MISSISSIPPI
STATE GEOLOGICAL SURVEY

WILLIAM CLIFFORD MORSE, Ph.D.
DIRECTOR

FROM
BULLETIN 49

SCOTT COUNTY

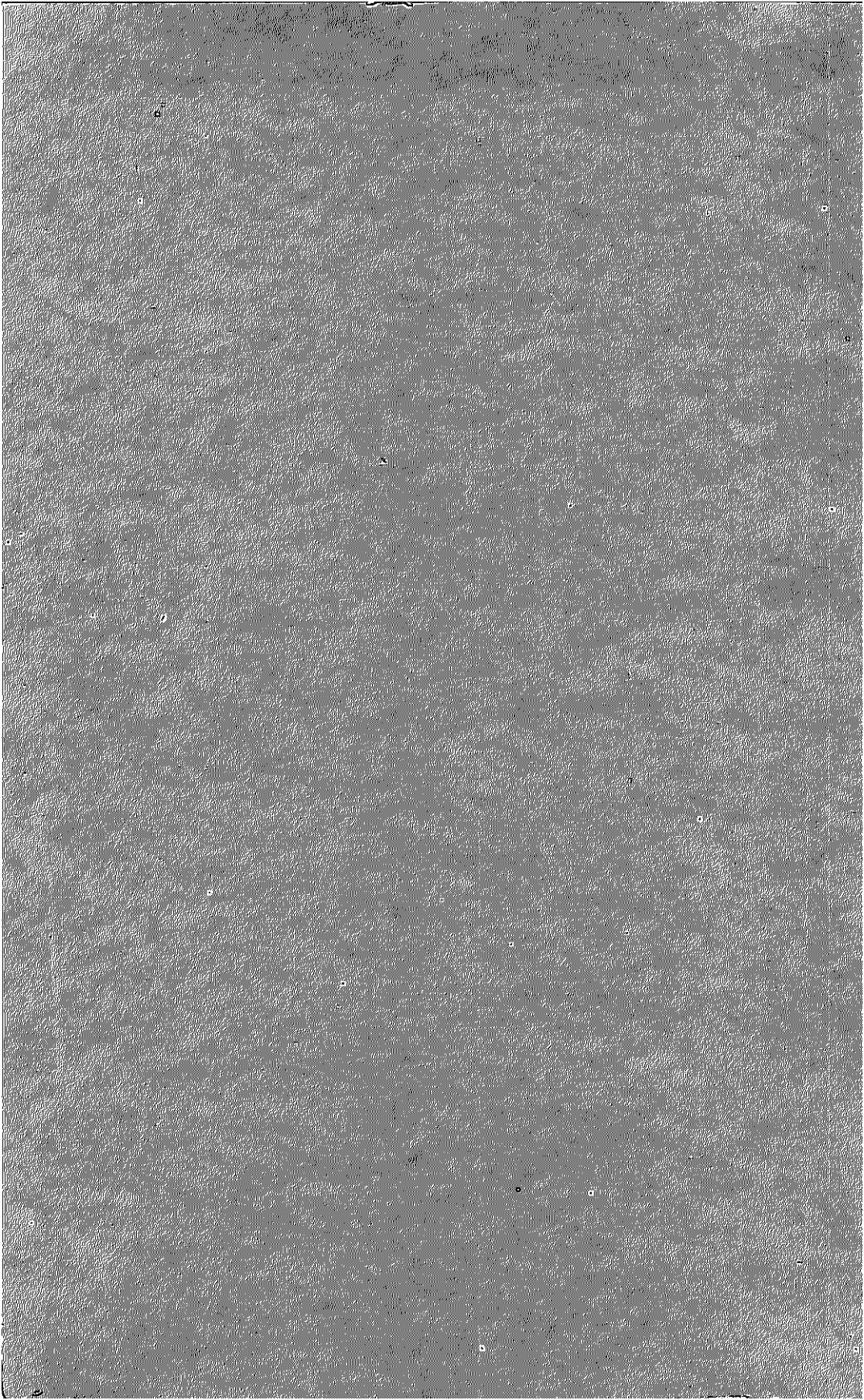
FOSSILS

JACKSON FORAMINIFERA AND OSTRACODA

By

HARLAN RICHARD BERGQUIST, Ph.D.

UNIVERSITY, MISSISSIPPI
1942



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JACKSON FORAMINIFERA AND OSTRACODA

HARLAN RICHARD BERGQUIST, PH.D.

INTRODUCTION

This report on the foraminifera and ostracoda from the Jackson formation in Scott County is a summation of a study of several hundred samples obtained from test holes drilled by a field crew under the writer's supervision in the summer and fall of 1940 and the winter of 1941. Numerous hand auger test holes, drilled along the strike to determine the limits of the formation and drilled across the dip for stratigraphic study, yielded unweathered fossiliferous material usually not obtainable. The lithology of the formation has been discussed in the geological portion of this bulletin.

A total of 225 species and varieties of foraminifera found in the Scott County samples is described and illustrated. Of this number, 34 are reported for the first time from the Jackson formation, 5 are new species, and 4 are new varieties. Fourteen species reported by Cushman[1] from the Jackson in other areas in the state are listed in the text. Ostracoda are very meagerly represented in the Scott County Jackson material by 17 species and 2 varieties, whereas many more have been reported by Monsour[2] from the formation in eastern Mississippi.

The Jackson formation has been studied very widely throughout the Gulf Coast, and several papers have been published on its foraminifera. This report, however, is the first study of the microfauna of the state undertaken by the Mississippi Geological Survey, and publication of these data is intended as a guide to a partial list of the foraminifera and as an aid in the identification of those likely to be found in the Jackson material in this state. Had more time been available, the study, which was started in May and finished in September 1942, would have included, as a comprehensive report, material throughout the

1. Cushman, Joseph A., Upper Eocene Foraminifera of the Southeastern United States, U. S. Geol. Survey Prof. Paper 181, 1935.

2. Monsour, Emil, Micro-Paleontologic Analysis of Jackson Eocene of Eastern Mississippi, Bull. Am. Assoc. Petr. Geol. Vol. 21, No. 1, pp. 80-96, 1937.

Jackson belt in Mississippi. It is, accordingly, not a complete record of the Jackson microfauna of the state.

Most of the material studied was prepared in the laboratory by James E. King who separated specimens from the washed samples and made preliminary mounts. Margarita Weyerstall Mills did most of the permanent mounting of specimens and assembled the illustrated plates. All illustrations were made by Mary Louise Pegues. To each of these persons the writer expresses his appreciation for the interest and efficiency shown toward the work.

STRATIGRAPHY

The Jackson formation in Scott County, which is uncomformably underlain by the Yegua formation and uncomformably overlain by the Forest Hill formation, consists of two members: a lower Moodys Branch marl and an upper Yazoo clay.

The Moodys Branch member, which has a maximum thickness of 20 feet, is a greenish-gray glauconitic clay-marl in the upper part and a glauconitic, pyritiferous sand in the lower part. It contains abundant foraminifera and mollusk shells.

The Yazoo clay member consists of calcareous, montmorillonitic greenish-gray clays, slightly glauconitic in the lower part. It has a maximum thickness of 340 feet.

Although the Moodys Branch marl and the Yazoo clay contain a great number of species of microfossils that range throughout both members, each member contains forms of limited range that may be used for stratigraphic delimitation.

