mm, inflation 16 mm; locality 25. MGS specimen 155.	175
2	**Clavilithes kennedyanus** Harris, 1895 Incomplete specimen; height 42 mm, width 19 mm; locality 25. MGS specimen 156.	113
3	**Scalina** sp. Incomplete specimen; height 5 mm, width 1.7 mm; locality 25. MGS specimen 157.	87
4	**Agaronia alabamensis** (Conrad, 1833) Incomplete specimen; height 14.5, width 10 mm; locality 25. MGS specimen 158.	115
5	**Bathytormus clarkensis ludovicianus** (Kent, 1960) Incomplete left valve; height 22 mm, inflation 7.7 mm; locality 25. MGS specimen 159.	176
6	**Plicatula filamentosa planata** Meyer and Aldrich, 1886 Left valve; height 24 mm, length 21.5 mm, inflation 4 mm; locality 25. MGS specimen 160.	158



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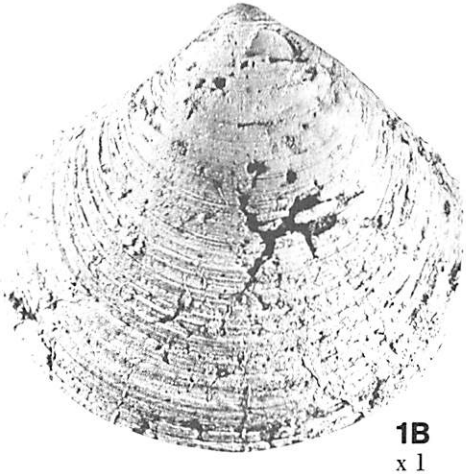

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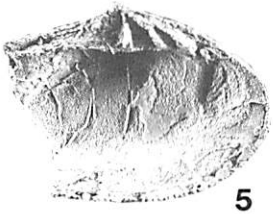

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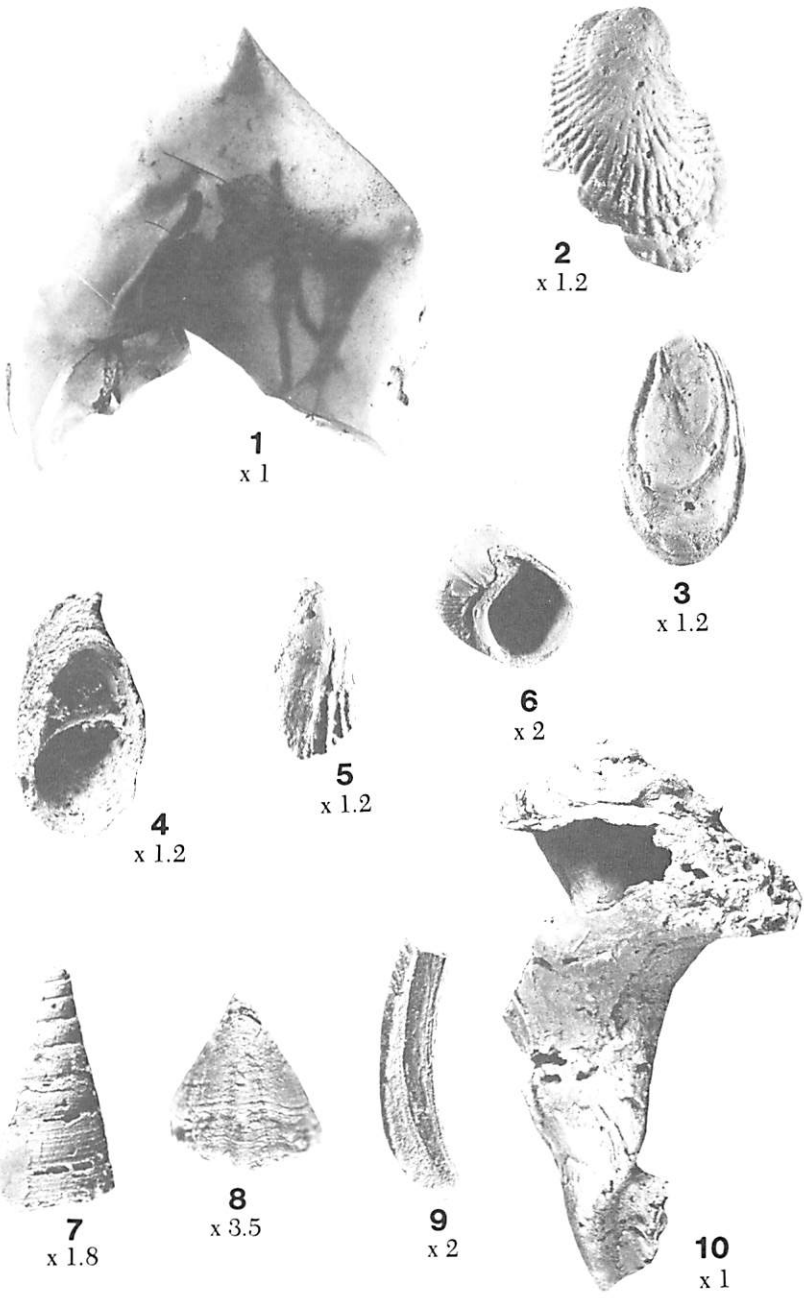
EXPLANATION PLATE 24

Cook Mountain Formation (Claiborne Group)

Figure		Page
1, 2, 3	**Cubitostrea sellaeformis** (Conrad, 1832)	162
	1. Shell replaced by translucent chalcedony with sediment filled borings showing through; greatest dimension 62 mm; locality 25. MGS specimen 161.	
	2. Left valve (young); height 30 mm, length 20 mm, inflation 7.2 mm; locality 25. MGS specimen 162.	
	3. Right valve (young); height 25.5 mm, length 13.7 mm, inflation 3.5 mm; locality 25. MGS specimen 163.	
4, 5	**Crepidula dumosa** Conrad, 1834	90
	4. Height 26 mm, width at aperture 12 mm; locality 25. MGS specimen 164.	
	5. Height 20 mm, width at aperture 9.5 mm; locality 25. MGS specimen 165.	
6	**Sinum bilix** (Conrad, 1833)	95
	Height 9.5 mm, width 9.5 mm; locality 25. MGS specimen 166.	
7	**Mesalia claibornensis** Harris, 1895	82
	Incomplete specimen; height 18 mm, width 9.5 mm; locality 25. MGS specimen 167.	
8, 9	**Euscalpellum eocenense** (Meyer, 1885)	189
	8. Rostrum (valve of goose-neck barnacle); height 6.2 mm, width 6 mm; locality 25. MGS specimen 168.	
	9. Carina (incomplete); length 17 mm, width 4 mm; locality 25. MGS specimen 169.	
10	**Lacinia alveata** (Conrad, 1833)	102
	Incomplete specimen; height 70.5 mm; locality 25. MGS specimen 170.	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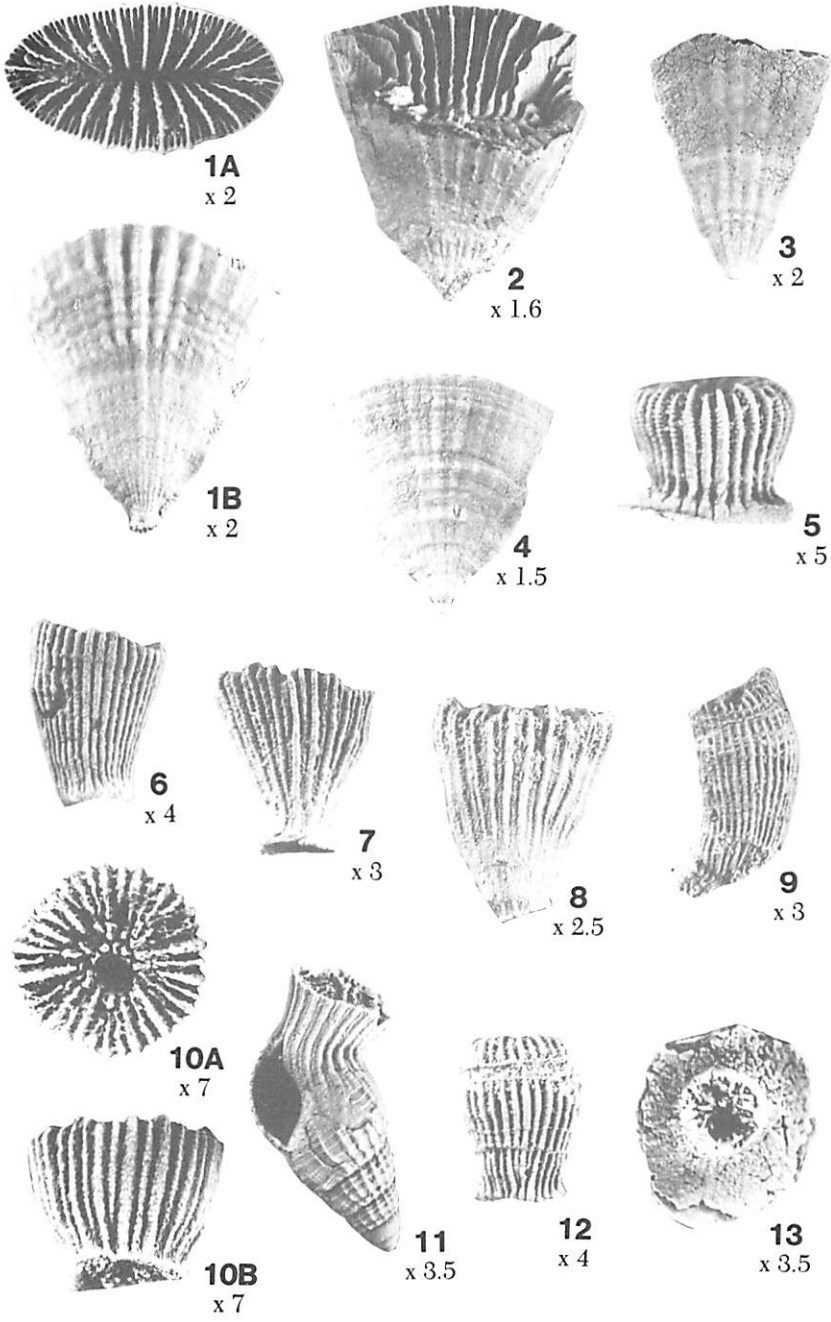
EXPLANATION PLATE 25

Cook Mountain Formation (Claiborne Group)

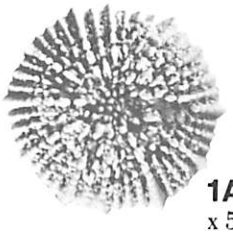
Figure		Page
1, 2, 4	**Flabellum cuneiforme pachyphyllum** Gabb and Horn, 1895	68
	1. Calice view (1A) and lateral view (1B); height 2.3 mm, large diameter 18.4 mm, small diameter 10 mm; locality 65. MGS specimen 414.	
	2. Height 24.2 mm, large diameter (incomplete) 21.9 mm; locality 64. MGS specimen 415.	
	4. Height 21 mm, large diameter 19.3 mm, small diameter 13 mm; locality 26a. MGS specimen 78.	
3	**Flabellum cuneiforme acutiforme** Vaughan, 1900	68
	Height 16.2 mm, large diameter 12 mm, small diameter 6 mm; locality 65. MGS specimen 417.	
5, 6, 9 10,12	**Paracyathus bellus** Vaughan, 1900	66
	5. Height 3.3 mm, greatest diameter 4.1 mm; locality 62. MGS specimen 421.	
	6. Height 7.7 mm, greatest diameter 5.9 mm; locality 61. MGS specimen 422.	
	9. Height 10.4 mm, greatest diameter 4.3 mm; locality 61. MGS specimen 423.	
	10. Calice view (10A) and lateral view (10B); height 3 mm, diameter 3.7 mm; locality 27. MGS specimen 77.	
	12. Height 5.3 mm, diameter 4 mm; locality 62. MGS specimen 425.	
7, 8, 11	**Paracyathus alternatus** Vaughan, 1900	67
	7. Height 8.1 mm, large diameter 7.2 mm, small diameter 6.4 mm; locality 61. MGS specimen 418.	
	8. Height 11.4 mm, large diameter 9.5 mm, small diameter 7.3 mm; locality 61. MGS specimen 419.	
	11. Attached to **Buccitriton sagenum** (Conrad, 1833) and incomplete; greatest diameter 4.6 mm; locality 68. MGS specimen 420.	
13	**Astrangia** sp.	66
	Height 2.3 mm, diameter of calice 3.4 mm; locality 27. MGS specimen 84.	


1A
x 2
2
x 1.6
3
x 2
1B
x 2
4
x 1.5
5
x 5
6
x 4
7
x 3
8
x 2.5
9
x 3
10A
x 7
10B
x 7
11
x 3.5
12
x 4
13
x 3.5

EXPLANATION PLATE 26

Cook Mountain Formation (Claiborne Group)

Figure		Page
1, 2	**Discotrochus orbignianus** Milne-Edwards and Haime, 1848	64
	1. Calice view (1A) and basal view (1B); height 2.2 mm, diameter 5.6 mm; locality 62. MGS specimen 427.	
	2. Calice view; height 1.3 mm, diameter 6.1 mm; locality 62. MGS specimen 428.	
3	**Discotrochus** sp.	65
	Calice view (3A) and lateral view (3B); height 1.4 mm, diameter 4.5 mm; locality 62. MGS specimen 429.	
4	**Trochocyathus depressus** Vaughan, 1900	66
	Calice view (4A) and basal view (4B); height 2.7 mm, diameter 7 mm; locality 26a. MGS specimen 68.	
5, 8	**Platytrochus stokesi** (Lea, 1833)	67
	5. Deformed specimen; height 7 mm, large diameter 5.3 mm, small diameter 4 mm; locality 26a. MGS specimen 81.	
	8. Calice view (8A) and lateral view (8B); height 6.8 mm, large diameter 6 mm, small diameter 4.4 mm; locality 26a. MGS specimen 80.	
6, 9	**Dendrophyllia lisbonensis** Vaughan, 1900	70
	6. Greatest dimension of coralum 29.3 mm, diameter of largest coralite 7 mm; locality 65. MGS specimen 433.	
	9. Greatest dimension of coralum 36.2 mm, diameter of largest coralite 4.5 mm; locality 65. MGS specimen 432.	
7	**Balanophyllia** sp.	69
	Height (incomplete) 16.5 mm, greatest diameter 10.5 mm; locality 61. MGS specimen 434.	
10	**Astrangia harrisi** Vaughan, 1900	65
	6.5 mm; locality 65. MGS specimen 436.	
11	**Astrangia expansa** Vaughan, 1900	65
	Coralum encrusting on **Cubitostrea sellaeformis** (Conrad, 1832); greatest dimension of coralum 33 mm, greatest diameter of largest coralite 6 mm; locality 65. MGS specimen 437.	



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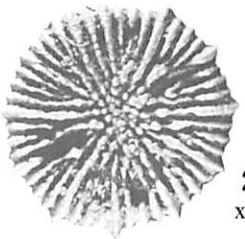

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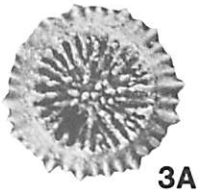

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3B
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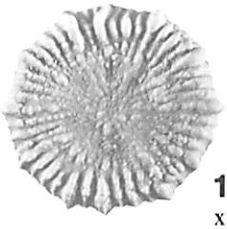

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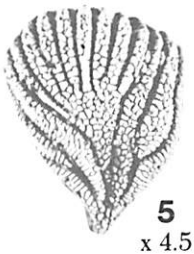
4A
x 3.5

6
x 1.4



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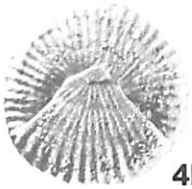

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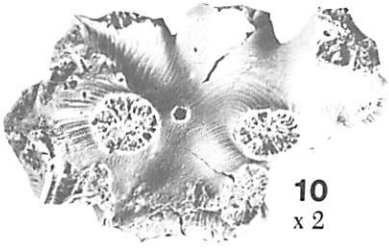
8A
x 3.5

9
x 1.4

7
x 1.6

8B
x 3.5



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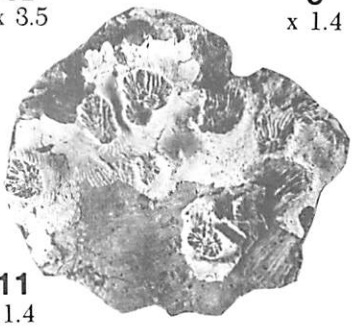
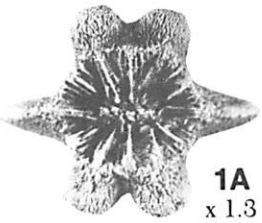


11
x 1.4

EXPLANATION PLATE 27

Cook Mountain Formation (Claiborne Group)

Figure		Page
1, 2	**Endopachys maclurii** (I. Lea, 1833)	70
	1. Calice view (1A) and lateral view (1B); height 12.6 mm, large diameter 21.5 mm, small diameter 17.2 mm; locality 61. MGS specimen 438.	
	2. Calice view (2A) and lateral view (2B); height 18.9 mm, large diameter 20 mm, small diameter 14.1 mm; locality 65. MGS specimen 439.	
3, 4	**Endopachys** sp.	70
	3. Calice view (3A) and lateral view (3B); height 7.7 mm, large diameter 8.7 mm, small diameter 4.2 mm; locality 65. MGS specimen 441.	
	4. Height 5.9 mm, large diameter 8 mm, small diameter 3.3 mm; locality 65. MGS specimen 442.	
5, 6	**Endopachys lonsdalei** Vaughan, 1900	70
	5. Incomplete specimen; height 10.7 mm, large diameter 12.1 mm; locality 61. MGS specimen 440.	
	6. Calice view (6A) and lateral view (6B); height 8 mm, large diameter 9.8 mm, small diameter 5.2; locality 27. MGS specimen 82.	



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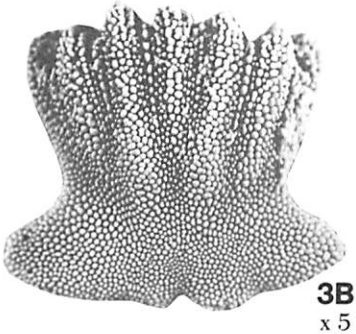
1B
x 1.3

3A
x 5



3B
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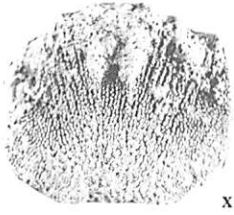

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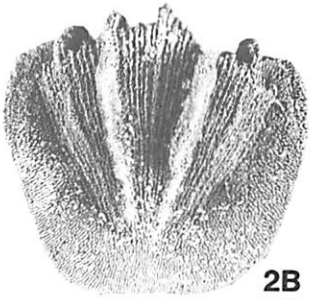
2A
x 2



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4
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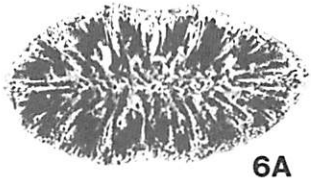

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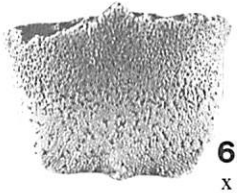
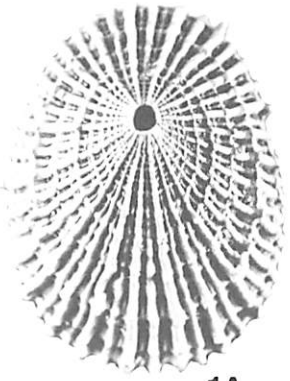


6B
x 3

EXPLANATION PLATE 28

Cook Mountain Formation (Claiborne Group)

Figure		Page
1	**Puncturella (Altrix) altior** (Meyer and Aldrich, 1886) Apical view (1A), lateral view (1B), and interior view showing septum and quadralobate apical aperture (1C); height 11.2 mm, length 16.4 mm, width 12.3 mm; locality 65. MGS specimen 444.	73
2, 3, 4	**Diodora tenebrosa antica** Palmer, 1947 2. Height 3.2 mm, length 7.9 mm, width 5.5 mm; locality 64. MGS specimen 445. 3. Height 6.6 mm, length 16.5 mm, width 11.3 mm; locality 66. MGS specimen 446. 4. Height 3.3 mm, length 8.7 mm, width 5.3 mm; locality 65. MGS specimen 447.	74
5.	**Holoporella granulosa** Canu and Bassler, 1920 Zoarium encrusting on **Cubitostrea sellaeformis** (Conrad, 1832); greatest diameter of zoarium 9 mm; locality 62. MGS specimen 448.	72
6	**Chiton** sp. Head valve; width 11.7 mm, length 5.6 mm; locality 63. MGS specimen 449.	73



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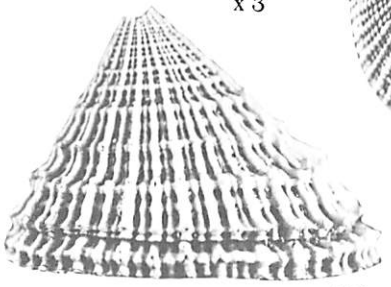

1B
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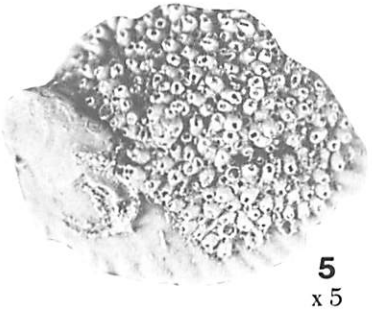
1C
x 5



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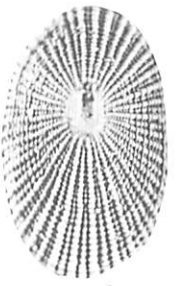

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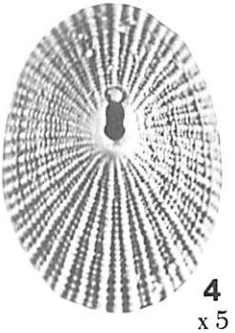

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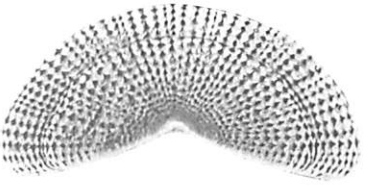


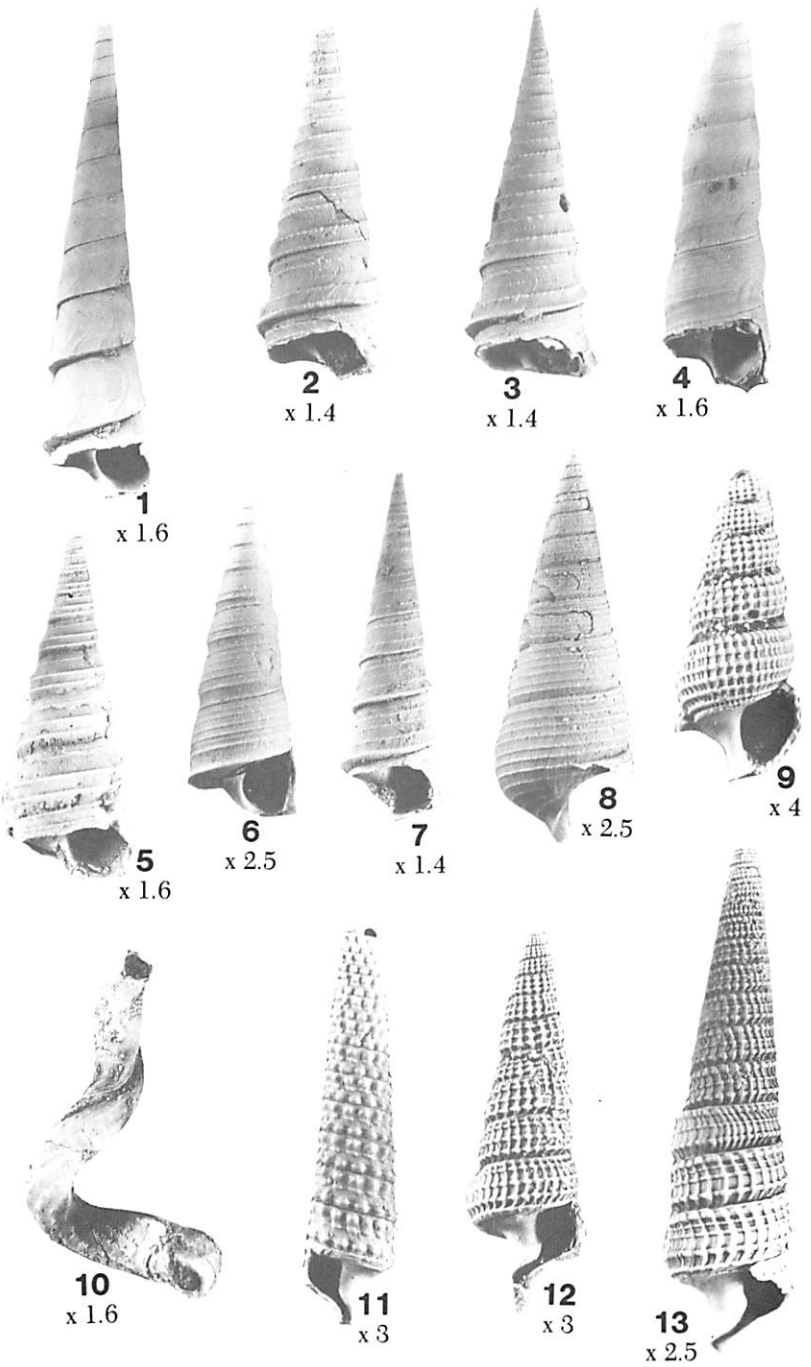
6A
x 4

6B
x 4

EXPLANATION PLATE 29

Cook Mountain Formation (Claiborne Group)

Figure		Page
1	**Turritella carinata** Lea, 1833	81
	Height 39.4 mm, width 8.7 mm; locality 65. MGS specimen 450.	
2, 3, 5, 7	**Turritella rina** Palmer, 1937	79
	2. Height 33.1 mm, width 12.1 mm; locality 61. MGS specimen 451.	
	3. Height 33.7 mm, width 12.3; locality 61. MGS specimen 452.	
	5. Height 28.4 mm, width 11 mm; locality 62. MGS specimen 453.	
	7. Height 32.5 mm, width 9.3 mm; locality 62. MGS specimen 454.	
4, 6	**Turritella nasuta** Gabb, 1860	81
	4. Height 29.6 mm, width 8.7 mm; locality 65. MGS specimen 455.	
	6. Height 16.3 mm, width 5.3 mm; locality 62. MGS specimen 456.	
8	**Mesalia claibornensis** Harris, 1895	82
	Height 20.6 mm, width 7.2 mm; locality 69. MGS specimen 457.	
9, 12, 13	**Cerithiella nassula** (Conrad, 1834)	84
	9. Height 9.8 mm, width 3.8 mm; locality 65. MGS specimen 458.	
	12. Height 17 mm, width 5.4 mm; locality 65. MGS specimen 459.	
	13. Height 27 mm, width 6.8 mm; locality 64. MGS specimen 460.	
10	**Tenagodus vitis** (Conrad, 1833)	83
	Greatest diameter of tube 5 mm; locality 61. MGS specimen 461.	
11	**Triphora major** (Meyer, 1886)	84
	Height 17.3 mm, width 3.9 mm; locality 65. MGS specimen 462.	


1
x 1.6
2
x 1.4
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x 1.4
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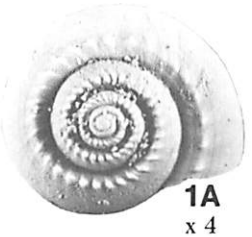
x 1.6
5
x 1.6
6
x 2.5
7
x 1.4
8
x 2.5
9
x 4
10
x 1.6
11
x 3
12
x 3
13
x 2.5

EXPLANATION PLATE 30

Cook Mountain Formation (Claiborne Group)

Figure		Page
1	**Solariella stalagmium modesta** (Meyer and Aldrich, 1886) ..... Height 4.5 mm, width 7.7 mm; locality 69. MGS specimen 463.	74
2, 3	**Solariella tricostata** (Conrad, 1835) ..... 2. Height 6.2 mm, width 6.7 mm; locality 69. MGS specimen 464. 3. Height 7.3 mm, width 7 mm; locality 69. MGS specimen 465.	75
4	**Architectonica scrobiculata** (Conrad, 1833) ..... Height 8 mm, width 17.8 mm; locality 69. MGS specimen 466.	76
5	**Architectonica scrobiculata hicoria** Palmer, 1937 ..... Height 5 mm, width 15 mm; locality 66. MGS specimen 467.	77



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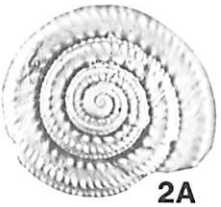

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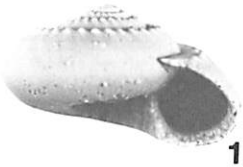

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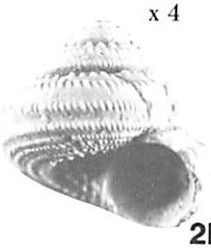

2B
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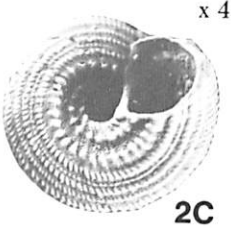
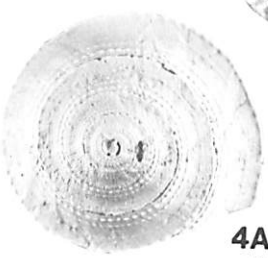
1C
x 4



2C
x 4

3
x 4



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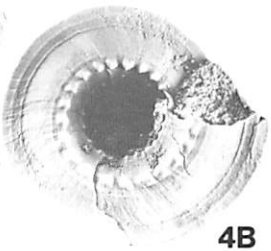

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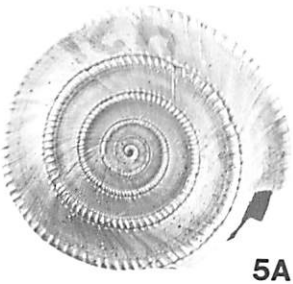

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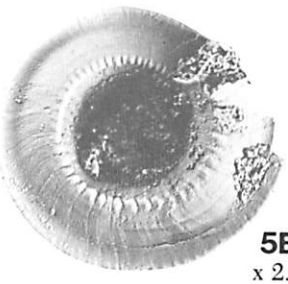


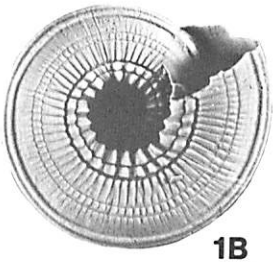
5B
x 2.5

EXPLANATION PLATE 31

Cook Mountain Formation (Claiborne Group)

Figure		Page
1	**Architectonica (Architectonica) amoena** (Conrad, 1833) ..... Height 7.2 mm, width 14.2 mm; locality 68. MGS specimen 468.	77
2	**Architectonica (Granosolarium) ornata** (I. Lea, 1833) ..... Height 4.6 mm, width 12 mm; locality 64. MGS specimen 469.	77
3	**Architectonica (Granosolarium)** sp. ..... Height 3 mm, width 9.5 mm; locality 65. MGS specimen 470.	78
4	**Architectonica (Granosolarium) meekana splendida** Palmer, 1944 ..... Height 9.5 mm, width 22 mm; locality 68. MGS specimen 471.	78

1A
x 2.5



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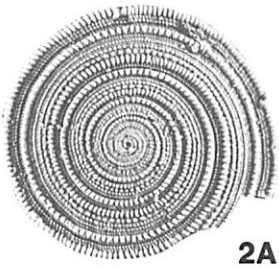

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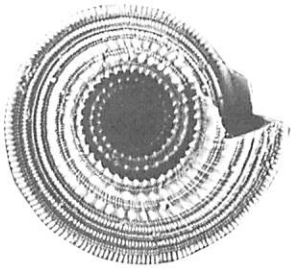

2B
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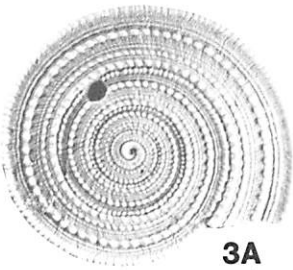

3A
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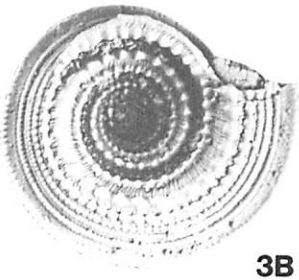

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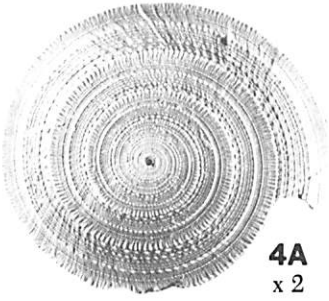

4A
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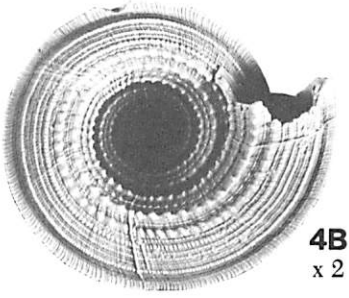


4B
x 2

EXPLANATION PLATE 32

Cook Mountain Formation (Claiborne Group)

Figure — Page

1, 2, 3, 4 **Melanella sp.** 87
1. Height 15.5 mm, width 4.7 mm; locality 64. MGS specimen 472.
2. Height 14.6 mm, width 4 mm; locality 63. MGS specimen 473.
3. Height 11.7 mm, width 3.6 mm; locality 63. MGS specimen 474.
4. Height 11 mm, width 3 mm; locality 64. MGS specimen 475.

