The Invertebrate Macropaleontology of the Clarke County, Mississippi, Area

DAVID T. DOCKERY III

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Bureau Director

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LETTER OF TRANSMITTAL

Mississippi Department of Natural Resources
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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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INVERTEBRATE MACROPALAEONTOLOGY OF CLARKE CO.

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.

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<td></td>
<td><em>Flabellum cuneiforme fragile</em></td>
<td>Miss. to Ala.</td>
</tr>
<tr>
<td></td>
<td><em>Flabellum cuneiforme pachyphyllum</em></td>
<td>Tex. to Miss.</td>
</tr>
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<td><em>Endopachys lonsdalei</em></td>
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<td>Wilcox Group</td>
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<td>Bashi Fm.</td>
<td><em>Balanophyllia haleana</em></td>
<td>Miss. to Ala.</td>
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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 lunuliform 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 altifera* 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:

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<tr>
<td>Vicksburg Group</td>
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<tr>
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<tr>
<td>Mint Spring Fm.</td>
<td>Spondylus dumosa</td>
<td>Miss. to Ala.</td>
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<td>and Marianna Ls.</td>
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<td>Red Bluff Fm.</td>
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<tr>
<td>Jackson Group</td>
<td>Pycnodonta trigonalis</td>
<td>La. to Fla.</td>
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<tr>
<td>Jackson Group</td>
<td></td>
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</tr>
<tr>
<td>in general</td>
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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 stalagmitum 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
Stnnum 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) mississipiensis (Meyer and Aldrich, 1886)
Pseudolitca vetusta carinata Conrad in Gabb, 1860
Levifusus mortoniopsis carexus (Harris, 1895)
Latirus moorei (Gabb, 1860)
Clavilithes kennedyanus Harris, 1895
Agronnia 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 incississimum Meyer and Aldrich, 1886 Type
Cadulus (Polyschides) newtonensis Meyer and Aldrich, 1886
Bivalvia

*Nucula (Nucula) ovula* Lea, 1833

*Nuculana wahtubbeana* (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 caitei* (Harris, 1919) Type

*Chlamys pulchrucosta* (Meyer and Aldrich, 1886) Type

*Cubitostrea sellaeformts* (Conrad, 1832)

*Venericardia (Rotundicardia) rotunda* Lea, 1833

*Glyptoactis (Claibornicardia) trapaquara* Harris, 1895

*Lirodiscus (Crustuloides) psychoterus* (Dall, 1900) Type

*Bathygormus 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)
Calyptrophorus stamineus (Conrad, 1856)
Hipponix pygmaeus I. Lea, 1833
Capulus americanus Conrad in Wailes, 1854
Calyptrea (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) sphenopsis Conrad, 1865 Type
Nuculana lintfera Conrad, 1865
Hilgardia multilineata (Conrad in Wailes, 1854)
Yoldia (Calorhadia) mater (Meyer, 1885)
Yoldia (Orthoyoldia) rubamnits 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
Timothythus 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) annexe (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.  
 | 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.

Eocene: Jackson Group

*Aporolepas hotvei* 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.
## INVERTEBRATE MACROPALEONTOLOGY OF CLARKE CO.

<table>
<thead>
<tr>
<th>WEST</th>
<th>FLORIDA</th>
<th>GEORGIA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ALABAMA</strong></td>
<td><strong>Panhandle</strong></td>
<td><strong>CENTRAL-EAST</strong></td>
</tr>
<tr>
<td>Miocene Undifferentiated</td>
<td>Chattahoochee Fm.</td>
<td>Hawthorn Fm.</td>
</tr>
<tr>
<td>Paynes Hammock Fm.</td>
<td>Bucatunna Clay</td>
<td>Suwannee Ls.</td>
</tr>
<tr>
<td>Chickasawhay Ls.</td>
<td>Glendon Ls.</td>
<td>Glendon Ls.</td>
</tr>
<tr>
<td>Bucatunna Clay</td>
<td>Glendon Ls.</td>
<td>Marianna Ls.</td>
</tr>
<tr>
<td>Byram Fm.</td>
<td>Marianna Ls.</td>
<td>Marianna Ls.</td>
</tr>
<tr>
<td>Glendon Ls.</td>
<td>Bumpnose Ls.</td>
<td>Bumpnose Ls.</td>
</tr>
<tr>
<td>Marianna Ls.</td>
<td>Suwannee Ls.</td>
<td>Suwannee Ls.</td>
</tr>
<tr>
<td>Red Bluff Fm.</td>
<td>Crystal River Fm.</td>
<td>'Cooper Marl'</td>
</tr>
<tr>
<td>Bumpnose Fm.</td>
<td>Williston Fm.</td>
<td>Twiggs Clay</td>
</tr>
<tr>
<td>Yazoo Fm.</td>
<td>Ingles Fm.</td>
<td>Twilla Ls.</td>
</tr>
<tr>
<td>Shubuta Clay Mbr</td>
<td>Crystal River Fm.</td>
<td>Crystal River Fm.</td>
</tr>
<tr>
<td>Pachuta Marl Mbr</td>
<td>Cocoa Sand Mbr</td>
<td>Cocoa Sand Mbr</td>
</tr>
<tr>
<td>N. Twistwood Cr. Clay Mbr</td>
<td>Moodys Branch Fm.</td>
<td>Moodys Branch Fm.</td>
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</tbody>
</table>

**CIAHOMBE GROUP**

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</tr>
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<tr>
<td>Paynes Hammock Fm.</td>
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</tr>
<tr>
<td>Chickasawhay Ls.</td>
<td>Glendon Ls.</td>
<td>Glendon Ls.</td>
</tr>
<tr>
<td>Bucatunna Clay</td>
<td>Glendon Ls.</td>
<td>Marianna Ls.</td>
</tr>
<tr>
<td>Byram Fm.</td>
<td>Marianna Ls.</td>
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<tr>
<td>Glendon Ls.</td>
<td>Bumpnose Ls.</td>
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<tr>
<td>Marianna Ls.</td>
<td>Suwannee Ls.</td>
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<td>Ingles Fm.</td>
<td>Twilla Ls.</td>
</tr>
<tr>
<td>Shubuta Clay Mbr</td>
<td>Crystal River Fm.</td>
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</tr>
<tr>
<td>Pachuta Marl Mbr</td>
<td>Cocoa Sand Mbr</td>
<td>Cocoa Sand Mbr</td>
</tr>
<tr>
<td>N. Twistwood Cr. Clay Mbr</td>
<td>Moodys Branch Fm.</td>
<td>Moodys Branch Fm.</td>
</tr>
</tbody>
</table>

**MODIFIED FROM:**
- Huddleston, 1965
- Huddleston, Marsalis, & Pickering, 1974
- Huddleston and Hentrick, 1978
- Puri and Vernon, 1964
- Toulmin, 1955

**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.
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 bottom to top consists of:

<table>
<thead>
<tr>
<th>Formation</th>
<th>Member</th>
<th>Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Meridian Sand</td>
<td></td>
<td>Fluvial—northern Miss.</td>
</tr>
<tr>
<td>2. Tallahatta Fm.</td>
<td>Basic City Shale</td>
<td>“Neritic bar”—southern Miss.—Ala.</td>
</tr>
<tr>
<td>3. Tallahatta Fm.</td>
<td>Neshoba Sand</td>
<td>Marine shelf and strandplain</td>
</tr>
<tr>
<td>4. Winona Fm.</td>
<td></td>
<td>Deltaic and strandplain</td>
</tr>
<tr>
<td>5. Zilpha Fm.</td>
<td></td>
<td>Destructional shelf (marine)</td>
</tr>
<tr>
<td>6. Kosciusko Fm.</td>
<td>Dobys Bluff Tongue</td>
<td>Marine shelf and prodelta</td>
</tr>
<tr>
<td>7. Kosciusko Fm.</td>
<td></td>
<td>Deltaic</td>
</tr>
<tr>
<td>8. Cook Mtn. Fm.</td>
<td>Archusa Marl</td>
<td>Destructional shelf (marine)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Carbonate shelf (marine)</td>
</tr>
</tbody>
</table>
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.
INVERTEBRATE MACROPALEONTOLOGY OF CLARKE CO. 31

Sandstone, white to light-gray, lightly indurated, bioturbated with some silicified burrow fillings

Clay, gray, some thin flaggy, claystone layers

Sandstone, gray, quartzitic

Clay, light-gray; flaggy claystone layers

Claystone, white to light-gray, thinly layered, fractured

Sand, light-gray, clayey

Sandstone, light-gray, nodular

Sand, light-gray, clayey, bioturbated

Sandstone, light-gray, nodular

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,
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, quartztic 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 mississipiensis (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—Protos-
cutella) in the Winona Formation indicate a shallow nearshore or shore-
face 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 Chicka-
sawhay 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 sub-
surface 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 "in-
cluding all the marine section above the Kosciusko and below the Cock-
field" (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 Veneri-
cardia (Venericor) densata (Conrad, 1845) with a slightly higher than
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
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.
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.
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 reequivalent 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 Marl 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 Koecisko Formation and the Andrews Marl Member of the Cook Mountain Formation at Dobys Bluff on the Clarksdale River at locality 29 (a and b) in the NW 1/4, SW 1/4, 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 28).
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 titanothere, 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
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 aban-
donment of the delta system. Eventually the delta plain surface was re-
worked 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 sand 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) de-
structional 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 sedi-
mentary slope. These trends are similar to those of the modern Mississippi
River Delta, a high-constructive, elongate, delta system.
Figure 84. The lower sand and upper shale members of the Cockfield Formation on Highway 511 at locality 59 in the E. 1/2, SW. 1/4, SW. 1/4, T. 21 N., R. 16 E., Clarke County. A lignite, 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
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 Moody's 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 *Periarchus 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
Shubuta at locality 31 (figure 31) contains numerous *P. lyelli pileus-sinensis*.

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 weather-
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 Ecucutta Creek at locality 46 in Clarke County. Here the lower part of the sequence contains abundant Red Bluff fossils and the upper part is non-fossiliferous. 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) Buckatunna 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-
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 conformably 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
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Limestone (calcirudite and calcarenite), gray, hard, fossiliferous with abundant Lepidocyclina supera
Limestone (mudstone), white, soft, fossiliferous
Limestone (wackestone), light-gray, hard, fossiliferous, with abundant fossil molds
Limestone (mudstone), white, soft, sparsely fossiliferous
Limestone (calcirudite), light-gray, fossiliferous, with abundant Lepidocyclina mantelli
Limestone (mudstone), white, soft, with contact erosional

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 elastics 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.
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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

1904. Lepidocyclina mantelli (Morton). Lemoine and R. Douville, Soc. Geol. France, Mem., Paléontologie, No. 32, p. 10, pl. 1, fig. 4; pl. 2, fig. 18; pl. 3, fig. 7, 12.

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


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


Type locality: ?


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


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


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


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

Astrangia sp.
Plate 25, figure 13

Occurrence: Mississippi: Archusa Marl, locality 27.

Family OCULINIDAE Gray, 1847
Genus ARCHOHELIA Vaughan, 1919
Archohelia vicksburgensis (Conrad)
Plate 76, figure 1


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

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
Paraeyathus bellus Vaughan
Plate 25, figures 5, 6, 9, 10A, 10B, 12
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, 4 1/2 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 PLATYTOCHUS** 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.


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. *Turbinollia goldfussi* Lea, Contr. Geol., p. 195, pl. 6, fig. 208.


Type locality: Gosport Sand, Claiborne Bluff, Alabama.

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

Flabellum cuneiforme acutiforme Vaughan
Plate 25, figure 3


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


Type locality: ?

Occurrence: Mississippi: Cook Mountain Formation, localities 64, 65, 4 miles northeast of Quitman, McLeod’s mill in Clarke County, Wautabee Hills, 8 miles west of Enterprise, 10⅔ 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


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


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


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


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.


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


Type locality: Lisbon Formation, Lisbon, Alabama.

Occurrence: Mississippi: Dobys Bluff Tongue, locality 26b; Cook Mountain Formation, locality 65. Alabama: Lisbon Formation, Lisbon
Invertebrate MacroPALEontology of Clarke Co. 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 GYMNO LAEMATA 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


Type locality: Moody's Branch Formation, Jackson, Mississippi.

Occurrence: Mississippi: Moody's Branch Formation, common at Jackson and locality 16.

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


Type locality: Moody's Branch Formation, Jackson, Mississippi.

Occurrence: Mississippi: Moody's 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


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


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.

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 Linne, 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.

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


Type locality: Cook Mountain Formation, Hickory, Mississippi.


Superfamily **TROCHACEA** Rafinesque, 1815

Family **TROCHIDAE** Rafinesque, 1815

Genus **SOLARIELLA** S. Wood, 1842

**Solariella sylvaerupis** Harris

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


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


**Solariella stalagmium modesta** (Meyer and Aldrich)

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


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.


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


Family TURBINIDAE Rafinesque, 1815
Genus *TIBURNUS* de Gregorio, 1890

*Tiburnus eboreus* (Conrad)
Plate 33, figures 3A, 3B, 3C


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

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

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


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


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.


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


*Architectonica scrobiculata hicoria* Palmer, 1937
Plate 15, figure 4; Plate 30, figures 5A, 5B


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.


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, Contr. Geol., p. 120, pl. 4, fig. 108.

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


*Architectonica (Granosolarium) meekana splendida* Palmer

Plate 31, figures 4A, 4B


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.


*Architectonica (Granosolarium) sp.*

Plate 31, figures 3A, 3B

Occurrence: Mississippi: Cook Mountain Formation, locality 65.

Subgenus SOLARIAAXIS Dall, 1892

*Architectonica (Solariaxis) elaborata* (Conrad)

Plate 15, figures 6A, 6B


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


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

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


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


**Turritella rina** Palmer, var.
Plate 2, figure 1

Occurrence: Mississippi: Bashi Formation, locality 19.

**Turritella gilberti** Bowles
Plate 2, figure 2


1939. *Turritella gilberti* Bowles, Jour. Paleont., v. 13, p. 302, pl. 32, fig. 16.


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 compressed 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


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


**Turritella carinata** I. Lea

Plate 29, figure 1

1833. *Turritella carinata* I. Lea, Contr. Geol., p. 129, pl. 4, fig. 120.

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


**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 re-
connaissance of the middle and southern counties of Arkansas,
pl. 9, fig. 6.

10, fig. 11.

275, pl. 31, fig. 5-7.

Paleont., v. 48, No. 218, pt. 2, p. 981.

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

10, fig. 10.

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

897, fig. 1488.

1939. *Mesaltia claibornensis* Harris. Bowles, Jour. Paleont., v. 13, p. 328,
pl. 34, fig. 5.


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

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


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

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


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

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

*Triphora major* (Meyer)
Plate 29, figure 11


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


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


Type locality: Cook Mountain Formation, Newton, Mississippi.