The Moodys Branch marl contains in its fauna the following species that are confined to this member or to it and the overlying lower Yazoo clay:

Textularia adalta Cushman
recta Cushman
Quinqueloculina anguina Terquem
Articulina terquemi Cushman (rare)
Miliola jacksonensis Cushman (rare)
saxorum Lamarck (rare)
Triloculina rotunda d'Orbigny var. (rare)
Cornuspira olygogyra Hantken
Robulus limbosus (Reuss) var. hockleyensis (Cushman and Applin)
Marginulina multiplicata Bergquist

Nodosaria latejugata Gumbel (rare)
Sigmomorphina jacksonensis (Cushman)
jacksonensis (Cushman) var. costifera Cushman and Ozawa
Nonion planatum Cushman and Thomas
Nonionella hantkeni (Cushman and Applin) var. spissa Cushman
Bitubulogenerina montgomeryensis Howe (rare)
Discorbis globulo-spinosa Cushman
Cassidulina winniana Howe
Globorotalia cocoaensis Cushman
Cibicides lobatulus (Walker and Jacob) var. ?
Gypsina globula (Reuss) var. ?
Cythereis hysonensis Howe and Chambers var. dohmi Howe and Chambers (rare)

The lower Yazoo clay contains in its fauna the following species which are restricted either to it alone or to it and the underlying Moodys Branch marl:

Textularia adalta Cushman
cf. dibollensis Cushman and Applin (rare)
mississippiensis Cushman var. alabamensis Cushman (rare)
mississippiensis Cushman var. elongata Davis
mississippiensis Cushman var. rhomboidea Cushman and Ellisor
recta Cushman
subhauerii (?) Cushman (rare)
Karreriella mauricensis Howe and Ellis (rare)
Quinqueloculina anguina Terquem (rare)
bicarinella Reuss (rare)
tessellata Cushman (rare)
Massilina mauricensis Howe and Ellis (rare)
Spiroloculina grateloupi d'Orbigny
Triloculina rotunda d'Orbigny var. (rare)
Cornuspira olygogyra Hantken
Robulus arcuato-striatus (Hantken) var. carolinianus Cushman
clericii (Fornasini) (rare)
cultratus Montfort
dumblei Weinzierl and Applin
limbosus (Reuss) var. hockleyensis (Cushman and Applin)
Planularia danvillensis Howe and Wallace var. yazooensis Bergquist
Marginulina havanensis Cushman and Bermudez (rare)
multiplicata Bergquist
Dentalina multilineata (?) Bornemann (rare)
sp. (B) (rare)
Nodosaria fissicostata (Gumbel)
latejugata Gumbel (rare)
latejugata Gumbel var. carolinensis Cushman

Frondicularia tenuissima Hantken (rare)
Lagena costata (?) (Williamson) (rare)
globosa (Montagu) (rare)
sulcata (Walker and Jacob) var. semiinterupta Berry
sp. (A) Howe and Walker
Globulina gibba d'Orbigny var. globosa (Von Munster)
gibba d'Orbigny var. tuberculata d'Orbigny
inaequalis Reuss (rare)
minuta (Roemer)
Sigmomorphina jacksonensis (Cushman)
Polymorphina advena Cushman (rare)
frondea (Cushman) var. ?
Nonion advenum (Cushman) (rare)
planatum Cushman and Thomas
Nonionella hantkeni (Cushman and Applin) var. spissa Cushman
Amphimorphina yazooensis Bergquist
Buliminella cf. bassendorfensis Cushman and Parker
Robertina subteres (H. B. Brady) var. angusta (Cushman)
Entosolenia incurvata (?) Green (rare)
marginata (Walker and Boys) (rare)
Virgulina recta (?) Cushman (rare)
Bolivina attenuata Cushman (rare)
gardnerae Cushman
Bitubulogenerina howei Cushman (rare)
montgomeryensis Howe (rare)
Tritubulogenerina mauricensis Howe (rare)
Reussella rectimargo (Cushman)
cf. subrotundata (Cushman and Thomas)
Uvigerina cookei Cushman
Angulogerina rugoplicata Cushman
Pleurostomella cubensis Cushman and Bermudez
Ellipsolagena sp. (rare)
Discorbis assulata (?) Cushman (rare)
globulo-spinosa Cushman
hemisphaerica Cushman
Gyroidina sp. (rare)
Cymbaloporetta (?) squammosa (d'Orbigny) (rare)
(?) squammosa (d'Orbigny) var. (rare)
Cassidulina winniana Howe
Globigerina sp. (A) Howe and Wallace
Hantkenina danvillensis Howe and Wallace (rare)
Globorotalia centralis Cushman and Bermudez
cocoaensis Cushman
Cibicides americanus (Cushman) var. antiquus (Cushman and Applin)
yazooensis Cushman
Paracypris franquesi Howe and Chambers

Cytheropteron montgomeryensis Howe and Chambers (rare)
Cythereis broussardi Howe and Chambers (rare)
florienensis Howe and Chambers (rare)
hysonensis Howe and Chambers var. dohmi Howe and Chambers (rare)
(?) israelskyi Howe and Pyeatt var. morsei Howe and Pyeatt (rare)
(?) jacksonensis Howe and Pyeatt
yazooensis Howe and Chambers (rare)
Loxoconcha jacksonensis Howe and Chambers
Cytheromorpha ouachitaensis Howe and Chambers
Brachycythere watervalleyensis Howe and Chambers

The upper Yazoo clay contains in its fauna the following species which are confined entirely to the upper part:

Textularia danvillensis Howe and Wallace (rare)
hockleyensis Cushman and Applin var.
mississippiensis Cushman var.
ouachitaensis Howe and Wallace
Gaudryina jacksonensis Cushman (rare)
Dorothia principensis Cushman and Bermudez (rare)
Massilina pratti Cushman and Ellisor (rare)
Pyrgo inornata (d'Orbigny) var. danvillensis Howe and Wallace
Robulus mayi Cushman and Parker (rare)
wilcoxensis Cushman and Ponton (rare)
Planularia catahoulaensis Howe and Wallace (rare)
danvillensis Howe and Wallace (rare)
ouachitaensis Howe and Wallace var. (rare)
Marginulina triangularis d'Orbigny var. danvillensis Howe and Wallace
Dentalina basitorta Cushman
cf. catenulata Brady (rare)
consobrina d'Orbigny var. emaciata Reuss
subspinosa (?) Neugeboren (rare)
Nodosaria longiscata d'Orbigny
pyrula d'Orbigny var. longi-costata (?) Cushman
Pseudoglandulina laevigata (d'Orbigny)
Lagena striata (Montagu) cf. var. interrupta Williamson (rare)
striata (d'Orbigny) var. strumosa Reuss (rare)
Globulina rotundata (Bornemann)
Gumbelina cubensis Palmer var. heterostoma Bermudez
Plectofrondicularia mexicana (Cushman) (rare)
Buliminella elegantissima (d'Orbigny) (rare)
Virgulina recta Cushman var. howei Cushman (rare)
Bolivina mexicana Cushman
Uvigerina danvillensis Howe and Wallace
glabrans Cushman
yazooensis Cushman

Angulogerina danvillensis Howe and Wallace
multicostata Bergquist
multicostata Bergquist var. yazooensis Bergquist
Cancris danvillensis Howe and Wallace
Ceratobulimina alazanensis Cushman and Harris
Chilostomella cylindroides Reuss (rare)
Chilostomelloides oviformis (Sherborn and Chapman) (rare)
Anomalina granosa (Hantken) var. dibollensis Cushman and Applin (rare)
Planulina cocoaensis Cushman var. cooperensis Cushman
Cibicides ouachitaensis Howe and Wallace
Cibicidella sp. (rare)
Cytherelloidea danvillensis Howe var.
Cythereis (?) israelskyi Howe and Pyeatt var. warneri Howe and Pyeatt (rare)

DESCRIPTION OF FORAMINIFERA

FAMILY TEXTULARIIDAE

Genus TEXTULARIA Defrance, 1824

TEXTULARIA ADALTA Cushman

Plate I, 7, 9

Textularia adalta Cushman, Contr. Cushman Lab. Foram. Res., Vol. 2, p. 29, pl. 4, figs. 2a, b, 1926. Ellisor, Bull. Am. Assoc. Petr. Geol., Vol. 17, no. 11, pl. 6, fig. 2, 1933. Plummer, Texas Univ. Bull. 3232, p. 696, 1932. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 8, pl. 1, figs. 11, 12, 1935. Davis, Jour. Pal., Vol. 15, no. 2, p. 147, pl. 24, figs. 1, 2a, b, 1941.

"Test elongate, slender, early portion tapering and compressed, adult portion thicker and with the sides nearly parallel, periphery subacute except in the last few chambers, which are rounded; chambers numerous, the last 5 or 6 making up half the test, earlier ones indistinct, low and broad, later ones more inflated, higher; sutures distinct, especially in the later portion, where they are somewhat depressed, usually oblique; wall finely arenaceous, only slightly roughened; aperture a high, arched opening in the central part of the base of the apertural face. Maximum length 2.00 mm."

A number of good specimens of this species came from lower Yazoo clay and Moodys Branch marl samples from Scott County.