5 **Niso umbilicata** (I. Lea, 1833) ? 87
Height 14 mm, width 5.6 mm; locality 65. MGS specimen 476.

6 **Cirsotrema sp.** 87
Height 19 mm, width 8.6; locality 61. MGS specimen 477.

7 **Cirsotrema (Coroniscala) newtonensis** (Meyer and Aldrich, 1886) 85
Incomplete specimen; height 6.4 mm, width 4 mm; locality 64. MGS specimen 478.

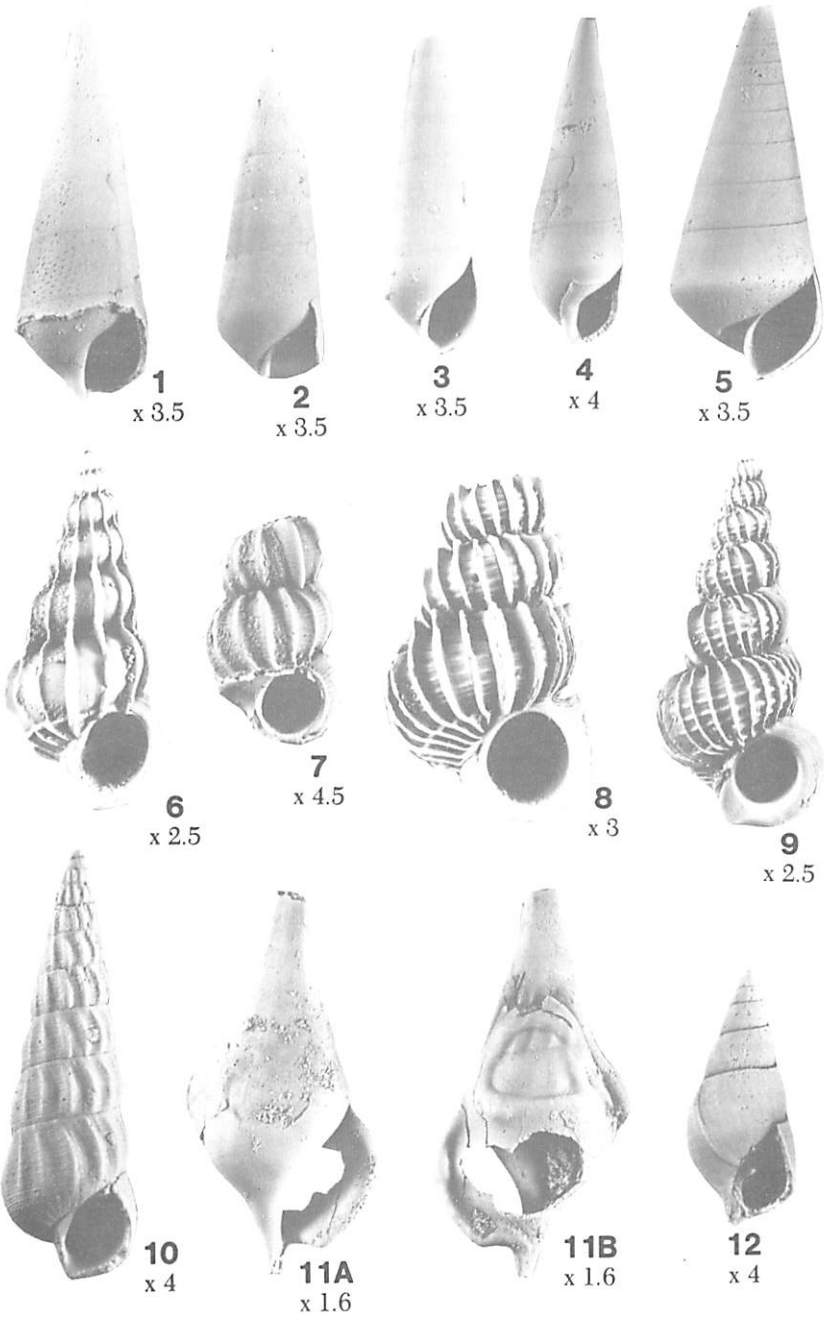
8 **Cirsotrema (Coroniscala) linteum** (Conrad, 1860) 85
Height 15.3 mm, width 9.1 mm; locality 65. MGS specimen 479.

9 **Cirsotrema (Coroniscala) nassulum** (Conrad, 1833) 86
Height 19.2 mm, width 8.3 mm; locality 63. MGS specimen 480.

10 **Alaba sp.** ? 84
Height 14 mm, width 4.2 mm; locality 65. MGS specimen 481.

11 **Calyptraphorus velatus nodovelatus** Palmer, 1937 88
Height 31.4 mm, width 15.4 mm; locality 69. MGS specimen 482.

12 **Odostomia (Evalea) melanella alveata** (H. C. Lea, 1841) 138
Height 8.2 mm, width 3.3 mm; locality 64. MGS specimen 483.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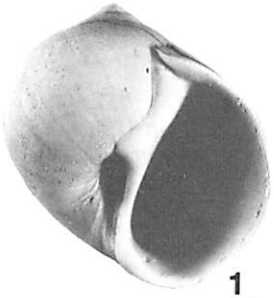
EXPLANATION PLATE 33

Cook Mountain Formation (Claiborne Group)

Figure		Page
1	**Euspira newtonensis** (Meyer and Aldrich, 1886) Height 15 mm, width 14 mm; locality 68. MGS specimen 484.	94
2	**Neverita sp.** Height 20.4 mm, width 18.4 mm; locality 61. MGS specimen 485.	93
3	**Tiburnus eboreus** (Conrad, 1833) Height 5.6 mm, width 7 mm; locality 65. MGS specimen 486.	75
4, 7	**Sinum inconstans** (Meyer and Aldrich, 1886) 4. Height 14.1 mm, width 9.6 mm, elevation 4.5 mm; locality 66. MGS specimen 487. 7. Height 6.7 mm, width 5.2, elevation 3 mm; locality 69. MGS specimen 488.	95
5, 6	**Sinum bilix** (Conrad, 1833) 5. Height 12.3 mm, width 11.4 mm, elevation 6.6 mm; locality 64. MGS specimen 489. 6. Height 11.2 mm, width 10.1 mm, elevation 6.4 mm; locality 69. MGS sepcimen 490.	95



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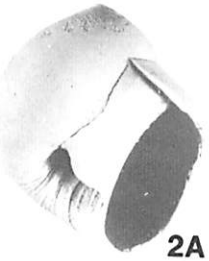

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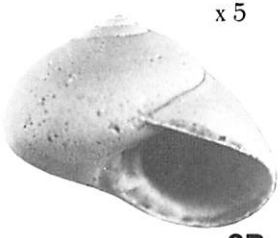

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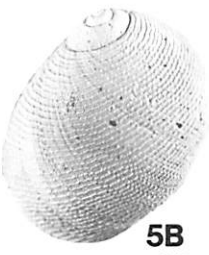

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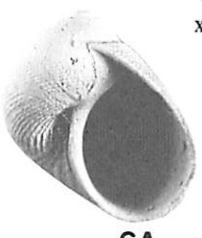

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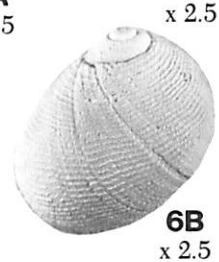

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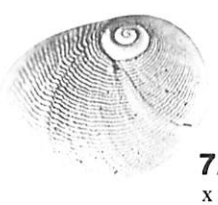

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EXPLANATION PLATE 34

Cook Mountain Formation (Claiborne Group)

Figure		Page
1, 4	**Distorsio (Personella) septemdentata** Gabb, 1860	97
	1. Height 21.8 mm, width 13.7 mm; locality 64. MGS specimen 491.	
	4. Height 16.4 mm, width 10.7 mm; locality 62. MGS specimen 492.	
2, 3	**Phalium brevicostatum** (Conrad, 1834)	96
	2. Height 11.4 mm, width 7.4 mm; locality 68. MGS specimen 493.	
	3. Height 16.3 mm, width 10.9 mm; locality 63. MGS specimen 494.	
5	**Crepidula dumosa** (Conrad, 1834)	90
	Height 14.6 mm, width 8.8 mm, elevation 5.5 mm; locality 68. MGS specimen 495.	
6	**Sulcocypraea vaughani** (Johnson, 1899)	91
	Height 14.3 mm, width 10 mm; locality 68. MGS specimen 496.	
7	**Mitrella (Columbellopsis) mississippiensis** (Meyer and Aldrich, 1886)	101
	Height 13.4 mm, width 6.5 mm; locality 63. MGS specimen 497.	

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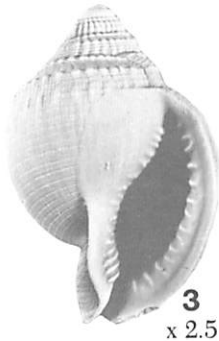

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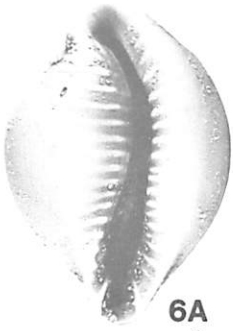

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EXPLANATION PLATE 35

Cook Mountain Formation (Claiborne Group)

Figure		Page
1	**Typhis palmerae** Gertman, 1969	100
	Height 16.7 mm, width 8.6 mm; locality 65. MGS specimen 498.	
2, 3	**Hexaplex (Hexaplex) vanuxemi** Conrad in Morton, 1834	99
	2. Height 13 mm, width 7.6 mm; locality 65. MGS specimen 499.	
	3. Height 10.7 mm, width 6.6 mm; locality 65. MGS specimen 500.	
4	**Hexaplex (Hexaplex) engonatus** (Conrad, 1834)	99
	Height 11.5 mm, width 5.8 mm; locality 65. MGS specimen 501.	
5	**Penion** sp. ?	107
	Height 8.9 mm, width 3.7 mm; locality 64. MGS specimen 502.	
6, 9	**Ficopsis texana** (Harris, 1895)	98
	6. Height 18.7 mm, width 7.5 mm; locality 63. MGS specimen 503.	
	9. Height 17.1 mm, width 9 mm; locality 63. MGS specimen 504.	
7, 8	**Murotriton mcglameriae** Palmer, 1937	100
	7. Height 30.2 mm, width 13 mm; locality 65. MGS specimen 505.	
	8. Height 25.6 mm, width 15.5 mm; locality 68. MGS specimen 506.	

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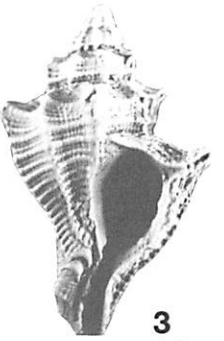

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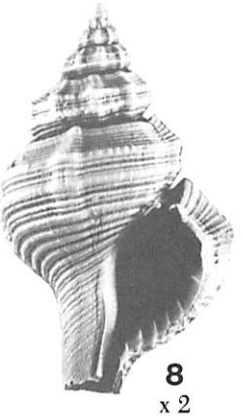

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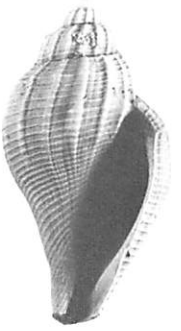

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EXPLANATION PLATE 36

Cook Mountain Formation (Claiborne Group)

Figure		Page
1	**Ficopsis penita** (Conrad, 1833) ..... Incomplete specimen; height 19 mm, width 8.5 mm; locality 68. MGS specimen 507.	98
2	**Siphonalia newtonensis** (Meyer and Aldrich, 1886) ..... Height 10.1 mm, width 5.8; locality 65. MGS specimen 508.	107
3	**Levifusus mortoniopsis carexus** (Harris, 1895) ..... Height 22 mm, width 13.3 mm; locality 64. MGS specimen 509.	110
4	**Potamides** sp. ? ..... Height 12.7 mm, width 8.5; locality 63. MGS specimen 510.	83
5, 6	**Coralliophila (Timothia) aldrichi** (Cossman, 1903) ..... 5. Height 11.6 mm, width 7.3 mm; locality 64. MGS specimen 511. 6. Height 9.3 mm, width 6 mm; locality 65. MGS specimen 512.	101
7, 8	**Levifusus** sp. ..... 7. Incomplete specimen; height 24 mm, width 17 mm; locality 69. MGS specimen 513. 8. Incomplete specimen; height 15.2 mm, width 8.3 mm; locality 64. MGS specimen 514.	111
9	**Dolicholatirus** sp. ..... Height 21.5 mm, width 6.6 m; locality 65. MGS specimen 515.	112
10	**Falsifusus bastropensis** (Harris, 1895) ..... Height 30.7 mm, width 10 mm; locality 65. MGS specimen 516.	113

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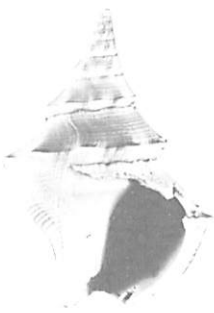

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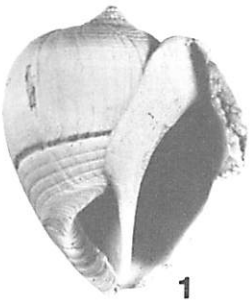
EXPLANATION PLATE 37

Cook Mountain Formation (Claiborne Group)

Figure		Page
1, 2, 3	**Pseudoliva vetusta carinata** Conrad in Gabb, 1860	106
	1. Height 21.3 mm, width 18 mm; locality 65. MGS specimen 517.	
	2. Height 16.3 mm, width 12.2 mm; locality 62. MGS specimen 518.	
	3. Height 19.9 mm, width 15.2 mm; locality 65. MGS specimen 519.	
4	**Mitrella** sp. ?	102
	Height 15.7 mm, width 4.2 mm; locality 68. MGS specimen 520.	
5	**Clavilithes kennedyanus** (Harris, 1895)	113
	Height 44.2 mm, width 16.2 mm; locality 61. MGS specimen 521.	
6	**Buccitriton sagenum** (Conrad, 1833)	103
	Height 13.5 mm, width 6.6 mm; locality 65. MGS specimen 522.	
7	**Bullia** sp.	110
	Height 11 mm, width 5.3 mm; locality 68. MGS specimen 523.	
8	**Mitrella (Bastropia) bastropensis** (Harris, 1895)	102
	Height 12.4 mm, width 4.1 mm; locality 63. MGS specimen 524.	
9	**Siphonalia** sp.	107
	Height 12.3 mm, width 5.7 mm; locality 65. MGS specimen 525.	
10, 11	**Bonellitia** sp. ?	122
	10. Height 11.7 mm, width 6.2 mm; locality 65. MGS specimen 526.	
	11. Height 9.1 mm, width 4.4 mm; locality 68. MGS specimen 527.	



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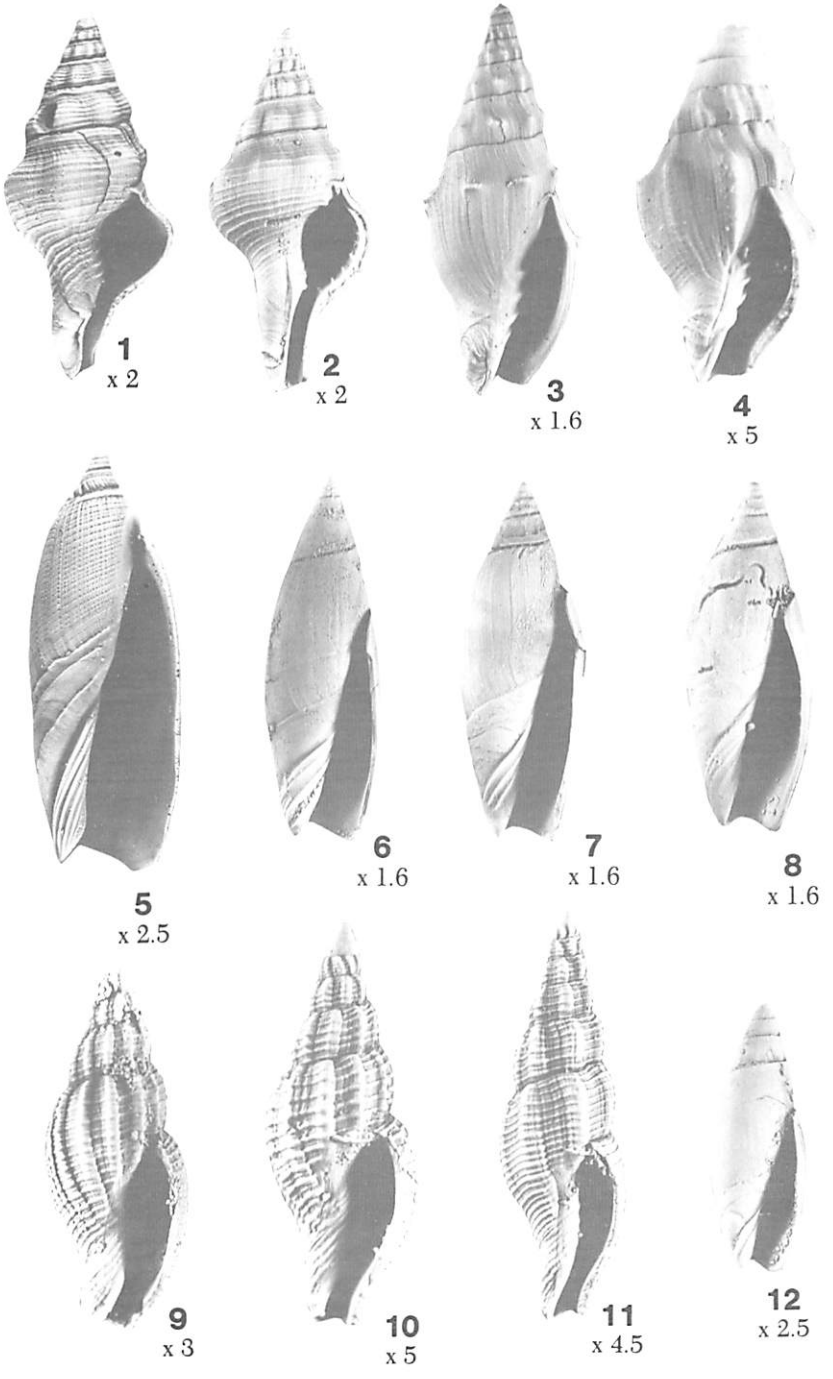
EXPLANATION PLATE 38

Cook Mountain Formation (Claiborne Group)

Figure		Page
1, 2	**Latirus moorei** (Gabb, 1860)	111
	1. Height 23.6 mm, width 11.1 mm; locality 65. MGS specimen 528.	
	2. Height 23.6 mm, width 10.5 mm; locality 65. MGS specimen 529.	
3, 4	**Lapparia mooreana** (Gabb, 1860)	119
	3. Height 31.7 mm, width 13 mm; locality 65. MGS specimen 530.	
	4. Height 9.4 mm, width 4.6 mm; locality 65. MGS specimen 531.	
5	**Ancilla staminea punctulifera** (Gabb, 1860)	114
	Height 21.5 mm, width 8 mm; locality 65. MGS specimen 532.	
6, 7, 8, 12	**Agaronia alabamensis** (Conrad, 1833)	115
	6. Height 29.6 mm, width 9.6 mm; locality 65. MGS specimen 533.	
	7. Height 29.3 mm, width 10.5 mm; locality 63. MGS specimen 534.	
	8. Height 28 mm, width 11 mm; locality 69. MGS specimen 535.	
	12. Height 14 mm, width 5.4 mm; locality 63. MGS specimen 536.	
9, 10, 11	**Terebrifusus** sp.	104
	9. Height 17 mm, width 6.2 mm; locality 65. MGS specimen 537.	
	10. Height 10.5 mm, width 4 mm; locality 64. MGS specimen 538.	
	11. Height 12 mm, width 3.5 mm; locality 65. MGS specimen 539.	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EXPLANATION PLATE 39

Cook Mountain Formation (Claiborne Group)

Figure		Page
1, 4	**Athleta petrosus** (Conrad, 1833)	116
	1. Height 31 mm, width 18 mm; locality 69. MGS specimen 540.	
	4. Height 43.7 mm, width 23.2 mm; locality 65. MGS specimen 541.	
2	**Caricella pyruloides** (Conrad, 1832)	117
	Height 21.8 mm, width 11.4 mm; locality 65. MGS specimen 542.	
3	**Caricella stenzeli** Palmer, 1937	117
	Height 24.5 mm, width 11.5 mm; locality 65. MGS specimen 543.	
5	**Athleta** sp. b	117
	Incomplete specimen; height 29.4 mm, width 15.2 mm; locality 63. MGS specimen 544.	
6, 7, 8, 9, 10	**Lyrischapa harrisi** Aldrich, 191	120
	6. Height 40.3 mm, width 24.7 mm; locality 65. MGS specimen 01.	
	7. Height 9.3 mm, width 4.2 mm; locality 65. MGS specimen 545.	
	8. Height 6.9 mm, width 3.3 mm; locality 62. MGS specimen 546.	
	9. Height 15.5 mm, width 7.7 mm; locality 63. MGS specimen 547.	
	10. Height 20.5 mm, width 11.2 mm; locality 65. MGS specimen 02.	

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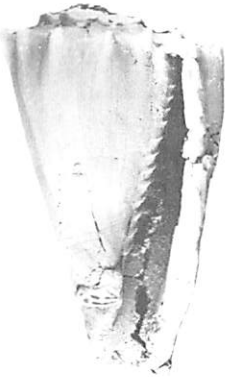

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EXPLANATION PLATE 40

Cook Mountain Formation (Claiborne Group)

Figure		Page
1, 2	**Bullata semen** (I. Lea, 1833) 1. Height 19 mm, width 13.4 mm; locality 65. MGS specimen 548. 2. Height 10.4 mm, width 6.5 mm; locality 65. MGS specimen 549.	123
3	**Marginella** sp. Height 13.5 mm, width 6.4 mm; locality 65. MGS specimen 550	122
4	**Cryptospira (Euryentome) silabra** (Palmer, 1937) Height 5.9 mm, width 3.9 mm; locality 63. MGS specimen 551.	123
5	**Sveltella parva** (I. Lea, 1833) Height 4.5 mm, width 1.5 mm; locality 62. MGS specimen 552.	121
6	**Trigonostoma** sp. Height 6.4 mm, width 5 mm; locality 65. MGS specimen 553.	120
7, 8	**Marginella (Dentimargo) constrictoides** Meyer and Aldrich, 1886 7. Height 10.6 mm, width 5.3 mm; locality 63. MGS specimen 554. 8. Height 10.6 mm, width 5.4 mm; locality 63. MGS specimen 555.	122
9	**Bonellitia** sp. Height 8.3 mm, width 4.5 mm; locality 65. MGS specimen 556.	122
10	**Bonellitia garvani** Palmer, 1937 Height 17.2 mm, width 12 mm; locality 65. MGS specimen 557.	121
11	**Lirofusus thoracicus** (Conrad, 1833) Incomplete specimen; width 10 mm; locality 65. MGS specimen 558.	112

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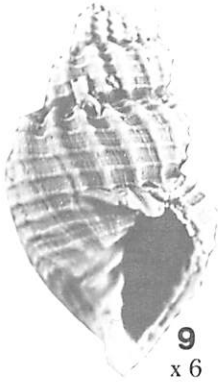

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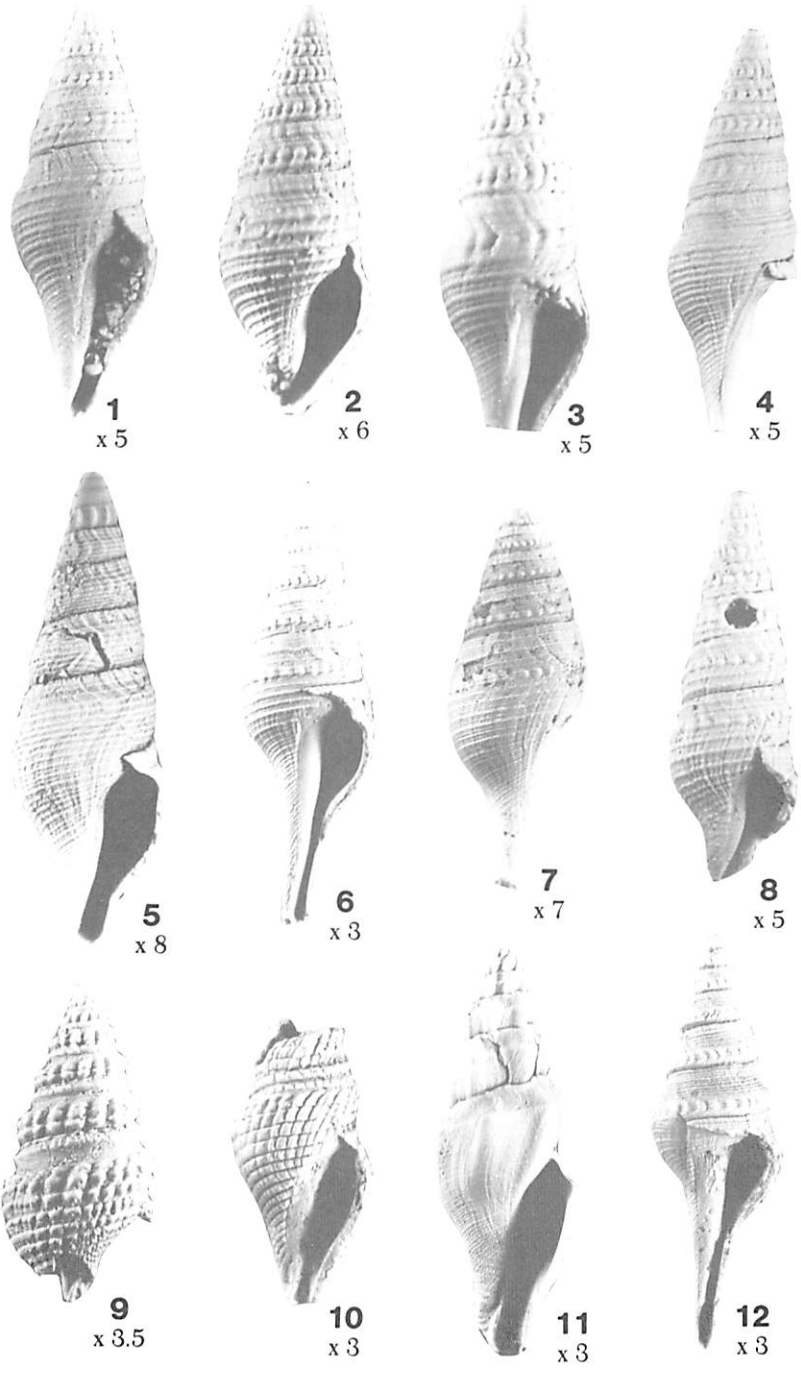
EXPLANATION PLATE 41

Cook Mountain Formation (Claiborne Group)

Figure		Page
1, 2, 3, 4	**Coronia childreni novoppidi** (Harris, 1937) 1. Height 11.2 mm, width 3.7 mm; locality 65. MGS specimen 559. 2. Height 9 mm, width 3.2 mm; locality 65. MGS specimen 560. 3. Height 11 mm, width 3.7 mm; locality 65. MGS specimen 561. 4. Height 10.5 mm, width 3 mm; locality 65. MGS specimen 562.	126
5	**Coronia ? cf. C. ? casteri** (Harris, 1937) Height 8.8 mm, width 2.7 mm; locality 64. MGS specimen 563.	126
6	**Coronia margaritosa** (Casey, 1904) Height 19.3 mm, width 5.8 mm; locality 65. MGS specimen 564.	126
7	**Coronia alternata** (Conrad, 1833) Height 20 mm, width 17.3 mm; locality 61. MGS specimen 565.	126
8	**Trypanotoma terebriformis curta** Harris, 1937 Height 10 mm, width 3.2 mm; locality 65. MGS specimen 566.	127
9	**Scobinella newtonensis** Aldrich, 1911 Incomplete specimen; height 11 mm, width 5.5 mm; locality 65. MGS specimen 567.	135
10	**Scobinella (Moniliopsis) hammettensis** Harris, 1937 Incomplete specimen; height 12.5 mm, width 6 mm; locality 62. MGS specimen 568.	136
11	**Raphitoma sp. ?** Height 18.7 mm, width 6.6 mm; locality 70. MGS specimen 569.	137
12	**Infracoronia ludoviciana** (Vaughan, 1896) Height 18.7 mm, width 5.7 mm; locality 62. MGS specimen 570.	128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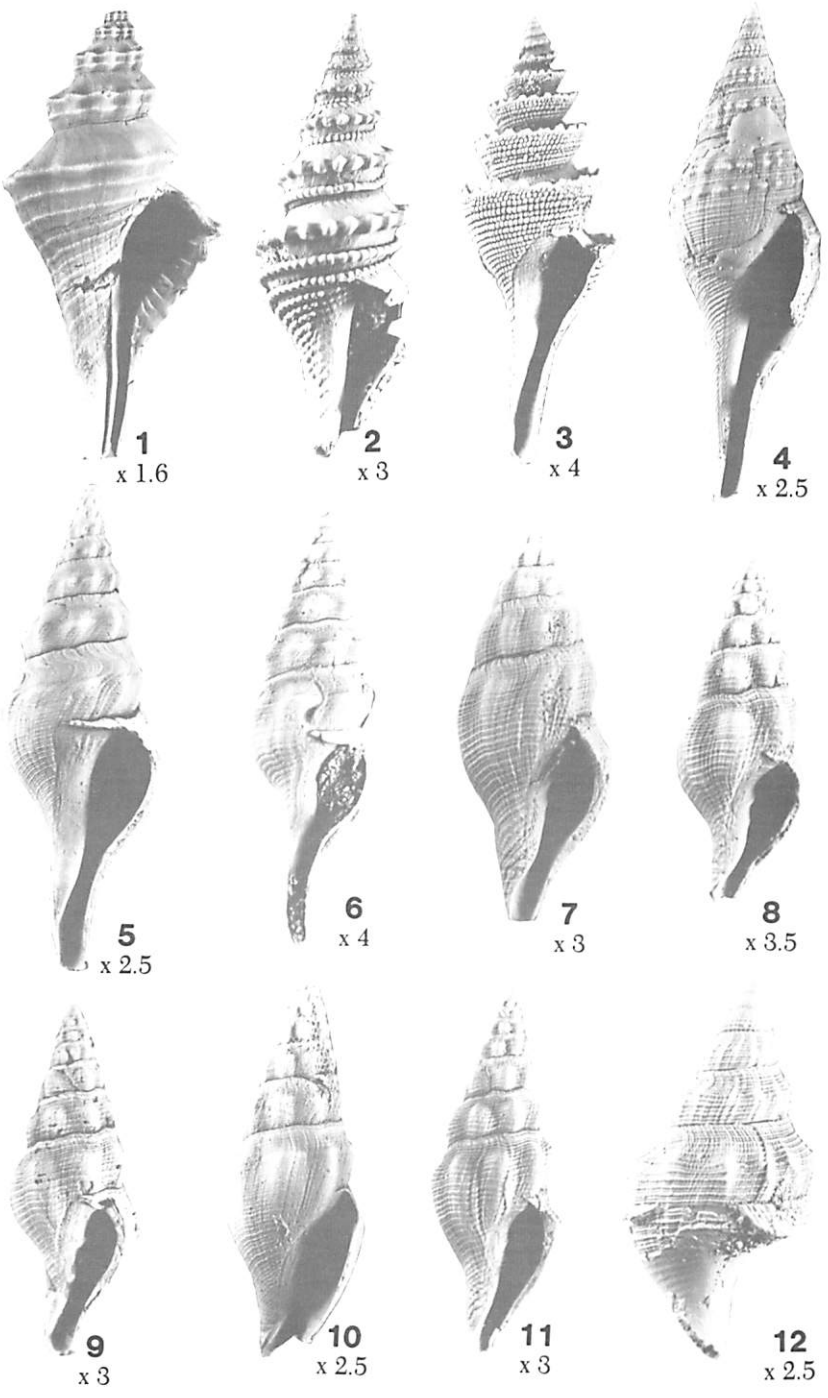
EXPLANATION PLATE 42