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

*Cirsotrema (Coroniscala) linteum* (Conrad)
Plate 32, figure 8


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

Cirsotrema (Coroniscala) nassulum (Conrad)
Plate 32, figure 9


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.


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


Cirsotrema (Coroniscala) nassulum creolum Palmer
Plate 58, figure 5; Plate 75, figure 2


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


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

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

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. *Pastithea umbilicata* I. Lea, Contri. Geol., p. 103, pl. 4, fig. 85.

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


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


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 pygmaeus* I. Lea, Cont. Geol., p. 95, pl. 3, fig. 75.

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


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

Calyptrea (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. *Calyptrea aperta* (Solander). Harris, Bull. Amer. Paleont., v. 3, No. 11, pt. 2, p. 84, pl. 11, fig. 13-16.
1977. *Calyptrea (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


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


Crepidula dumosa Conrad

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


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


Superfamily CYRAEACEA Rafinesque, 1815

Family OVULIDAE Fleming, 1822
Genus SULCOCYPRAEA Conrad, 1865

Sulcocypraea kennedyi (Harris)
Plate 15, figures 8, 9A, 9B


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


Sulcocypraea vaughani (Johnson)
Plate 34, figures 6A, 6B


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.


Sulcocypraea healeyi (Aldrich)
Plate 77, figure 1

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; Moody's Branch Formation, localities 1, 2. Louisiana: Moody's 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


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.

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


Genus POLINICES Montfort, 1810

Polinices weisbordi Palmer
Plate 57, figure 9


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


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


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


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


1977. *Euspira jacksonensis* Palmer. Dockery, Miss. Geol. Survey, Bull. 120, p. 63, pl. 7, fig. 5A, 5B.

Type locality: Moodys Branch Formation, locality 1.


**Genus SINUM** Röding, 1798

**Sinum declive** (Conrad)
Plate 1, figures 9A, 9B


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.


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

**Sinum bilix** (Conrad)
Plate 16, figures 1A, 1B; Plate 24, figure 6; Plate 33, figures 5A, 5B, 6A, 6B

1937. *Sinum bilix* (Conrad). Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 139, pl. 15, fig. 17-20, pl. 80, fig. 7.

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


**Sinum inconstans** (Meyer and Aldrich)
Plate 33, figures 4A, 4B, 7A, 7B


Type locality: Cook Mountain Formation, Newton, Mississippi.

Genus **SIGATICA** Meyer and Aldrich, 1886

**Sigatica clarkeana** Aldrich

Plate 1, figures 8A, 8B


Type locality: Bashi Formation, Choctaw Corner, Alabama.


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


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


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


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


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


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


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


Ficopsis penita (Conrad)
Plate 36, figure 1


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


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

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.


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

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.


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

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 meglameriae Palmer
Plate 35, figures 7, 8

Type locality: Cook Mountain Formation, Hickory, Mississippi.


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 Rugotypsis Vella, 1961

Typhis (Rugotypsis) dentatus Johnson
Plate 58, figure 7
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


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


Type locality: Cook Mountain Formation, Newton, Mississippi.


Subgenus BASTROPIA Palmer, 1937

Mitrella (Bastropia) bastropensis (Harris)

Plate 37, figure 8


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


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


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


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.


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


**Buccitriton texanus** (Gabb)

**Plate 16, figures 6, 7**


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


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


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

1899b. Pseudoliva vetusta Conrad "var." Harris in Harris and Veatch The geology of Louisiana. Part 5, p. 305, pl. 54, fig. 6, 7.


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 Formation, localities 19, 20, 21. Alabama: Bells Landing Member, Tuscaloosa Formation, Bells Landing and Yellow Bluff on the Alabama River, Tuscaloosa; Nanafalia Formation, Nanafalia; Bashi Formation, near the mouth of Bashi Creek, Hatchetbee. 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.

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


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

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


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


Type locality: Bashi Formation, locality 21.


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 Duménil, 1806

*Nassarius exilis* (Conrad)
Plate 2, figure 3


Type locality: Type not designated.


Genus *BULLIA* Gray, 1834

*Bullia calluspira* n. sp.

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


Type locality: Bashi Formation, locality 19.


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 altitlis 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


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


**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

1937. *Levifusus mortoniopsis* (Gabb). Palmer, Bull. Amer. Paleont., v. 7, No. 32, p. 330, pl. 49, fig. 7, 8, 12; pl. 87, fig. 7.

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


**Levifusus mortoniopsis carexus** (Harris)

Plate 36, figure 3

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

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.

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


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


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

Genus **TRITONOATRACTUS** Cossmann, 1901

**Tritonoatractus pearlensis** (Aldrich)
Plate 58, figure 9


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


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


Genus **CLAVILITHES** Swainson, 1840

**Clavilithes kennedyanus** Harris
Plate 23, figure 2; Plate 37, figure 5

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


Clavilithes humerosus Conrad in Wailes
Plate 58, figure 6


Type locality: Moodys Branch Formation, Jackson, Mississippi.


Superfamily VOLUTACEA Rafinesque, 1815
Family OLIVIDAE Latreille, 1825
Genus ANCILLA Lamarck, 1799

Ancilla staminea punctulifera (Gabb)
Plate 17, figure 3; Plate 38, figure 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


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

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

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.


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


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.


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.


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

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.  

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

Caricella stenzeli Palmer, 1937  
Plate 39, figure 3


Type locality: Cook Mountain Formation, Wautubbee, Mississippi.  
Caricella subangulata Conrad in Wailes
Plate 59, figure 4

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.


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.
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


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


*Lapparia dumosa* (Conrad *in* Wailes) var.

Plate 59, figure 6

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


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


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.
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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.

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


Genus BONELLITIA Jousseaume, 1887

Bonellitia parilis Palmer
   Plate 16, figure 5


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


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 DENTIMARCO Cossmann, 1899

**Marginella (Dentimargo) constrictoides** Meyer and Aldrich
Plate 40, figures 7, 8


Type locality: Cook Mountain Formation, Newton, Mississippi.


**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


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


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.


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


*Bullata semen jacksonensis* (Meyer)
Plate 59, figures 1, 2A, 2B


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


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


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


Superfamily CONACEA Rafinesque, 1815
Family TURRIDAE Swainson, 1840
Genus *MICHELA* Gardner, 1945

*Michela trabeatoides* (Harris)
Plate 17, figure 1


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


Genus *CORONIA* de Gregorio, 1890

*Coronia childreni* (I. Lea) var. a
Plate 2, figure 6


*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


Type locality: Cook Mountain Formation, Newton, Mississippi.

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

**Coronia margaritosa** (Casey)
Plate 41, figure 6


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


**Coronia alternata** (Conrad)
Plate 41, figure 7


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


**Coronia? cf. C.? casteri** (Harris)
Plate 41, figure 5


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


**Coronia conjuncta** (Casey)

Plate 59, figures 9, 10


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.


Type locality: Cook Mountain Formation, Hickory, Mississippi.


*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.


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

1977. Sinistrella americana (Aldrich). Dockery, Miss. Geol. Survey, Bull. 120, p. 90, pl. 15, fig. 4.

Type locality: Moodys Branch Formation, Jackson, Mississippi.


Genus INFRACORONIA Harris, 1947

Infracoronia ludoviciana (Vaughan)
Plate 41, figure 12


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


Genus HESPERITURRIS Gardner, 1945

Hesperiturris nodocarinatus (Gabb)
Plate 18, figure 1


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.


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


**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.


**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?

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.