TEXTULARIA CUYLERI (?) Davis

Plate I, 10a, 10b

Textularia cuyleri Davis, Jour. Pal., Vol. 15, no. 2, p. 147, pl. 24, figs. 3a, b, 4, 1941.

"Test short, increasing in size from a pointed apex to a broad apertural end; chambers low, increasing in size with each newly added chamber; walls coarsely arenaceous but showing a fine base when worn down; aperture a broad arch at base of inner margin of last formed chamber; periphery sub-acute. Length 0.53 mm."

A number of small specimens exhibit features similar to the species recently described from Texas. It appears to range through the Jackson formation in Scott County.

TEXTULARIA DANVILLENSIS Howe and Wallace

Plate I, 6

Textularia danvillensis Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 18, pl. 1, figs. 2a, b, 4a, b, 1932.

"Test elongate, tapering, about twice as long as broad; edges broadly rounded; chambers numerous, often seventeen or more showing, in the early stages very slightly inflated, but becoming more so as chambers are added, adult chambers inflated most near the junction with the preceding chamber below; sutures depressed, not oblique; wall finely arenaceous; aperture a slit at the base of the last-formed chamber at the terminal end of the test, its length being about equal to one-third of the thickness of the test. Length 0.7 mm.; width 0.4 mm.; thickness 0.22 mm."

This is a characteristic species and easily distinguishable. It was found sparingly in two samples of upper Yazoo clay from Scott County.

TEXTULARIA cf. DIBOLLENSIS Cushman and Applin

Textularia dibollensis Dumble (nomen nudum), Bull. Am. Assoc. Petr. Geol., Vol. 8, p. 443, 1924.

Textularia dibollensis Cushman and Applin, Bull. Am. Assoc. Petr. Geol., Vol. 10, p. 165, pl. 6, figs. 12-14, 1926. Ellisor, Bull. Am. Assoc. Petr. Geol., Vol. 17, no. 11, p. 1301, pl. 1, fig. 4, 1933. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 8, pl. 1, figs. 13-16, 1935. Davis, Jour. Pal., Vol. 15, no. 2, p. 148, pl. 24, figs. 7a, b, 1941.

"Test small, short, and broad, moderately compressed, margin subacute, initial end rounded; apertural end broadly truncate; chambers few, rather indistinct, rapidly increasing in breadth as added, becoming high in the adult, with the sides nearly parallel, the last four usually making up at least half of the test; sutures indistinct, not depressed, at right angles to the peripheral margin; wall finely arenaceous; aperture an arched opening, low and broad, at the inner margin of the last-formed chamber, the apertural face of the chamber evenly rounded. Maximum length 0.80 mm., usually much shorter; breadth 0.03 mm."

Lower Yazoo clay samples from Scott County test holes yielded a few specimens that are tentatively placed with this species. The specimens are relatively smooth and the sutures barely distinguishable.

TEXTULARIA DIBOLLENSIS Cushman and Applin var. HUMBLEI Cushman and Applin

Plate I, 13

Textularia dibollensis Cushman and Applin var. *humblei* Cushman and Applin, Bull. Am. Assoc. Petr. Geol., Vol. 8, p. 443, 1926; idem., Vol. 10, p. 165, pl. 6, fig. 9, 1926. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 8, pl. 1, figs. 17a, b, 1935. Davis, Jour. Pal., Vol. 15, no. 2, p. 148, pl. 24, figs. 9a, b, 1941.

Variety differs from the typical in being larger, more elongate and symmetrical with the greatest width at the apertural end; sutures are more distinct and somewhat depressed; periphery is somewhat acute.

Specimens referred to this variety show variations; on some the sutures are distinct, but on others, which appear to be somewhat worn, they are not readily distinguishable; peripheries subacute, either regular in outline or somewhat indented. Most of the specimens from Scott County came from lower Yazoo clay samples.

TEXTULARIA DISTORTIO Cushman and Applin

Textularia hockleyensis var. *distortio* Dumble (nomen nudum), Bull. Am. Assoc. Petr. Geol., Vol. 8, p. 443. 1924.

Textularia distortio Cushman and Applin, Bull. Am. Assoc. Petr. Geol., Vol. 10, p. 164, pl. 6, figs. 7, 8, 1926. Cushman. U. S. Geol. Survey Prof. Paper 181, p. 8, pl. 1, figs. 18, 19, 1935.

This small irregular form was not found in the Scott County Jackson samples, but it has been noted in well cuttings from artesian wells drilled in the Yazoo Basin of Mississippi.

TEXTULARIA HOCKLEYENSIS Cushman and Applin var.

Plate I, 18, 20

Textularia hockleyensis Dumble (nomen nudum), Bull. Am. Assoc. Petr. Geol., Vol. 8, p. 443, 1924.

Textularia hockleyensis Cushman and Applin, Bull. Am. Assoc. Petr. Geol., Vol. 10, p. 164, pl. 6, figs. 3-6, 1926. Ellisor, Bull. Am. Assoc. Petr. Geol., Vol. 17, no. 11, pl. 1, fig. 7, 1933.

Textularia hockleyensis Cushman and Applin var.? Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 19, pl. 1, figs. 5a, b, 1932. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 9, pl. 1, figs. 20, 21, 1935.

"Test comparatively large, tapering, compressed, the central portion thickest, thence with a depressed area between the cen-

ter and the periphery; periphery thin, but rounded; chambers numerous, distinct; sutures distinct, and toward the central portion often somewhat limbate, strongly curved, especially toward the periphery; wall arenaceous, but smoothly finished, in end view, rhomboid; the aperture much curved, low. Length, up to 3.00 mm.; breadth, up to 1.25 mm."

Several smoothly arenaceous specimens with distinctly marked and curved sutures seem to compare most closely with the variety illustrated by Howe and Wallace from the Jackson formation at Danville Landing, Louisiana. The only specimens were in a sample 20 feet beneath the surface in test hole J43, drilled in the upper Yazoo clay on the J. P. Donald property (NW.1/4, SE.1/4, NE.1/4, Sec. 35, T.6 N., R.6 E.).

TEXTULARIA MISSISSIPPIENSIS Cushman

Plate I, 2, 4

Textularia mississippiensis Cushman, U. S. Geol. Survey Prof. Paper 129, pp. 90, 125, pl. 14, fig. 4, 1922; Prof. Paper 133, p. 17, 1923. Cushman and Applin, Bull. Am. Assoc. Petr. Geol., Vol. 10, p. 166, pl. 6, figs. 10, 11, 1926. Cushman and Thomas, Jour. Pal., Vol. 3, p. 177, pl. 23, figs. 1a, b, 1929. Cushman, Contr. Cushman Lab. Foram. Res., Vol. 5, p. 79, pl. 12, fig. 5, 1929. Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 19, pl. 1, figs. 7a, b, 1932. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 7, pl. 1, figs. 3, 4, 1935.

"Test elongate, fairly broad, thickest in the middle, thence thinning toward the periphery, in end view biconvex, central portion curved; chambers rather low and broad, especially in the early stages, becoming somewhat higher in the adult; sutures covered by a coarsely arenaceous layer, meeting in the center and at the periphery, leaving the central portion of each chamber uncovered; periphery irregular, not definitely or regularly spinose, chamber walls smooth and finely perforate. Length 0.40-0.75 mm."

Specimens show variations from the typical form to the varieties. Many are darkened by mineral matter and have pyritized arenaceous material forming the raised portion along the sutures. This is a common form in both the Jackson and Vicksburg formations of the state. It was found in many Scott County samples that ranged throughout the Jackson.

TEXTULARIA MISSISSIPPIENSIS Cushman var. ALABAMENSIS Cushman

Textularia mississippiensis Cushman var. *alabamensis* Cushman, U. S. Geol. Survey Prof. Paper 133, p. 17, pl. 1, fig. 4, 1923; idem., Prof. Paper 181, p. 7, pl. 1, figs. 5, 6, 1935. Ellisor, Bull. Am. Assoc. Petr. Geol., Vol. 17, no. 11, pl. 1, fig. 6, 1933. Davis, Jour. Pal., Vol. 15, no. 2, p. 150, pl. 25, figs. 2a, b, 3, 1941.

"Variety differing from the typical species in the more elongate form, somewhat thicker test, especially in the center, the less well-defined peripheral carina, and the sutures excavated instead of being covered by an arenaceous layer."