Cook Mountain Formation (Claiborne Group)

Figure		Page
1	**Levifusus sp. ?** Height 36.5 mm, width 18.2 mm; locality 65. MGS specimen 571.	111
2	**Cochlespira bella** Conrad, 1865 Height 19 mm, width 7.2 mm; locality 65. MGS specimen 572.	134
3	**Cochlespira sp.** Height 14.5 mm, width 5.2 mm; locality 64. MGS specimen 573.	134
4	**Eosurcula pulcherrima** (Heilprin, 1879) Height 26.3 mm, width 8 mm; locality 65. MGS specimen 574.	132
5, 6	**Eopleurotoma gemmavia** Harris, 1937 5. Height 25.3 mm, width 8.2 mm; locality 65. MGS specimen 575. 6. Height 14.5 mm, width 4.2 mm; locality 63. MGS specimen 576.	129
7, 8, 9, 11	**Cordiera biconica newtonensis** Harris, 1937 7. Height 18 mm, width 7 mm; locality 65. MGS specimen 577. 8. Height 12.8 mm, width 4.6 mm; locality 63. MGS specimen 578. 9. Height 15.4 mm, width 5.4 mm; locality 62. MGS specimen 579. 11. Height 15.9 mm, width 5.7 mm; locality 62. MGS specimen 580.	136
10	**Cordiera biconica curta** Harris, 1937 Height 20.2 mm, width 7.3 mm; locality 65. MGS specimen 581.	136
12	**Pseudotoma sp. ?** Incomplete specimen; height 20 mm, width 10 mm; locality 63. MGS specimen 582.	133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EXPLANATION PLATE 43

Cook Mountain Formation (Claiborne Group)

Figure		Page
1, 2	**Hemisurcula hicoricola** Harris, 1937 1. Height 26.3 mm, width 9 mm; locality 63. MGS specimen 583. 2. Height 18.4 mm, width 7.3 mm; locality 63. MGS specimen 584.	133
3	**Nucleopsis subvaricata** (Conrad, 1860) Height 8.7 mm, width 5.2 mm; locality 65. MGS specimen 585.	140
4	**Retusa (Cylichnina) galba** (Conrad, 1833) Height 9 mm, width 3.4 mm; locality 65. MGS specimen 586.	142
5	**Acteon idoneus** Conrad, 1833 Height 6.2 mm, width 3.2 mm; locality 61. MGS specimen 587.	139
6	**Hastula houstonia** (Harris, 1895) Height 11 mm, width 2.8 mm; locality 65. MGS specimen 588.	138
7	**Volvaria (Volvariella) reticulata** Johnson, 1899 Height 6.1 mm, width 2.9 mm; locality 64. MGS specimen 589.	124
8	**Conus (Lithoconus) smithvillensis** Harris, 1895 var. Height 20.2 mm, width 9.2 mm; locality 65. MGS specimen 590.	137
9	**Umbraculum** cf. **U. planulatum** (Conrad in Wailes, 1854) Greatest dimension 28.3 mm; locality 63. MGS specimen 591.	142
10	**Dentalium (Antalis) thalloides** Conrad, 1833 Height 19.6 mm, greatest diameter 2.5 mm; locality 61. MGS specimen 592.	144
11	**Dentalium (Antalis) minutistriatum** Gabb, 1860 Height 24.3 mm, greatest diameter 2.5 mm, locality 69. MGS specimen 593.	144

1
x 2

2
x 3

3
x 5

4
x 5

5
x 6

6
x 5

7
x 8

8
x 2.5

9
x 1.4

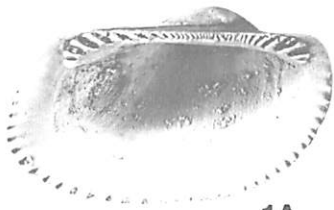
10
x 2.5

11
x 2

EXPLANATION PLATE 44

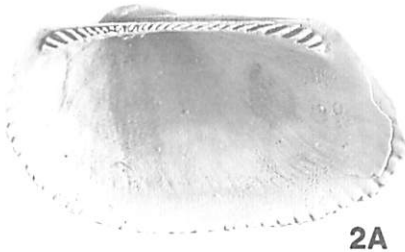
Cook Mountain Formation (Claiborne Group)

Figure		Page
1, 2	**Anadara vaughani** (Casey, 1903) 1. Left valve; height 17 mm, length 26.1 mm, inflation 7.7 mm; locality 27. MGS specimen 183. 2. Right valve; height 10.1 mm, length 17.5 mm, inflation 4 mm; locality 65. MGS specimen 593.	150
3	**Nucula sp.** Left valve; height 9.2 mm, length 10.8 mm, inflation 3 mm; locality 65. MGS specimen 594.	147
4	**Hilgardia multilineata** (Conrad, 1885) Right valve; height 6.3 mm, length 13 mm, inflation 2.3 mm; locality 65. MGS specimen 595.	147
5	**Barbatia (Acar) aspera** (Conrad in Wailes, 1854) Left valve; height 7 mm, length 13 mm, inflation 3 mm; locality 63. MGS specimen 596.	149

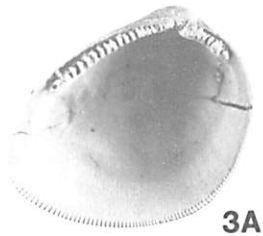


1A
x 1.6

1B
x 1.6



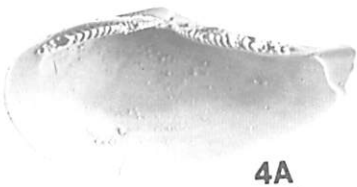
2A
x 3



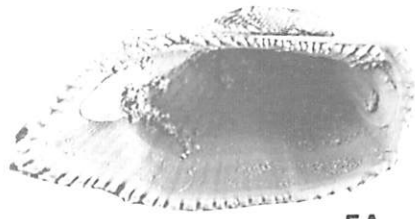
3A
x 3

2B
x 3

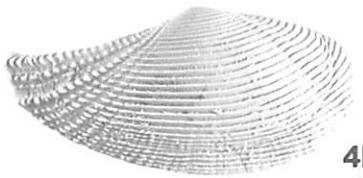
3B
x 3



4A
x 3.5



5A
x 4



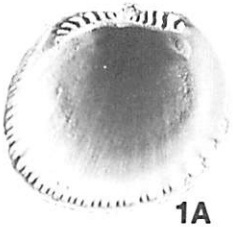
4B
x 3.5

5B
x 4

EXPLANATION PLATE 45

Cook Mountain Formation (Claiborne Group)

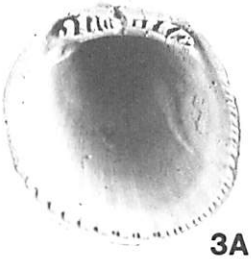
Figure		Page
1, 2, 3	**Limopsis aviculoides** (Conrad, 1833) var.	151
	1. Left valve; height 8.2 mm, length 8.4 mm, inflation 2.6 mm; locality 65. MGS specimen 597.	
	2. Left valve; height (incomplete) 7.4 mm, length 7.3 mm, inflation 2.6 mm; locality 26a. MGS specimen 172.	
	3. Right valve; height 9.1 mm, length 8.7 mm, inflation 2.9 mm; locality 65. MGS specimen 598.	
4, 5	**Glycymeris (Glycymeris) lisbonensis** Harris, 1919	151
	4. Left valve; height 16.4 mm, length 16.7 mm, inflation 4.8 mm; locality 26a. MGS specimen 599.	
	5. Height 23.5 mm, length 25 mm, inflation 8.5 mm; locality 27. MGS specimen 171.	
6, 7	**Cubitostrea sellaeformis** (Conrad, 1832)	162
	6. Left valve (young); height 18.6 mm, width 12.2 mm, inflation 3.2 mm; locality 26a. MGS specimen 185.	
	7. Right valve (young); height 22 mm, length 15 mm, inflation 3 mm; locality 26a. MGS specimen 186.	



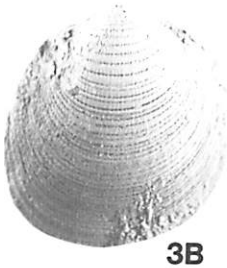
1A
x 3.5

1B
x 3.5

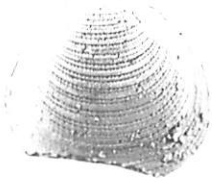
2A
x 3.5



3A
x 3.5



3B
x 3.5



2B
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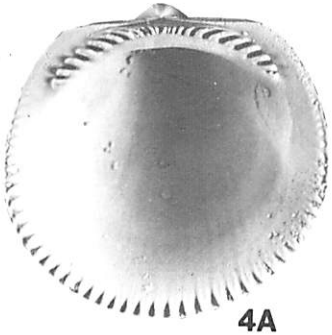


4A
x 2.5

4B
x 2.5

5
x 1.2

6
x 2

7
x 1.5

EXPLANATION PLATE 46

Cook Mountain Formation (Claiborne Group)

Figure		Page
1, 2	**Cubitostrea sellaeformis** (Conrad, 1832)	162

1. Left valve; height 139 mm, width 80 mm, valve is dorsal-ventrally concave and anterior-posteriorly convex; locality 26a. MGS specimen 181.
2. Right valve of same individual as figure 1; height 145 mm, width 71 mm, valve is dorsal-ventrally convex and anterior-posteriorly concave. MGS specimen 182.

1A
x 0.6

2A
x 0.6

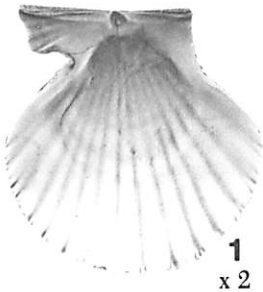
1B
x 0.6

2B
x 0.6

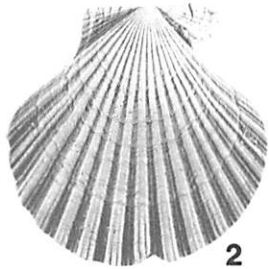
EXPLANATION PLATE 47

Cook Mountain Formation (Claiborne Group)

Figure		Page
1, 2, 5	**Chlamys wahtubbeana** Dall, 1898	155
	1. Right valve; height 17.8 mm, length 17.2 mm, inflation 1.8 mm; locality 61. MGS specimen 600.	
	2. Right valve; height 21.5 mm, length 21.5 mm, inflation 2.3 mm; locality 61. MGS specimen 601.	
	5. Right valve; height 24 mm, length 23.2, inflation 2.3 mm; locality 27. MGS specimen 175.	
3	**Eburneopecten** sp.	153
	Height 15 mm, length 14 mm; locality 26a. MGS specimen 174.	
4	**Chlamys cainei (Harris, 1919)**	155
	Right valve; height 20 mm, length 19.5 mm, inflation 3.5; locality 26a. MGS specimen 173.	
6, 8	**Plicatula filamentosa concentrica** Dall, 1898	158
	6. Right valve; height 11.1 mm, length 11.2 mm, inflation 1.6 mm; locality 62. MGS specimen 602.	
	8. Right valve; height 10.5 mm, length 10.3 mm, inflation 1.5 mm; locality 62. MGS specimen 604.	
7	**Plicatula filamentosa** Conrad, 1833 var. ?	159
	Right valve; height 18 mm, length 15.1 mm, inflation 4 mm; locality 27. MGS specimen 179.	
9	**Anomia** sp.	158
	Height 10.2 mm, length 9.6 mm, valve is concave with 1.1 mm of relief; locality 26a. MGS specimen 180.	



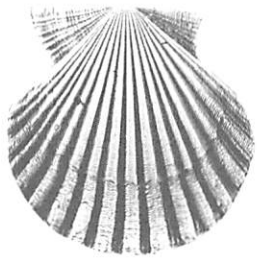
1
x 2



2
x 1.6

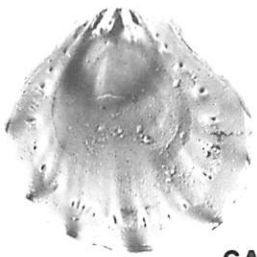
3
x 2

4A
x 1.7

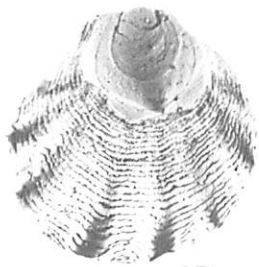


4B
x 1.7

5
x 1.4



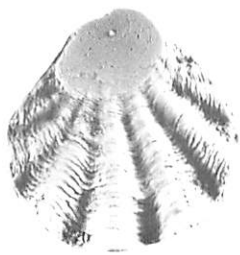
6A
x 3



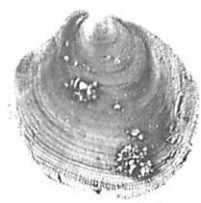
6B
x 3

7
x 2.3

8A
x 3



8B
x 3



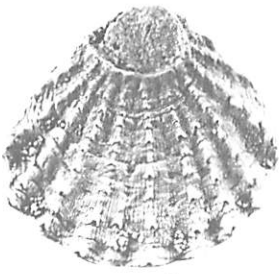
9
x 2.5

EXPLANATION PLATE 48

Cook Mountain Formation (Claiborne Group)

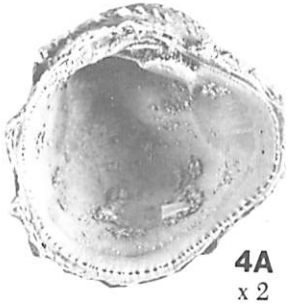
Figure		Page
1, 2, 3	**Plicatula filamentosa planata** Meyer and Aldrich, 1886	158
	1. Incomplete specimen; height 12 mm, length 13 mm, inflation 2.5 mm; locality 27. MGS specimen 176.	
	2. Height 12.6 mm, length 13.5 mm, inflation 2 mm; locality 27. MGS specimen 178.	
	3. Height 21.4 mm, length 19.1 mm, inflation about 3 mm; locality 27. MGS specimen 177.	
4, 5, 8	**Chama (Chama) monroensis** Aldrich, 1903	166
	4. Left valve; height 18.8 mm, length 18.3 mm, inflation 9.3 mm; locality 63. MGS specimen 605.	
	5. Right valve; height 12.6 mm, length 16.6 mm, inflation 3.7 mm; locality 65. MGS specimen 606.	
	8. Right valve; height 11.7 mm, length 11.5 mm, inflation 4.4 mm; locality 65. MGS specimen 608.	
6, 7	**Chama harrisi** (Gardner, 1927)	166
	6. Right valve; height 10 mm, length 11.4 mm, inflation 3.2 mm; locality 63. MGS specimen 607.	
	7. Right valve; height 11.4 mm, length 11.5 mm, inflation 3.8 mm; locality 26a. MGS specimen 189.	

1
x 2.3

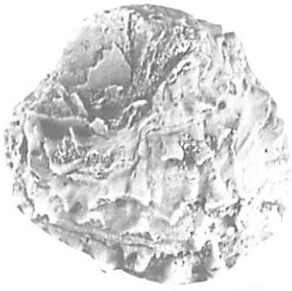


2
x 2.3

3
x 1.7



4A
x 2



4B
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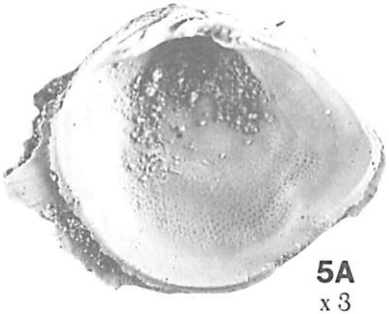
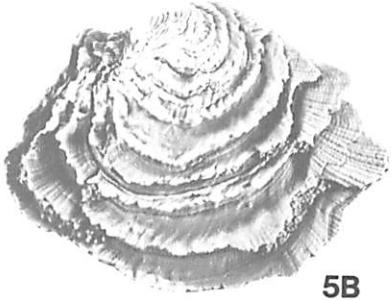
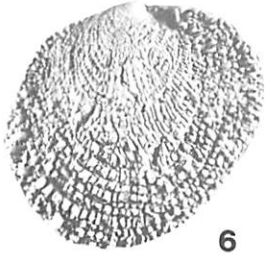


5A
x 3

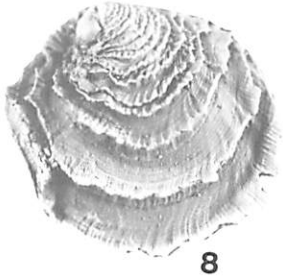


5B
x 3



6
x 3

7
x 2.5

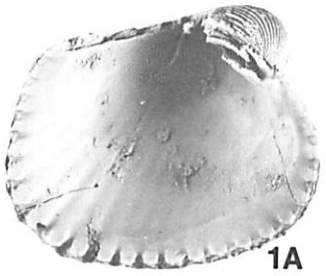


8
x 3

EXPLANATION PLATE 49

Cook Mountain Formation (Claiborne Group)

Figure		Page
1	**Glyptoactis (Claibornicardia) alticostata** (Conrad, 1833) var. Left valve; height 22.5 mm, length 26.1 mm, inflation 9.6 mm; locality 63. MGS specimen 609.	172
2, 3	**Venericardia (Rotundicardia) rotunda** Lea, 1833 2. Right valve; height 16 mm, length 16.4 mm, inflation 5.5 mm; locality 64. MGS specimen 610. 3. Left valve; height 17.3 mm, length 19 mm, inflation 6.4 mm; locality 64. MGS specimen 611.	168
4, 5	**Glyptoactis (Claibornicardia) trapaquara** Harris, 1895 var. 4. Left valve; height 14 mm, length 16 mm, inflation 6 mm; locality 65. MGS specimen 612. 5. Left valve; height 10.5 mm, length 12 mm, inflation 4 mm; locality 65. MGS specimen 613.	172



1A
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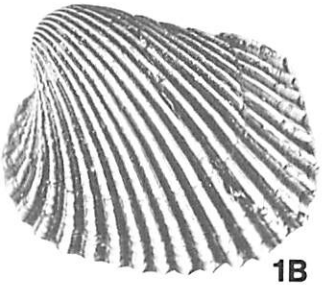
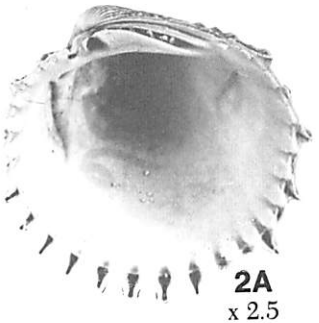
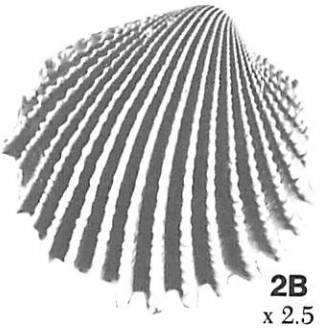


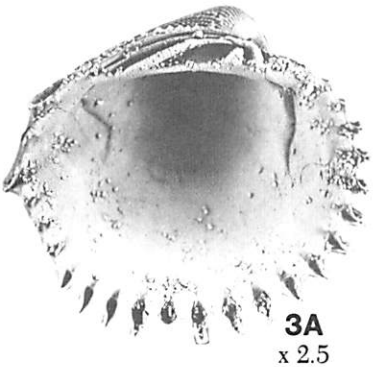
1B
x 1.6



2A
x 2.5



2B
x 2.5



3A
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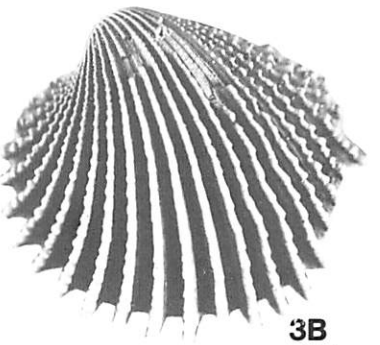

3B
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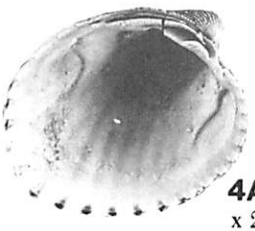
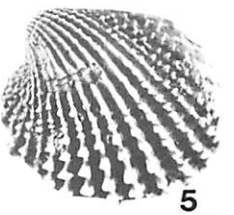


4A
x 2

4B
x 2

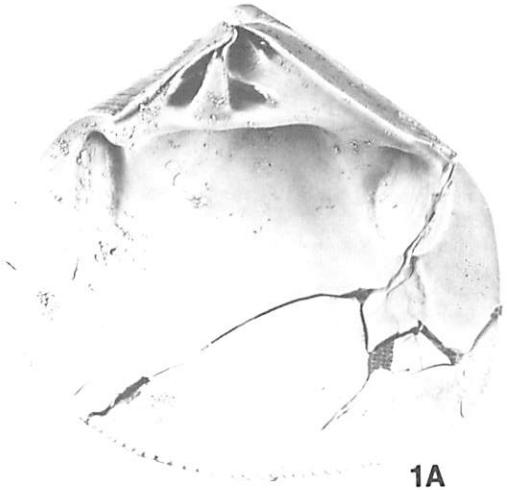


5
x 2.5

EXPLANATION PLATE 50

Cook Mountain Formation (Claiborne Group)

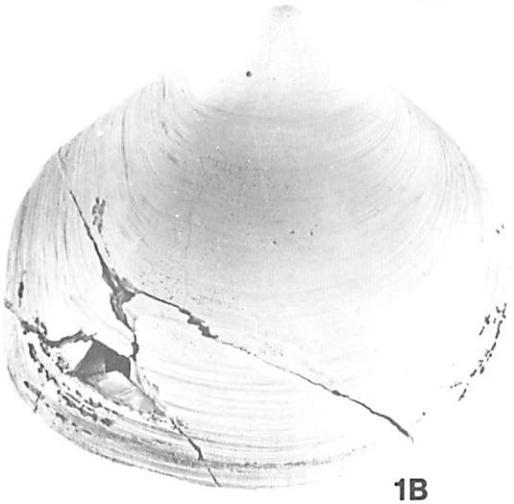
Figure		Page
1, 4	**Crassatella texalta** Harris, 1895	175
	1. Right valve; height 62.3 mm, length 65 mm, inflation 19.5 mm; locality 69. MGS specimen 614.	
	4. Left valve; height 14 mm, length 15.3 mm, inflation 4.2 mm, locality 69. MGS specimen 617.	
2, 3	**Lirodiscus (Lirodiscus) cf. L. (L.) smithvillensis** (Harris, 1895)	174
	2. Right valve; height 14.7 mm, length 18 mm, inflation 4.1 mm; locality 65. MGS specimen 615.	
	3. Left valve; height 15.3 mm, length 17.8 mm, inflation 4.6 mm; locality 69. MGS specimen 616.	



1A
x 1

2A
x 2

2B
x 2



1B
x 1

3A
x 2

3B
x 2

4A
x 2.5

4B
x 2.5

EXPLANATION PLATE 51

Cook Mountain Formation (Claiborne Group)

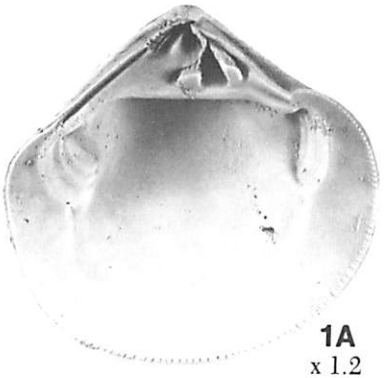
Figure — Page

1, 5, 6, 7 **Crassatella texalta** Harris, 1895 175

1. Left valve; height 40 mm, length 41 mm, inflation 12 mm; locality 69. MGS specimen 618.
5. Left valve; height 12.6 mm, length 14 mm, inflation 4 mm; locality 63. MGS specimen 622.
6. Incomplete right valve; height 21.8 mm, inflation 6.4 mm; locality 26a. MGS specimen 188.
7. Both valves viewing right valve; height 10 mm, length 12.2 mm, combined inflation of both valves 6.2 mm; locality 27. MGS specimen 187.

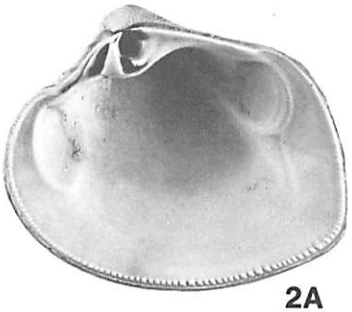
2, 3, 4 **Crassatella** cf. **C. negreetensis** (Harris, 1919) 176

2. Right valve; height 27.8 mm, length 31 mm, inflation 10 mm; locality 63. MGS specimen 619.
3. Right valve; height 11 mm, length 12 mm, inflation 4 mm; locality 63. MGS specimen 620.
4. Right valve; height 27.3 mm, length 31.4 mm, inflation 10 mm; locality 63. MGS specimen 621.



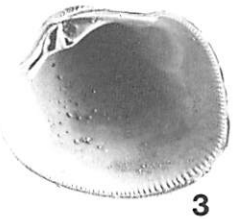
1A
x 1.2

1B
x 1.2



2A
x 1.4

2B
x 1.4

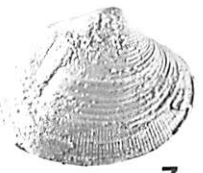


3
x 2.5

4
x 1.4

5
x 2.5

6
x 1.4

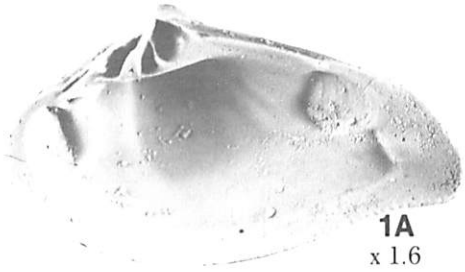


7
x 2

EXPLANATION PLATE 52

Cook Mountain Formation (Claiborne Group)

Figure		Page
1, 2	**Bathytormus clarkensis ludovicianus** (Kent, 1960)	176
	1. Right valve; height 21.3 mm, length 37.5 mm, inflation 8 mm; locality 69. MGS specimen 623.	
	2. Left valve; height 17.3 mm, length 29 mm, inflation 6.5 mm; locality 65. MGS specimen 624.	
3	**Callista (Costacallista)** cf. **C. (C.) mortoni** (Conrad, 1834)	185
	Right valve; height 15 mm, length 21 mm, inflation 4.6 mm; locality 69. MGS specimen 625.	
4	**Pitar (Calpitaria) texacola** (Harris, 1895)	184
	Right valve; height 29.6 mm, length 38.3 mm, inflation 11 mm; locality 26a. MGS specimen 626.	



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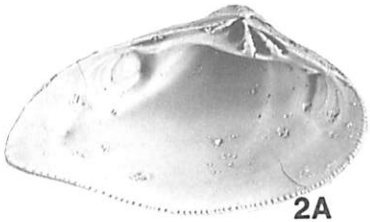
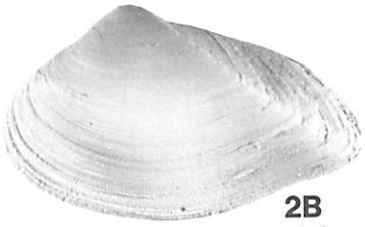


2A
x 1.6

1B
x 1.6



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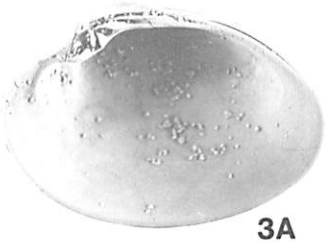
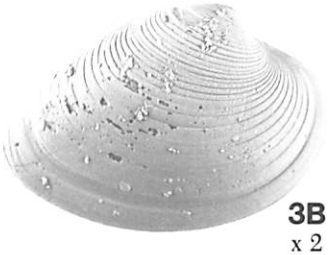


3A
x 2



3B
x 2

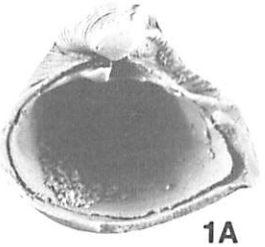
4A
x 1.2

4B
x 1.2

EXPLANATION PLATE 53

Cook Mountain Formation (Claiborne Group)

Figure		Page
1, 2, 3	**Caestocorbula fossata** (Meyer and Aldrich, 1886)	188
	1. Right valve; height 7.5 mm, length 8.2 mm, inflation 3.7 mm; locality 62. MGS specimen 627.	
	2. Right valve; height 8.2 mm, length 9.5 mm, inflation 4.3 mm; locality 62? MGS specimen 628.	
	3. Right valve; height 5.4 mm, length 6.8 mm, inflation 2.8 mm; locality 27. MGS specimen 184.	
4	**Solen** (cf. **Eosolen**) **abruptus** (Dall, 1900)	179
	Posterior fragment of right valve; height 18 mm; locality 27. MGS specimen 191.	
5	**Harpactocarinus sp.**	190
	Inner view (5A) and outer view (5B) of right manus (crab claw); length 28.4 mm, height 19.5 mm, thickness 12 mm; locality 26a. MGS specimen 190.	
6	**Maretia arguta** (Clark, 1915)	193
	Internal mold; length 25.5 mm, width 23.2 mm, height 9 mm; locality 62. MGS specimen 629.	