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


**Eopleurotoma cochlea** Harris
Plate 18, figure 4

1937. **Eopleurotoma cochlea** Harris, Paleont. Amer., v. 2, No. 7, p. 33, pl. 5, figure 6.

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


**Genus GLYPHTOMA** Casey, 1904

**Glyptotoma crassiplicata** (Gabb)
Plate 18, figure 12

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.
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.

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


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


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


Genus PROTOSURCULA Casey, 1904

Protosurcula gabbii (Conrad)

Plate 18, figures 5, 6


Type locality: ?


**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.

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* (Alrich)

Plate 60, figure 11

1886. *Pleurotoma (Ancistrostyrinx) columbaria* Aldrich, Geol. Survey Alabama, Bull. No. 1, pt. 1, p. 31, pl. 6, fig. 9.
1977. *Cochlespira columbaria* (Alrich). 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


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


Genus **COCHLESPIROPSIS** Casey, 1904

**Cochlespiropsis engonata** (Conrad)
Plate 18, figure 8


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

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


**Scobinella newtonensis** Aldrich

Plate 41, figure 9


Type locality: Cook Mountain Formation, Newton, Mississippi.

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

**Scobinella louisianae** Harris

Plate 60, figure 10


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.


**Scobinella pluriplicata** Casey

Plate 76, figure 3


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

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

**Scobinella caelata** Conrad var.

Plate 76, figure 4


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.


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


Type locality: Cook Mountain Formation, Newton, Mississippi.

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

*Cordieria 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.


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** Linne, 1758

**Subgenus LITHOCONUS** Mörch, 1852

**Conus (Lithoconus) sauridens** Conrad

Plate 19, figures 1, 2, 3


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


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

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."

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

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.
new name.

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

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.

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

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.


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


*Tornatellaea lata* (Conrad in Morton)

Plate 60, figures 1, 2


Type locality: Claiborne Group, Alabama (type locality not differentiated).


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


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


Superfamily CYLICHACEA A. Adams, 1850
Family CYLICHIHNIADA A. Adams, 1850
Genus SCAPHANDER Montfort, 1810

Scaphander jacksonensis Palmer
Plate 60, figure 9
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

Type locality: Moodys Branch Formation, Jackson, Mississippi.


Superfamily BULLACEA Rafinesque, 1815
Family RETUSIDAE Thiele, 1926
Genus RETUSA Brown, 1827
Subgenus CYLICHIURNINA 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.

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


Retusa (Cylichnina) jacksonensis (Meyer)
Plate 60, figure 5

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.


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
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.
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.

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.

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

*Dentalium (Antalis) minutistriatum* Gabb
Plate 43, figure 11


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


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


Subgenus POLYSCHIDES Pilsbry and Sharp, 1898

Cadulus (Polysches) jacksonensis Meyer
Plate 60, figure 3


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.

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**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.


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


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

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

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


Yoldia (Calorhadia) mater (Meyer)

Plate 61, figures 4A, 4B

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.


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.

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

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.


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. *Area (cuculloides ?) ludoviciana* Harris, Bull. Amer. Paleont., v. 6, No. 31, p. 54, pl. 22, fig. 8-16.


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.


**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

1917. Arca (Scapharca) vaughani Casey. Sheldon, Paleont. Amer., v. 1, No. 1, p. 31, pl. 7, fig. 11.

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


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


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.

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


Type locality: Lisbon Formation, Lisbon Bluff, Alabama River, Alabama.


Glycymeris (Glycymeris) idonea (Conrad)
Plate 62, figures 3A, 3B

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,

**Glycymeris (Glycymeris) filosa** (Conrad in Wailes)
Plate 61, figures 7A, 7B; Plate 62, figures 4A, 4B

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


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.

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


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

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


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


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.


Type locality: Lisbon Formation, Sowilpa Creek, Choctaw County, Alabama.


*Chlamys burlesonensis* (Harris)

Plate 13, figures 2, 4


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.

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) wahtubbean us Dall, Wagner Free Inst. Sci., Trans., v. 3, pt. 4, p. 736, pl. 34, fig. 9.
1936. Chlamys (Chlamys) wahtubbeanus Dall. Tucker, Amer. Midland Nat., v. 17, p. 992, pl. 5, fig. 7-9; pl. 9, fig. 4.

Type locality: Cook Mountain Formation, Indian Mound 3 miles east of Newton on the A. and V. Railroad.


Subgenus Aequipecten Fischer, 1886

Chlamys (Aequipecten) nupera (Conrad in Wailes)
Plate 63, figure 4

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.


Chlamys spillmani (Gabb)
Plate 75, figures 1A, 1B


Type locality: Yazoo Formation, Alabama.


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

1834. Pecten perplanus Morton. Morton, Synop. organic remains, Cretaceous Group, p. 58, pl. 5, fig. 5, pl. 15, fig. 8.


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

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


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.


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 Linne, 1758

**Anomia** sp.  
Plate 47, figure 9

Occurrence: Mississippi: Archusa Marl, locality 26a

Family PLICATULIDAE Watson, 1930  
Genus PLICATULA Lamarck, 1801

**Plicatula filamentosa concentrata** Dall  
Plate 47, figures 6A, 6B, 8A, 8B


Type locality: Cook Mountain Formation, Wautubbee, Mississippi.  

**Plicatula filamentosa planata** Meyer and Aldrich  
Plate 23, figure 6; Plate 48, figures 1, 2, 3


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 Linne, 1758
Subgenus SPONDYLUS Linne, 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.

Type locality: Red Bluff Formation, St. Stephens Bluff, Tombigbee River, Alabama.


Suborder OSTREINA Ferussac, 1822
Superfamily OSTREACEA Rafinesque, 1815
Family GYPHAEIDAE Vyalov, 1936
Genus Pycnodonte Fischer de Waldheim, 1835
Subgenus Pycnodonte Fischer de Waldheim, 1835

Pycnodonte (Pycnodonte) trigonalis (Conrad in Wailes)
Plate 63, figure 3

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

Genus **GRYPHAEOSTREA** Conrad, 1865

**Gryphaeostrea plicatella** (Morton)
Plate 75, figure 3


Type locality: Jackson Group (probably Pachuta Marl), Alabama.


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.


Genus **OSTREA** Linné, 1758

**Ostrea brevifrona** 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


Type locality: Tallahatta Formation, Caton’s Bluff, Conecuh River, west-northwest of Andalusia, Alabama.


*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.

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.
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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.


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.


Genus LOPHA Röding, 1798
Subgenus LOPHA Röding, 1798

Lopha (Lopha) vicksburgensis (Conrad)
Plate 78, figures 4A, 4B; Plate 80, figures 4, 5, 9


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

1977. Gonimyrtea curta (Conrad). Dockery, Miss. Geol. Survey, Bull. 120, p. 119, pl. 23, fig. 3A, 3B, 4A, 4B.

Type locality: Moody's Branch Formation, locality 9.

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.
1977. Conimyrtsea 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.

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.


Genus CODAKIA Scopoli, 1777  
Subgenus CLAIBORNITES Stewart, 1930

Codakia ? (Claibornites) sp.  
Plate 6, figures 1A, 1B, 3A, 3B, 6


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.

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.

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


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

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


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 the 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.

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.


**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


1968. *Venericardia (Rotundicardia) carsonensis* 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


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

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.


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.

Type locality: Greggs Landing Member, Tuscahoma Formation, Greggs Landing, Alabama River, Alabama.


Venericardia (Venericor) bashiplata Gardner and Bowles
Plate 7, figures 1, 2; Plate 8, figures 1, 2
Venericardia (Venericor) 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.