This form was found rarely in lower Yazoo clay samples from Scott County. Cushman has reported this species from a hill above the pumping station at Jackson.

TEXTULARIA MISSISSIPPIENSIS Cushman var. ELONGATA Davis

Plate I, 1, 3

Textularia mississippiensis Cushman var. *elongata* Davis, Jour. Pal., Vol. 15, no. 2, p. 151, pl. 24, figs. 21a, b, 22, 1941.

"Test very elongate, gradually tapering; chambers numerous, low, slightly depressed; sutures raised, covered with finely arenaceous material, curved downward with pronounced curving close to periphery; periphery slightly serrate and thin; aperture an oval-shaped opening at base of last formed chamber. Length 0.95 mm.

"Differs from *T. mississippiensis* in having a sharp periphery and in being slimmer and longer."

This variety described from the Whitsett (upper Jackson) beds of Texas is found in a few lower Yazoo clay samples from Scott County.

TEXTULARIA MISSISSIPPIENSIS Cushman var. RHOMBOIDEA Cushman and Ellisor

Plate I, 5

Textularia mississippiensis Cushman var. *rhomboidea* Cushman and Ellisor, Contr. Cushman Lab. Foram. Res., Vol. 7, part 3, p. 52, pl. 7, figs. 2a, b, 1931. Idem, Bull. Am. Assoc. Petr. Geol., Vol. 17, no. 11, pl. 1, figs. 2a, b, 1933. Davis, Jour. Pal., Vol. 15, no. 2, p. 151, pl. 24, figs. 18a, b, 20, 1941.

"Test elongate, thin, in end view biconvex; chambers low and broad, depressed, curved downward; sutures distinct, excavated;

walls smoothly arenaceous; periphery even and thin. Length 0.54-0.75 mm.

"This species is easily distinguished from *T. alabamensis* in its rhomboid outline and much compressed test."

Specimens referred to this variety have depressed sutures but median line of test is slightly raised. Peripheries are thinned to almost a keel and are somewhat irregular. All came from samples of lower Yazoo clay obtained in Scott County.

TEXTULARIA MISSISSIPPIENSIS Cushman var.

Plate I, 14, 19

Test compressed with a heavy median ridge of arenaceous or calcareous material which extends from it a short distance along each suture; chambers either projecting spine-like beyond the periphery or bordered by irregular thin carinae.

Specimens obtained from upper Yazoo clay samples from test holes located at a road intersection 1½ miles southeast of Morton and at a road bend approximately one mile northeast of Pulaski.

TEXTULARIA OUACHITAENSIS Howe and Wallace

Plate I, 11a, 11b

Textularia ouachitaensis Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 20, pl. 1, figs. 1a, b, 1932.

"Test elongate, tapering, in transverse section almost circular; chambers numerous, only those occupying the later two-thirds of the test being distinct and slightly inflated; sutures depressed, transverse; wall arenaceous; aperture a short, rectangular slit in the terminal end. Length 1.0 mm.; diameter 0.5 mm."

Specimens that are similar to the species described from the Danville Landing beds in Louisiana were found in a sample of upper Yazoo clay from a test hole 4 miles southwest of Morton.

TEXTULARIA RECTA Cushman

Plate I, 8

Textularia recta Cushman, U. S. Geol. Survey Prof. Paper 133, p. 17, pl. 1, fig. 2, 1923; Prof. Paper 181, p. 7, pl. 1, figs. 8, 9, 1935.

"Test elongate, slightly compressed, early portion rapidly increasing in diameter, later portion in the adult with the sides

parallel for a large part of the test; chambers numerous; sutures distinct; wall thick, covered with agglutinated calcareous grains but when worn showing a coarsely perforated undertest; apertural end obliquely truncate; aperture in a deep depression at the base of the last-formed chamber. Maximum length of specimens 1.25 mm."

Samples of lower Yazoo clay and Moodys Branch marl from Scott County furnished a number of specimens that are identified as this species. It has been reported from the Jackson formation at Jackson and Garlands Creek.

TEXTULARIA SUBHAUERII (?) Cushman

Textularia subhauerii Cushman, U. S. Geol. Survey Prof. Paper 129, pp. 89, 126, pl. 14, figs. 2a, b; idem., Prof. Paper 133, p. 16, 1923; idem., Prof. Paper 181, p. 8, pl. 1, fig. 10, 1935. Davis, Jour. Pal., Vol. 15, no. 2, p. 152, pl. 25, figs. 15a, b, 1941.

"Test large, stout, elongate, early portion rapidly increasing in width with each newly added chamber, later adult portion with the sides nearly parallel, slightly lobulate; periphery rounded, but the median portion nearly flat; chambers 18 to 20, increasing in height as added, those of the later portion nearly as high as broad; sutures usually rather indistinct; wall coarsely arenaceous; aperture at the base of the inner margin of the chamber. Maximum length 2.00 mm."

A few specimens, none very well preserved, show characteristics similar to this species and have been questionably referred to it. These came from lower Jackson samples from Scott County. Cushman has identified the species from material from a locality on the Chickasawhay River, 1½ miles south of Shubuta.

TEXTULARIA sp.

Plate I, 17

Test small, tapering, somewhat compressed except for last pair of chambers; sutures indistinct for most of test; walls smooth, finely arenaceous; periphery subacute in early part, rounded on last chambers; aperture a low opening at base of last chamber.

FAMILY VERNEUILINIDAE

Genus GAUDRYINA d'Orbigny, 1839

GAUDRYINA JACKSONENSIS Cushman

Plate I, 16

Gaudryina jacksonensis Cushman, Contr. Cushman Lab. Foram. Res., Vol. 2, p. 33, pl. 5, figs. 1a, b, 1926. U. S. Geol. Survey Prof. Paper 181, p. 9, pl. 2, figs. 4-6, 1935.

"Test large, elongate, irregularly triangular in section, the angles subacute, triserial portion short, biserial portion triangular, angles subacute, almost carinate; chambers distinct, very slightly inflated; sutures distinct, slightly depressed; wall composed of fine sand grains with a large amount of cement, surface smoothly finished; aperture semi-circular, in a reentrant at the base of the apertural face of the last-formed chamber. Maximum length 2.00 mm."

Specimens were found in only one sample which was obtained from a shallow test hole drilled in the upper Yazoo clay on a hill ½ mile north of Homewood, Mississippi. Cushman records this species from a locality 1½ miles south of Shubuta.

FAMILY VALVULINIDAE

Genus DOROTHIA Plummer, 1931

DOROTHIA PRINCIPENSIS Cushman and Bermudez

Plate I, 12

Dorothia principensis Cushman and Bermudez, Contr. Cushman Lab. Foram. Res., Vol. 12, pt. 3, p. 57, pl. 10, figs. 3, 4, 1936.

"Test small, elongate, about two and one-half times as long as broad, very slightly compressed, biserial portion making up nearly the entire test, periphery lobulate; chambers distinct except in the earliest portion, of rather uniform size throughout, becoming slightly more inflated toward the apertural end; sutures distinct, depressed, in the biserial portion nearly at right angles to the vertical axis; wall finely arenaceous, smoothly finished; aperture a low, arched opening at the inner margin of the last-formed chamber. Length 0.80 mm.; diameter 0.30 mm."

The figured specimen is the only one obtained from the Scott County samples. It is very similar to the described form, but the line of contact of chambers has a slightly raised irregular ridge of granular shell material.

Test hole J91 in upper Yazoo clay, ½ mile east of Pulaski.

Genus KARRERIELLA Cushman, 1933

KARRERIELLA MAURICENSIS Howe and Ellis

Plate I, 15, 21, 22

Karreriella mauricensis Howe and Ellis, Howe, La. Dept. Cons. Geol. Bull. 14, p. 34, pl. 2, figs. 1, 2, 1939.

"Test elongate, tapering, greatest breadth across the last two chambers, slightly compressed, periphery broadly rounded, earliest chambers indistinct, later biserial with chambers rapidly increasing in size; sutures rather indistinct except in weathered specimens; wall finely arenaceous; aperture elongate, ovate, subterminal, with a distinct lip."

Rare specimens of an elongate tapering form and one test with chambers approximately uniform in width from initial end were found in samples of lower Yazoo clay from two test holes in Scott County. These appear to belong to the species described from the Cook Mountain formation of Louisiana.