1A
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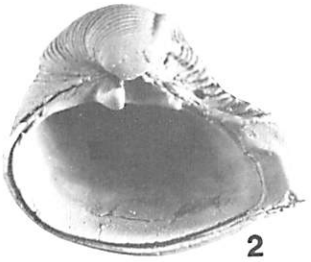
1B
x 4



2
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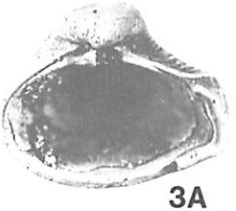

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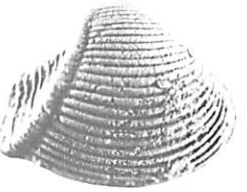

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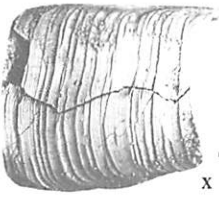

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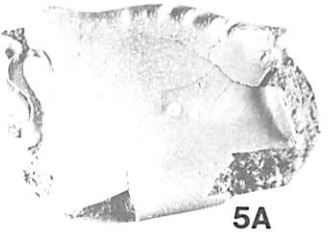

5A
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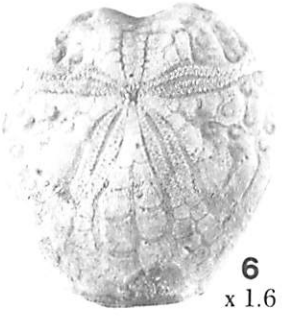

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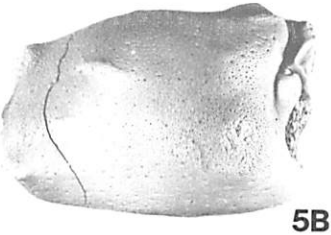


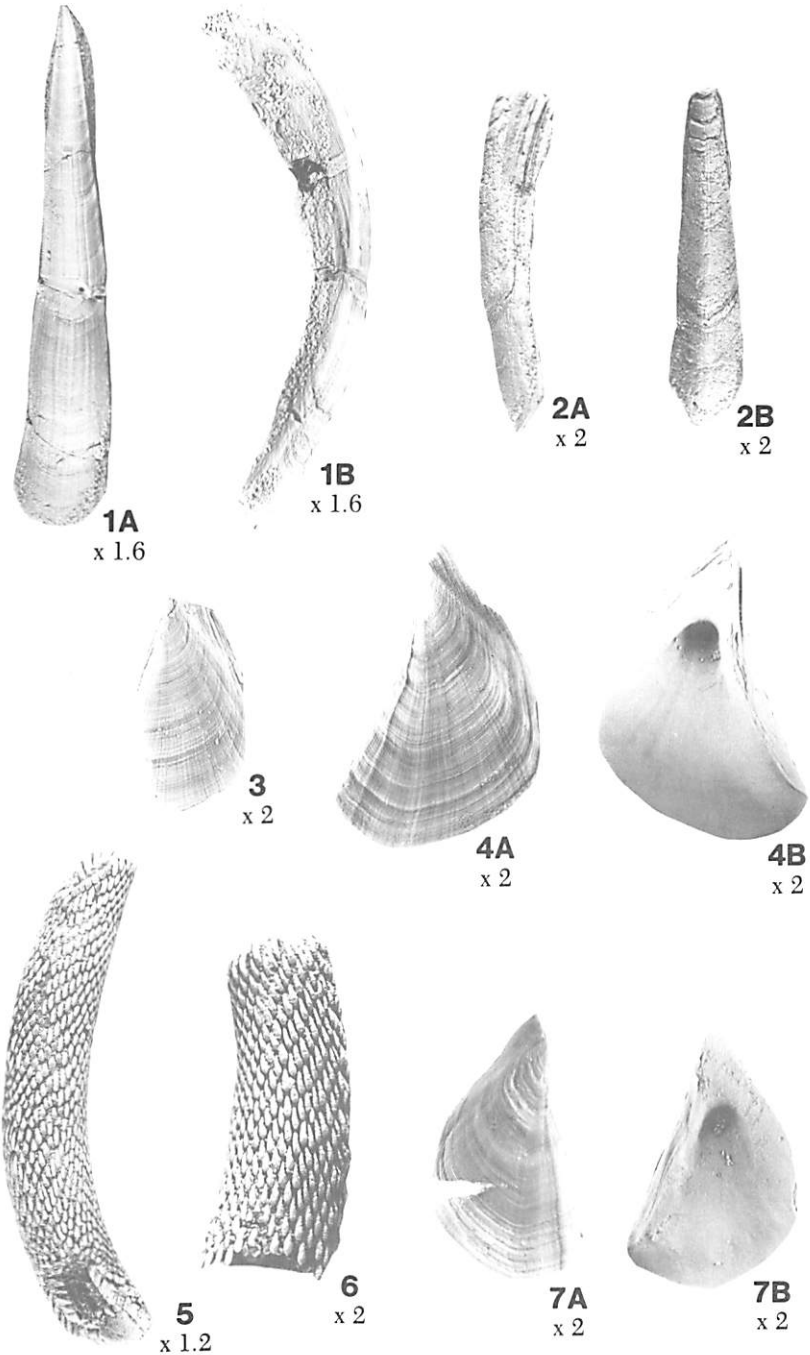
5B
x 1.5

EXPLANATION PLATE 54

Cook Mountain Formation (Claiborne Group)

Figure		Page
1 - 7	**Euscalpellum eocenense** (Meyer, 1885)	189

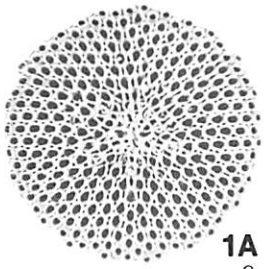
1. Carina, outer view (1A) and side view (1B); length 41.4 mm, width 7.3 mm; locality 70. MGS specimen 630.
2. Incomplete carina, side view (2A) and outer view (2B); length 22.3 mm; locality 27. MGS specimen 192.
3. Incomplete right scutum; length 13.7 mm; locality 63. MGS specimen 631.
4. Right scutum; length 19.7 mm, width 11.6 mm; locality 63. MGS specimen 632.
5. Pedicle (attachment "neck" of goose-neck barnacle); length 55 mm, diameter 9 mm; locality 64. MGS specimen 633.
6. Incomplete pedicle; diameter 8.6 mm; locality 26a. MGS specimen 193.
7. Left scutum; length 17.1 mm, width 9.4 mm; locality 63. MGS specimen 634.


1A
x 1.6
1B
x 1.6
2A
x 2
2B
x 2
3
x 2
4A
x 2
4B
x 2
5
x 1.2
6
x 2
7A
x 2
7B
x 2

EXPLANATION PLATE 55

Moodys Branch Formation (Jackson Group)

Figure		Page
1	**Schizorthosecos interstitia** Lea, 1833, var. ..... Outer (1A) and inner (1B) side of zoarium; greatest diameter 4.3 mm, height 1 mm; locality 16. MGS specimen 194.	72
2	**Lunulites fenestrata** De Gregorio, 1894 ..... Outer (2A) and inner (2B) side of zoarium; greatest diameter 4.5 mm, height 1.1 mm; locality 16. MGS specimen 195.	71
3, 4	**Lunulites jacksonensis** Canu and Bassler, 1920 ..... 3. Outer (3A) and inner (3B) side of zoarium; greatest diameter 4.3 mm, height 0.8 mm; locality 16. MGS specimen 196. 4. Outer (4A) and inner (4B) side of zoarium; greatest diameter 3.7 mm, height 1.1 mm; locality 16. MGS specimen 197.	71



1A
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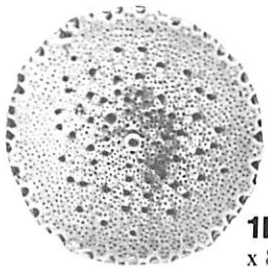
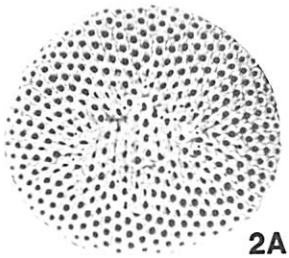
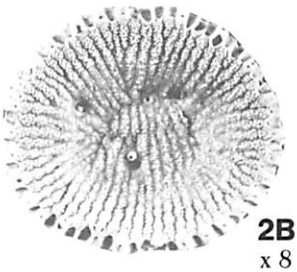


1B
x 8

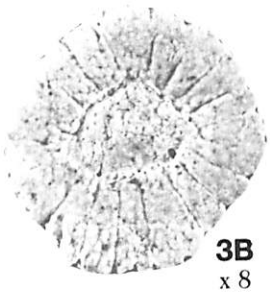


2A
x 8



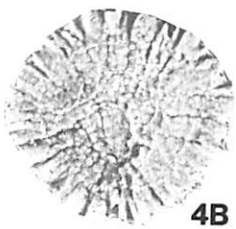
2B
x 8

3A
x 8



3B
x 8

4A
x 8

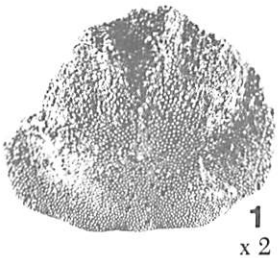


4B
x 8

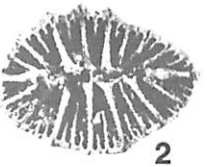
EXPLANATION PLATE 56

Moodys Branch Formation (Jackson Group)

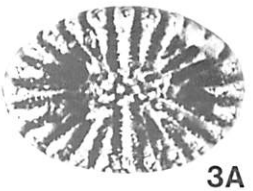
Figure		Page
1	**Endopachys maclurii** (Lea, 1833) ..... Specimen incomplete; height 14.6 mm, large diameter 18 mm, small diameter 11.5 mm; locality 9. MGS specimen 198.	70
2, 5, 6	**Flabellum magnocostatum** Vaughan, 1900 ..... 2. Specimen incomplete; height 16.4 mm, large diameter 14 mm, small diameter 10 mm; locality 9. MGS specimen 199. 5. Specimen incomplete; height 29 mm, large diameter 14 mm, small diameter 11 mm; locality 9. MGS specimen 200. 6. Height 18.7 mm, large diameter 14.6, small diameter 11.3 mm; locality 9. MGS specimen 201.	11
3	**Platytrochus goldfussi** (Lea, 1833) ..... Height 5.8 mm, large diameter 4.5 mm, small diameter 3 mm; locality 9. MGS specimen 202.	67
4	**Flabellum cuneiforme wailesi** Conrad, 1855 ..... Specimen incomplete; height 14.6 mm, large diameter 17 mm, small diameter 8.4 mm; locality 9. MGS specimen 203.	11
7, 9, 10	**Turritella arenicola** (Conrad, 1865) ..... 7. Height 39 mm, width 11.4 mm; locality 16. MGS specimen 204. 9. Height 42.8 mm, width 12.4 mm; locality 16. MGS specimen 205. 10. Height 37.6 mm, width 10.8 mm; locality 16. MGS specimen 206.	82
8, 11, 12	**Turritella perdita** Conrad, 1865 ..... 8. Height 38 mm, width 10.7 mm; locality 9. MGS specimen 207. 11. Height 40.2 mm, width 11.1 mm; locality 16. MGS specimen 208. 12. Height 39.4 mm, width 11.2 mm; locality 16. MGS specimen 209.	82



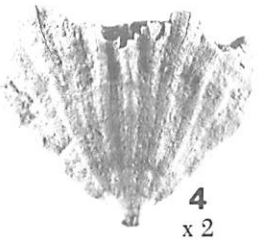
1
x 2



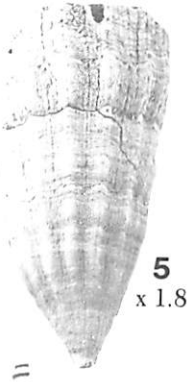
2
x 2



3A
x 7

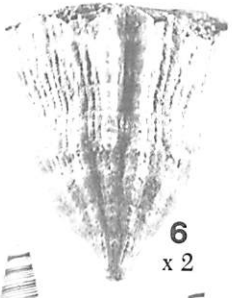


4
x 2



5
x 1.8

3B
x 5.5



6
x 2

7
x 1.4

8
x 1.4

9
x 1.4

10
x 1.4

11
x 1.4

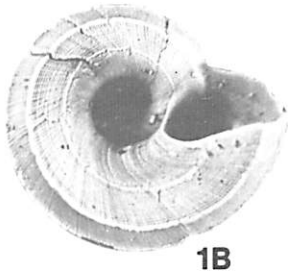
12
x 1.4

EXPLANATION PLATE 57

Moodys Branch Formation (Jackson Group)

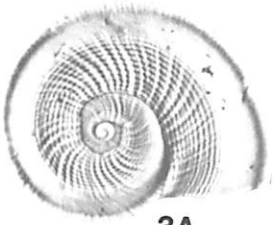
Figure		Page
1	**Circulus ottonius** Palmer, 1947 Height 3 mm, width 5.6 mm; locality 9. MGS specimen 210.	76
2	**Bittium koeneni** Meyer, 1886 Height 3.3 mm, width 1.2 mm; locality 9. MGS specimen 211.	83
3	**Tornus infraplicatus** (Johnson, 1899) Height 1.4 mm, width 3.1 mm; locality 16. MGS specimen 212.	76
4, 6	**Natica permunda** Conrad in Wailes, 1854 4. Inner view of operculum; height 6.5 mm, width 4.2 mm; locality 16. MGS specimen 213. 6. Height 21 mm, width 22 mm; locality 9. MGS specimen 214.	92
5	**Calyptraea (Trochita) aperta** (Solander in Brander, 1766) Height 12.5 mm, width 15.5 mm; locality 9. MGS specimen 215.	89
7	**Euspira jacksonensis** Palmer, 1947 Height 14 mm, width 14 mm; locality 9. MGS specimen 216.	94
8	**Hipponix pygmaeus** I. Lea, 1833 Height (apex to anterior) 3.9 mm, elevation above aperture 1.4 mm, width 3.2 mm; locality 16. MGS specimen 217.	89
9	**Polinices weisbordi** Palmer, 1937 Height 25.4 mm, width 21.2 mm; locality 16. MGS specimen 218.	92

1A
x 6.5



1B
x 6.5

2
x 12



3A
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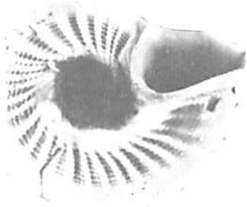
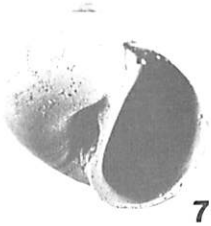


3B
x 12

4
x 4

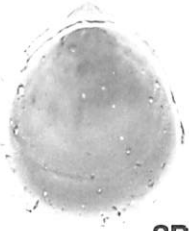
5
x 2

6
x 1.4



7
x 2

8A
x 8



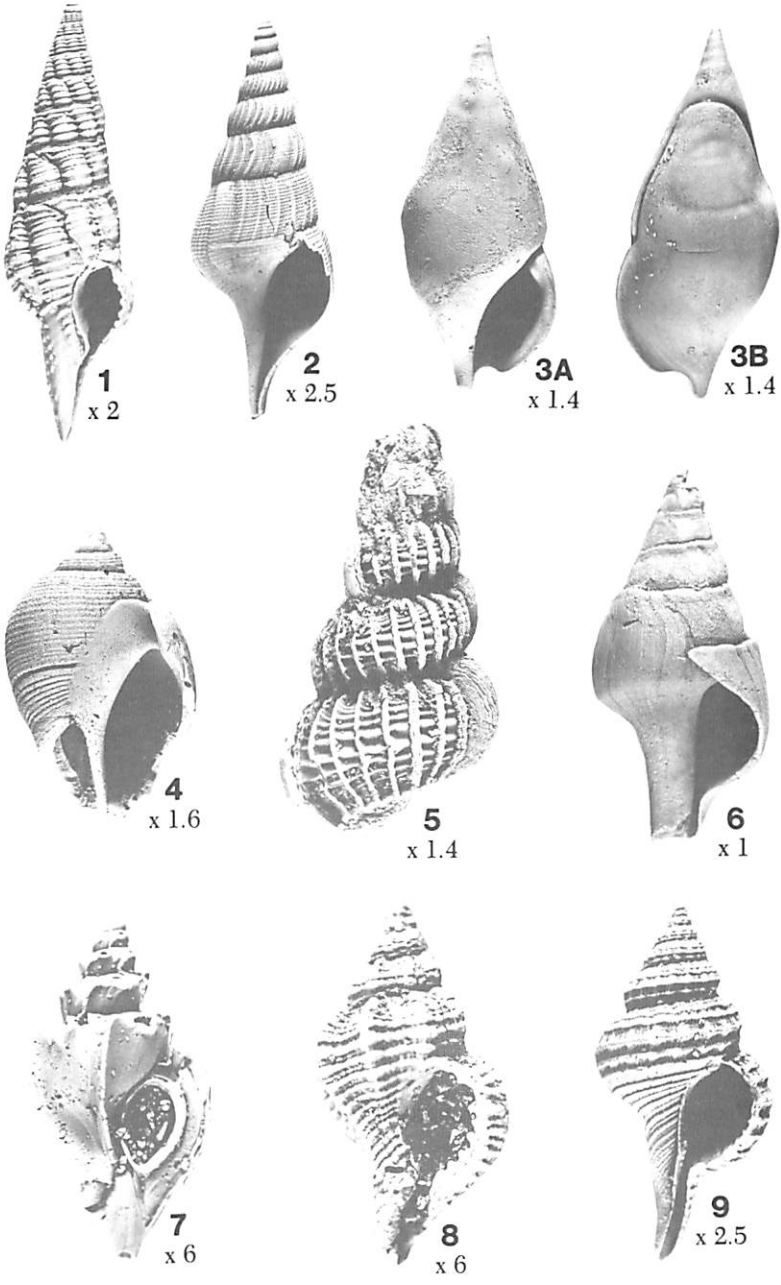
8B
x 8

9
x 1.4

EXPLANATION PLATE 58

Moodys Branch Formation (Jackson Group)

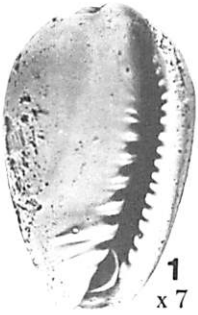
Figure		Page
1	**Dolicholatirus leaensis** (Harris, 1897) Height 28.5 mm, width 18.3 mm; locality 16. MGS specimen 219.	112
2, 3	**Calyptraphorous stamineus** (Conrad, 1856) 2. Young; height 21 mm, width 17.5 mm; locality 9. MGS specimen 220. 3. Adult; height 34.2 mm, width 14.3 mm; locality 16. MGS specimen 221.	88
4	**Pseudoliva vetusta perspectiva** Conrad in Gabb, 1860 Height 23.8 mm, width 16.4 mm; locality 9. MGS specimen 222.	106
5	**Cirsotrema (Coroniscala) nassulum creolum** Palmer, 1947 Height 34 mm, width 27.5 mm; locality 17. MGS specimen 223.	86
6	**Clavilithes humerosus** Conrad in Wailes, 1854 Height 48.5 mm, width 24 mm; locality 9. MGS specimen 224.	114
7	**Typhis (Rugotyphis) dentatus** Johnson, 1899 Height 7.5 mm, width 4 mm; locality 16. MGS specimen 225.	100
8	**Hexaplex (Hexaplex) marksi** (Harris, 1894) Height 8 mm, width 4.5 mm; locality 16. MGS specimen 226.	99
9	**Tritonoatractus pearlensis** (Aldrich, 1885) Height 19 mm, width 9.6 mm; locality 9. MGS specimen 227.	113


1
x 2
2
x 2.5
3A
x 1.4
3B
x 1.4
4
x 1.6
5
x 1.4
6
x 1
7
x 6
8
x 6
9
x 2.5

EXPLANATION PLATE 59

Moodys Branch Formation (Jackson Group)

Figure		Page
1, 2	**Bullata semen jacksonensis** (Meyer, 1885) 1. Height 5.7 mm, width 3.6 mm; locality 9. MGS specimen 228. 2. Specimen shows 6 spiral color bands; height 6 mm, width 3.6 mm; locality 9. MGS specimen 229.	123
3	**Agaronia media** (Meyer, 1885) Height 7.5 mm, width 3.2 mm; locality 16. MGS specimen 230.	115
4	**Caricella subangulata** Conrad in Wailes, 1854 Specimen covered by Clione (sponge) borings; height 47.3 mm, width 34 mm; locality 9. MGS specimen 231.	118
5	**Athleta symmetricus** (Conrad in Wailes, 1854) Height 33 mm, width 17.5 mm; locality 9. MGS specimen 232.	116
6	**Lapparia dumosa** (Conrad in Wailes, 1854) var. Specimen illustrated in MGS Bull. 120, pl. 14, fig. 7; height 39.5 mm, width 17 mm; locality 9.	119
7	**Pleurofusia fluctuosa** (Harris, 1937) Height 27.2 mm, width 9.5 mm; locality 16. MGS specimen 233.	131
8	**Sinistrella americana** (Aldrich, 1885) Height 10 mm, width 3.3 mm; locality 9. MGS specimen 234.	128
9, 10	**Coronia conjuncta** (Casey, 1904) 9. Height 7.3 mm, width 3 mm; locality 16. MGS specimen 235. 10. Height 6 mm, width 2.5 mm; locality 16. MGS specimen 236.	127

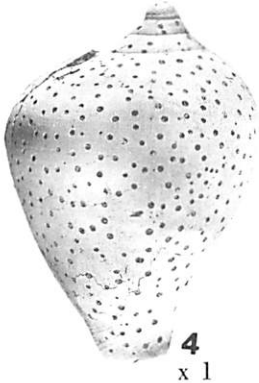


1
x 7

2A
x 5.5

2B
x 5.5

3
x 4.5

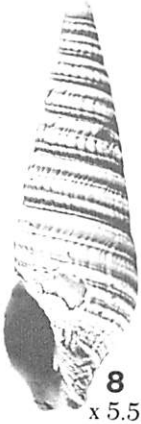


4
x 1

5
x 1.4

6
x 1.4

7
x 1.8



8
x 5.5

9
x 7

10
x 7

EXPLANATION PLATE 60

Moodys Branch Formation (Jackson Group)

Figure		Page
1, 2	**Tornatellaea lata** (Conrad in Morton, 1834) 1. Height 18.8 mm, width 10.3 mm; locality 9. MGS specimen 237. 2. Height 18.7 mm, width 12.1; locality 9. MGS specimen 238.	140
3	**Cadulus (Polyschides) jacksonensis** Meyer, 1885 Length 9.5 mm, greatest diameter 1.4 mm; locality 9. MGS specimen 239.	145
4	**Dentalium (Antalis) mississippiense jacksonense** Palmer, 1947 Length 27.2 mm, greatest diameter 5.1 mm; locality 9. MGS specimen 240.	145
5	**Retusa (Cylichnina) jacksonensis** (Meyer, 1886) Height 5.5 mm, width 2.4 mm; locality 16. MGS specimen 241.	142
6	**Abderospira oviformis** (Meyer, 1886) Height 3 mm, width 1.9 mm; locality 9. MGS specimen 242.	141
7	**Turbonilla (Strioturbonilla) major** Meyer, 1887 Specimen incomplete; height 3.7 mm, width 1.2 mm; locality 9. MGS specimen 243.	138
8	**Melanella jacksonensis** (de Gregorio, 1890) Specimen incomplete; height 6.4 mm, width 1.7 mm; locality 16. MGS specimen 244.	87
9	**Scaphander jacksonensis** Palmer, 1947 Specimen incomplete; height 23 mm, width 13.7 mm; locality 16. MGS specimen 245.	141
10	**Scobinella louisianae** Harris, 1937 Height 30 mm, width 19.2 mm; locality 9. MGS specimen 246.	135
11	**Cochlespira columbaria** (Aldrich, 1886) Height 14.2 mm, width 8.3 mm; locality 16. MGS specimen 247.	133

1
x 2

2
x 2

3
x 6

4
x 2

5
x 7

6
x 10

7
x 11

8
x 8

9
x 2

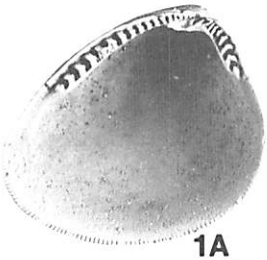
10
x 1.4

11
x 3

EXPLANATION PLATE 61

Moodys Branch Formation (Jackson Group)

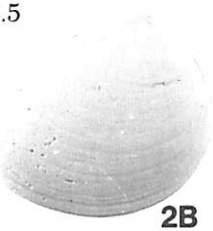
Figure		Page
1, 2	**Nucula (Nucula) spheniopsis** Conrad, 1865	146
	1. Right valve; height 8.6 mm, length 9.8 mm, inflation 3 mm; locality 16. MGS specimen 248.	
	2. Left valve; height 6.4 mm, length 7.4 mm, inflation 2 mm; locality 16. MGS specimen 249.	
3, 5, 6	**Hilgardia multilineata** (Conrad in Wailes, 1854)	147
	3. Left valve; height 7 mm, length 12.8 mm, inflation 2.3 mm; locality 16. MGS specimen 250.	
	5. Left valve; height 5.8 mm, length 10.8 mm, inflation 2 mm; locality 16. MGS specimen 251.	
	6. Both valves showing hinge (6A) and left valve (6B); height 5.5 mm, length 10.7 mm, inflation of both valves 3.9 mm; locality 16. MGS specimen 252.	
4	**Yoldia (Calorhadia) mater** (Meyer, 1885)	148
	Left valve; height 3.6 mm, length 8.2 mm, inflation 1.6 mm; locality 16. MGS specimen 253.	
7	**Glycymeris (Glycymeris) filosa** (Conrad in Wailes, 1854)	152
	Right valve; height 25.3 mm, length 28.2 mm, inflation 8.7 mm; locality 9. MGS specimen 254.	



1A
x 3.5

1B
x 3.5

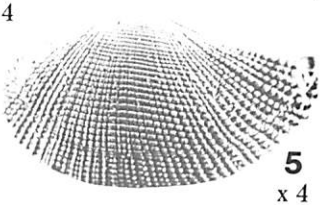
2A
x 4



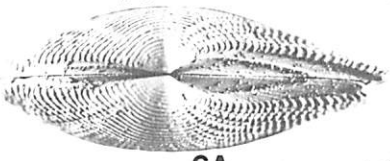
2B
x 4

3
x 3

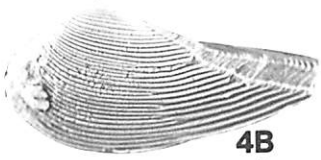
4A
x 5



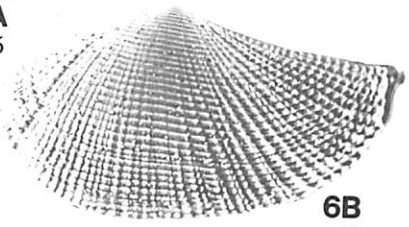
5
x 4



6A
x 5

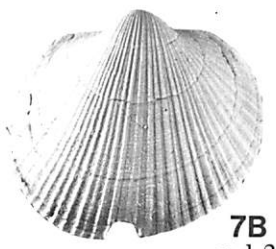


4B
x 5



6B
x 5

7A
x 1.2



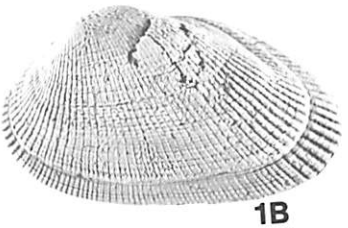
7B
x 1.2

EXPLANATION PLATE 62

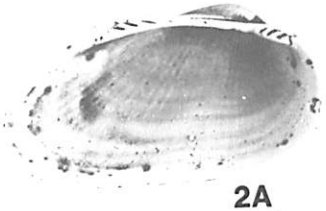
Moodys Branch Formation (Jackson Group)

Figure		Page
1, 2	**Barbatia (Cucullaearca) ludoviciana (Harris, 1919)** 1. Left valve; height 7.6 mm, length 13 mm, inflation 3.1 mm; Gosport Sand at Little Stave Creek, Alabama, locality 29. MGS specimen 255. 2. Left valve; height 4.1 mm, length 7.5 mm, inflation 1.7 mm; locality 16. MGS specimen 410.	149
3	**Glycymeris (Glycymeris) idonea** (Conrad, 1833) Right valve; height 25.5 mm, length 26.2 mm, inflation 8.7 mm; locality 16. MGS specimen 256.	151
4	**Glycymeris (Glycymeris) filosa** (Conrad in Wailes, 1854) Right valve; height 40.3 mm, length 4.8 mm, inflation 13 mm; locality 9. MGS specimen 257.	152

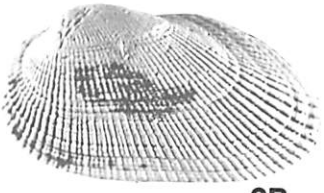
1A
x 3.5



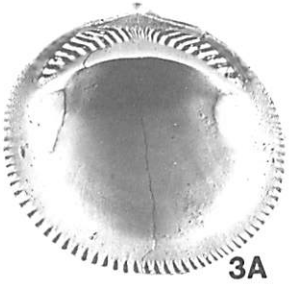
1B
x 3.5



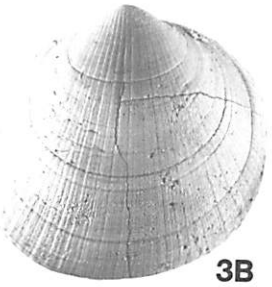
2A
x 5.5



2B
x 5.5

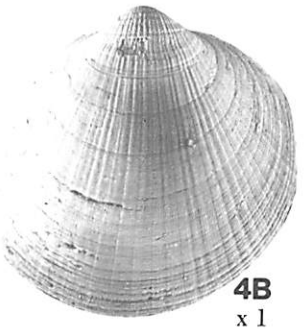


3A
x 1.4



3B
x 1.4

4A
x 1



4B
x 1

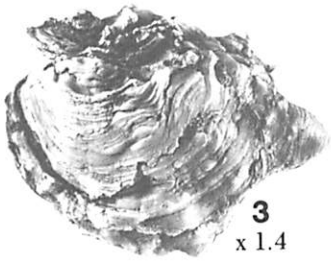
EXPLANATION PLATE 63

Moodys Branch Formation (Jackson Group)

Figure		Page
1, 2	**Eburneopecten (Eburneopecten) scintillatus** Conrad, 1865	153
	1. Right valve; height 17.8 mm, length 6.8 mm, inflation 2.1 mm; locality 16. MGS specimen 258.	
	2. Right valve; height 23.9 mm, length 23 mm, inflation 2.6 mm; locality 9. MGS specimen 259.	
3	**Pcynodonta (Pcynodonta) trigonalis** (Conrad in Wailes, 1854)	159
	Left valve; height 26.5 mm, length 25.5 mm, inflation 8.7 mm; locality 9. MGS specimen 300.	
4	**Chlamys (Aequipecten) nupera** (Conrad in Wailes, 1854)	155
	Right valve; height 24.4 mm, length 24.2 mm, inflation 4 mm; locality 9. MGS specimen 301.	
5	**Erycina zitteli** Meyer, 1887	167
	Left valve; height 2.7 mm, length 3.8 mm, inflation 1.1 mm; locality 19. MGS specimen 302.	
6	**Lucina (Callucina ?) subcurta** (Harris, 1946)	164
	Right valve; height 5.8 mm, length 6.1 mm, inflation 1.8 mm; locality 19. MGS specimen 303.	

1
x 2

2
x 1.4



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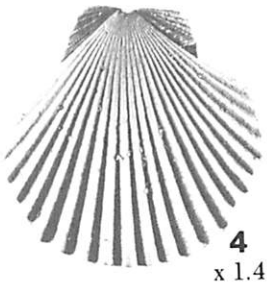
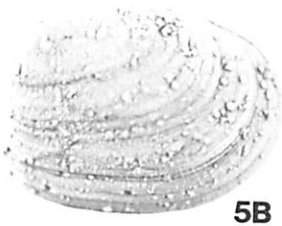


4
x 1.4

5A
x 10



5B
x 10

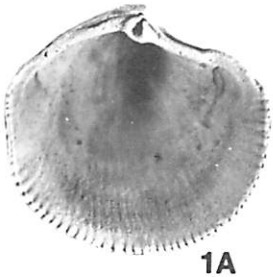
6A
x 7

6B
x 7

EXPLANATION PLATE 64

Moodys Branch Formation (Jackson Group)

Figure		Page
1, 2	**Lucina (Callucina ?) subcurta** (Harris, 1946)	164
	1. Left valve; height 4.6 mm, length 4.9 mm, inflation 1.5 mm; locality 9. MGS specimen 304.	
	2. Right valve; height 4.2 mm, length 4.4 mm, inflation 1.4 mm; locality 9. MGS specimen 305.	
3, 4	**Lucina (Callucina ?) curta** (Conrad, 1865)	163
	3. Left valve; height 4.6 mm, length 4.7 mm, inflation 1.1 mm; locality 9. MGS specimen 306.	
	4. Right valve; height 4.6 mm, length 4.9 mm, inflation 1.1 mm; locality 9. MGS specimen 307.	