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.


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


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


Venericardia (Venericor) densata (Conrad). Gardner and Bowles,


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.


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.
1919. *Venericardia rotunda* varying towards *trapaquara* Harris, Bull. Amer. Paleont., v. 6, No. 31, p. 80, pl. 29, fig. 6, 7.


**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.

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Superfamily CRASSATELLACEA Ferussac, 1822
Family ASTARIDAE d’Orbigny, 1844
Genus *ASTARTE* J. Sowerby, 1816

**Astarte triangulata** Meyer
Plate 77, figures 4A, 4B, 5A, 5B


**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


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


Lirodiscus (Lirodiscus) smithvillensis (Harris) var.
Plate 6, figures 7A, 7B


Lirodiscus (Lirodiscus) pretriangulata (Dockery)
Plate 65, figures 3A, 3B, 4A, 4B, 5A, 5B, 6A, 6B

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. ? Louisiana: 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

1946. Lirodiscus jacksonensis (Meyer). Harris, Bull. Amer. Paleont., v. 30, No. 117, pt. 1, p. 77-78, pl. 18, fig. 1-5, 8-10.
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


Type locality: Hurricane lentil, base of Landrum Member, Cook Mountain Formation, Hurricane Bayou, Houston County, Texas.

Occurrence: Mississippi: Cook Mountain Formation, localities 63, 69,

**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.

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


Type locality: Cook Mountain Formation, Lapiniere Landing on the Ouachita River, Louisiana.


**Bathytormus flexurus productus** (Conrad)
Plate 66, figures 2A, 2B, 3A, 3B, 4A, 4B, 5A, 5B, 6A, 6B; Plate 67, figures 1A, 1B


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


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


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.

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

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.

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


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


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.


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


Type locality: Moodys Branch Formation, locality 9.

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

**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.


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


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


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.

Subgenus MOERELLA Fischer, 1887

Tellina (Moerella) petropolitana Stenzel and Krause
Plate 22, figure 4


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


Family SEMELIDAE Stoliczka, 1870
Genus ABRA Lamarck, 1818
Subgenus ABRA Lamarck, 1818

Abra (Abra) cf. A. perovata (Conrad)
Plate 69, figures 2A, 2B


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


Type locality: Moodys Branch Formation, locality 9.


Superfamily VENERACEA Rafinesque, 1815

Family VENERIDAE Rafinesque, 1815

Genus PITAR Romer, 1857

Subgenus PITAR Romer, 1857

Pitar (Pitar) nuttalliopsis (Heilprin)

Plate 10, figure 5


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


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


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


**Pitar (Calpitaria) texacola** (Harris)
Plate 52, figures 4A, 4B


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


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.


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


Subgenus **MACROCALLISTA** Meek, 1876

*Callista* (*Macrocallista*) *sylvaerupis* (Harris)

Plate 10, figures 6, 7A, 7B.


1919. *Meretrix sylvaerupis* Harris, Bull. Amer. Paleont., v. 6, No. 31, p. 136, pl. 43, fig. 1.


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

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

1919. *Corbula subengonata* Dall. Harris, Bull. Amer. Paleont., v. 6, No. 31, p. 185, pl. 56, fig. 1-4, 7; 6, 8 vars.

Type locality: Greggs Landing Member, Tuscahoma Formation, Greggs Landing, Alabama River.


Discussion: Harris (1919, p. 56) mentions a variety of this species in the Bashi Formation that approaches the form of *Caryocorbula alabamienst* (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

1924. *Corbula (Cuneocorbula) deussenti* Gardner in Deussen, U.S. Geol. Survey Prof. Paper 126, p. 68, pl. 22, fig. 8, 8a.

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


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.


**Corbula (Caryocorbula) willistoni arkansia** Harris
Plate 71, figure 9


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.

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


Type locality: Cook Mountain Formation, Newton, Mississippi.


Caestocorbula wailesiana Harris in Dall
Plate 71, figures 1A, 1B, 3A, 3B

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.

Phylum ARTHROPODA
Superclass CRUSTACEA
Class CIRRIPIEDIA 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

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.

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: Moody's 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


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.

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


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

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.
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


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.

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.
Figure 1  
Madracis gregorioi Vaughan, 1900  
Greatest diameter of corallum 13.4 mm, average diameter of corallites 3 mm; locality 19. MGS specimen 03.

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.

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.

8  
Sigatica clarkeana Aldich, 1887  
20.7 mm, width 18.3 mm; locality 20. MGS specimen 10.

9  
Sinum declive (Conrad, 1833)  
Height 13 mm, width 11.2 mm; locality 20. MGS specimen 11.

10  
Euspira sabina (Palmer, 1937)  
Height 9.5 mm, width 12.7 mm; locality 20. MGS specimen 12.
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<th>Figure</th>
<th>Specimen Description</th>
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<td>1</td>
<td>Turritella rina Palmer, 1937, var. Height 15.5 mm, width 7 mm; locality 19. MGS specimen 13.</td>
</tr>
<tr>
<td>2</td>
<td>Turritella gilberti Bowles, 1939 Height 10.2 mm, width 4 mm; locality 19. MGS specimen 14.</td>
</tr>
<tr>
<td>3</td>
<td>Nassarius exilis (Conrad, 1860) Height 8.3 mm, width 4.1 mm; locality 19. MGS specimen 15.</td>
</tr>
<tr>
<td>4</td>
<td>Eopleurotoma cainei (Harris, 1899) Incomplete specimen; height 7.7 mm, width 3.2 mm; locality 19. MGS specimen 16.</td>
</tr>
<tr>
<td>5</td>
<td>Cornulina minax compressa n. subsp. Height 31.4 mm, width 24.5; locality 20. MGS specimen 17.</td>
</tr>
<tr>
<td>6</td>
<td>Coronia childreni (I. Lea, 1833) var. a Height 9.6 mm, width 3.4 mm; locality 19. MGS specimen 18.</td>
</tr>
<tr>
<td>7</td>
<td>Athleta tuomeyi (Conrad, 1853) Incomplete specimen; height 29.1 mm, width 21.7 mm; locality 19. MGS specimen 19.</td>
</tr>
<tr>
<td>8</td>
<td>Tornatellae bella Conrad, 1860 Height 13.6 mm, width 8 mm; locality 19. MGS specimen 20.</td>
</tr>
</tbody>
</table>
Figure 1, 2, 3  
Pseudoliva santander Gardner, 1945  
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.  

Figure 4, 5, 6, 7  
Bullia calluspira n. sp.  
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.
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.