Genus LIEBUSELLA Cushman, 1933

LIEBUSELLA BYRAMENSIS (Cushman) var. TURGIDA (Cushman)

Clavulina byramensis Cushman var. *turgida* Cushman, U. S. Geol. Survey Prof. Paper 133, p. 22, pl. 2, figs. 4, 5, 1923; U. S. Geol. Survey Prof. Paper 181, p. 11, pl. 2, fig. 9, 1935.

This form was not found in the Scott County Jackson samples, but it has been reported by Cushman from a location 1½ miles south of Shubuta.

FAMILY MILIOLIDAE

Genus QUINQUELOCULINA d'Orbigny, 1826

QUINQUELOCULINA ANGUINA Terquem

Plate II, 2

Quinqueloculina anguina Terquem, Soc. geol. France Mem., ser. 3, Vol. 1, p. 78, pl. 9 (14), figs. 20a-c, 1878; Vol. 2, p. 180, pl. 19 (27), figs. 20a-c, 1882. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 12, pl. 2, figs. 18, 19, 1935.

"Test about 2½ times as long as broad, compressed, periphery broadly rounded; chambers distinct, inflated, at the base somewhat enlarged and extending well beyond the previous chamber, at the apertural end narrowed and extended into a short cylindrical neck; sutures distinct, much depressed; wall smooth; aperture circular, terminal with a distinct lip and a small, nar-

row, simple tooth. Length 0.35 mm.; breadth 0.15 mm.; thickness 0.08 mm."

A few small specimens from the lower Yazoo clay and Moodys Branch material of Scott County are referable to this species.

QUINQUELOCULINA BICARINELLA Reuss

Plate II, 3, 4

Quinqueloculina bicarinella Reuss, Akad. Wiss. Wien. sitzber., Vol. 59, p. 456, pl. 1, figs. 6a, b, 1869.

Test small, somewhat flattened, chambers carinate with two irregular ridges developed along periphery; apertural end produced into a short rounded neck.

Specimens which appear to belong to this species came from a sample of lower Yazoo clay from a test hole on the northeast slope of Bald hill, approximately 2½ miles southwest of Lake.

QUINQUELOCULINA LAEVIGATA d'Orbigny

Plate II, 1, 5

Quinqueloculina laevigata d'Orbigny, Annales sci. nat., Vol. 7, p. 301, no. 6, 1826. Terquem, Soc. geol. France Mem., ser. 3, Vol. 2, p. 173, pl. 18 (26), figs. 14, 15, 1882. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 11, pl. 2, figs. 13-15, 1935.

"Test nearly twice as long as broad, slightly compressed, periphery rounded; chambers distinct, somewhat inflated, of nearly uniform diameter, the ends only slightly extended, apertural end slightly exserted; sutures distinct, slightly depressed; wall smooth; aperture nearly circular, terminal, with a simple tooth but usually without a lip. Length 0.35 mm.; breadth 0.20 mm.; thickness 0.12 mm."

Specimens showing considerable variation but still within the limits of this species were identified as belonging to it. These came from several localities out of samples from the basal Yazoo clay to the uppermost bed.

QUINQUELOCULINA LONGIROSTRA d'Orbigny

Plate II, 6, 7

Quinqueloculina longirostra d'Orbigny, Annales sci. nat., Vol. 7, p. 303, no. 46, 1826; Foraminiferes fossiles du bassin tertiare de Vienne, p. 291, pl. 18, figs. 25-27, 1846. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 12, pl. 2, figs. 16a-c, 1935.

"Test nearly twice as long as broad, compressed, periphery subacute; chambers distinct, not inflated, gradually compressed to the subacute, almost keeled periphery, sides on the inner part convex, thence becoming slightly concave toward the periphery, each extending well beyond the previous ones at both ends, apertural end exserted so that the aperture is terminal; sutures distinct, slightly depressed; wall smooth; aperture circular, terminal, with a slight lip and a small, simple tooth. Length 0.90 mm.; breadth 0.45 mm.; thickness 0.25 mm."

Specimens assigned to this species are very angular with a sharp periphery and the faces of the chambers are flat. The apertural end is produced to form an elongate neck. Large specimens are common and range throughout the Jackson formation of Scott County.

QUINQUELOCULINA TESSELLATA Cushman

Plate II, 11, 14

Quinqueloculina tessellata Cushman, U. S. Geol. Survey Prof. Paper 129-F, p. 142, pl. 33, fig. 8; pl. 34, fig. 1, 1922.

"Test elongate, fusiform, in transverse section much angled; periphery rather sharply angled, sides flat and very slightly convex, apertural end very little extended; sutures not very distinct; surface ornamented by longitudinal rows of rather large pits, five or six rows on each side of the largest chamber. Length 1.25 mm.; breadth 0.5 mm."

Three specimens, each slightly different in shape from the others but all pitted in the manner characteristic of the species described from the Marianna limestone, were found in one of the lower Yazoo clay samples from a test hole beside a road fork, 2 miles north of Forkville.

QUINQUELOCULINA sp.

Plate II, 13

This somewhat rugged form is found sparingly in the Yazoo clay. The figured specimen is from a sample of lower Yazoo clay obtained from a test hole on the northeast slope of Bald hill, approximately 2½ miles southwest of Lake.

Genus MASSILINA SCHLUMBERGER, 1893

MASSILINA COOKEI Cushman

Massilina cookei Cushman, U. S. Geol. Survey Prof. Paper 181, p. 13, pl. 3, fig. 17, 1935.

This species is reported to be very common in the Moodys Branch marl at Jackson, the locality from which the holotype came. It was not noted in the Scott County samples.

MASSILINA DECORATA Cushman

Plate I, 26

Massilina decorata Cushman, U. S. Geol. Survey Prof. Paper 129-F, p. 143, pl. 34, fig. 7, 1922; Prof. Paper 133, p. 55, 1923. Cushman and G. D. Hanna, Proc. Calif. Acad. Sci., ser. 4, Vol. 16, p. 224, 1927. Cole and Ponton, Bull. 5, Florida State Geol. Survey, p. 29, pl. 10, fig. 5, 1930. Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 20, pl. 2, fig. 6, 1932. Cushman and McMasters, Jour. Pal., Vol. 10, p. 510, pl. 74, fig. 8, 1936. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 13, pl. 3, figs. 14-16, 1935. Cushman, Contrib. Cushman Lab. Foram. Res., Vol. 15, pt. 3, p. 52, pl. 9, fig. 13, 1939.

"Test much flattened, elliptical or oval, slightly longer than broad, basal and apertural ends projecting, the apertural end narrowing to a small cylindrical neck, nearly in the longitudinal axis of the test; sutures rather indistinct; surface dull white; periphery rounded, the wall ornamented by very fine pits, giving a finely granular, matte appearance to the test. Maximum length 1.00 mm."

This little species is common throughout the Jackson formation, and specimens were obtained from most of the Scott County samples.

MASSILINA JACKSONENSIS Cushman

Massilina jacksonensis Cushman, Contr. Cushman Lab. Foram. Res., Vol. 9, p. 2, pl. 1, fig. 4, 1933; U. S. Geol. Survey Prof. Paper 181, p. 13, pl. 3, figs. 7-10, 1935.

This species was described by Cushman from the Jackson formation at Jackson and was reported at Garlands Creek. No specimens were found in the Scott County samples.

MASSILINA JACKSONENSIS Cushman var. PUNCTATOCOSTATA Cushman

Massilina jacksonensis Cushman var. *punctatocostata* Cushman, Contr. Cushman Lab. Foram. Res., Vol. 9, p. 3, pl. 1, figs. 5, 6, 1933; U. S. Geol. Survey Prof. Paper 181, p. 14, pl. 3, figs. 11-13, 1935.

This species was not found in any of the Scott County basal Jackson samples, but specimens have been obtained from equiva-

lent beds in Yazoo County. Cushman's holotype is from the Moodys Branch marl at Jackson where the variety is fairly abundant.

MASSILINA MAURICENSIS Howe and Ellis

Plate I, 23, 24

Massilina mauricensis Howe and Ellis, La. Dept. Cons. Geol. Bull. 14, p. 36, pl. 3, figs. 14-16, 1939.

"Test elongate, very much compressed, periphery somewhat flattened; early chambers quinqueloculine, later ones spiroloculine, chambers very elongate with flattened sides; wall smooth; aperture small, rounded with a small simple tooth; apertural end projecting."