1A
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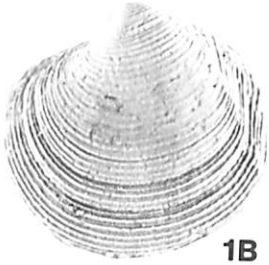
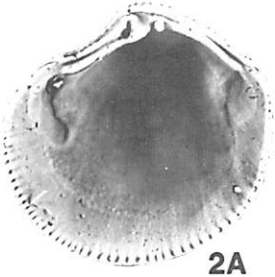
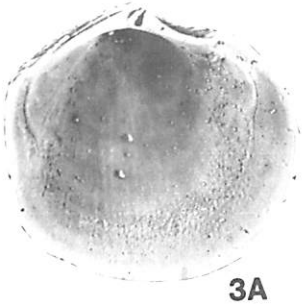


1B
x 7



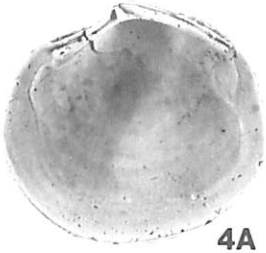
2A
x 8

2B
x 8



3A
x 8

3B
x 8



4A
x 7

4B
x 7

EXPLANATION PLATE 65

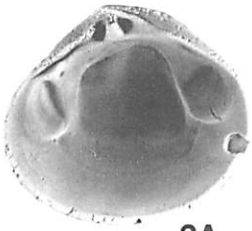
Moodys Branch Formation (Jackson Group)

Figure		Page
1	**Lirodiscus (Lirodiscus) jacksonensis** (Meyer, 1885)	175
	Left valve; height 10.6 mm, length 12.8 mm; inflation 3 mm; locality 16. MGS specimen 308.	
2	**Lirodiscus (Lirodiscus)** sp.	175
	Left valve; height 5.4 mm, length 6.7 mm; inflation 1.3 mm; locality 16. MGS specimen 309.	
3, 4, 5, 6	**Lirodiscus (Lirodiscus) pretriangulata** (Dockery, 1977)	174
	3. Right valve; height 7.2 mm, length 8.1 mm; inflation 2 mm; locality 16. MGS specimen 310.	
	4. Illustrated in MGS Bull. 120, pl. 24, fig. 5; right valve; height 7 mm, length 7.8 mm; inflation 1.7 mm; locality 1.	
	5. Left valve; height 6.4 mm, length 7.5 mm, inflation 1.9 mm; locality 16. MGS specimen 311.	
	6. Right valve; height 7.5 mm, length 7.8 mm, inflation 2.1 mm; locality 16. MGS specimen 312.	

1A
x 2.5

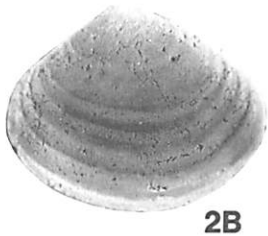
1B
x 2.5

2A
x 5



3A
x 4

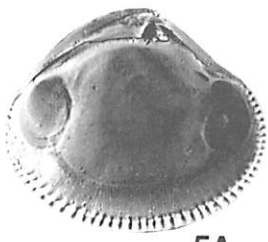
3B
x 4



2B
x 5

4A
x 4

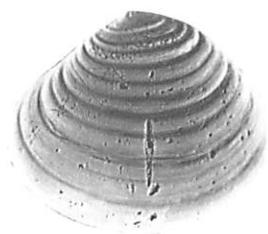
4B
x 4



5A
x 4.5

6A
x 4

6B
x 4

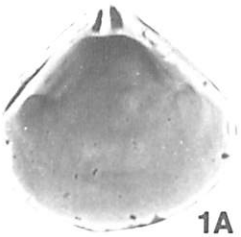


5B
x 4.5

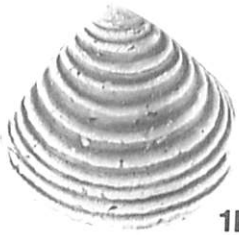
EXPLANATION PLATE 66

Moodys Branch Formation (Jackson Group)

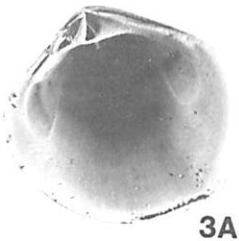
Figure		Page
1	**Crassinella pygmaea** (Conrad, 1865) Height 2 mm, length 2 mm, inflation 0.5 mm; locality 16. MGS specimen 313.	177
2, 3, 4, 5, 6	**Bathytormus flexurus productus** (Conrad, 1863) 2. Right valve (juvenile); height 2.4 mm, length 2.6 mm, inflation 0.6 mm; locality 16. MGS specimen 314. 3. Right valve (young); height 5.2 mm, length 5.3 mm, inflation 1.8 mm; locality 16. MGS specimen 315. 4. Left valve (young); height 5.5 mm, length 6 mm, inflation 1.8 mm; locality 16. MGS specimen 316. 5. Right valve (young); height 6.5 mm, length 7.2 mm, inflation 2.3 mm; locality 16. MGS specimen 317. 6. Right valve (young); height 11.3 mm, length 15 mm, inflation 4 mm; locality 16. MGS specimen 318.	176



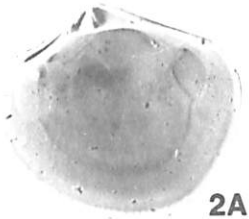
1A
x 14



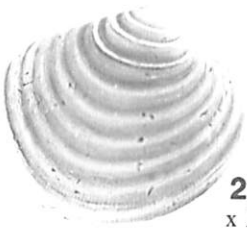
1B
x 14



3A
x 5.2

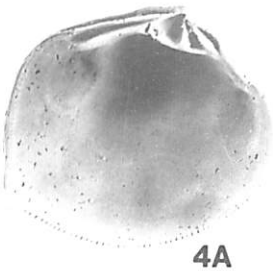


2A
x 12



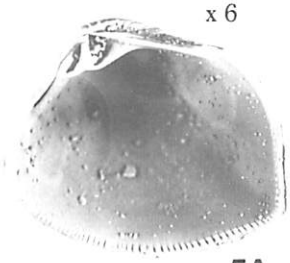
2B
x 12

3B
x 5.2



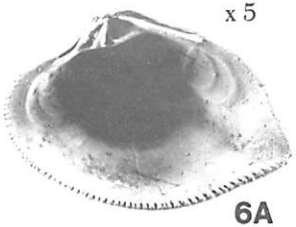
4A
x 6

4B
x 6

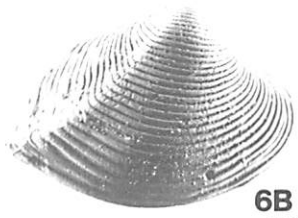


5A
x 5

5B
x 5



6A
x 2.5



6B
x 2.5

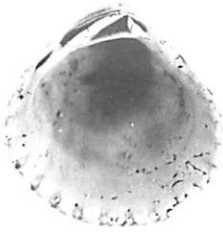
EXPLANATION PLATE 67

Moodys Branch Formation (Jackson Group)

Figure		Page
1	**Bathytormus flexurus productus** (Conrad, 1863)	176
	Right valve; height 26.2 mm, length 49.5 mm, inflation 11 mm; locality 9. MGS specimen 319.	
2, 3	**Pleuromeris quadrata** n. sp.	167
	2. Left valve; height 4.2 mm, length 4.1 mm, inflation 1.4 mm; locality 16. Holotype PRI No. 30025.	
	3. Left valve; height 5.7 mm, length 5.4 mm, inflation 1.4 mm; locality 16. MGS specimen 320.	
4, 5, 6	**Pleuromeris inflatior jacksonensis** (Meyer, 1885)	167
	4. Left valve; height 4 mm, length 3.6 mm, inflation 2.2 mm; locality 16. MGS specimen 321.	
	5. Right valve; height 4.5 mm, length 4.1 mm, inflation 3.2 mm; locality 16. MGS specimen 322.	
	6 Left valve; height 3.9 mm, length 3.6 mm, inflation 1.9 mm; locality 16. MGS specimen 323.	

1A
x 1

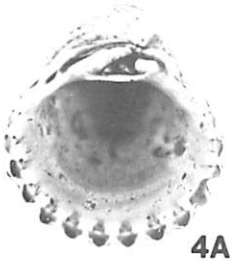
1B
x 1



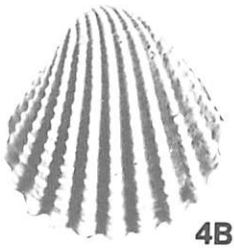
2A
x 7

2B
x 7

3A
x 6

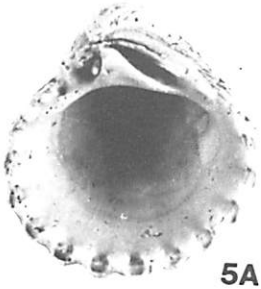


4A
x 8

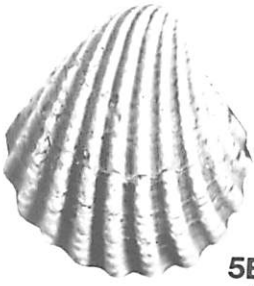


4B
x 8

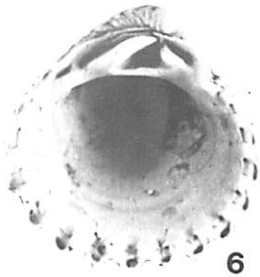
3B
x 6



5A
x 8



5B
x 8

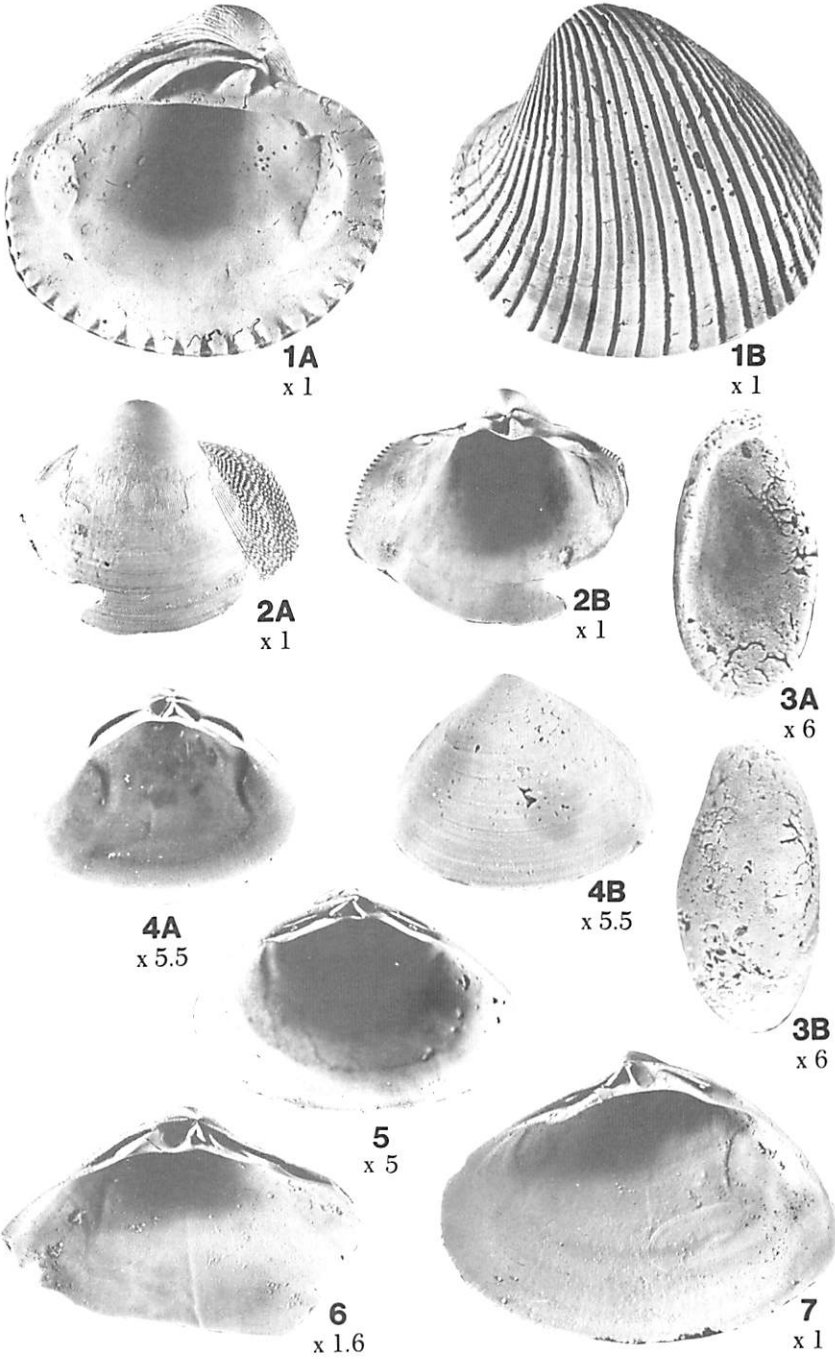


6
x 9

EXPLANATION PLATE 68

Moodys Branch Formation (Jackson Group)

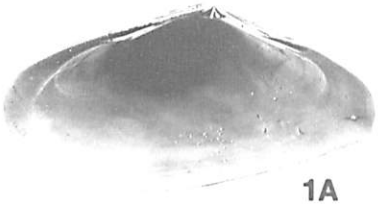
Figure		Page
1	**Venericardia (Venericor) apodensata** Gardner and Bowles, 1939 Left valve; height 46.7 mm, length 48.2 mm, inflation 20 mm; locality 9. MGS specimen 324.	172
2	**Nemocardium (Nemocardium) nicolletti** (Conrad, 1841) Incomplete left valve; length 36 mm; locality 9. MGS specimen 325.	177
3	**Crenella isocardioides** (Lea, 1833) Height 6.2 mm, length 3.2 mm, inflation 2.2 mm; locality 16. MGS specimen 326.	152
4, 5	**Spisula jacksonensis** Cook, 1926 4. Left valve; height 5 mm, length 6.3 mm, inflation 1.8 mm; locality 16. MGS specimen 327. 5. Right valve; height 6.2 mm, length 8.6 mm, inflation 2.3 mm; locality 16. MGS specimen 328.	178
6, 7	**Spisula (Symmorphomactra) praetenuis** (Conrad, 1833) 6. Incomplete left valve; length 30 mm; locality 16. MGS specimen 329. 7. Right valve; height 24 mm, length 32 mm, inflation 6 mm; locality 16. MGS specimen 411.	178


1A
x 1
1B
x 1
2A
x 1
2B
x 1
3A
x 6
4A
x 5.5
4B
x 5.5
3B
x 6
5
x 5
6
x 1.6
7
x 1

EXPLANATION PLATE 69

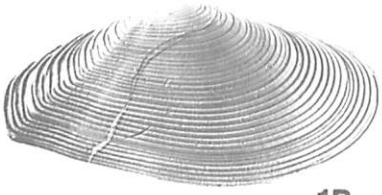
Moodys Branch Formation (Jackson Group)

Figure		Page
1, 3	**Tellina (Eurytellina) linifera** Conrad, 1865	181
	1. Left valve; height 9.8 mm, length 19.3 mm, inflation 2 mm; locality 16. MGS specimen 330.	
	3. Right valve; height 10.4 mm, length 20.4 mm, inflation 2.3 mm; locality 16. MGS specimen 331.	
2	**Abra (Abra) cf. A. (A.) perovata** (Conrad, 1848)	182
	Right valve; height 4.4 mm, length 6.3 mm, inflation 1.1 mm; locality 16. MGS specimen 332.	
4, 5	**Tellina vicksburgensis moodiana** Cooke, 1926	181
	4. Right valve; height 5.5 mm, length 7.3 mm, inflation 1.3 mm; locality 16. MGS specimen 333.	
	5. Left valve; height 7 mm, length 9.1 mm, inflation 2 mm; locality 16. MGS specimen 334.	



1A
x 2.5

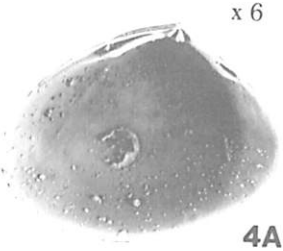
2A
x 6



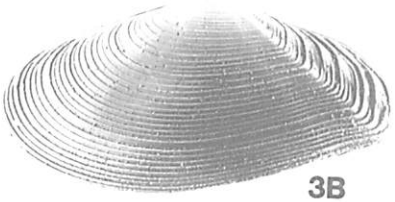
1B
x 2.5

2B
x 6

3A
x 2.5

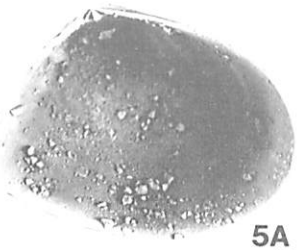


4A
x 5



3B
x 2.5

4B
x 5



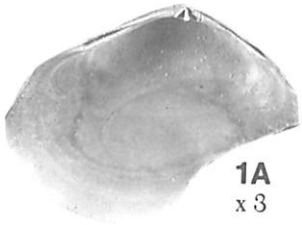
5A
x 4.5

5B
x 4

EXPLANATION PLATE 70

Moodys Branch Formation (Jackson Group)

Figure		Page
1	**Tellina (Eurytellina) vaughani** Cooke, 1926 Incomplete right valve; height 9.6 mm, length 13 mm, inflation 2.8 mm; locality 16. MGS specimen 335.	181
2	**Tellina (Arcopaginula) eburneopsis** Conrad, 1865 Left valve; height 26.5 mm, length 36.2 mm; locality 9. MGS specimen 336.	180
3, 4, 5	**Callista (Callista) annexa** (Conrad, 1865) 3. Left valve; height 22.4 mm, length 30.8 mm, inflation 8.3 mm; locality 16. MGS specimen 337. 4. Right valve; height 20.4 mm, length 27 mm, inflation 7.3 mm; locality 16. MGS specimen 338. 5. Right valve; height 21.4 mm, length 27 mm, inflation 7.3 mm; locality 16. MGS specimen 339.	184
6	**Pitar (Pitar) securiformis** (Conrad, 1865) Right valve; height 37 mm, length 4.5 mm, inflation 12.6 mm; locality 9. MGS specimen 340.	183



1A
x 3

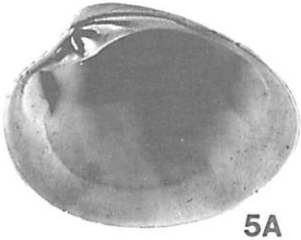
1B
x 3

2
x 1.2

3
x 1.4

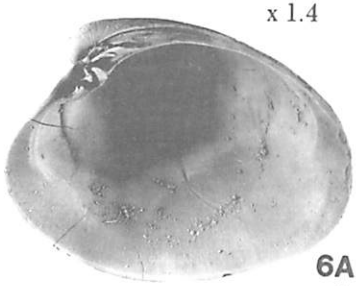
4A
x 1.4

4B
x 1.4

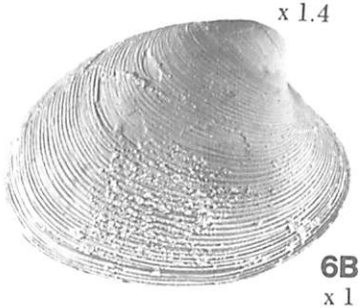


5A
x 1.4

5B
x 1.4



6A
x 1



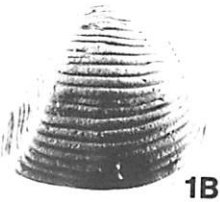
6B
x 1

EXPLANATION PLATE 71

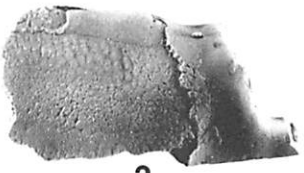
Moodys Branch Formation (Jackson Group)

Figure		Page
1, 3	**Caestocorbula wailesiana** Harris in Dall, 1898	188
	1. Right valve; height 8.4 mm, length 9 mm, inflation 4.5 mm; locality 9. MGS specimen 341.	
	3. Right valve; height 5.2 mm, length 5.7 mm, inflation 2.5 mm; locality 16. MGS specimen 342.	
2	**Callianassa** sp.	190
	Outer view of right palm and fixed finger (shrimp claw), specimen incomplete; length 19 mm, height 10.5 mm, thickness 6 mm; locality 9. MGS specimen 343.	
4, 5, 7	**Corbula (Caryocorbula) densata** (Conrad in Wailes, 1854)	187
	4. Both valves viewing hinge; height 5.1 mm, length 7.4 mm, inflation 3.3 mm, locality 16. MGS specimen 344.	
	5. Left valve; height 4.4 mm, length 7 mm, inflation 1.7 mm; locality 16. MGS specimen 345.	
	7. Right valve; height 5 mm, length 7.4 mm, inflation 2.1 mm; locality 16. MGS specimen 346.	
6	**Periarchus lyelli** (Conrad, 1834)	192
	Inner view of pyramid (one of 5 forming the sand dollar's jaw mechanism called Aristotle's lantern); height 6.2 mm, width 6.2 mm; locality 16. MGS specimen 347.	
8	**Alveinus minutus** Conrad, 1865	182
	Right valve; height 2 mm, width 2 mm, inflation 0.6 mm; locality 16. MGS specimen 348.	
9	**Corbula (Caryocorbula) willistoni arkansia** Harris, 1946	187
	Right valve; height 4.1 mm, length 7.6 mm, inflation 2.5 mm; locality 16. MGS specimen 349.	

1A
x 3



1B
x 3



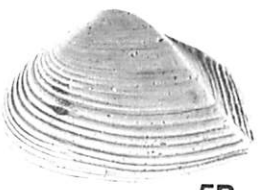
2
x 2

3A
x 5

3B
x 5

4
x 5

5A
x 5



5B
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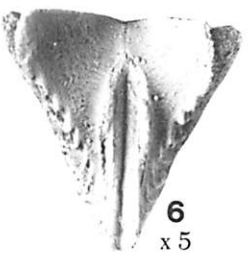
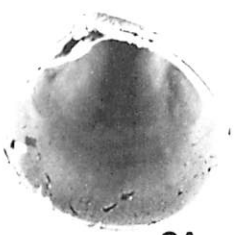


6
x 5

7A
x 5

7B
x 5



8A
x 14

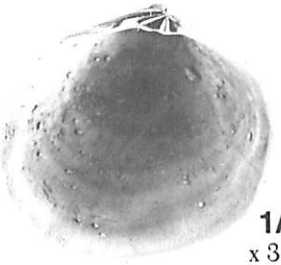
8B
x 14

9
x 5

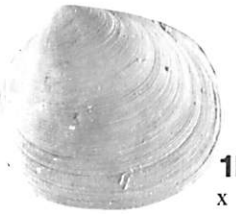
EXPLANATION PLATE 72

Moodys Branch Formation (Jackson Group)

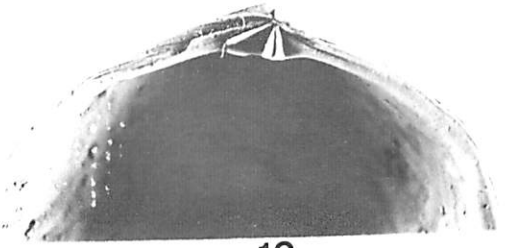
Figure		Page
1	**Felaniella palmerae** n. sp. Left valve; height 9.7 mm, length 10.2 mm, inflation 2.8 mm; locality 2. Holotype PRI No. 30026.	165
2	**Periarchus lyelli** (Conrad, 1834) Top view; greatest diameter 75 mm; locality 30. MGS specimen 350a. Specimen is from the underside of rock figured in plate 73.	192



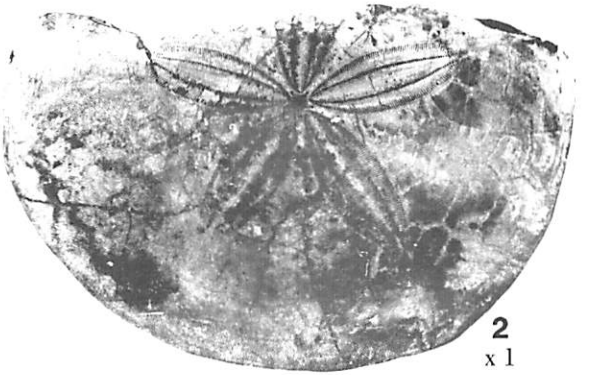
1A
x 3.5



1B
x 3



1C
x 7

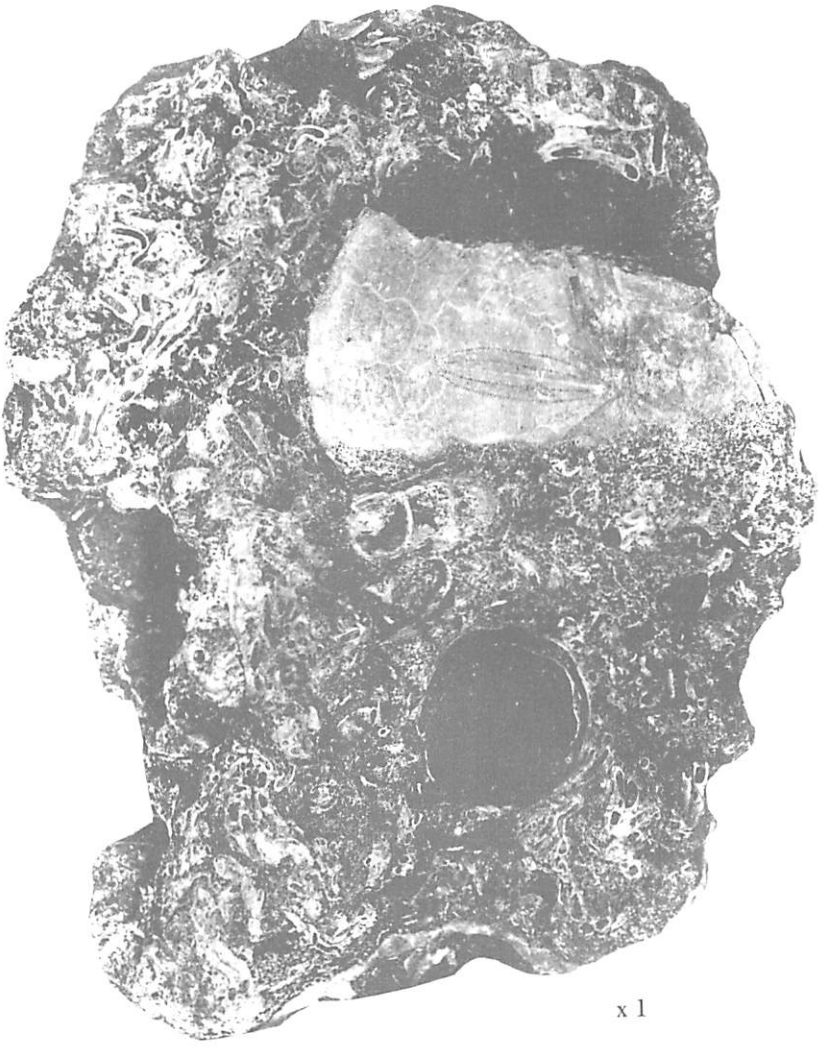


2
x 1

EXPLANATION PLATE 73

Moodys Branch Formation (Jackson Group)

The rock specimen figured is from the basal contact of the Moodys Branch Formation on a branch to Little Stave Creek, Alabama. This contact is above a concretionary zone in the upper part of the Gosport Sand and is at the base of a cross-bedded shell bed in the Moodys Branch Formation. The contact is erosional with the overlying few centimeters of the Moodys Branch Formation being lithified and bearing many sabellid worm tubes. These worm tubes probably anchored the basal Moodys Branch sediments and were important in their early lithification. The echinoid (sand dollar) **Periarchus lyelli** is common along the contact. MGS specimen 350.

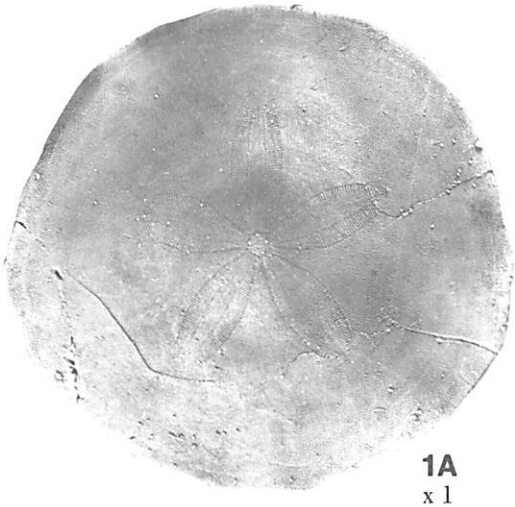


x 1

EXPLANATION PLATE 74

Cocoa Sand Member, Yazoo Formation (Jackson Group)

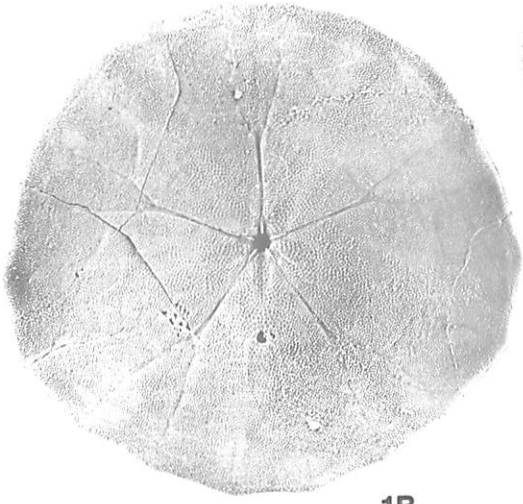
Figure		Page
1, 3	**Periarchus lyelli pileussineusis** (Ravenel, 1844)	192
	1. Top view (1A), bottom view (1B) and side view (1C); greatest diameter 67.5 mm, thickness 10.7 mm; locality 31. MGS specimen 351.	
	3. Top view; greatest diameter 18.7 mm, thickness 2.5 mm; locality 31. MGS specimen 352.	
2	**Cirsotrema (Coroniscala) danvillense** Palmer, 1947	86
	Specimen incomplete; width 6.5 mm; locality 31. MGS specimen 353.	
4	**Chlamys** sp.	156
	Both valves viewing left valve; height 16 mm, width 14 mm, inflation of both valves 4.2 mm; locality 31. MGS specimen 354.	



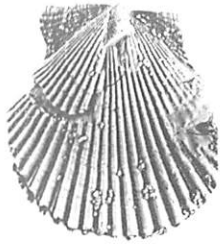
1A
x 1

2
x 3

3
x 2



1B
x 1



4
x 3

1C
x 1

EXPLANATION PLATE 75

Pachuta Marl and Shubuta Clay Members, Yazoo Formation (Jackson Group)

Figure — Page

1 **Chlamys spillmani** (Gabb, 1860) 156
Left valve; height 26 mm, length 26.5 mm, inflation 5.5 mm; Pachuta Marl, locality 32. MGS specimen 355.

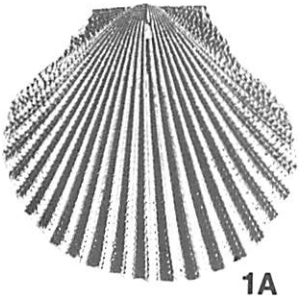
2 **Cirsotrema (Coroniscala) nassulum creolum** Palmer, 1947 86
Specimen incomplete; height 23 mm, width 16 mm; Pachuta Marl, locality 33. MGS specimen 356.

3 **Gryphaeostrea plicatella** (Morton, 1833) 160
Right valve; height 31 mm, length 18 mm, inflation 2.7 mm; Pachuta Marl, locality 33. MGS specimen 357.

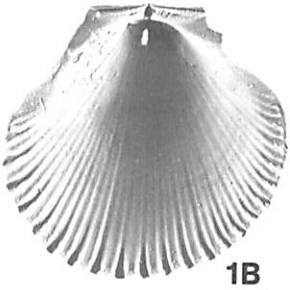
4, 6 **Flabellum rhomboideum** Vaughan, 1900 68
4. Height 15 mm, large diameter 14.5 mm, small diameter 13 mm; Shubuta Clay, locality 36. MGS specimen 358.
6. Height 15 mm, large diameter 20.5, small diameter 16.3 mm; Shubuta Clay, locality 36. MGS specimen 359.