Crassostrea sp. ..............................................................................160
Right valve; height 51.7 mm, length 32 mm, inflation 10 mm; locality 19. MGS specimen 29.
### EXPLANATION PLATE 5

**Bashi Formation (Wilcox Group)**

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<th>Figure</th>
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<th>Description</th>
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| 1, 2   | 162  | **Odontogryphaea sp.**
|        |      | 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      | 153  | **Chlamys choctavensis** (Aldrich, 1895)
|        |      | Left valve; height 23 mm, length 23.5 mm, inflation 3 mm; locality 19. MGS specimen 32. |
| 4, 5   | 164  | **Lucina (Cavilinga) pomilia smithi** (Meyer, 1866)
|        |      | 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. |
EXPLANATION PLATE 6
Bashi Formation (Wilcox Group)

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. nanapla 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.
EXPLANATION PLATE 7
Bashi Formation (Wilcox Group)

Figure Page

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.
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**Bashi Formation (Wilcox Group)**

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**Venericardia (Venericor) bashiplata** Gardner and Bowles, 1939

1. Left valve; same specimen as in plate 7, figure 1. MGS specimen 40.
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Doby's Bluff Tongue, Kosciusko Formation (Claiborne Group)

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<td><em>Tellina (Arcopagia) raveneli</em> Conrad, 1846</td>
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<td>2</td>
<td><em>Diplodonta sp.?</em></td>
<td>7.6 mm</td>
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<tr>
<td>3</td>
<td><em>Cubitostrea sp.</em></td>
<td>32.3 mm</td>
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<td>4</td>
<td><em>Barbatia (Plagiarca) rhomboidella</em> (Lea, 1833)</td>
<td>5.7 mm</td>
</tr>
<tr>
<td>5</td>
<td><em>Barbatia (Plagiarca) rhomboidella</em> (Lea, 1833)</td>
<td>11.2 mm</td>
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<td>6</td>
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<td>Tellina (Moerella) petropolitana Stenzel and Krause, 1957</td>
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<td>Left valve with hinge missing; height (incomplete) 15 mm, length 27 mm; locality 26b. MGS specimen 151.</td>
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<td>Corbula (Caryocorbula) sp</td>
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<td>7. Right valve; height 3.5 mm, length 4.5 mm, inflation 1.7 mm; locality 26b. MGS specimen 153.</td>
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<td>8. Left valve; height 4.2 mm, length 6.2 mm, inflation 1.9 mm; locality 26b. MGS specimen 154.</td>
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<td>Clavilithes kennedyanus Harris, 1895</td>
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<td>Incomplete specimen; height 42 mm, width 19 mm; locality 25. MGS specimen 156.</td>
</tr>
<tr>
<td>3</td>
<td>Scalina sp</td>
</tr>
<tr>
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<td>Incomplete specimen; height 5 mm, width 1.7 mm; locality 25. MGS specimen 157.</td>
</tr>
<tr>
<td>4</td>
<td>Agaronia alabamensis (Conrad, 1833)</td>
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<tr>
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<td>Incomplete specimen; height 14.5, width 10 mm; locality 25. MGS specimen 158.</td>
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<tr>
<td>5</td>
<td>Bathytormus clarkensis ludovicianus (Kent, 1960)</td>
</tr>
<tr>
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<td>Incomplete left valve; height 22 mm, inflation 7.7 mm; locality 25. MGS specimen 159.</td>
</tr>
<tr>
<td>6</td>
<td>Plicatula filamentosa planata Meyer and Aldrich, 1886</td>
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<tr>
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<td>Left valve; height 24 mm, length 21.5 mm, inflation 4 mm; locality 25. MGS specimen 160.</td>
</tr>
</tbody>
</table>
Figure Page
1, 2, 3 Cubitostrea sellaeformis (Conrad, 1832) ................................................................. 162
1. Shell replaced by translucent chalcedony with sediment filled bor-
   ings 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 speci-
   men 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.
EXPLANATION PLATE 25
Cook Mountain Formation (Claiborne Group)

1

Flabellum cuneiforme pachyphyllum Gabb and Horn, 1895

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.
3. Height 21 mm, large diameter 19.3 mm, small diameter 13 mm; locality 26a. MGS specimen 78.

3

Flabellum cuneiforme acutiforme Vaughan, 1900

Height 16.2 mm, large diameter 12 mm, small diameter 6 mm; locality 65. MGS specimen 417.

5

Paracyathus bellus Vaughan, 1900

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.
7. Height 10.4 mm, greatest diameter 4.3 mm; locality 61. MGS specimen 423.
8. Calice view (10A) and lateral view (10B); height 3 mm, diameter 3.7 mm; locality 27. MGS specimen 77.
9. Height 5.3 mm, diameter 4 mm; locality 62. MGS specimen 425.

7

Paracyathus alternatus Vaughan, 1900

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.
9. Attached to Bucictriton sagenum (Conrad, 1833) and incomplete; greatest diameter 4.6 mm; locality 68. MGS specimen 420.

13

Astrangia sp

Height 2.3 mm, diameter of calice 3.4 mm; locality 27. MGS specimen 84.
EXPLANATION PLATE 26
Cook Mountain Formation (Claiborne Group)

Figure | Page | Description
--- | --- | ---
1, 2 | 64 | Discotrochus orbignianus Milne-Edwards and Haime, 1848
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 | 65 | Discotrochus sp
Calice view (3A) and lateral view (3B); height 1.4 mm, diameter 4.5 mm; locality 62. MGS specimen 429.

4 | 66 | Trochocyathus depressus Vaughan, 1900
Calice view (4A) and basal view (4B); height 2.7 mm, diameter 7 mm; locality 26a. MGS specimen 68.

5, 8 | 67 | Platytrochus stokesi (Lea, 1833)
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 | 70 | Dendrophyllia lisbonensis Vaughan, 1900
6. Greatest dimension of coralum 29.3 mm, diameter of largest coralite 7 mm; locality 65. MGS specimen 433.
9. Greatest dimension of coralum 38.2 mm, diameter of largest coralite 4.5 mm; locality 65. MGS specimen 432.

7 | 69 | Balanophyllia sp
Height (incomplete) 16.5 mm, greatest diameter 10.5 mm; locality 61. MGS specimen 434.

10 | 65 | Astrangia harrisi Vaughan, 1900
6.5 mm; locality 65. MGS specimen 436.

11 | 65 | Astrangia expansa Vaughan, 1900
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.
EXPLANATION PLATE 27
Cook Mountain Formation (Claiborne Group)

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.
EXPLANATION PLATE 28
Cook Mountain Formation (Claiborne Group)

Figure | Page
---|---
1 | 73

Puncturella (Altrix) altior (Meyer and Aldrich, 1886)
Apical view (1A), lateral view (1B), and interior view showing septum and quadratalobate apical aperture (1C); height 11.2 mm, length 16.4 mm, width 12.3 mm; locality 65. MGS specimen 444.

2, 3, 4 | 74

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.

5 | 72

Holoporella granulosa Canu and Bassler, 1920
Zoarium encrusting on Cubitostrea sellaeformis (Conrad, 1832); greatest diameter of zoarium 9 mm; locality 62. MGS specimen 448.

6 | 73

Chiton sp.
Head valve; width 11.7 mm, length 5.6 mm; locality 63. MGS specimen 449.
Cook Mountain Formation (Claiborne Group)

Figure EXPLANATION PLATE 29

<table>
<thead>
<tr>
<th>Figure</th>
<th>Species and Description</th>
<th>Height</th>
<th>Width</th>
<th>Locality</th>
<th>MGS Specimen</th>
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<tbody>
<tr>
<td>1</td>
<td>Turritella carinata Lea, 1833</td>
<td>39.4 mm</td>
<td>8.7 mm</td>
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<td>2, 3, 5, 7</td>
<td>Turritella rina Palmer, 1937</td>
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<td>12.1 mm</td>
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<td></td>
<td>33.7 mm</td>
<td>12.3 mm</td>
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<td>28.4 mm</td>
<td>11 mm</td>
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<td>453</td>
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<td>9.3 mm</td>
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<td>454</td>
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<tr>
<td>4, 6</td>
<td>Turritella nasuta Gabb, 1860</td>
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<td>8.7 mm</td>
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<td>5.3 mm</td>
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<td>8</td>
<td>Mesalia claibornensis Harris, 1895</td>
<td>20.6 mm</td>
<td>7.2 mm</td>
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<tr>
<td>9, 12, 13</td>
<td>Cerithiella nassula (Conrad, 1834)</td>
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<td>3.8 mm</td>
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<td></td>
<td>17 mm</td>
<td>5.4 mm</td>
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<td>27 mm</td>
<td>6.8 mm</td>
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<td>460</td>
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<td>10</td>
<td>Tenagodus vitis (Conrad, 1833)</td>
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<td></td>
<td>Greatest diameter of tube 5 mm</td>
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<td>461</td>
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<td>11</td>
<td>Triphora major (Meyer, 1886)</td>
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<td></td>
<td>Height 17.3 mm, width 3.9 mm</td>
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<td>65</td>
<td>462</td>
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## Cook Mountain Formation (Claiborne Group)