The figured specimens came from lower Yazoo clay, test hole J162C, northeast slope of Bald Hill, approximately 2½ miles southwest of Lake.

MASSILINA PRATTI Cushman and Ellisor

Plate I, 25

Massilina pratti Cushman and Ellisor, Contrib. Cush. Lab. Foram. Res., Vol. 7, pt. 3, p. 53, pl. 7, figs. 4a-c, 1931. Howe, La. Dept. Cons. Geol. Bull. 2, p. 21, pl. 2, fig. 5, 1932.

"Test slightly longer than broad, much compressed, periphery distinctly keeled; chambers distinct, projecting at both ends so that the apertural end has a short cylindrical neck, usually six chambers visible on each side in the adult, each chamber inflated in the middle, and compressed toward the sides; sutures distinct, slightly depressed; wall smooth; aperture subcircular with a simple tooth. Length 0.95 mm.; width 0.6 mm."

Samples from three test holes in the upper Yazoo clay in Scott County furnished a few specimens of this species.

Genus SPIROLOCULINA d'Orbigny, 1826

SPIROLOCULINA GRATELOUPI d'Orbigny

Plate II, 12

Spiroloculina grateloupi d'Orbigny, Annales sci. nat., Vol. 7, p. 298, 1826. Terquem, Soc. geol. France Mem., ser. 3, Vol. 1, p. 52, pl. 5, figs. 5, 6, 1878; Vol. 2, p. 155, pl. 16, figs. 6a, b, 1882. Weisner, Archiv Protistenkunde, Vol. 25, p. 203, 1912. Cushman, U. S. Nat. Mus. Bull. 71, pt. 6, p. 31, pl. 4, figs. 4, 5, 1917; U. S. Geol. Survey Prof. Paper 129,

p. 101, pl. 25, fig. 2, 1922; Prof. Paper 133, p. 50, 1923. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 14, pl. 3, figs. 18-21, 1935.

Spiroloculina excavata H. B. Brady (not d'Orbigny), *Challenger* Rept., Zoology, Vol. 9, p. 151, pl. 9, figs. 5, 6, 1884.

"Test with the length greater than the breadth, the periphery flattened or convex, the angles somewhat carinate, flat faces of the test much excavated; wall smooth, matte; apertural end produced with a cylindrical neck. Specimens not exceeding 0.75 mm."

Scott County specimens which resemble those figured by Cushman are sparse in two samples of basal Yazoo clay. The species has been reported from a few other localities in the state.

Genus ARTICULINA d'Orbigny, 1826

ARTICULINA TERQUEMI Cushman

Plate II, 9, 10

Articulina terquemi Cushman, Contr. Cushman Lab. Foram. Res., Vol. 9, p. 3, pl. 1, figs. 7a-c, 1933; U. S. Geol. Survey Prof. Paper 181, p. 14, pl. 4, figs. 2, 3, 1935.

The narrow compressed test with rounded periphery and longitudinal costae distinguish this small fossil. A few specimens were found in a sample of Moodys Branch marl from a test hole in Scott County. It is also found in the marl at Jackson.

Genus MILIOLA Lamarck, 1804

MILIOLA JACKSONENSIS Cushman

Miliola jacksonensis Cushman, Contr. Cushman Lab. Foram. Res., Vol. 9, p. 2, pl. 1, figs. 2, 3, 1933. U. S. Geol. Survey Prof. Paper 181, p. 13, pl. 3, figs. 4-6, 1935.

"Test elongate, elliptical or fusiform, large, quinqueloculine; chambers numerous, distinct, the periphery angled; sutures distinct; wall ornamented with numerous oblique, longitudinal costae, with a single row, occasionally a double one, of coarse round pits between each two costae; aperture at the end of a very short neck, cribrate in the adult, in the young with a large number of fine teeth projecting in from the edge. Length 2.00 mm.; diameter 0.55 mm."

The species was found in a test hole sample of Moodys Branch marl in the northwestern part of Scott County, where it is rare; whereas at Jackson, it is common.

MILIOLA SAXORUM Lamarck

Plate II, 8

Miliola (Miliolites) saxorum Lamarck, Annales du Museum, Vol. 5, p. 352, no. 5, 1804; Vol. 9, pl. 17, figs. 2a, b, 1807. Defrance, Dictionnaire des sciences naturelles, Vol. 31, p. 69, 1824; Atlas de conchyliologie, pl. 15, fig. 1. Cushman, U. S. Geol. Survey Prof. Paper 181, pp. 12, 13, pl. 3, figs. 1-3, 1935.

"Test large, elongate, fusiform, quinqueloculine; chambers very numerous, distinct, the periphery flattened; sutures distinct; wall nearly smooth, marked by very numerous small circular pits arranged in oblique rows across the chambers; aperture at the end of a very short neck, cribrate, made up of a large number of pores. Length 2.50 mm.; diameter 0.60 mm."

A few specimens of this species were found in test hole samples from the Moodys Branch member of the Jackson formation in the northwestern part of Scott County. Cushman reports the species from Jackson and Garlands Creek.

Genus TRILOCULINA d'Orbigny, 1826

TRILOCULINA ROTUNDA d'Orbigny var.

Plate II, 18

Triloculina rotunda d'Orbigny, Ann. Sci. Nat., Vol. 7, p. 299, no. 4, 1826. Cushman, U. S. Nat. Mus., Bull. 104, pt. 6, p. 59, pl. 14, figs. 3a-c, 1929. Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 23, pl. 2, figs. 4a, b, 1932.

"Test somewhat longer than wide; chambers rotund; periphery broadly rounded; surface of the test made up largely or entirely of the last-formed chambers; sutures very slightly depressed; apertural end somewhat contracted, with a slightly thickened lip; aperture rounded, with a single bifid tooth, projecting somewhat above the outline of the aperture; surface of the test smooth and shining, often with transverse wrinkles. Length 0.53 mm."

Specimens which compare with those described from the Jackson of Louisiana were found sparingly in some samples of basal Yazoo clay and Moodys Branch marl from Scott County.

TRILOCULINA sp.

Plate II, 17

The figured specimen is a bluntly angular form from the lower Yazoo clay of Scott County. It is extremely rare.

Genus PYRGO Defrance, 1924

PYRGO INORNATA (d'Orbigny) var. DANVILLENSIS
Howe and Wallace

Plate II, 15, 16

Pyrgo inornata (d'Orbigny) var. *danvillensis* Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 21, pl. 2, figs. 1a, b, 1932.

"Test oviform, completely involute; chambers smooth; sutures slightly depressed; wall smooth, dull white; aperture simple, containing a single broad tooth. Length 0.45 mm.; diameter 0.38 mm."

Specimens that appear to belong to this variety came from a test hole sample in the upper Yazoo clay near the county line, 4 miles southwest of Morton.

FAMILY OPHTHALMIDIIDAE

Genus CORNUSPIRA Schultze, 1854

CORNUSPIRA OLYGOGYRA Hantken

Plate II, 19

Cornuspira olygogyra Hantken, Magy. kir. foldt. int. Evkonyve, Vol. 4, p. 16, pl. 1, fig. 10, 1875 (1876); K. ungar. geol. Anstalt Mitt. Jahrb., Vol. 4, p. 20, pl. 1, fig. 10, 1875 (1881). Cushman, U. S. Geol. Survey Prof. Paper 181, p. 15, pl. 4, fig. 14, 1935. Howe, La. Dept. Cons. Geol. Bull. 14, pp. 39, 40, pl. 3, figs. 9, 10, 1939.

"Test close-coiled, much compressed, sides flattened, periphery truncate; chamber rectangular in section, in end view the apertural end higher than broad, the sides in the last-formed chamber very slightly concave, sutural line distinct and the basal edge of the chamber slightly thickened; wall smooth, glossy. Diameter 0.60 mm."

On most specimens of this form from Scott County the periphery is truncated, but on a few it is rounded, and the test resembles *C. involvens* (Reuss).

This species was common in some of the samples of lower Yazoo clay and Moodys Branch marl of Scott County.

FAMILY LAGENIDAE

Genus ROBULUS Montfort, 1808

ROBULUS ALATO-LIMBATUS (Gumbel)

Plate III, 7

Robulina alato-limbata Gumbel, K. bayer. Akad. Wiss. Munchen, Cl. 2, Abh., Vol. 10, p. 641, pl. 2, figs. 70a, b, 1868 (1870).