5 **Barbatia** sp. 149
Specimen incomplete; height 11 mm; locality 35. MGS specimen 360.

7 **Saxolucina (Plastomiltha)** sp. ? 165
Specimen forms the center of a clay concretion. Specimen incomplete; height 61.5 mm, length 61.5 mm; Shubuta Clay 8 feet below the upper contact, locality 34. MGS specimen 361.

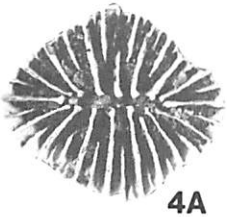


1A
x 1.4



1B
x 1.4

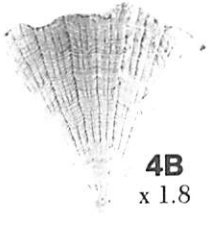
2
x 1.6



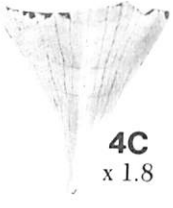
4A
x 2

5
x 2

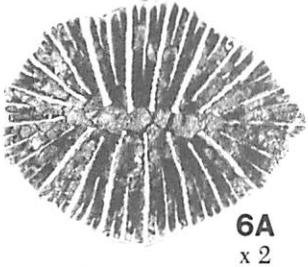
3
x 1.4



4B
x 1.8

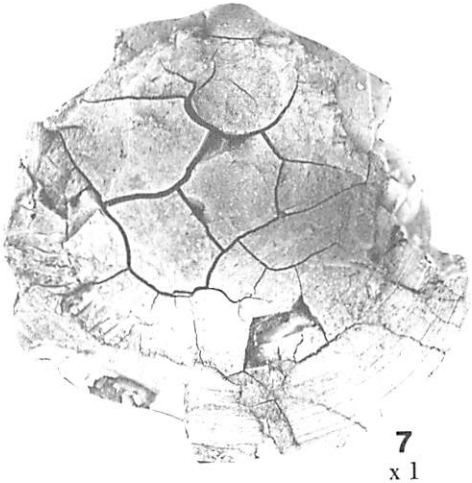


4C
x 1.8



6A
x 2

6B
x 1.8

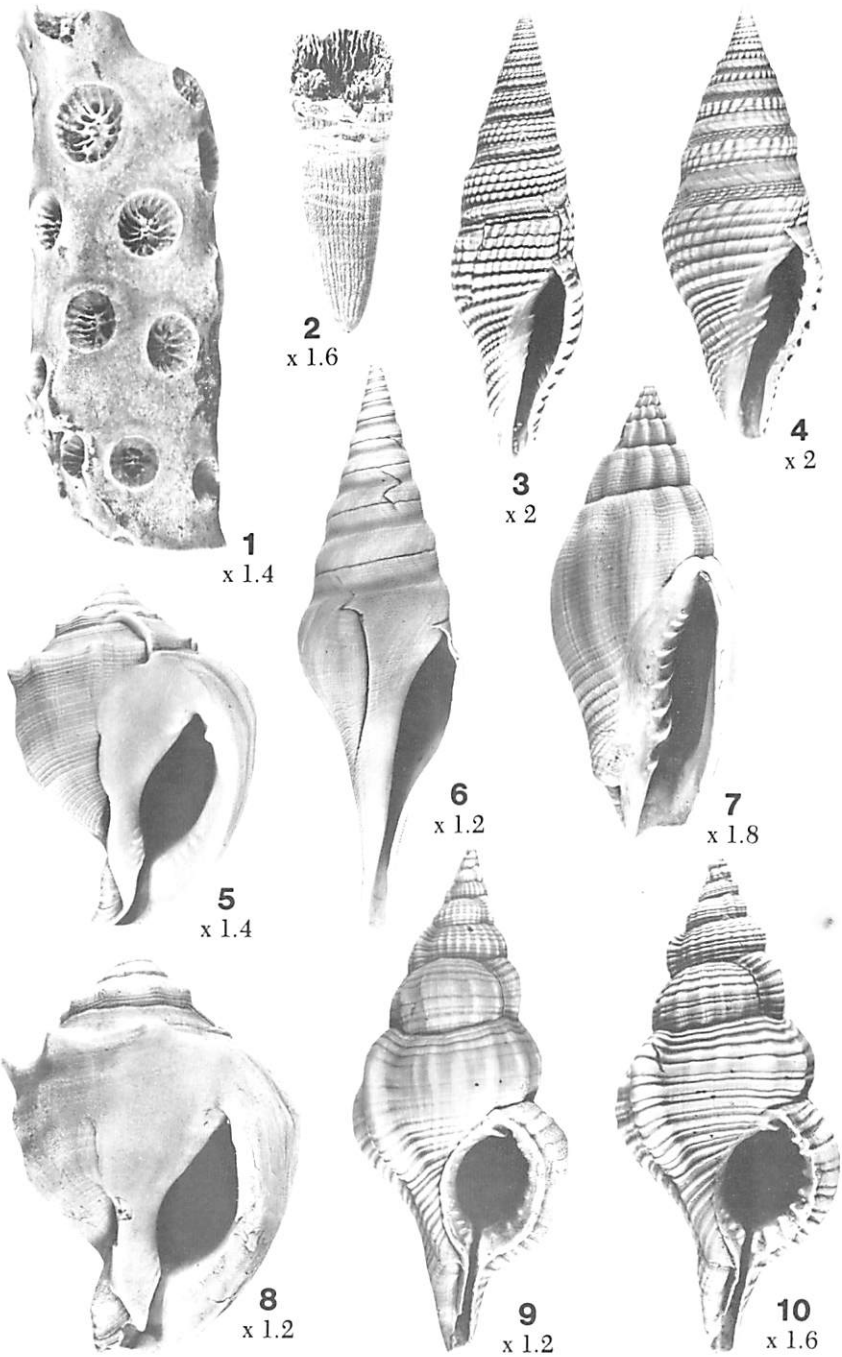


7
x 1

EXPLANATION PLATE 76

Red Bluff Formation

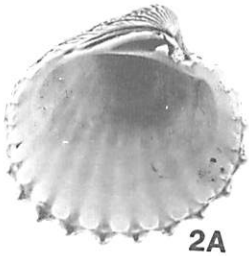
Figure		Page
1	**Archohelia vicksburgensis** (Conrad 1848) ..... Height of corallum (fragment) 50 mm, diameter of corallum 18 mm, diameter of lateral corallites 4.3 mm to 6.7 mm, diameter of axial corrallite 7.5 mm; locality 38. MGS specimen 362.	66
2	**Balanophyllia (Balanophyllia) elongata** Vaughan, 1900 ..... Height 25.6 mm, greatest diameter 9.5 mm; locality 38. MGS specimen 363.	69
3	**Scobinella pluriplicata** Casey, 1903 ..... Height 29.4 mm, width 8.6 mm; locality 38. MGS specimen 364.	135
4	**Scobinella caelata** Conrad, 1847, var. ..... Height 28 mm, width 1.2 mm; locality 38. MGS specimen 365.	135
5, 8	**Galeodea (Mambrinia) brevidentata** (Aldrich, 1885) ..... 5. Height 32.3 mm, width 22.8 mm; locality 39. MGS specimen 366. 8. Height 43.7 mm, width 32 mm; locality 37. MGS specimen 367.	96
6	**Orthosurcula longiforma** (Aldrich, 1885) ..... Height 62.3 mm, width 18.5 mm; locality 38. MGS specimen 368.	131
7	**Lyria (Lyria) nestor** Casey, 1903 ..... Height 33 mm, width 14 mm; locality 37. MGS specimen 369.	119
9, 10	**Sassia conradiana** (Aldrich, 1885) ..... 9. Height 55 mm, width 24.1 mm; locality 38. MGS specimen 370. 10. Height 41 mm, width 18.6 mm; locality 40. MGS specimen 371.	97


1
x 1.4
2
x 1.6
3
x 2
4
x 2
5
x 1.4
6
x 1.2
7
x 1.8
8
x 1.2
9
x 1.2
10
x 1.6

EXPLANATION PLATE 77
Red Bluff Formation

Figure		Page
1	**Sulcocypraea healeyi** (Aldrich, 1894) ..... Height 18.3 mm, width 13.2 mm; locality 38. MGS specimen 372.	91
2	**Venericardia (Rotundicardia) carsonensis** Dall, 1903 ..... Left valve; height 16.2 mm, length 16.2 mm; locality 38. MGS specimen 373.	169
3	**Caricella (Atraktus) reticulata** Aldrich, 1885 ..... Height 32.6 mm, width 15.4 mm; locality 39. MGS specimen 374.	118
4, 5	**Astarte triangulata** Meyer, 1886 ..... 4. Left valve; height 7.3 mm, inflation 3.2 mm; locality 38. MGS specimen 375. 5. Right valve; height 8.7 mm, length 9.7 mm, inflation 3.7 mm; locality 38. MGS specimen 376.	173
6	**Mitra (Fusimitra) conquista** Conrad, 1848 ..... Height 36.7 mm, width 11.3 mm; locality 38. MGS specimen 377. Borings in the columella, as seen in this specimen, are common in siphonate gastropods of the Byram Formation (Vicksburg Group).	124
7	**Aturia** cf. **A. alabamensis** (Morton, 1834) ..... Greatest diameter 23.2 mm, width 14.3 mm; locality 38. MGS specimen 378.	143

1
x 1.8



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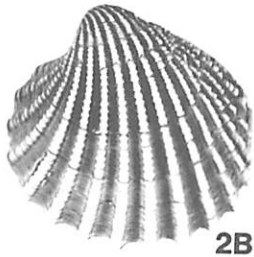

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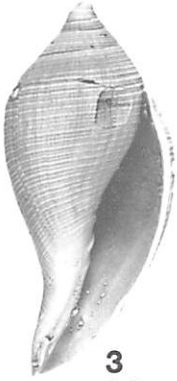

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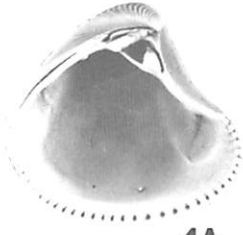

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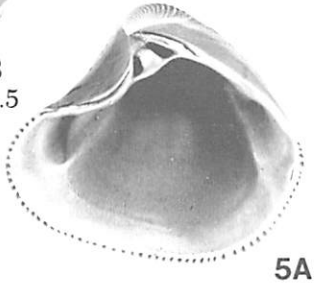

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5B
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6
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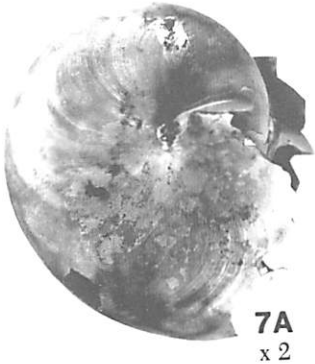


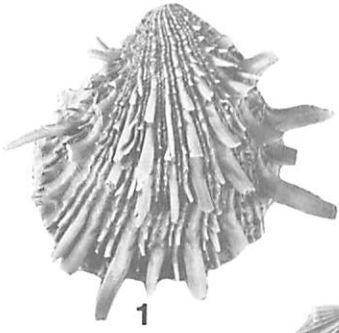
7A
x 2

7B
x 2

EXPLANATION PLATE 78

Red Bluff Formation

Figure		Page
1, 2, 5	**Spondylus (Spondylus) dumosus** (Morton, 1834)	159
	1. Right valve; height (not including spines) 26.5 mm, length (not including spines) 22.4 mm, inflation 7 mm; locality 40. MGS specimen 379.	
	2. Left valve; height (not including spines) 34 mm, length 31.2 mm, inflation 7.5 mm; locality 40. MGS specimen 380.	
	5. Left valve; height (not including spines) 54.2 mm, length 48 mm, inflation 12 mm; locality 40. MGS specimen 381.	
3	**Pecten (Pecten) perplanus** Morton, 1833	156
	Left valve; height 22.8 mm, length 24 mm, inflation 3.2 mm; locality 38. MGS specimen 382.	
4	**Lopha (Lopha) vicksburgensis** (Conrad, 1847)	163
	Left valve; height 26 mm, length 27 mm, inflation 8.7 mm; locality 40. MGS specimen 383.	



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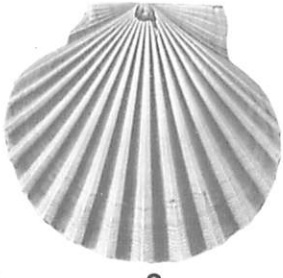

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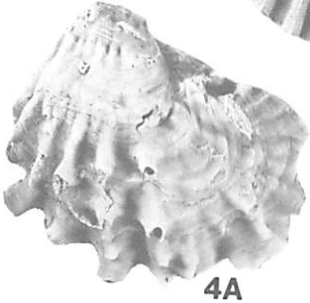

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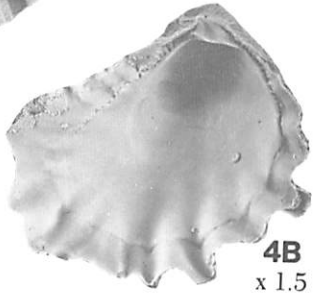

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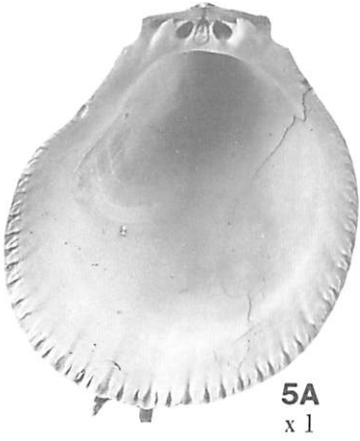


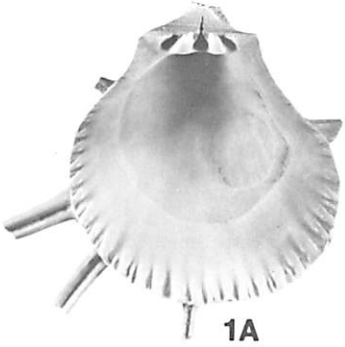
5A
x 1

5B
x 1

EXPLANATION PLATE 79
Red Bluff Formation

Figure		Page
1, 2, 3	**Spondylus (Spondylus) dumosus** (Morton, 1834)	159

1. Right valve; height (not including spines) 33.4 mm, length (not including spines) 29 mm, inflation 9 mm; locality 40. MGS specimen 384.
2. Right valve; height 59.5 mm, length (not including spines) 48 mm, inflation 16 mm; locality 40. MGS specimen 385.
3. Right valve; height 60.8 mm, length 49.6 mm, inflation 18 mm; locality 40. MGS specimen 386.



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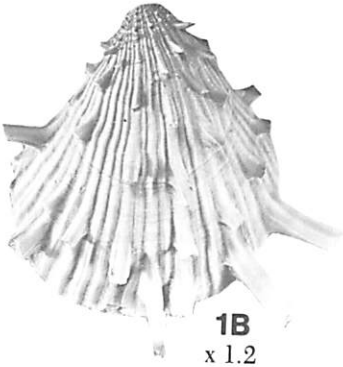

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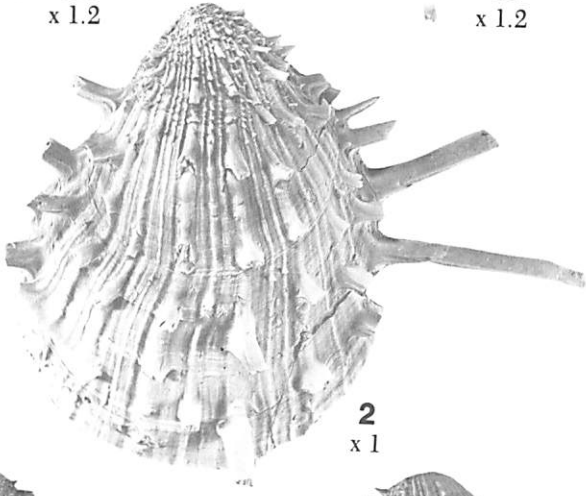

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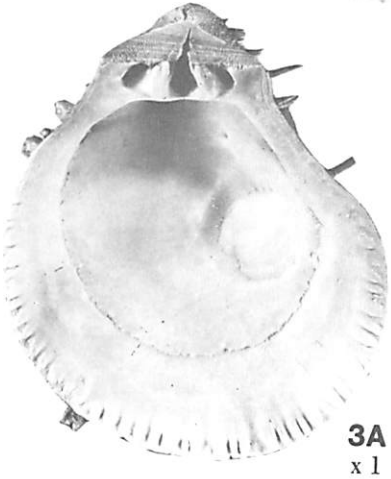

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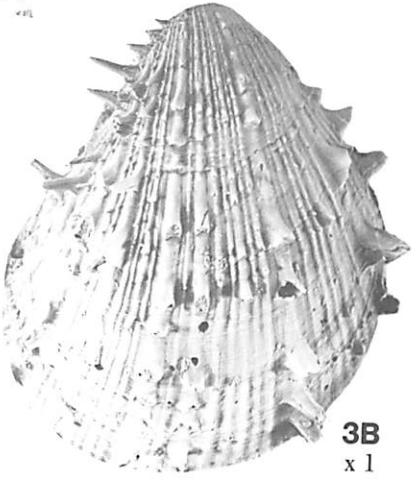


3B
x 1

EXPLANATION PLATE 80

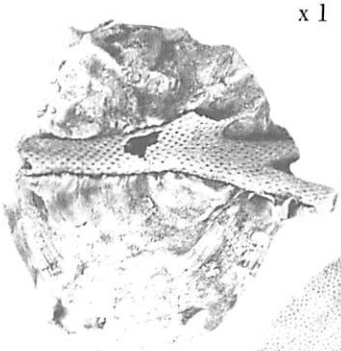
Marianna Limestone (Vicksburg Group)

Figure		Page
1, 3	**Trigonopora grande** (Canu and Bassler, 1920) 1. Height of zoarium fragment 20 mm, large diameter 3.3 mm, small diameter 1.1 mm; locality 41. MGS specimen 387. 3. Height of zoarium fragment 12.7 mm, large diameter 4.2 mm, small diameter 1.4 mm; locality 41. MGS specimen 388.	71
2	**Lepidocyclina (Lepidocyclina) mantelli** (Morton, 1833) Greatest diameter 32.4 mm; locality 41. MGS specimen 389.	63
4, 5, 9	**Lopha (Lopha) vicksburgensis** (Conrad, 1847) 4. Left valve attached to **Trigonopora grande**; height 25.3 mm, length 22 mm, inflation 8 mm; locality 41. MGS specimen 390. 5. Left valve; height 34.3 mm, length 28.2 mm, inflation 9.6 mm; locality 42. MGS specimen 391. 9. Right valve; height 35 mm, length 36 mm, inflation 9.6 mm; Glendon Limestone, locality 45. MGS specimen 392.	163
6, 7	**Clypeaster rogersi** (Morton, 1834) 6. Top view; greatest diameter 44 mm, thickness 7 mm; locality 41. MGS specimen 393. 7. Side view; greatest diameter 39.2 mm, thickness 6.6 mm; locality 43. MGS specimen 394.	191
8	**Pecten (Pecten) poulsoni** Morton, 1834 Left valve; height 25.7 mm, length 27 mm, inflation 2.5 mm; locality 41. MGS specimen 395.	157

1
x 3.5

2
x 1

3
x 5



4
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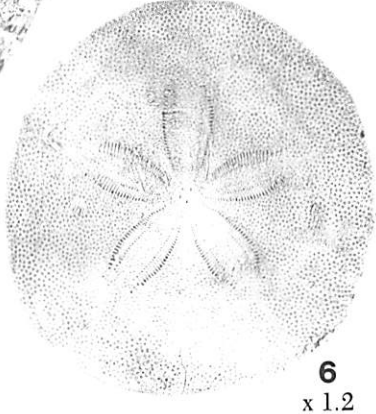
5
x 1.4



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x 1.2

7
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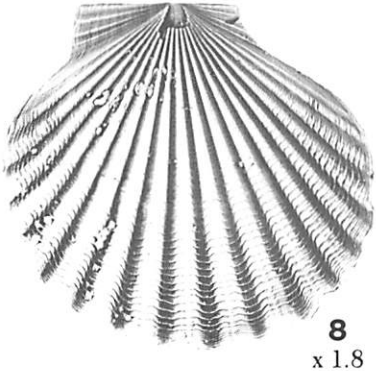


8
x 1.8

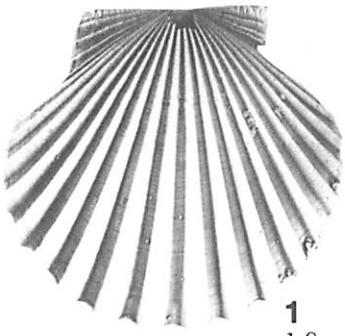
9
x 1.2

EXPLANATION PLATE 81

Marianna Limestone (Vicksburg Group)

Figure		Page
1 - 8	**Pecten (Pecten) poulsoni** Morton, 1834	157

1. Right valve; height 23.5 mm, length 24.6 mm, inflation 7.4 mm; locality 41. MGS specimen 396.
2. Right valve; height 21.2 mm, length 21.9 mm, inflation 8.7 mm; locality 41. MGS specimen 397.
3. Right valve; height 23.1 mm, length 24 mm, inflation 7.6 mm; locality 44. MGS specimen 398.
4. Left valve; height 22.1 mm, length 23 mm, inflation 2.7 mm; locality 41. MGS specimen 399.
5. Left valve; height 21.4 mm, length 22.8 mm, inflation 2.9 mm; locality 41. MGS specimen 400.
6. Left valve; height 21.7 mm, length 22.5 mm, inflation 3.2 mm; locality 41. MGS specimen 401.
7. Left valve; height 23.5 mm, length 25 mm, inflation 3 mm; locality 41. MGS specimen 402.
8. Left valve; height 25.8 mm, length 27 mm, inflation 3 mm; locality 41. MGS specimen 403.



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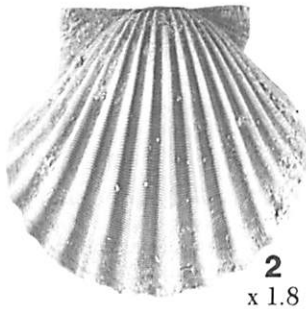

2
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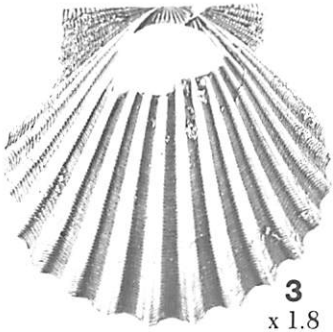

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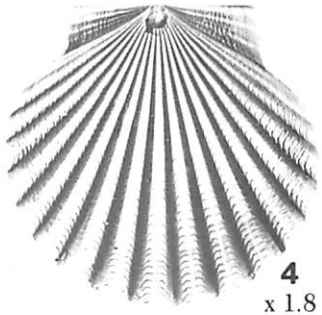

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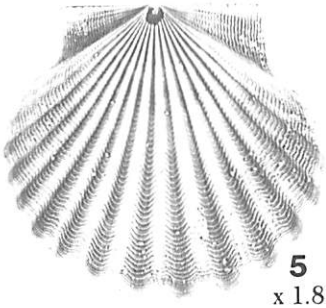

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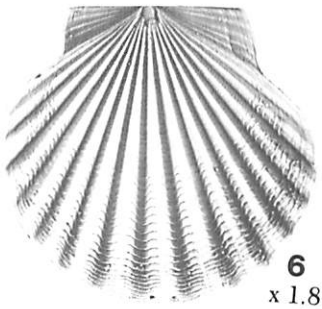

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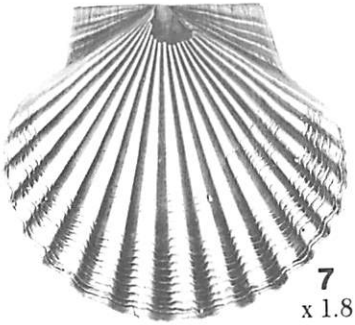

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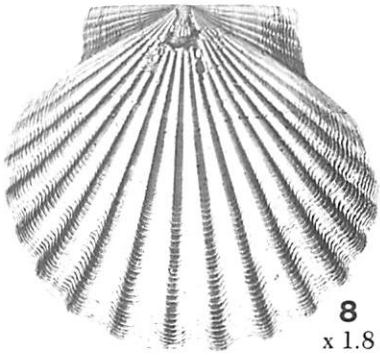
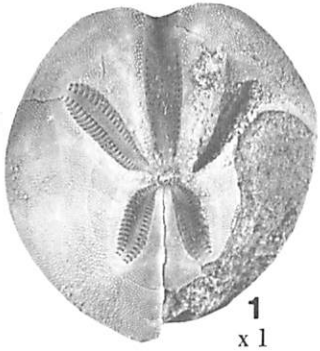


8
x 1.8

EXPLANATION PLATE 82

Glendon Limestone (Vicksburg Group)

Figure		Page
1	**Schizaster (Paraster) americanus** (Clark, 1915) Top view; length 44 mm, width 41.5 mm, height 29 mm; locality 42. MGS specimen 404.	193
2	**Ranina (Lophoranina) georgiana** Rathbun, 1935 Portion of crab carapace; greatest dimension of carapace fragment 21 mm; locality 45. MGS specimen 405. The circular disks in the surrounding matrix are tests of **Lepidocyclina (Lepidocyclina) supera** (Conrad, 1865).	190
3	**Pecten (Pecten) poulsoni** Morton, 1834 Left valve; height 30.3 mm, length 32 mm, inflation 4.6 mm; locality 45. MGS specimen 406.	157
4	**Glycymeris arctata** (Conrad, 1847) Incomplete internal mold; length 21 mm; locality 42. MGS specimen 407.	152
5, 6	**Pecten (Pecten) byramensis** Gardner, 1945 5. Left valve; height 26.6 mm, length 28 mm, inflation 3.4 mm; locality 45. MGS specimen 408. 6. Right valve; height 29.6 mm, length 30.4 mm, inflation 8.5 mm; locality 45. MGS specimen 409.	157



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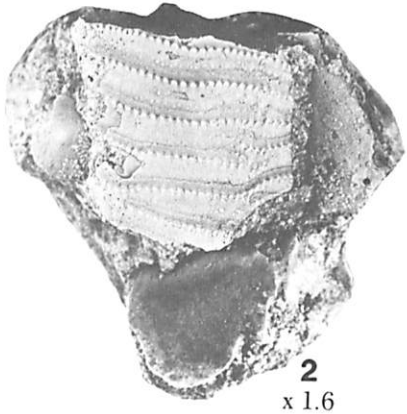

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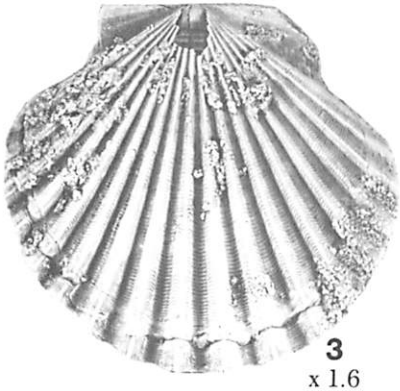

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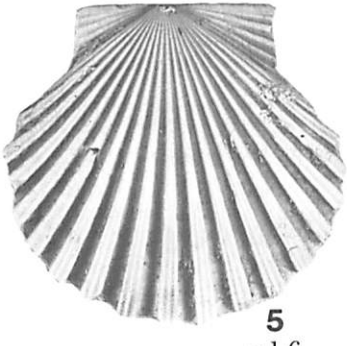

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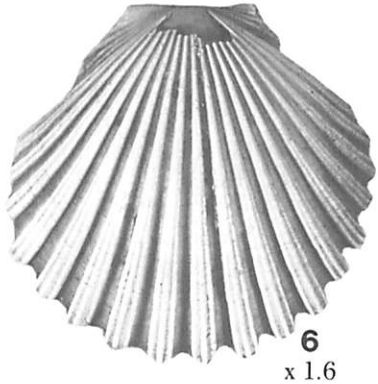

6
x 1.6

LOCALITIES

MGS Localities

1. Moodys Branch Formation: Town Creek along a northwest-southeast stretch in the SE/4, SW/4, Section 10, T.5 N, R.1 E., Jackson, Hinds County, Mississippi.
2. Moodys Branch Formation: Riverside Park, ravine along valley wall of the Pearl River flood plain and behind the old Riverside swimming pool, NE/4, NW/4, NW/4, Section 36, T.6 N., R.1 E., Jackson, Hinds County, Mississippi.
3. Moodys Branch Formation: Moodys Branch, S/2, SW/4, Section 35, T.6 N., R.1 E., Jackson, Hinds County, Mississippi.
4. Moodys Branch Formation: ". . . the first bluff below the first bridge east of the Institution For The Blind, SW/4, Section 35, T.6 N., R.1 E." Jackson, Mississippi. Palmer and Brann, 1966, Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 913.
5. Moodys Branch Formation: ". . . in R.R. cut of G.M. and N.R.R., first cut northeast of freight station." Harris and Palmer, 1946, Bull. Amer. Paleont., v. 30, No. 117, pt. 1, p. 12. Probably in NW/4, NW/4, NE/4, Section 2, T.5 N., R.1 E., Jackson, Hinds County, Mississippi.
6. Moodys Branch Formation: "The highly bryozoal layer in the cut along the railway between the city water works and Jackson." Bull. Amer. Paleont., v. 30, No. 117, p. 17; NE/4, SE/4, Section 35, T.6 N., R.1 E., Jackson, Hinds County, Mississippi.
7. Moodys Branch Formation: Sewer excavation across Town Creek, W/2, SE/4, Section 10, T.5 N., R.1 E., Jackson, Hinds County, Mississippi.
8. Moodys Branch Formation: Tunnel excavations for sewer, SE/4, NE/4, Section 10, T.5 N., R.1 E., Jackson, Hinds County, Mississippi.
9. Moodys Branch Formation: Garland Creek, NW/4, NW/4, NW/4, Section 28, T.1 N., R.16 E., Clarke County, Mississippi, and about one mile upstream along the right fork.
10. Moodys Branch Formation: "Sims Siding about 8 miles north of Yazoo City, Miss." Harris and Palmer, 1946, Bull. Amer. Paleont., v. 30, No. 117, pt. 1, p. 13.
11. Moodys Branch Formation: Techeva Creek, SW/4, SW/4, Section 32, T.13 N., R.1 E., and Sections 5, 4, 9, and 10, T.12 N., R.1 E., Yazoo County, Mississippi.
12. Moodys Branch Formation: Tinnin locality (J. W. Tinnin property), along deep ravine, NW/4, NE/4, Section 20, T.13 N., R.1 W., Yazoo County, Mississippi.
13. Moodys Branch Formation: Perry Creek, SW cor. NW/4, Section 13, T.10 N., R.3 W., Yazoo County, Mississippi.
14. Moodys Branch Formation: Thompson Creek, Section 12, T.10 N., R.3 W., Yazoo County, Mississippi.