### Figure 1

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<th>Locality</th>
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<tr>
<td>1</td>
<td>Solariella stalagmum modesta (Meyer and Aldrich, 1886)</td>
<td>4.5 mm</td>
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<tr>
<td>2, 3</td>
<td>Solariella tricostata (Conrad, 1835)</td>
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<td>6.7 mm</td>
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<td>464</td>
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<td></td>
<td></td>
<td>7.3 mm</td>
<td>7 mm</td>
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<td>465</td>
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<tr>
<td>4</td>
<td>Architectonica scrobiculata (Conrad, 1833)</td>
<td>8 mm</td>
<td>17.8 mm</td>
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<td>466</td>
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<tr>
<td>5</td>
<td>Architectonica scrobiculata hicoria Palmer, 1937</td>
<td>5 mm</td>
<td>15 mm</td>
<td>66</td>
<td>467</td>
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EXPLANATION PLATE 31
Cook Mountain Formation (Claiborne Group)

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<tr>
<th>Figure</th>
<th>Description</th>
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<tr>
<td>1</td>
<td>Architectonica (Architectonica) amoena (Conrad, 1833)</td>
<td>77</td>
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<td></td>
<td>Height 7.2 mm, width 14.2 mm; locality 68. MGS specimen 468.</td>
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</tr>
<tr>
<td>2</td>
<td>Architectonica (Granosolarium) ornata (I. Lea, 1833)</td>
<td>77</td>
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<tr>
<td></td>
<td>Height 4.6 mm, width 12 mm; locality 64. MGS specimen 469.</td>
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<tr>
<td>3</td>
<td>Architectonica (Granosolarium) sp.</td>
<td>78</td>
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<td></td>
<td>Height 3 mm, width 9.5 mm; locality 65. MGS specimen 470.</td>
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<tr>
<td>4</td>
<td>Architectonica (Granosolarium) meekana splendida Palmer, 1944</td>
<td>78</td>
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<td>Height 9.5 mm, width 22 mm; locality 68. MGS specimen 471.</td>
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<td>Figure</td>
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<tr>
<td>1, 2, 3, 4</td>
<td><strong>Melanella sp.</strong> 87</td>
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</tr>
<tr>
<td>1.</td>
<td>Height 15.5 mm, width 4.7 mm; locality 64. MGS specimen 472.</td>
<td></td>
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<tr>
<td>2.</td>
<td>Height 14.6 mm, width 4 mm; locality 63. MGS specimen 473.</td>
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<tr>
<td>3.</td>
<td>Height 11.7 mm, width 3.6 mm; locality 63. MGS specimen 474.</td>
<td></td>
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<td>4.</td>
<td>Height 11 mm, width 3 mm; locality 64. MGS specimen 475.</td>
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<tr>
<td>5</td>
<td><strong>Niso umbilicata</strong> (I. Lea, 1833) 87</td>
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<tr>
<td>6</td>
<td><strong>Cirsotrema sp.</strong> 87</td>
<td></td>
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<td>7</td>
<td><strong>Cirsotrema (Coroniscala) newtonensis</strong> (Meyer and Aldrich, 1886) 85</td>
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<td>8</td>
<td><strong>Cirsotrema (Coroniscala) linteum</strong> (Conrad, 1860) 85</td>
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<td>9</td>
<td><strong>Cirsotrema (Coroniscala) nassulum</strong> (Conrad, 1833) 86</td>
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<td>10</td>
<td><strong>Alaba sp.</strong> 84</td>
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<td>11</td>
<td><strong>Calyptrophorus velatus nodovelatus</strong> Palmer, 1937 88</td>
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<td>12</td>
<td><strong>Odostomia (Evalea) melanella alveata</strong> (H. C. Lea, 1841) 138</td>
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<td>Figure</td>
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<tr>
<td>1</td>
<td>Euspira newtonensis (Meyer and Aldrich, 1886) 94</td>
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<td>Height 15 mm, width 14 mm; locality 68. MGS specimen 484.</td>
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<tr>
<td>2</td>
<td>Neverita sp 93</td>
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<td></td>
<td>Height 20.4 mm, width 18.4 mm; locality 61. MGS specimen 485.</td>
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<td>3</td>
<td>Tiburnus eboreus (Conrad, 1833) 75</td>
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<td></td>
<td>Height 5.6 mm, width 7 mm; locality 63. MGS specimen 486.</td>
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<tr>
<td>4</td>
<td>Sinum inconstans (Meyer and Aldrich, 1886) 95</td>
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<tr>
<td></td>
<td>Height 14.1 mm, width 9.6 mm, elevation 4.5 mm; locality 66. MGS specimen 487.</td>
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<td>7</td>
<td>Height 6.7 mm, width 5.2, elevation 3 mm; locality 69. MGS specimen 488.</td>
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<td>5</td>
<td>Sinum bilix (Conrad, 1833) 95</td>
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<tr>
<td></td>
<td>Height 12.3 mm, width 11.4 mm, elevation 6.6 mm; locality 64. MGS specimen 489.</td>
<td></td>
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<tr>
<td>6</td>
<td>Height 11.2 mm, width 10.1 mm, elevation 6.4 mm; locality 69. MGS specimen 490.</td>
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<td>Figure</td>
<td>Specimen Description</td>
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<td>1, 4</td>
<td><strong>Distorsio (Personella) septemdentata</strong> Gabb, 1860&lt;br&gt;1. Height 21.8 mm, width 13.7 mm; locality 64. MGS specimen 491.&lt;br&gt;4. Height 16.4 mm, width 10.7 mm; locality 62. MGS specimen 492.</td>
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<td>2, 3</td>
<td><strong>Phalium brevicostatum</strong> (Conrad, 1834)&lt;br&gt;2. Height 11.4 mm, width 7.4 mm; locality 68. MGS specimen 493.&lt;br&gt;3. Height 16.3 mm, width 10.9 mm; locality 63. MGS specimen 494.</td>
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<tr>
<td>5</td>
<td><strong>Crepidula dumosa</strong> (Conrad, 1834)&lt;br&gt;Height 14.6 mm, width 8.8 mm, elevation 5.5 mm; locality 68. MGS specimen 495.</td>
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<td>6</td>
<td><strong>Sulcoocypraea vaughani</strong> (Johnson, 1899)&lt;br&gt;Height 14.3 mm, width 10 mm; locality 68. MGS specimen 496.</td>
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<td>7</td>
<td><strong>Mitrella (Columbellopsis) mississippiensis</strong> (Meyer and Aldrich, 1886)&lt;br&gt;Height 13.4 mm, width 6.5 mm; locality 63. MGS specimen 497.</td>
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## EXPLANATION PLATE 35
Cook Mountain Formation (Claiborne Group)