Cristellaria alato-limbata Cushman and Applin, Bull. Am. Assoc. Petr. Geol., Vol. 10, no. 9, p. 171, pl. 8, figs. 8a, b, 1926.

Robulus alato-limbatus Cole, Bull. Am. Pal., Vol. 14, no. 51, p. 18, pl. 4, fig. 1, 1927. Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 37, pl. 3, figs. 2a, b, 1932. Cushman, U. S. Geol. Survey Prof. Paper 181, pp. 15, 16, pl. 6, figs. 2a, b, 1935. Howe, La. Dept. Cons. Geol. Bull. 14, p. 40, pl. 4, fig. 18, 1939.

"Test close-coiled, last-formed coil composed of few chambers, usually 7 in number, the central region with a large umbo not greatly projecting above the general surface but distinct, periphery with a narrow keel; chambers distinct, not inflated; sutures distinct, not depressed, strongly curved; aperture radiate; wall smooth. Diameter 0.65 mm."

This species is common throughout the Jackson formation in Scott County and is reported by Cushman from a locality 1½ miles south of Shubuta.

ROBULUS ARCUATO-STRIATUS (Hantken) var. CAROLINIANUS Cushman

Plate II, 23

Robulus arcuato-striatus (Hantken) var. *carolinianus* Cushman, Contr. Cushman Lab. Foram. Res., Vol. 9, p. 4, pl. 1, figs. 9a, b, 1933; U. S. Geol. Survey Prof. Paper 181, p. 17, pl. 6, figs. 6a, b, 1935.

"Test close-coiled throughout, strongly umbonate, periphery keeled with a fairly wide thin carina; chambers very distinct, 8 or 9 in the last-formed coil, of uniform shape and increasing very slightly in size as added; sutures distinct, strongly limbate, slightly raised, very strongly curved, ending in the middle in a clear umbo; wall smooth except for the slightly raised sutures; aperture slightly protruding, at the peripheral angle, radiate, apertural face slightly concave, the sides thickened. Diameter 1.30 mm."

Specimens assigned to this variety compare favorably in all characteristics except that the Scott County forms have a narrow and somewhat thickened keel. The species was found to be fairly common in the samples of lower Jackson material from that county and is listed by Cushman from a locality 1½ miles south of Shubuta.

ROBULUS ARTICULATUS (Reuss) var. TEXANUS (Cushman and Applin)

Plate III, 6

Cristellaria articulata Reuss var. *texana* Cushman and Applin, Bull. Am. Assoc. Petr. Geol., Vol. 10, p. 170, pl. 8, figs. 1, 2, 1926.

Robulus articulatus (Reuss) var. *texanus* Ellisor, Bull. Am. Assoc. Petr. Geol., Vol. 17, no. 11, pl. 2, fig. 3, 1933.

Lenticulina articulata (Reuss) var. *texana* Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 31, pl. 5, figs. 1, 2, 1932.

Robulus articulatus (Reuss) var. *texanus* (Cushman and Applin), U. S. Geol. Survey Prof. Paper 181, p. 16, pl. 4, figs. 16, 17, 1935.

"This variety is of large size, in the young with the chambers close-coiled, but in the adult with the central portion becoming visible, owing to the shortening of the chambers, which fail to cover the preceding whorl entirely, periphery with a distinct, rounded keel, in the adult with as many as 10 to 12 chambers. Diameter 1.60 mm. or less."

This variety was found to be fairly abundant in samples that range throughout the Jackson formation of Scott County.

ROBULUS CLERICII (Fornasini)

Plate III, 13

Cristellaria clericii Fornasini, Mem. R. Acad. Sci. Bologna, ser. 5, Vol. 9, p. 65, fig. 17, 1901. Nuttall, Quart. Jour. Geol. Soc., Vol. 84, p. 87, pl. 5, fig. 10, 1928.

Robulus clericii (Fornasini) Cushman, Contr. Cushman Lab. Foram. Res., Vol. 5, pt. 4, p. 84, pl. 12, figs. 16, 17, 1929. Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 38, pl. 15, fig. 3, 1932.

Rare specimens which appear to belong to this species came from basal Yazoo clay in Scott County.

ROBULUS CULTRATUS Montfort

Plate III, 4

Robulus cultratus Montfort, Conchyliogie systematique, Vol. 1, p. 214, 1808.

Robulina cultrata (Montfort) d'Orbigny, Ann. Sci. Nat., Vol. 7, p. 287, No. 1, Modeles No. 80, 1826; Foram. Foss. Vienne, p. 96, pl. 4, figs. 14, 15, 1846.

Cristellaria cultrata (Montfort) Cushman, U. S. Geol. Surv. Prof. Paper 129, p. 130, pl. 31, fig. 8, 1922.

Robulus cultratus Montfort, Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 38, pl. 7, fig. 1, 1932.

"Test planispiral, entirely involute, equally biconvex, almost circular in outline; periphery with a prominent keel; chambers

numerous, about ten in the last formed whorl, not inflated; sutures almost radial, slightly curved, raised and thickened; umbilical area filled with the thickened ends of the sutures which form a pronounced boss; wall calcareous, finely perforate; aperture radial at the periphery but extending a short distance down the concave face of the last-formed chamber as a narrow slit protected on either side by a fine lip. Diameter 0.75 mm."

A number of good specimens, showing the prominent keel, thickened boss, and sutures, came from samples of lower Yazoo clay in test holes 2 miles south of Lake.

ROBULUS DUMBLEI Weinzierl and Applin

Plate II, 20a, 20b

Robulus dumblei Weinzierl and Applin, Jour. Pal., Vol. 3, no. 4, p. 396, pl. 43, figs. 3a, b, 1929.

"The form is close-coiled, strongly biconvex; chambers numerous, ten generally visible in the mature forms; umbo covered by a thick boss of clear shell material; sutures outlined by low ribs which are very narrow near the umbo, and close to the periphery, but widen rapidly in the area between these two points. The margin is outlined by a very thick and narrow keel."

Good specimens of this species, some having the sutures darkened by mineral matter underlying the low ribs, were found in lower Yazoo clay samples from Scott County test holes.

ROBULUS GUTTICOSTATUS (Gumbel)

Robulina gutticostata Gumbel, K. bayer. Akad. Wiss. Munchen, Cl. 2, Abh., vol. 10, p. 643, pl. 1, fig. 74, 1868 (1870). Hantken, Magy. kir. foldt. int. Evkonyve, vol. 4, p. 48, pl. 6, fig. 10, 1875 (1876); K. ungar. geol. Anstalt Mitt. Jahrb., Vol. 4, p. 57, 1875 (1881). Cushman, U. S. Geol. Survey Prof. Paper 181, p. 15, pl. 5, figs. 1, 2, 1935.

"Test close-coiled, periphery acute, keeled, compressed; chambers distinct but not inflated, 9 to 11 chambers in the last-formed coil in the adult; sutures distinct, ornamented, limbate, a raised costa on the exterior broken into a row of rounded, bead-like protuberances, especially toward the umbilicus, the beads increasing in size, with the largest nearest the umbilicus; sutures very slightly curved; wall between the sutures smooth; aper-

ture peripheral, radiate, slightly projecting. Diameter up to 1.50 mm."

Specimens that show stages in variation from the typical species to the variety *cocoaensis* are found throughout the Jackson formation of Scott County.

ROBULUS GUTTICOSTATUS (Gumbel) var. COCOAENSIS (Cushman)

Plate II, 24

Cristellaria gutticostatus (Gumbel) var. *cocoaensis* Cushman, Contr. Cushman Lab. Foram. Res., Vol. 1, p. 67, pl. 10, fig. 11, 1925; U. S. Geol. Survey Prof. Paper 181, p. 15, pl. 5, figs. 3, 4, 1935.

"Variety with usually a larger number of chambers in each whorl than in the typical form; sutures with very distinct beading, the beads growing larger toward the inner end of the sutures, and the umbonal region occupied by a series of large bosses, last-formed suture in adults often unornamented and slightly depressed."