15. Yazoo Formation: Miss-Lite clay pit at Cynthia, SE/4, SW/4, Section 25, T.7 N., R.1 W., Hinds County, Mississippi.
16. Moodys Branch Formation: East bank of the Chickasawhay River below a hunting lodge; NW/4, NE/4, SE/4, Section 30, T.1 N., R.16 E., Clarke County, Mississippi.
17. Moodys Branch Formation: Trench behind Getty Oil Co. Well #1 J. Blanks 21-6; NE/4, SW/4, NW/4, Section 21, T.2 N., R.14 E., Clarke County, Mississippi.
18. Moodys Branch Formation: Bluff on southeast side of Chickasawhay River below the old Heard Cemetery; S/2, NE/4, SE/4, NE/4, Section 30, T.1 N., R.16 E., Clarke County, Mississippi.
19. Bashi Formation: Bluff behind the Red Hot Truck Stop parking lot, Meridian, Mississippi; NE/4, NW/4, Section 20, T.6 N., R.16 E., Lauderdale County, Mississippi.
20. Bashi Formation: Concretions placed along the 31st Street exit south of I-20, Meridian, Mississippi; SE/4, Section 24, T.6 N., R.15 E., Lauderdale County, Mississippi.
21. Bashi Formation: Road cut on Highway 19, 1.2 miles from the State line; NE/4, SW/4, Section 22, T.5 N., R.18 E., Lauderdale County, Mississippi.
22. Winona Formation: East bank of Chickasawhay River about one-half mile south of bridge at Enterprise, Mississippi; SW/4, NE/4, SE/4, Section 24, T.4 N., R.14 E., Clarke County, Mississippi.
23. Winona Formation: Bluff on Allen Branch below Enterprise Cemetery in the NW/4, NE/4, NW/4, Section 24, T.4 N., R.14 E., Clarke County, Mississippi.
24. Upper part of the Basic City Shale Member, Tallahatta Formation: Drainage ditch on west side of road 50 feet south of Dunn's Falls; SE/4, NE/4, SW/4, Section 36, T.5 N., R.14 E., Lauderdale County, Mississippi.
25. Weathered Archusa Marl with silicified fossils in a 2- to 3-inch zone above the basal contact with nonfossiliferous, well-sorted, cross-bedded Kosciusko sand; roadcut on south side, SW/4, NE/4, SW/4, NW/4, Section 21, T.4 N., R.15 E., Clarke County, Mississippi.

26a. Archusa Marl Member, Cook Mountain Formation: Dobys Bluff, east side of Chickasawhay River; center of north line, NW/4, SW/4, NW/4, Section 18, T.2 N., R.16 E., Clarke County, Mississippi.

26b. Fossiliferous marine beds in the top of the Kosciusko Formation below the basal contact of the Archusa Marl: Dobys Bluff, east side of Chickasawhay River; center of north line, NW/4, SW/4, NW/4, Section 18, T.2 N., R.16 E., Clarke County, Mississippi.

27. Archusa Marl Member, Cook Mountain Formation: Road cut on east side just south of entrance to Archusa Creek Water Park; NE/4, NW/4, SW/4, Section 7, T.2 N., R.16 E., Clarke County, Mississippi.
28. Gosport Sand: Claiborne Bluff on the Alabama River, Claiborne, Alabama.
29. Gosport Sand: Little Stave Creek, Jackson, Alabama.

30. Moodys Branch Formation: Little Stave Creek, Jackson, Alabama.
31. Cocoa Sand, Yazoo Formation: Stream bed of Shubuta Creek below and just upstream of bridge 205; SW/4, SW/4, NW/4, Section 35, T.1 N., R.15 E., Clarke County, Mississippi.
32. Pachuta Marl, Yazoo Formation: Road cut; SE/4, SE/4, SE/4, Section 29, T.10 N., R.5 W., Wayne County, Mississippi.
33. Pachuta Marl, Yazoo Formation: NW/4, NW/4, Section 21, T.1 N., R.14 E., Clarke County, Mississippi.
34. Shubuta Clay, Yazoo Formation: Bluff along west bank of the Chickasawhay River; E/2, NE/4, NW/4, NW/4, Section 28, T.10 N., R.7 W., Wayne County, Mississippi.
35. Shubuta Clay, Yazoo Formation: Bluff along east bank of the Chickasawhay River; SW/4, SW/4, SW/4, Section 28, T.10 N., R.7 W., Wayne County, Mississippi.
36. Shubuta Clay, Yazoo Formation: Bluff on the east and southeast side of a horse-shoe bend in the Chickasawhay River; N/2, SE/4, NE/4, Section 16, T.10 N., R.7 W., Wayne County, Mississippi.
37. Red Bluff Formation: Type locality, bluff on the east and southeast side of a horse-shoe bend in the Chickasawhay River; N/2, SE/4, NE/4, Section 16, T.10 N., R.7 W., Wayne County, Mississippi.
38. Red Bluff Formation: East bank of Chickasawhay River west of Hiwannee; NE/4, SE/4, NE/4, Section 28, T.10 N., R.7 W., Wayne County, Mississippi.
39. Red Bluff Formation: South bank of Chickasawhay River southwest of Hiwannee; NE/4, SE/4, NE/4, SE/4, Section 28, T.10 N., R.7 W., Wayne County, Mississippi.
40. Red Bluff Formation: Stream bed of a tributary to Sand Branch; NW/4, SE/4, NE/4, SE/4, Section 24, T.10 N., R.7 W., Wayne County, Mississippi.
41. Marianna Limestone: Roadcut at intersection of dirt road leading to the Shell Oil Company Goodwater Plant; NE/4, SW/4, SW/4, Section 8, T.10 N., R.8 W., Clarke County, Mississippi.
42. Glendon Limestone: Roadcut at intersection of dirt road leading to the Shell Oil Company Goodwater Plant; NE/4, SW/4, SW/4, Section 8, T.10 N., R.8 W., Clarke County, Mississippi.
43. Marianna Limestone: Gully on west side of dirt road; NW/4, NE/4, NW/4, Section 10, T.10 N., R.8 W., Clarke County, Mississippi.
44. Marianna Limestone: Roadcut on south side across from the intersection of dirt road leading to locality 43; NW/4, SE/4, NE/4, Section 10, T.10 N., R.8 W., Clarke County, Mississippi.
45. Glendon Limestone: Agricultural lime plant quarry north of Waynesboro; NE/4, Section 23, and W/2, NW/4, Section 24, T.9 N., R.7 W., Wayne County, Mississippi.
46. Red Bluff Formation: Gullies in a power line right of way crossing Eucutta Creek below Lyle Cashion Company Oil well #13-1 of North Yellow Creek field; NW/4, NE/4, NE/4, NE/4, Section 13, T.10 N., R.8 W., Clarke County, Mississippi.

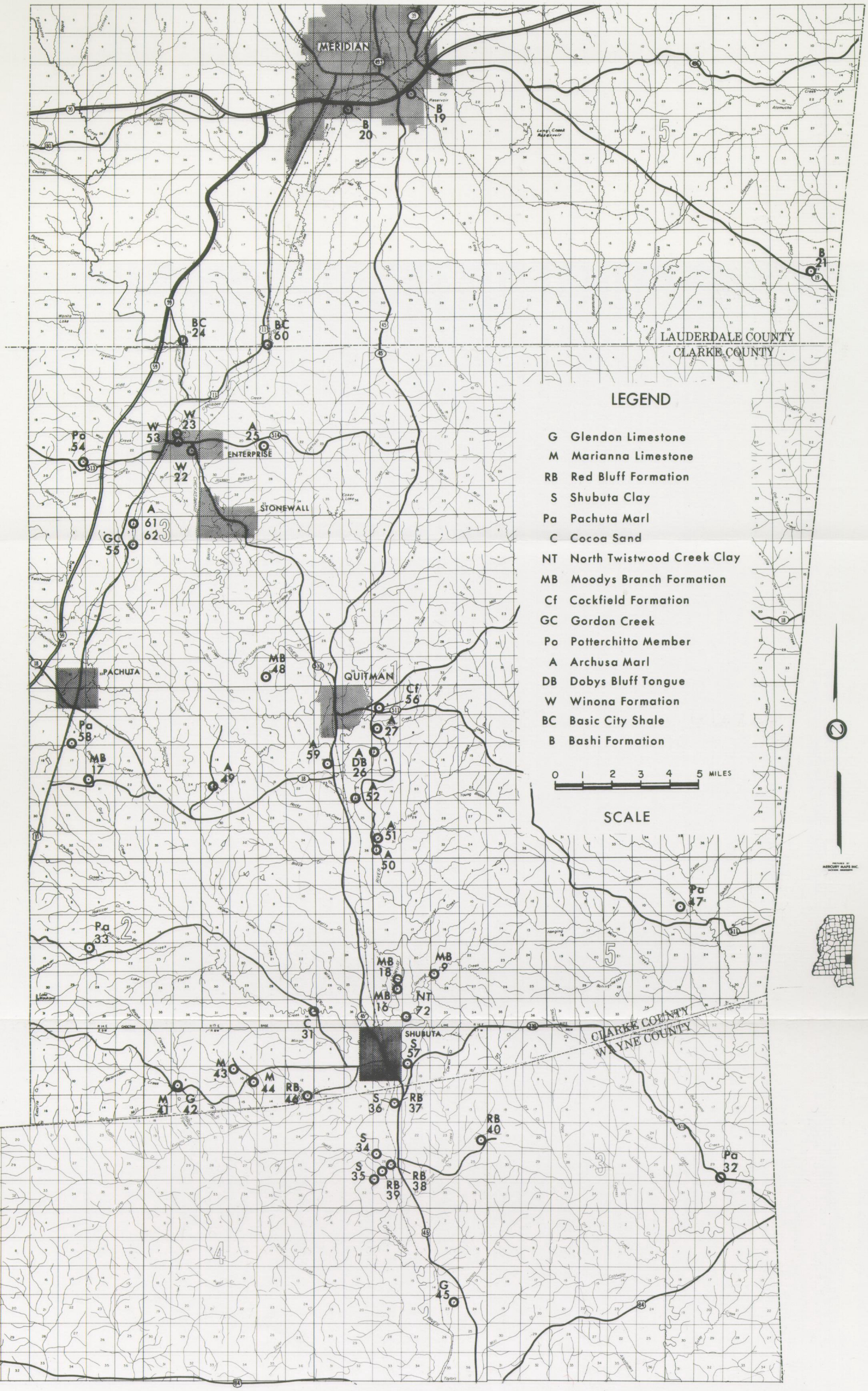

Figure 36. Localities in Lauderdale, Clarke, and Wayne Counties.

47. Yazoo Formation (probably Pachuta Marl): Locality is locally known as the "Bone Yard"; gullies in north side of ridge near the center of SE/4, Section 11, T.1 N., R.17 E., Clarke County, Mississippi.

48. Moodys Branch Formation: Cut for oil well on top of Prairie Hill facing west; NE/4, SW/4, Section 33, T.3 N., R.15 E., Clarke County, Mississippi.

49. Archusa Marl, Cook Mountain Formation: Forms waterfall in Souinlovey Creek at bridge; SE/4, SE/4, NW/4, Section 19, T.2 N., R.15 E., Clarke County, Mississippi.

50. Archusa Marl, Cook Mountain Formation: Limestone forms a bench on the east side of the Chickasawhay River just south of bridge at DeSoto; SE/4, SW/4, NW/4, Section 31, T.2 N., R.16 E., Clarke County, Mississippi.

51. Archusa Marl, Cook Mountain Formation: Limestone forms waterfall at bridge over Fallen Creek; SE/4, SW/4, NW/4, Section 31, T.2 N., R.16 E., Clarke County, Mississippi.

52. Archusa Marl, Cook Mountain Formation: Titanothere locality; bed of an intermittent branch of a tributary on the Chickasawhay River; SW/4, SE/4, SW/4, Section 24, T.2 N., R.15 E., Clarke County, Mississippi. Information on stratigraphy and location is from the notes of Survey Geologist Alvin R. Bicker who visited the site on December 3, 1969.

53. Winona Formation: Stream bed of Weir Creek just souh of the old Enterprise Cemetery; SE/4, NW/4, NW/4 and N/2, SW/4, NW/4 of Section 24, T.4 N., R.14 E., Clarke County, Mississippi.

54. Potterchitto Member, Cook Mountain Formation: Roadcut on north side of Highway 513; SE/4, NW/4, NE/4, Section 29, T.4 N., R.14 E., Clarke County, Mississippi.

55. Gordon Creek Shale, Cook Mountain Formation: A complete section of the Gordon Creek Shale showing the upper and lower contacts with the Cockfield sand above and Potterchitto glauconitic sand below is exposed in a railroad cut at the U.S. Highway 11 bridge; NE/4, NE/4, NW/4, Section 10, T.3 N., R.14 E., Clarke County, Mississippi.

56. Cockfield Formation: The contact between the upper shaly part and lower sandy part of the Cockfield Formation is exposed in an excavation behind an animal hospital on Highway 511 just west of the south intersection of road leading to the Archusa Creek Water Park; E/2, SW/4, SW/4, Section 6, T.2 N., R.16 E., Clarke County, Mississippi.

57a. Shubuta Clay, Yazoo Formation: Type locality, gully 100 feet north of dirt road and east of bridge over the Chickasawhay River; S/2, SW/4, SE/4, SW/4, Section 3, T.10 N., R.7 W., Clarke County, Mississippi.

57b. Pachuta Marl, Yazoo Formation: Lower stretch of gully referenced in 57a; SE/4, SE/4, SW/4, SW/4, Section 3, T.10 N., R.7 W., Clarke County, Mississippi.

58. Pachuta Marl, Yazoo Formation: Type locality, south side of Pachuta

Creek 1½ miles south-southeast of Pachuta; SE/4, SW/4, Section 8, T.2 N., R.14 E., Clarke County, Mississippi.

59. Archusa Marl, Cook Mountain Formation: Type locality, bluff on south side of Chickasawhay River below the old Highway 45 bridge; center of N/2, SW/4, SE/4, Section 14, T.2 N., R.16 E., Clarke County, Mississippi.
60. Basic City Shale Member, Tallahatta Formation: Type locality at a cut on the Gulf, Mobile, and Ohio Railroad north of Basic City in the NE/4, NE/4, NW/4, Section 4, T.4 N., R.15 E., Clarke County and SE/4, SE/4, SW/4, Section 33, T.4 N., R.15 E., Lauderdale County, Mississippi.
61. Archusa Marl Member, Cook Mountain Formation: Cuts on both sides of the Southern Railroad north of Wautubbee in the N/2, SE/4, NW/4, NE/4, Section 3, T.3 N., R.14 E., Clarke County, Mississippi.
62. Archusa Marl Member, Cook Mountain Formation: Cut on west side of the Southern Railroad north of Wautubbee in the NE/4, SW/4, NE/4, Section 3, T.3 N., R.14 E., Clarke County, Mississippi.
63. Cook Mountain Formation: "Roadcut on county road 4 miles northeast of Rose Hill, Jasper County, Mississippi" (Tulane Locality Register, locality 85). Probably in Section 26, T.4 N., R.13 E., Jasper County, Mississippi.
64. Cook Mountain Formation: "Roadcut on east side of Mississippi Highway 15, 0.8 mile north of junction with U.S. Highway 80, Newton Co., Mississippi. (Note: Interstate 20 has subsequently covered this locality, and it is no longer available.)" (Tulane Locality Register, locality 86). SE/4, SW/4, SW/4, SE/4, SE/4, Section 22, T.6 N., R.11 E., Newton County, Mississippi.
65. Cook Mountain Formation: Cut behind gas station on the southwest corner of junction of Highway 15 and Interstate 20, just northeast of Newton in the NE/4, NW/4, NE/4, T.6 N., R.11 E., Newton County, Mississippi (Tulane locality 907).
66. Cook Mountain Formation: "Fill behind Sinclair Truck Stop, northwest corner of intersection of Mississippi Highway 15 and Interstate 20 (material probably from cut for I-20); just north of Newton" (Tulane Locality Register, locality 921). NE/4, SW/4, SW/4, SE/4, SE/4, Section 23, T.6 N., R.11 E., Newton County, Mississippi.
67. Cook Mountain Formation: "Newton, Mississippi—Cut on I.C. Railroad about 3 miles east of town—200 yards west of milepost 27 (from Meridian)—[same as "Indian Mound" of Palmer]" (Tulane Locality Register, locality 921; P.R.I. locality 726). Probably in the SE/4, Section 31, T.6 N., R.12 E., Newton County, Mississippi.
68. Cook Mountain Formation: "Hill on south side of county road paralleling Interstate 20 along north side, 0.3 mile west of Mississippi Highway 15, just north of Newton" (Tulane Locality Register, locality 923). NE/4, SW/4, SE/4, Section 23, T.6 N., R.11 E., Newton County, Mississippi.
69. Cook Mountain Formation: "Roadcut 2.7 miles east of Mississippi Highway 15 at Newton, on road to Poplar Springs Church" (Tulane

Locality Register, locality 924). NW/4, NW/4, SE/4, SE/4, Section 36, T.6 N., R.11 E., Newton County, Mississippi.

70. Cook Mountain Formation: "I-20—cuts both sides of road just west of Mississippi 15, about 2 miles north of Newton" (Tulane Locality Register, locality 925). SW/4, SE/4, T.6 N., R.11 E., Newton County, Mississippi.

71. Cook Mountain Formation: "Road cut on top of second hill—1 mile west of Mississippi 503 on county road 1 mile south of Hickory" (Tulane Locality Register, locality 928). SE/4, NW/4, SW/4, Section 2, T.5 N., R.12 E., Newton County, Mississippi.

72. North Twistwood Creek Clay Member, Yazoo Formation: South bank of the Chickasawhay River below a bridge north of Shubuta in the SW/4, NW/4, SW/4, Section 32, T.1 N., R.16 E., Clarke County, Mississippi.

Localities listed in the Paleontological Research Institution Station Book

P1. Bunker Hill Landing, Ouachita River, Caldwell Parish, Louisiana.

P2. Wyant Bluff, Caldwell Parish, Louisiana.

P6. Danville Landing, Ouachita River, Catahoula Parish, Louisiana.

P7. One mile above Gibson Landing, Ouachita River, Caldwell Parish, Louisiana.

P8. One-half mile below Gibson Landing, Ouachita River, Louisiana.

P9. Gibson Landing, Ouachita River, Louisiana.

P10. Montgomery Landing, Red River, Grant Parish, Louisiana.

P11. Upper bed, Montgomery Landing, Red River, Grant Parish, Louisiana.

P12. Tullos, La Salle Parish, Louisiana.

P14. Bayou Toro, SE/4, NW/4, Section 6, T.3 N., R.11 W., Vernon Parish, Louisiana.

P15. Montgomery Landing, lower bed, Red River, Grant Parish, Louisiana.

P16. Grandview Bluff, Ouachita River, Caldwell Parish, Louisiana.

P103. Lower bed at the base of the bluff, on the Alabama River at Claiborne, Monroe County, Alabama.

P104. "Feruginous sand" bed at Claiborne, on the Alabama River, Monroe County, Alabama (Gosport Sand).

P707. About 3 miles W.N.W. of Orangeburg, South Carolina.

P708. About 6 miles W.N.W. of Orangeburg, South Carolina.

P723. Moseley's Ferry, on the Brazos River, Burleson County, Texas.

P725. Sabine River, Texas side, opposite SW corner of SE/4 Section 35, T.5 N., R.13 W., Sabine Parish, Louisiana.

P726. Indian Mound, 3 miles east of Newton, on the A. and V. Railroad, Newton County, Mississippi.

P727. Little Brazos River, 2 and 1/2 miles above Stone City, Brazos County, Texas.

P728. Hickory, Newton County, Mississippi.

P729. About 8 miles west of Enterprise, Clarke County, Mississippi.

P730. Hammett's Branch, SW/4 Section 30, T.18 N., R.6 W., about 2 miles northeast of Mt. Lebanon, Louisiana.

P731. Wautubbee, Clarke County, Mississippi.

P733. Smithville, Bastrop County, Texas.

P734. Lisbon, Alabama River, Monroe County, Alabama.

P741. East bank Ouachita River, Lapiniere Landing, Louisiana.

P745. Near top of south side of Angelina River, bank at Marion, on the north line of Angelina County, Texas.

P747. Well at Monroe, Ouachita Parish, Louisiana.

P748. About 2 miles south of Hickory, Newton County, Mississippi.

P758. H. W. Berryman Place 2 and 1/2 miles from Linwood, 11 miles from Rusk, Angelina County, Texas.

P766. Big branch of Cedar Creek, east of Mr. Pollard's farm, 3 miles N.W. of Stone City, Burleson County, Texas.

P767. South bank of the Colorado River about 200 yards west of bridge at Smithville, Bastrop County, Texas.

P778. Lisbon Landing on the west bank of Alabama River about 6 and 1/2 miles above a toll bridge at Claiborne, Monroe County, Alabama.

P803. Two miles northeast of Newton, on Highway 15, Newton County, Mississippi.

P854. Newcastle, Hanover County, Virginia.

P883. Montgomery, about one-half mile below the ferry, on the Red River, Grant Parish, Louisiana.

P886. Danville Landing, Ouachita River, at E. D. Blyght house, Catahoula Parish, Louisiana.

P894. Crow Creek, beneath, above and below road bridge on Highway 70 about 2 miles east of Forrest City, St. Francis County, Arkansas.

P896. On west bank of Arkansas River, at White Bluff, Jefferson County, Arkansas.

P897. Vince Ferry, Saline River, about 18 miles southeast of Rison, Cleveland County, Arkansas.

P912. Gibson Landing, Ouachita River, at the water's edge 3/4 mile below the landing, Caldwell Parish, Louisiana.

P913. Wyant Bluff, west bank of Ouachita River, about 15 miles south of Columbia on Highway 106, Caldwell Parish, Louisiana.

P922. Sabine River, Texas side opposite center Section 6, T.3 N., R.12 W., Sabine Parish, Louisiana.

P923. Bunker Hill, in road near top of the hill from Ouachita River, Cadlwell Parish, Louisiana.

P1046. Crow Creek, at bridge, St. Francis County, Arkansas.

P1048. Little Crow Creek, south of railroad and highway on Crow Creek, about 2 miles east of Forrest City, Arkansas.

P1049. White Bluff, south bank Arkansas River, mostly upstream from locality P896, Jefferson County, Arkansas.

P1054. Lower layer (Moodys Branch "marl"), Red River, near Montgomery, Louisiana.

P1056. Gopher Hill, above St. Stephens, first hard ledge above "*Scutella* bed," Washington County, Alabama.

P1118. From ravines in little stream 1/2 to 1 mile back of Bunker Hill, Ouachita River, Caldwell Parish, Louisiana.

P1119. Bunker Hill bluff on Ouachita River, Caldwell County, Louisiana.

P1120. Bayou Toro, "first bluff," Vernon Parish, Louisiana.

P1121. One mile below Robinson's Ferry, Sabine River, Sabine County, Texas.

REFERENCES CITED

Aldrich, Truman Hemingway, 1885, *Notes on the Tertiary of Alabama and Mississippi, with descriptions of new species:* Cincinnati Soc. Nat. Hist., Jour., v. 8, No. 2, p. 145-153, pl. 2, 3 in part.

Aldrich, Truman Hemingway, 1886, *Preliminary report on the Tertiary fossils of Alabama and Mississippi:* Geol. Survey Alabama, Bull. 1, pt. 1, p. 15-60, pl. 1-6, tables 1-10.

Aldrich, Truman Hemingway, 1887, *Notes on Tertiary fossils, with descriptions of new species:* Cincinnati Soc. Nat. Hist., Jour., v. 10, No. 2, p. 78-83, 1 fig.

Aldrich, Truman Hemingway, 1894, *Paleontology of the Eocene of Alabama,* p. 232-239, pl. 12-15, *in* Smith, Eugene Allen, Johnson, Lawrence Clement, and Langdon, Daniel W., Jr., *Report on the geology of the Coastal Plain of Alabama:* Alabama Geol. Survey, 759 p., 29 pl.

Aldrich, Truman Hemingway, 1895, *New or little known Tertiary Mollusca from Alabama and Texas:* Bull. Amer. Paleont., v. 1, No. 2, 30 p., 5 pl.

Aldrich, Truman Hemingway, 1903, *New species of Tertiary fossils from Alabama, Mississippi, and Florida:* Nautilus, v. 16, No. 9, p. 97-101, pl. 3-4.

Aldrich, Truman Hemingway, 1911, *New Eocene fossils from the southern Gulf states:* Bull. Amer. Paleont., v. 5, No. 22, 24 p., 5 pl.

Aldrich, Truman Hemingway, 1923, *New molluskan names:* Biol. Soc. Washington, Proc., v. 36, p. 199.

Barry, John O'Keefe, and LeBlanc, Rufus J., 1942, *Lower Eocene faunal units of Louisiana:* Louisiana Dept. Conserv., Geol. Bull. No. 23, 208 p. 19 pl.

Blanpied, B. W., and Hazzard, Roy T., 1938, *Correlation of Cockfield and Gosport Formations, Eastern Mississippi and Western Alabama:* Amer. Assoc. Petroleum Geol., v. 22, No. 33, p. 309-314.

Bowles, Edgar Oliver, 1939, *Eocene and Paleocene Turritellidae of the Atlantic and Gulf Coastal Plain of North America:* Jour. Paleont., v. 13, No. 3, p. 267-336, pl. 31-34.

Brann, Doris Colgate, and Kent, Lois Schoonover, 1960, *Catalogue of the type and figured specimens in the Paleontological Research Institution:* Bull. Amer. Paleont., v. 40, No. 184, 996 p., 1 pl.

Bronn, Heinrich Georg, 1848, *Index Palaeontologicus oder ubersicht der bis jetzt bekannten Fossilen Organismen . . .*, v. 2, p. 777-1381, Stuttgart.

Canu, Ferdinand, and Bassler, Ray S., 1917, *A Synopsis of American early Tertiary Cheilostome Bryozoa:* U.S. Nat. Mus., Bull. 96, 87 p., 6 pl.

Canu, Ferdinand, and Bassler, Ray S., 1920, *North American early Tertiary Bryozoa:* U.S. Nat. Mus., Bull. 106, 878 p., 162 pl.

Casey, Thomas Lincoln, 1903, *Notes on the Conrad collection of Vicksburg fossils, with descriptions of new species:* Acad. Nat. Sci. Philadelphia, Proc. 1903, v. 55, p. 261-283.

Casey, Thomas Lincoln, 1904, *Notes on the Pleurotomidae with descriptions of some new genera and species:* Acad. Sci. St. Louis, Trans., v. 14, No. 5, p. 123-170.

Cheetham, Alan H., 1963, *Gooseneck barnacles in the Gulf Coast Tertiary:* Jour. Paleont., v. 37, No. 2, p. 393-400, pl. 46, text-fig. 1.

Clark, William Bullock, and Martin, George Curtis, 1901, *Systematic paleontology, Eocene. Mollusca.* p. 122-203, pl. 17-57, *in, Eocene:* Maryland Geol. Survey, 331 p., 64 pl.

Clark, William Bullock, and Twitchell, Mayville W., 1915, *The Mesozoic and Cenozoic Echinodermata of the United States:* U.S. Geol. Survey Monograph 54, 341 p., 108 pl.

Coleman, James Lawrence, Jr., 1978, *Stratigraphy and depositional environments of the carbonates of the Vicksburg Group (Oligocene) in Mississippi and adjacent areas:* Masters Thesis, Dept. Geol. and Geography, Mississippi State University.

Coleman, James M., and Gagliano, Sherwood M., 1965, *Sedimentary structures—Mississippi River deltaic plain, in, Primary sedimentary structures and their hydrodynamic interpretation—A symposium:* Soc. Econ. Geologists and Mineralogists, Spec. Pub. 12, p. 133-148.

Conrad, Timothy Abbott, 1832, *Fossil shells of the Tertiary formations of North America, illustrated by figures drawn on one stone by T. A. Conrad*, v. 1, No. 1, p. 1-20, pl. 1-6.

Conrad, Timothy Abbott, 1833a, *One some new fossils and Recent shells of the United States:* Amer. Jour. Sci., 1st ser., v. 23, No. 2, Art. 17, p. 339-346.

Conrad, Timothy Abbott, 1833b, *Fossil shells of the Tertiary formations of North America, illustrated by figures drawn on stone by T. A. Conrad*, v. 1, No. 3, p. 29-38.

Conrad, Timothy Abbott, 1833c, *Ibid*, v. 1, No. 4, p. 39-46.

Conrad, Timothy Abbott, 1834, *Observations on the Tertiary and more recent formations of a portion of the southern states.* Appendix, *Descriptions of new Tertiary fossils from the southern states.* (p. 130-157): Acad. Nat. Sci. Philadelphia, Jour., v. 7, p. 116-157.

Conrad, Timothy Abbott, 1834, *Catalogue of the fossil shells of the Tertiary formation of the United States:* Appendix *in* Morton, Samuel George, *Synopsis of the organic remains of the Cretaceous group of the United States:* Philadelphia, 88 p., 19 pls., App. p. 1-8.

Conrad, Timothy Abbott, 1835, *Fossil shells of the Tertiary formations of North America, illustrated by figures drawn on stone by T. A. Conrad*, v. 1, No. 3, p. 29-56, pl. 15-18.

Conrad, Timothy Abbott, 1841, *Descriptions of twenty-six new species of fossil shells, from Maryland etc.:* Acad. Nat. Sci. Philadelphia, Proc., v. 1, p. 28-33.

Conrad, Timothy Abbott, 1845, *Descriptions of the eight new fossil shells of the United States:* Acad. Nat. Sci. Philadelphia, Proc. 1844, v. 2, No. 6, p. 173-175.

Conrad, Timothy Abbott, 1848a, *Observations of the Eocene formation, and descriptions of one hundred and five new fossils of that period, from the vicinity of Vicksburg, Mississippi:* Acad. Nat. Sci. Philadelphia, Proc. 1847, v. 3, p. 280-299.

Conrad, Timothy Abbott, 1848b, *Observations on the Eocene formation, and descriptions of one hundred and five new fossils of that period, from the vicinity of Vicksburg, Mississippi:* Acad Nat. Sci. Philadelphia, Jour. , 2nd ser., v. 1, pt. 2, p. 111-134, pl. 11-14.

Conrad, Timothy Abbott, 1853, *Notes on shells:* Acad. Nat. Sci. Philadelphia, Proc. 1853, v. 6, p. 320-321.

Conrad, Timothy Abbott, 1854, *Fossil Testacea of the Tertiary green-sand and marl-bed of Jackson, Miss.*, p. 289, pl. 14-17, *in* Wailes, Benjamin Leonard Covington, *Report on the agriculture and geology of Mississippi . . .*, Jackson, Miss., 371 p., 17 pl.

Conrad, Timothy Abbott, 1855, *Descriptions of fossil shells from the Eocene and Miocene formations of California. Reports of explorations and surveys to ascertain. . . . route for a railroad from the Mississippi River to the Pacific Ocean:* Pacific RR Report, v. 5, p. 320-329, pl. 2-9.

Conrad, Timothy Abbott, 1856, *Observations on the Eocene deposits of Jackson, Mississippi, with descriptions of thirty-four new species of shells and corals:* Acad. Nat. Sci., Philadelphia, Proc. 1855, v. 7, p. 257-263.

Conrad, Timothy Abbott, 1860, *Description of new species of Cretaceous and Eocene fossils of Mississippi and Alabama:* Acad. Nat. Sci. Philadelphia, Jour., 2nd ser., v. 4, pt. 3, p. 275-298, pl. 46-47.

Conrad, Timothy Abbott, 1860, *in* Gabb, William More, *Descriptions of new species of Cretaceous fossils from New Jersey:* Acad. Nat. Sci. Philadelphia, Proc. 1860, v. 12, p. 93-95.

Conrad, Timothy Abbott, 1865a, *Catalogue of the Eocene and Oligocene Testacea of the United States:* Amer. Jour. Conch, v. 1, No. 1, p. 1-35.

Conrad, Timothy Abbott, 1865b, *Descriptions of new Eocene shells from Enterprise, Mississippi:* Amer. Jour. Conch., v. 1, No. 2, p. 137-141, pl. 10-11.

Conrad, Timothy Abbott, 1865c, *Catalogue of the older Eocene shells of Oregon:* Amer. Jour. Conch., v. 1, No. 2, p. 150-154.

Conrad, Timothy Abbott, 1865d, *Descriptions of new Eocene shells, and references with figures to published species:* Amer. Jour. Conch., v. 1, No. 3, p. 210-212, pl. 20-21 in part.

Conrad, Timothy Abbott, 1865e, *Catalogue of the Eocene Annulata, Foraminifera, Echinodermata and Cirripedia of the United States:* Acad. Nat. Sci. Philadelphia, Proc., v. 17, p. 74.

Conrad, Timothy Abbott, 1866, *Checklist of invertebrate fossils of North America. Eocene and Oligocene.* Smithsonian Misc. Coll., v. 7, No. 200, p. 1-41.