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<td>Typhis palmerae Gertman, 1969</td>
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<td>2, 3</td>
<td>Hexaplex (Hexaplex) vanuxemi Conrad in Morton, 1834</td>
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<td>7.6 mm</td>
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<td>10.7 mm</td>
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<td>65</td>
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<td>Hexaplex (Hexaplex) engonatus (Conrad, 1834)</td>
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<td>Penion sp.?</td>
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<td>6, 9</td>
<td>Ficopsis texana (Harris, 1895)</td>
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<td>9 mm</td>
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<td>7, 8</td>
<td>Murotriton meglameriae Palmer, 1937</td>
<td>30.2 mm</td>
<td>13 mm</td>
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<td>25.6 mm</td>
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| 1      | 98   | Ficopsis penita (Conrad, 1833)  
Incomplete specimen; height 19 mm, width 8.5 mm; locality 68. MGS specimen 507. |
| 2      | 107  | Siphonalia newtonensis (Meyer and Aldrich, 1886)  
Height 10.1 mm, width 5.8; locality 65. MGS specimen 508. |
| 3      | 110  | Levifusus mortoniopsis carexus (Harris, 1895)  
Height 22 mm, width 13.3 mm; locality 64. MGS specimen 509. |
| 4      | 83   | Potamides sp.?  
Height 12.7 mm, width 8.5; locality 63. MGS specimen 510. |
| 5, 6   | 101  | 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. |
| 7, 8   | 111  | 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. |
| 9      | 112  | Dolicholatirus sp.  
Height 21.5 mm, width 6.6 m; locality 65. MGS specimen 515. |
| 10     | 113  | Falsifusus bastropensis (Harris, 1895)  
Height 30.7 mm, width 10 mm; locality 65. MGS specimen 516. |
EXPLANATION PLATE 37
Cook Mountain Formation (Claiborne Group)

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<td>1.</td>
<td>Pseudoliva vetusta carinata Conrad in Gabb, 1860 Height 21.3 mm, width 18 mm; locality 65. MGS specimen 517.</td>
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<td>Outer (4A) and inner (4B) side of zoarium; greatest diameter 3.7 mm, height 1.1 mm; locality 16. MGS specimen 197.</td>
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### Moodys Branch Formation (Jackson Group)

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<td>Abra (Abra) cf. A. (A.) perovata (Conrad, 1848)</td>
<td>Right valve: height 4.4 mm, length 6.3 mm, inflation 1.1 mm</td>
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1, 3

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2

Callianassa sp.

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6

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8

Alveinus minutus Conrad, 1865

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<td>Top view; greatest diameter 75 mm; locality 30. MGS specimen 350a. Specimen is from the underside of rock figured in plate 73.</td>
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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.
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Pachuta Marl and Shubuta Clay Members, Yazoo Formation (Jackson Group)

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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 (Coroniscale) 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
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   6. Height 15 mm, large diameter 20.5, small diameter 16.3 mm; Shubuta Clay, locality 36. MGS specimen 359.

5. Barbatia sp .................................................................149
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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.
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<td>Archobelia vicksburgensis (Conrad 1848)</td>
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<td>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 corallite 7.5 mm; locality 38. MGS specimen 362.</td>
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<td>2</td>
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<td>Height 25.6 mm, greatest diameter 9.5 mm; locality 38. MGS specimen 363.</td>
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<td>3</td>
<td>Scobinella pluriplicata Casey, 1903</td>
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<td>Height 29.4 mm, width 8.6 mm; locality 38. MGS specimen 364.</td>
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<td>4</td>
<td>Scobinella caelata Conrad, 1847, var.</td>
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<td>Height 28 mm, width 1.2 mm; locality 38. MGS specimen 365.</td>
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<td>Galeodea (Mambrinia) brevidentata (Aldrich, 1885)</td>
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<td>Height 32.3 mm, width 22.8 mm; locality 39. MGS specimen 366.</td>
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<td>Height 43.7 mm, width 32 mm; locality 37. MGS specimen 367.</td>
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<td>Orthosurecula longiforma (Aldrich, 1885)</td>
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<td>Lyria (Lyria) nestor Casey, 1903</td>
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<td>Sassia conradiana (Aldrich, 1885)</td>
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<td>Height 41 mm, width 18.6 mm; locality 40. MGS specimen 371.</td>
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<td>Sulcocypraea healeyi (Aldrich, 1894)</td>
<td>Height 18.3 mm, width 13.2 mm; locality 38. MGS specimen 372.</td>
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<td>Venericardia (Rotundicardia) carsonensis Dall, 1903</td>
<td>Left valve; height 16.2 mm, length 16.2 mm; locality 38. MGS specimen 373.</td>
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<td>Caricella (Atraktus) reticulata Aldrich, 1885</td>
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<td>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.</td>
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<td>Mitra (Fusimitra) conquista Conrad, 1848</td>
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<td>Height of zoarium fragment 12.7 mm, large diameter 4.2 mm, small diameter 1.4 mm; locality 41. MGS specimen 388.</td>
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<td>Lepidocyclina (Lepidocyclina) mantelli (Morton, 1833)</td>
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<td>Greatest diameter 32.4 mm; locality 41. MGS specimen 389.</td>
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<td>Lopha (Lopha) vicksburgensis (Conrad, 1847)</td>
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<td>Left valve attached to Trigonopora grande; height 25.3 mm, length 22 mm, inflation 8 mm; locality 41. MGS specimen 390.</td>
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<td>5.</td>
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<td>Right valve; height 35 mm, length 36 mm, inflation 9.6 mm; Glenodon Limestone, locality 45. MGS specimen 392.</td>
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<td>Side view; greatest diameter 39.2 mm, thickness 6.6 mm; locality 43. MGS specimen 394.</td>
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<td>8</td>
<td>Pecten (Pecten) poulsoni Morton, 1834</td>
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<td>Left valve; height 25.7 mm, length 27 mm, inflation 2.5 mm; locality 41. MGS specimen 395.</td>
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Marianna Limestone (Vicksburg Group)

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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<td><em>Schizaster (Paraster) americanus</em> (Clark, 1915) Top view; length 44 mm, width 41.5 mm, height 29 mm; locality 42. MGS specimen 404.</td>
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<td>2</td>
<td><em>Ranina (Lophoranina) georgiana</em> 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 <em>Lepidocyclina (Lepidocyclina) supera</em> (Conrad, 1865).</td>
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<td>3</td>
<td><em>Pecten (Pecten) poulsoni</em> Morton, 1834 Left valve; height 30.3 mm, length 32 mm, inflation 4.6 mm; locality 45. MGS specimen 406.</td>
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<td>4</td>
<td><em>Glycymeris arctata</em> (Conrad, 1847) Incomplete internal mold; length 21 mm; locality 42. MGS specimen 407.</td>
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<td>5, 6</td>
<td><em>Pecten (Pecten) byramensis</em> 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.</td>
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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.


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.


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.


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.


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.
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.11 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 south 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
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, SW/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, north side 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 parallel with 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
Localities listed in the Paleontological Research Institution Station Book


P2. Wyant Bluff, Caldwell Parish, Louisiana.


P7. One mile above Gibson Landing, Ouachita River, Caldwell Parish, Louisiana.

P8. One-half mile below Gibson Landing, Ouachita River, Louisiana.


P11. Upper bed, Montgomery Landing, Red River, Grant Parish, Louisiana.

P12. Tullos, La Salle 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.


P723. Moseley’s Ferry, on the Brazos River, Burleson County, Texas.


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.
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.
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.
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, Caldwell 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.


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.


P1121. One mile below Robinson's Ferry, Sabine River, Sabine County, Texas.
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