Cooke, Charles Wythe, 1921, *The Byram Calcareous Marl of Mississippi:* U.S. Geol. Survey Prof. Paper 129, p. 79-85.

Cooke, Charles Wythe, 1925, *Correlation of the Eocene formations of Mississippi and Alabama:* U.S. Geol. Survey Prof. Paper 140-E, p. 133-136.

Cooke, Charles Wythe, 1926a, *The Cenozoic formations:* Geol. Survey Alabama, Special Report 14, p. 251-297, pl. 93-97.

Cooke, Charles Wythe, 1926b, *New Eocene mollusks from Jackson, Miss.:* Washington Acad. Sci., Jour., v. 16, No. 5, p. 132-138, 1 pl.

Cooke, Charles Wythe, 1933, *Definition of Cocoa Sand Member of Jackson Formation:* Amer. Assoc. Petroleum Geologists, Bull., v. 17, No. 1, p. 1387-1388.

Cooke, Charles Wythe, 1942, *Cenozoic irregular echinoids of Eastern United States:* Jour. Paleont., v. 16, No. 1, p. 1-62, 8 pl.

Cooke, Charles Wythe, 1959, *Cenozoic Echinoids of Eastern United States:* U.S. Geol. Survey Prof. Paper 321, 106 p., 43 pl.

Cooke, Charles Wythe, Gardner, Julia, and Woodring, Wendell P., 1943, *Correlation of the Cenozoic Formations of the Atlantic and Gulf Coastal Plain and the Caribbean region:* Geol. Soc. Amer., Bull., v. 54, p. 1713-1723.

Cossmann, Alexandre Edouard Maurice, 1893a, *Catalogue illustré des coquilles fossiles de l'Eocène des environs de Paris*, Appendix No. 1: Ann. Soc. Roy. Malacol. Belgique, v. 28, p. 1-18, text figures.

Cossmann, Alexandre Edouard Maurice, 1893b, *Notes complementaires sur la faune Eocènique de l'Alabama:* Ann. Géol. et. Paléont., v. 12, 51 p., 2 pl.

Cossmann, Alexandre Edouard Maurice, 1901, *Catalogue illustré des coquilles fossiles de l'Eocene des environs de Paris:* Ann. Soc. roy. Malacol. Belquigue, App. No. 3, t. 36, p. 9-110, pl. 2-7.

Cossmann, Alexandre Edouard Maurice, 1903, *Essais de Paléoconchologie comparée*, v. 5, 215 p., 9 pl.

Cushing, E. M., Boswell, E. H., Speer, P. R., Hossman, R. L., and others, 1970, *Availability of water in the Mississippi Embayment:* U.S. Geol. Survey Prof. Paper 448-A, Table 2.

Cushman, Joseph Augustine, 1919, *Fossil Foraminifera from the West Indies:* Carnegie Inst. Washington, Pub. No. 291, p. 21-71, 15 pl., 8 fig.

Cushman, Joseph Augustine, 1920, *The American species of Orthophragmina and Lepidocyclina:* U.S. Geol. Survey Prof. Paper 125, p. 39-108, 35 pl.

Dall, William Healey, 1890, *Tertiary fauna of Florida . . .*: Wagner Free Inst. Sci., Philadelphia, Trans., v. 3, pt. 1, p. 1-200, pl. 1-12.

Dall, William Healey, 1892, *Ibid*, v. 3, pt. 2, p. 201-473, pl. 13-22.

Dall, William Healey, 1898, *Ibid*, v. 3, pt. 4, p. 571-948, pl. 23-35.

Dall, William Healey, 1900, *Ibid*, v. 3, pt. 5, p. 949-1217, pl. 37-47.

Dall, William Healey, 1903, *Ibid*, v. 3, pt. 6, p. 1219-1654, pl. 48-60.

Dana, James Dwight, 1895, *Manual of geology*, 4th ed.: Boston, 1807 p.

Deussen, Alexander, 1924, *Geology of the Coastal Plain of Texas West of Brazos River:* U.S. Geol. Survey Prof. Paper 126, 145 p., 35 pl.

DeVries, David A., 1963, *Jasper County Mineral Resources:* Mississippi Geol. Survey, Bull. 95, 99 p.

Dockery, David Terrell, III, 1976, *Depositional systems in the upper Claiborne and lower Jackson groups (Eocene) of Mississippi:* Master's Thesis, Dept. Geol., University of Mississippi, 109 p.

Dockery, David Terrell, III, 1977, *Mollusca of the Moodys Branch Formation, Mississippi:* Miss. Geol. Survey, Bull. 120, 212 p., 28 pl., 23 fig.

Douvillé, Henri, 1918, *Les couches a orbitoides de l'Amerique du Nord:* Ac. Sc. Paris, Compt. Rend. 167, p. 261-267.

Duplantis, Merle James, 1975, *Depositional systems in the Midway and Wilcox groups (Paleocene-Lower Eocene), North Mississippi:* Master's Thesis, Dept. Geol., University of Mississippi, 87 p., 28 fig.

Echols, Dorothy Anne Jung, and Malkin, Doris Sarah, 1948, *Wilcox (Eocene) stratigraphy, a key to production:* Amer. Assoc. Petroleum Geologists, Bull., v. 32, No. 1, p. 11-33.

Fisher, William L., Rodda, Peter Ulisse, and Dietrich, John W., 1964, *Evolution of Athleta petrosa stock (Eocene, Gastropoda) of Texas:* Univ. Texas Pub. No. 6413, 117 p., 11 pl.

Fisk, H. N., 1938, *Geology of Grant and LaSalle Parishes:* Louisiana Dept. Conserv., Geol. Bull. 10, 246 p., 24 pls., 17 figs.

Gabb, William More, 1860, *Description of new species of American Tertiary and Cretaceous Fossils:* Acad. Nat. Sci. Philadelphia, Jour., 2nd ser., v. 4, pt. 4, p. 375-406, pl. 67-69.

Gabb, William More, and Horne, George Henry, 1860, *Description of new Cretaceous corals from New Jersey:* Acad. Nat. Sci. Philadelphia, Proc. 1860, p. 366-367.

Galloway, William E., 1968, *Depositional systems of the lower Wilcox Group, north-central Gulf Coast Basin:* Gulf Coast Assoc. Geol. Trans., v. 18, p. 275-289.

Gardner, Julia Anna, 1924, *in* Deussen, Alexander, *Geology of the Coastal Plain of Texas west of Brazos River:* U.S. Geol. Survey Prof. Paper 126, 145 p., 35 pl.

Gardner, Julia Anna, 1927, *New species of mollusks from the Eocene of Texas:* Washington Acad. Sci., Jour., v. 17, No. 14, p. 362-383, fig. 1-44.

Gardner, Julia Anna, 1937, *The molluscan fauna of the Alum Bluff Group of Florida. Part 6. Pteropoda, Opisthobranchia and Ctenobranchia (in part):* U.S. Geol. Survey Prof. Paper 142-F, p. 251-435, pl. 37-48.

Gardner, Julia Anna, 1939a, *Recent collections of upper Eocene Mollusca from Alabama and Mississippi:* Jour. Paleont., v. 13, No. 3, p. 340-343.

Gardner, Julia Anna, 1939b, *Notes on fossils from the Eocene of the gulf province:* U.S. Geol. Survey Prof. Paper 193-B, p. 17-44, pl. 1-8.

Gardner, Julia Anna, 1945, *Mollusca of the Tertiary formations of northeastern Mexico:* Geol. Soc. Amer., Memoir 11, 332 p. 28 pl.

Gardner, Julia Anna, and Bowles, Edgar Oliver, 1939, *The Venericardia planicosta group in the Gulf Province:* U.S. Geol. Survey Prof. Paper 189-F, p. 141-215, pl. 33-46.

Gazin, C. Lewis, and Sullivan, J. Magruder, 1942, *A new Titanothere from the Eocene of Mississippi, with notes on the correlation between the marine Eocene of the Gulf Coastal Plain and Continental Eocene of the Rocky Mountain region:* Smithsonian Misc. Collections, v. 101, No. 13, p. 1-13, 2 fig.

Gertman, Richard L., 1969, *Cenozoic Typhinae (Mollusca: Gastropoda) of the Western Atlantic region:* Tulane Studies in Geol. and Paleont., v. 7, No. 4, p. 143-192, pl. 1-8, text fig. 1-3.

Glawe, Lloyd N., 1969, *Pecten perplanus stock (Oligocene) of the Southeastern United States:* Geol. Survey Alabama, Bull. 91, 179 p., 5 pl.

Glibert, Maxine, 1962, *Les Euthyneura et Pulmonata fossiles du Cenozoique Etranger. . . .* Inst. roy des. Sci. Nat. de Belgique, Mem., 10th ser., fasc. 70, 140 p.

Gregorio, Antoine de, 1890, *Monographie de la Faunc-Éocènique de l'Alabama et surtout de celle de Claiborne de l'Étage Parisien (Horizon à Venericardia planicosta Lamk.):* Ann. Géol. et Paléont., livr. 7 et 8, 316 p., 46 pl.

Harris, Gilbert Dennison, 1894, *The Tertiary geology of southern Arkansas:* Arkansas Geol. Survey, Ann. Report for 1892, v. 2, 207 p., 7 pl.

Harris, Gilbert Dennison, 1895a, *New and otherwise interesting Tertiary Mollusca from Texas:* Acad. Nat. Sci. Philadelphia, Proc., v. 47, p. 45-88, pl. 1-9.

Harris, Gilbert Dennison, 1895b, *New or little known Tertiary Mollusca from Alabama and Texas:* Bull. Amer. Paleont., v. 1, No. 2, 30 p., 5 pl.

Harris, Gilbert Dennison, 1895, *in* Dall, William Healey, *Tertiary fauna of Florida . . .* Wagner Free Inst. Sci., Philadelphia, Trans., v. 3, pt. 3, p. 475-570.

Harris, Gilbert Dennison, 1897a, *New and interesting Eocene Mollusca from the Gulf states:* Acad. Nat. Sci. Philadelphia, Proc., v. 48, p. 470-482, pl. 18-23.

Harris, Gilbert Dennison, 1897b, *The Lignitic stage, Part I, stratigraphy and Pelecypoda:* Bull. Amer. Paleont., v. 2, No. 9, 102 p., 14 pl.

Harris, Gilbert Dennison, 1899, *The Lignitic stage, Part II, Scaphopoda, Gastropoda, Pteropoda and Cephalopoda:* Bull. Amer. Paleont., v. 3, No. 11, 128 p., 12 pl.

Harris, Gilbert Dennison, 1899, *The Cretaceous and lower Eocene faunas of Louisiana*, p. 289-310, *in* Harris and Veatch, Arthur Clifford, *The geology of Louisiana. A preliminary report.* Part V: Baton Rouge, La., 354 p., 62 pl.

Harris, Gilbert Dennison, 1919, *Pelecypods of the St. Maurice and Claiborne stages:* Bull. Amer. Paleont., v. 6, No. 31, 268 p., 59 pl.

Harris, Gilbert Dennison, 1937, *Turrid illustrations:* Paleont. Amer., v. 2, No. 7, 122 p., 14 pl.

Harris, Gilbert Dennison, 1946, Part 1. *Bivalves and bibliography for parts I and II*, p. 1-206, pl. 1-25, *in* Harris and Palmer, Katherine Van Winkle, *The Mollusca of the Jackson Eocene of the Mississippi Embayment (Sabine River to the Alabama River):* Bull. Amer. Paleont., v. 30, No. 117, 564 p., 65 pl.

Heaslip, William Graham, 1968, *Cenozoic evolution of the alticostate venericards in Gulf and East Coastal North America:* Paleont. Amer., v. 6, No. 39, p. 55-135, pl. 20-29, 28 text fig.

Heilprin, Angelo, 1879, *On some new Eocene fossils from the Claiborne marine formation of Alabama:* Acad. Nat. Sci. Philadelphia, Proc., v. 31, p. 211-216, pl. 13.

Heilprin, Angelo, 1881, *On some new lower Eocene Mollusca from Clarke Co., Ala., with some points as to the stratigraphical positions of the beds containing them:* Acad. Nat. Sci. Philadelphia, Proc., 1880, v. 32, p. 364-375, pl. 20.

Heilprin, Angelo, 1891, *The Eocene Mollusca of the state of Texas:* Acad. Nat. Sci. Philadelphia, Proc. 1890, v. 42, p. 393-406.

Hendy, William J., 1948, *Notes on the stratigraphy of northeastern Wayne County, Mississippi:* Mississippi Geol. Society, 6th Field Trip guide book, p. 25-36.

Hoerle, Shirley E., and Vokes, Emily H., 1978, *A review of the volutid genera Lyria and Falsilyria (Mollusca: Gastropoda) in the Tertiary of the Western Atlantic:* Tulane Studies Geol. and Paleont., v. 14, No. 3, p. 105-130, 5 pl.

Howe, Robert Crombie, 1963, *Type Saline Bayou Ostracoda of Louisiana:* Louisiana Dept. Conserv., Geol. Bull. 40, 62 p., 4 pl., 6 fig.

Huddlestun, Paul F., 1965, *Correlation of Upper Eocene and Lower Oligocene strata between the Sepulga, Conecuh, and Choctawhatchee Rivers of Southern Alabama:* Master's thesis, Florida State University, 101 p., 13 fig.

Huddlestun, Paul F., and Hetrick, John H., 1978, *Stratigraphy of the Tobacco Road Sand—a new formation:* Georgia Geol. Survey, Bull. 93, p. 56-76, 8 fig.

Huddlestun, Paul F., Marsalis, William E., and Pickering, Sam M., Jr., 1974, *Tertiary stratigraphy of the central Georgia Coastal Plain:* Geol. Soc. Amer., Southeastern Section Guidebook, No. 12, 35 p.

Huff, William J., 1970, *The Jackson Eocene Ostracoda of Mississippi:* Mississippi Geol. Survey, Bull. 114, 289 p., 26 pl.

Hughes, Richard John, Jr., 1958, *Kemper County Geology:* Mississippi Geol. Survey, Bull. 84, 274 p., 65 fig.

Johnson, Charles Willison, 1899, *New and interesting species in the "Isaac Lea collection of Eocene Mollusca":* Acad. Nat. Sci. Philadelphia, Proc. 1899, v. 51, p. 71-82, pls. 1-2.

Keen, Myra, 1969, *Family Kelliellidae: Treatise Invert. Paleont.*, pt. N, v. 2 of 3, p. N651-N653, fig. E130.

Kennedy, William, 1892, *A section from Terrell, Kaufman County, to Sabine Pass on the Gulf of Mexico:* Texas Geol. Survey, 3rd Ann. Rept., p. 43-125.

Kent, Lois Schoonover, 1960, *A new subspecies of Crassatella clarkensis (Dall) from the Claiborne Eocene of southern United States:* Bull. Amer. Paleont., v. 40, No. 184, Appendix 1, p. 986-988, pl. 1.

Knight, J. Brookes, Cox, L. R., Keen, A. Myra, Batten, R. L., Yochelson, E. L., and Robertson, Robert, 1960, *Systematic Descriptions* (Archaeogastropoda): Treatise Invertebrate Paleont., pt. I, Mollusa 1, p. I169-I310, text fig. 89-205.

LeBlanc, Rufus Joseph, 1942, *Systematic descriptions of Lower Eocene Scaphopoda and Gastropoda of Louisiana:* p. 79-156, pl. 12-19 *in* Barry, John O'Keefe and LeBlanc, Rufus Joseph, *Lower Eocene faunal units of Louisiana:* Louisiana Dept. Conserv., Geol. Bull., No. 23, 208 p., 19 pl., 5 text fig., 2 tables.

Lea, Henry Carey, 1841, *Descriptions of some new species of fossil shells from the Eocene at Claiborne, Alabama:* Amer. Jour. Sci., 1st ser., v. 40, p. 92-103, pl. 1.

Lea, Isaac, 1833, *Contributions to geology:* Philadelphia, p. 227, 6 pl.

Lemoine and Douville, R., 1904, Soc. geol. France Mem., Paleontologie, No. 32, p. 10, pl. 1, fig. 4; pl. 2, fig. 18; pl. 3, fig. 7, 12.

Lowe, Ephraim Noble, 1915, *Mississippi, its geology, geography, soils and mineral resources:* Miss. Geol. Survey, Bull. 12, 335 p., map.

Lowe, Ephraim Noble, 1919, *Mississippi, its geology, geography, soil, and mineral resources* (a revision, with additions, of Bulletin 12): Miss. Geol. Survey, Bull. 14, 346 p., 20 fig., map.

Lowe, Ephraim Noble, 1933, *The Eocene formations below the Jackson:* Miss. Geol. Survey, Bull. 25, 125 p., 20 fig., map.

Marsalis, William E., and Friddell, Michael S., 1975. *A guide to selected Upper Cretaceous and Lower Tertiary outcrops in the lower Chattahoochee River Valley of Georgia:* Georgia Geol. Survey, Guidebook 15, 79 p., 44 fig., 4 pl.

May, James H., 1974, *Wayne County Geology and Mineral Resources:* Mississippi Geol. Survey, Bull. 117, 293 p.

McBride, E. F., Lindeman, W. L., and Freeman, P. S., 1968, *Lithology and petrology of the Gueydan (Catahoula) Formation in South Texas:* Bureau Econ. Geol., Univ. Texas, Report of Investigations, No. 63, 122 p., 28 pl.

Meyer, Otto, 1885a, *The genealogy and the age of the species of the southern Old-Tertiary.* Part I: Amer. Jour. Sci., 3rd ser., v. 29, No. 174, p. 457-468.

Meyer, Otto, 1885b, *Ibid.* Part II: Amer. Jour. Sci., 3rd ser., v. 30, No. 175, p. 60-72.

Meyer, Otto, 1886, *Contributions to the Eocene paleontology of Alabama and Mississippi:* Geol. Survey Alabama, Bull. 1, pt. 2, p. 61-85, pl. 1-3.

Meyer, Otto, 1887a, *Beitrag zur Kenntnis der Fauna des Alttertiärs von Mississippie und Alabama:* Senckenbergische naturforschende Gesellschaft in Frankfurt, 22 p., 2 pl.

Meyer, Otto, 1887b, *On the invertebrates from the Eocene of Mississippi and Alabama:* Acad. Nat. Sci. Philadelphia, Proc., v. 39, p. 51-56, pl. 3.

Meyer, Otto, and Aldrich, Truman Hemingway, 1886, *The Tertiary fauna of Newton and Wautubbee, Mississippi:* Cincinnati Soc. Nat. Hist., Jour., v. 9, No. 2, p. 40-50, 64, pl. 2.

Miller, Arthur K., 1947, *Tertiary nautiloids of the Americas:* Geol. Soc. America, Memoir 23, 234 p., 100 pl.

Milne-Edwards, Henri and Haime, Jules, 1848a, *Monographie des Turbinolides:* Annales des Sci. Nat., 3rd ser., v. 9.

Milne-Edwards, Henri and Haime, Jules, 1848b, *Monographie des Eupsammides:* Annales sci. nat., 3rd ser., v. 10.

Milne-Edwards, Henri and Haime, Jules, 1850, Annales sci. nat., 3rd serv., v. 8, p. 75.

Moore, Raymond C., ed., 1953, *Bryozoa: Treatise Invert. Paleont.*, pt. G, 253 p., 173 text-fig.

Mörch, Otto Andreas Lowson, 1860, *Review of the genus Tenagodus Guettard:* Zool. Soc. London, Proc., pt. 26, p. 409-415.

Morton, Samuel George, 1833, *Supplement to the "Synopsis of the Organic Remains of ferruginous sand formation of the United States" contained in vols 17 and 18 of this Journal:* Amer. Jour. Sci., 1st ser., v. 23, No. 2, p. 288-294, pl. 5, 8.

Morton, Samuel George, 1834, *Synopsis of the organic remains of the Cretaceous group of the United States.* Appendix. *Catalogue of the fossil shells of the Tertiary formation of the United States,* by Timothy A. Conrad: Philadelphia, 88 p., 19 pl., App. p. 1-8.

Murray, Grover Elmer, 1961, *Geology of the Atlantic and Gulf Coastal Province of North America:* Harper and Brothers, New York, 692 p.

Newman, William A., Zullo, Victor A., and Withers, T. H., 1969, *Cirripedia:* p. R206-R295, *in, Treatise on Invertebrate Paleontology.* Part R, *Arthropoda 4,* 398 p., 216 fig.

O'Donnell, Terrence Timothy, 1974, *Depositional systems in the lower Claiborne (Eocene) of Central Mississippi:* Master's Thesis, Dept. Geol., University of Mississippi, 60 p., 18 fig.

d'Orbigny, Alcide Dessalines d', 1850, *Prodome de paléontologie stratigraphique universelle des animaux mollusques and rayonnés faisant suite au cours élémentaire de paléontologie et de géologie stratigraphiques*, v. 2, 427 p.

Owen, David Pace, 1860, *Second report of a geological reconnaissance of the middle and southern counties of Arkansas made during the year 1859 and 1860:* Philadelphia, 433 p., 9 pl.

Palmer, Katherine E. Hilton Van Winkle, 1927/1929, *The Veneridae of eastern America, Cenozoic and Recent:* Palaeont. Amer., v. 1, No. 5, 319 p., 35 text fig. (1927); 45 pls. (1929).

Palmer, Katherine E. Hilton Van Winkle, 1937, *The Claibornian Scaphopoda, Gastropoda, and dibranchiate Cephalopoda of the southern United States:* Bull. Amer. Paleont., v. 7, No. 32, pt. 1, 548 p., pt. 2, 90 pls.

Palmer, Katherine E. Hilton Van Winkle, 1938, *Nomenclatorial notes on Eocene Mollusca:* Bull. Amer. Paleont., v. 24, No. 80, 7 p.

Palmer, Katherine E. Hilton Van Winkle, 1944, *Notes on Eocene gastropods, chiefly Claibornian:* Bull. Amer. Paleont., v. 28, No. 112, 26 p., 2 pl.

Palmer, Katherine E. Hilton Van Winkle, 1947, *Univalves and index:* p. 207-563, pl. 26-56, 62-64 *in* Harris, G. D. and Palmer, K. V. W., *The Mollusca of the Jackson Eocene of the Mississippi Embayment (Sabine River to the Alabama River):* Bull. Amer. Paleont., v. 30, No. 117, 564 p., 65 pl.

Palmer, Katherine E. Hilton Van Winkle, and Brann, Doris C., 1965, *Catalogue of the Paleocene and Eocene Mollusca of the Southern and Eastern United States. Part I. Pelecypoda, Amphineura, Pteropoda, Scaphopoda, and Cephalopoda:* Bull. Amer. Paleont., v. 48, No. 218, pt. 1, p. 1-466, pl. 1-3.

Palmer, Katherine E. Hilton Van Winkle, and Brann, Doris C., 1966, *Catalogue of the Paleocene and Eocene Mollusca of the Southern and Eastern United States. Part II. Gastropoda:* Bull. Amer. Paleont., v. 48, No. 218, pt. 2, p. 471-1057, pl. 4-5.

Powell, A. W. B., 1964, *The family Turridae in the Indo-Pacific: Part I. The subfamily Turrinae:* Indo-Pacific Mollusca, v. 2, No. 5, p. 227-345.

Powell, A. W. B., 1969, *The family Turridae in the Indo-Pacific: Part II. The subfamily Turriculinae:* Indo-Pacific Mollusca, v. 2, No. 10, p. 215-415.

Puri, Harbans S., 1969, *Family Nuculanidae Adams and Adams:* Treatise Invertebrate Paleont., pt. N, v. 1 (of 3), Mollusca G, Bivalvia, p. N235-N241, fig. A6-A9.

Puri, Harbans S., and Vernon, Robert O., 1964, *Summary of the geology of Florida and a guidebook to the classic exposures:* Florida Geol. Survey, Spec. Pub. No. 5, 312 p., 37 fig., 11 pl. 4 tables.

Rathbun, Mary J., 1935, *Fossil Crustacea of the Atlantic and Gulf Coastal Plain:* Geol. Soc. Amer. Spec. Papers No. 2, 160 p., 26 pl.

Ravenel, Edmund, 1844, *Description of some new species of fossil organic remains, from the Eocene of South Carolina:* Acad. Nat. Sci. Philadelphia, Proc., v. 2, p. 96-98.

Reinhart, Philip Wingate, 1935, *Classification of the pelecypod family Arcidae:* Musee roy. d'Histoire Nat. Belgique, Bull., v. 11, No. 13, 68 p., 4 pl.

Rogers, William Barton, and Rogers, Henry Darwin, 1837, *Contributions to the geology of the Tertiary formations of Virginia:* Amer. Philos. Soc. Trans., v. 5, p. 319-341, pl. 26-27.

Ross, Arnold, and Newman, William A., 1967, *Eocene Balanidae of Florida, including a new genus and species with a unique plan of "turtle-barnacle" organization:* Amer. Museum Novitates, No. 2288, p. 1-21, fig. 1-7.

Schilder, Franz Aldred, 1927, *Revision der Cypraeacea:* Archiv Naturg., 91 Abt. A, v. 10, 171 p.

Schilder, Franz Aldred, 1932, *Fossilium Catalogus:* I: *Animalia.* Pars. 55: *Cypraeacea:* W. Quenstedt, Ed., Berlin, p. 276.

Sheldon, Pearl Gertrude, 1917, *Atlantic Slope Arcas:* Paleont. Amer., v. 1, No. 1, 101 p., 16 pl.

Shreveport Geological Society, Eleventh Annual Field Trip, 1934, *Stratigraphy and paleontological notes on the Eocene (Jackson Group), Oligocene and lower Miocene of Clarke and Wayne Counties, Mississippi,* 53 p., 6 pl.

Solander, Daniel Carl, 1766, *in* Brander, Gustavo, *Fossilia Hantontensia collecta, et in Musaeo Britannico deposita:* London, 43 p., 9 pl.

Stefanini, G., 1924, *Relations between American and European Tertiary echinoid faunas:* Geol. Soc. Amer. Bull., v. 35, No. 4, p. 827-846, 4 fig.

Stenzel, Henryk Bronislaw, 1940, *New Eocene branchiopods from the Gulf and Atlantic Coastal Plain and Tertiary nautiloids from the Gulf Coastal Plain:* Univ. Texas Pub. 3945, p. 717-794, pl. 34-42.

Stenzel, Henryk Bronislaw, 1952a, *Boundary problems, in, Claiborne of western Alabama and eastern Mississippi:* Ninth Field Trip Guidebook, Mississippi Geol. Society, p. 11-31.

Stenzel, Henryk Bronislaw, 1952b, *Notes on surface correlation chart, in, Claiborne of western Alabama and eastern Mississippi:* Ninth Field Guidebook, Mississippi Geol. Society, p. 32-33.

Stenzel, Henryk Bronislaw, 1952c, *Transgression of the Jackson Group, in, Claiborne of western Alabama and eastern Mississippi:* Ninth Field Trip Guidebook, Mississippi Geol. Society, p. 36-43.

Stenzel, Henryk Bronislaw, 1971, *Oysters:* Treatise Invertebrate Paleont., pt. N, v. 3 (of 3), Mollusca 6, Bivalvia, p. N953-N1224, 153 fig.

Stenzel, Henryk Bronislaw, Krause, Edwin Koerps, and Twining, John Theodore, 1957, *Pelecypoda from the type locality of the Stone City Beds (Middle Eocene) of Texas:* Univ. Texas Pub. 5704, 237 p., 22 pls., 4 tables, 31 text figs.

Stewart, Ralph Bentley, 1930, *Gabb's California Cretaceous and Tertiary type lamellibranchs:* Acad. Nat. Sci. Philadelphia, Spec. Pub. 3, 314 p., 17 pl.

Thomas, Emil Paul, 1942, *The Claiborne:* Miss. Geol. Survey, Bull. 48, 96 p., 26 fig. 2 pl.

Toulmin, Lyman D., 1955, *Cenzoic geology of southeastern Alabama, Florida and Georgia:* Amer. Assoc. Petroleum Geologists, Bull., v. 39, No. 2, p. 207-235, 6 fig.

Toulmin, Lyman D., 1977, *Stratigraphic distribution of Paleocene and Eocene fossils in the Eastern Gulf Coast Region:* Geol. Survey Alabama, Monograph 13, v. 1, 602 p., 72 pl., fig. 1-2, 6, 8-18, 20-21, 23-24, 26-27, 29; v. 2, fig. 3-5, 7, 19, 22, 25, 28, 30-37.

Trowbridge, Arthur Carleton, 1923, *A geologic reconnaissance in the Gulf Coastal Plain of Texas near the Rio Grande:* U.S. Geol. Survey Prof. Paper 131-D, p. 85-107, 1 pl., map.

Trowbridge, Arthur Carleton, 1932, *Tertiary and Quanternary geology of the lower Rio Grande region, Texas:* U.S. Geol. Survey, Bull. 837, 260 p., 76 fig., 20 pl.

Tryon, G. W., Jr., and Pilsbry, H. A., 1896, *Manual of Conchology . . .*, v. 16.

Tschudy, R. H., 1973, *Stratigraphic distribution of significant Eocene palynomorphs of the Mississippi Embayment:* U.S. Geol. Survey Prof. Paper 743-B, 24 p., 4 pl.

Tucker, Helen Ione, 1936, *The Atlantic and Gulf Coast Tertiary Pectinidae of the United States:* Amer. Midland Nat., v. 17, p. 985-1017, pl. 5-10. Under H. I. Rowland.

Twitchell, Mayville W., 1915, *in* Clark, William Bullock, and Twitchell, Mayville W., *The Mesozoic and Cenozoic Echinodermata of the United States:* U.S. Geol. Survey Monograph 54, 341 p., 108 pl.

Vaughan, T. Wayland, 1895, *The stratigraphy of northwestern Louisiana:* Amer. Geol., v. 15, p. 205-229.

Vaughan, T. Wayland, 1896, *A brief contribution to the geology and paleontology of northwestern Louisiana:* U.S. Geol. Survey Bull. No. 142, 65 p., 4 pl.

Vaughan, T. Wayland, 1900, *The Eocene and lower Oligocene coral faunas of the United States with descriptions of a few doubtfully Cretaceous species:* U.S. Geol. Monograph 39, 263 p., 24 pl.

Vaughan, T. Wayland, 1919, *Contributions to the geology and paleontology of the Canal Zone, Panama* . . .. U.S. National Museum, Bull. 103, p. 547-612.

Verastegui, Pedro, 1953, *The pelecypod genus Venericardia in the Paleocene and Eocene of western North America:* Paleont. Amer., v. 4, No. 25, 112 p., 22 pl.

Vokes, Emily H., 1968, *Cenozoic Muricidae of the Western Atlantic region, Part IV, Hexaplex and Murexiella:* Tulane Studies in Geol., v. 6, No. 3, p. 85-126, pl. 1-8.

Weisbord, Norman E., 1977, *Some Paleocene and Eocene Barnacles (Cirripedia) of Alabama:* Bull. Amer. Paleont., v. 72, No. 297, p. 143-166, pl. 19-21.

Wenz, Wilhelm, 1943, *Handbuch der Paläozologie:* Band 6, v. 6, p. 1201-1506.

Wermund, E. G., 1965, *Cross-bedding in the Meridian Sand:* Sedimentology, v. 5, No. 1, p. 69-79.

Williamson, David Ray, 1976, *An investigation of the Tertiary lignites of Mississippi:* Miss. Geol. Survey, Information Series MGS-74-1, 146 p.

Withers, Thomas Henry, 1951, *Cretaceous and Eocene peduncles of cirripede Euscalpellum:* Bull. British Museum (Nat. Hist.), Geol. I, 5, p. 147-162, pl. 11-14.

Withers, Thomas Henry, 1953, *Catalogue of fossil Cirripedia in the Department of Geology. Vol. III. Tertiary:* British Museum (Nat. Hist.), London, 396 p., 64 pl.

Zullo, Victor August, 1963, *Classification and phylogeny of the Balanomorpha (Cirripedia):* Doctoral Dissertation, University of California, Berkeley, 372 p., 2 pl., 14 text-fig.

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