Characteristically ornamented specimens, some showing variations in the pattern and amount of beaded protuberances, were common throughout most of the Yazoo clay of Scott county. Immature specimens that resemble the early stages of development of *Marginulina fragaria* (Gumbel) var. *texasensis* (Cushman and Applin) are sometimes found in the same material.

ROBULUS LIMBOSUS (Reuss)

Plate II, 25

Robulina limbosa Reuss, Akad. Wiss. Wien Sitzungsber., Vol. 48, pt. 1, p. 55, pl. 6, figs. 69a, b, 1863 (1864). Hantken, Magy. kir. foldt. int. Evkonyve, Vol. 4, p. 48, pl. 6, fig. 11, 1875 (1876); K. ungar. geol. Anstalt Mitt. Jahrb., Vol. 4, p. 57, pl. 6, fig. 11, 1875 (1881).

Robulus limbosus Ellisor, Bull. Am. Assoc. Petr. Geol., Vol. 17, no. 11, pl. 2, figs. 1a, b, 1933. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 16, pl. 6, fig. 5, 1935. Contr. Cushman Lab. Foram. Res., Vol. 15, pt. 3, pl. 9, fig. 20, 1939.

"Test close-coiled, umbonate, periphery with a broad, very thin, plate-like transparent keel; chambers distinct, 9 or 10 in the last-formed coil; sutures distinct, curved, slightly limbate, of clear material, ending at the umbo in a transparent mass of clear shell material; wall smooth; apertural face slightly con-

cave, aperture on the peripheral angle, radiate. Maximum diameter 1.50 mm."

This species was fairly abundant in representative samples that ranged through the Yazoo clay of Scott County. It has been reported from several localities in the Jackson formation of the state.

ROBULUS LIMBOSUS (Reuss) var. HOCKLEYENSIS (Cushman and Applin)

Plate II, 22

Cristellaria limbosa (Reuss) var. *hockleyensis* Cushman and Applin, Bull. Am. Assoc. Petr. Geol., Vol. 10, p. 171, pl. 8, figs. 3, 4, 1926.

Robulus limbosus (Reuss) var. *hockleyensis* Ellisor, Bull. Am. Assoc. Petr. Geol., Vol. 17, no. 11, pl. 1, figs. 11a, b, 1933. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 16, pl. 4, figs. 15a, b; pl. 6, figs. 3a, b, 1935. Contr. Cushman Lab. Foram. Res., Vol. 15, pt. 3, pl. 9, fig. 21, 1939.

"Test differing from the typical form in the fewer chambers and the broader form in apertural view, the keel perhaps not so broad and thin, and the central umbo not so strongly developed. Diameter 0.75 mm."

Good specimens were found in samples of Moodys Branch marl and the lower part of the Yazoo clay at several localities in Scott County.

ROBULUS MAYI Cushman and Parker

Plate III, 2

Robulus mayi Cushman and Parker, Contr. Cushman Lab. Foram. Res., Vol. 7, pt. 1, p. 2, pl. 1, figs. 3-5, 1931. Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 40, pl. 2, fig. 7, 1932.

"Test comparatively small, much compressed, later chambers tending to elongate but not to definitely uncoil, periphery subacute, slightly keeled; chambers distinct, but not inflated, gradually elongating as added; sutures limbate, very distinct, flush with the surface; wall smooth, very finely perforate; apertural face slightly convex, aperture radiate, at the peripheral angle. Length 0.5 mm."

One sample of Yazoo clay from the top of the formation contained a few specimens that appear to belong to this species. The test hole furnishing the sample was located near the Rankin County line at a point 4 miles southwest of Morton.

ROBULUS PROPINQUUS (Hantken)

Plate II, 21

Cristellaria propinqua Hantken, Magy. kir. foldt. int. Evkonyve, Vol. 4, p. 45, pl. 5, fig. 4, 1875 (1876); K. ungar. geol. Anstalt Mitt. Jahrb., Vol. 4, p. 52, pl. 5, fig. 4, 1876 (1881). Cushman and Applin, Bull. Am. Assoc. Petr. Geol., Vol. 10, p. 172, pl. 8, fig. 9, 1926.

Robulus propinquus Ellisor, Bull. Am. Assoc. Petr. Geol., Vol. 17, no. 11, pl. 7, figs. 12a, b, 1933. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 16, pl. 6, figs. 1a, b, 1935. Howe, La. Dept. Cons. Geol. Bull. 14, p. 41, pl. 4, figs. 13, 14, 1939.

"Test with the early portion close-coiled, later tending to become uncoiled, the periphery subacute, later chambers increasing in width; chambers few, 6 or 7 in the last-formed coil, distinct but not inflated; sutures distinct, curved, not depressed; wall smooth; apertural face somewhat tapering toward the aperture, which is radiate and slightly projecting. Diameter 0.60 mm."

Typical specimens and others that show slight variations were found in Yazoo clay samples obtained from test holes in both the lower portion and the uppermost part of the formation in Scott County.

ROBULUS WILCOXENSIS Cushman and Ponton

Plate III, 1, 3

Robulus wilcoxensis Cushman and Ponton, Contr. Cushman Lab. Foram. Res., Vol. 8, pt. 3, p. 52, pl. 7, figs. 3a, b, 1932. Toulmin, Jour. Pal., Vol. 15, p. 579, pl. 78, figs. 24, 25, 1941. Cushman, Contr. Cushman Lab. Foram. Res., Vol. 18, pt. 2, p. 27, pl. 5, fig. 7, 1942.

"Test compressed, close coiled except in the oldest (latest) portion where 1 or 2 chambers may become uncoiled, periphery in the earlier portion with a narrow blunt keel, in the adult chambers with the keel becoming obsolescent and the periphery rounded in the last chambers; chambers numerous, 9 or 10 in the last-formed coil of the adult, later ones slightly inflated and uncoiling, early ones of uniform shape, gradually increasing in size as added; sutures distinct, rather strongly curved, in the early portion limbate and raised, then becoming flush with the surface and in the adult slightly depressed; wall smooth except for the early raised sutures; aperture terminal, radiate in the adult, in the earlier chambers at the outer peripheral angle. Length 1.00-1.15 mm.; breadth 0.75-0.80 mm.; thickness 0.25-0.30 mm."

Certain Jackson specimens appear to be most closely related to the species described from the Wilcox of Alabama. A few show a tendency to uncoil in that the final chamber fails to reach back to the periphery. Upper Yazoo clay samples from Scott County yielded the specimens referred to this species.

Genus LENTICULINA Lamarck, 1804

LENTICULINA CONVERGENS (Bornemann)

Cristellaria convergens Bornemann, Deutsch. geol. Gesell. Zeitschr., Vol. 7, p. 327, pl. 13, figs. 16, 17, 1855.

Lenticulina convergens (Bornemann), Cushman, U. S. Geol. Survey Prof. Paper 181, p. 17, pl. 6, figs. 4a, b, 1935.

"Test compressed, ovate, close-coiled, thickest in the umbonal region but without a distinct umbo; chambers fairly distinct, the later ones increasing somewhat in height; sutures fairly distinct, not depressed; apertural face strongly convex, aperture at the peripheral angle, radiate, slightly produced. Diameter 1.00 mm."

The species ranges through the Jackson formation and was found in several samples from Scott County.

LENTICULINA sp.

Plate III, 5

Test compressed, nearly circular in outline, periphery keeled with a thin carina; chambers fairly distinct, about 6 in last-formed coil; sutures fairly distinct, last one slightly depressed; apertural face somewhat concave; aperture at peripheral angle, radiate.

A somewhat similar form was noted by Howe and Wallace in the Danville Landing beds; but the carina on their specimen does not continue on the last chamber, and the apertural face is convex. The figured specimen is from a test hole in the upper Yazoo clay in the Homewood area, Scott County.

Genus PLANULARIA Defrance, 1824

PLANULARIA CATAHOULAENSIS Howe and Wallace

Plate III, 12

Planularia catahoulaensis Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 36, pl. 3, figs. 3, 4, 1932.

"Outline subcircular, test compressed, periphery provided with a wide, thin keel; chambers numerous, often twelve or more in

adult specimens, younger forms can be found with two or more; sutures distinct, limbate, curvature greatest in the early portion, almost imperceptible in the last few chambers; wall calcareous glossy; aperture, a radiate opening at the peripheral angle. Diameter (adult) 1.35 mm."

Specimens compare favorably with those described from Louisiana. A few show slightly raised boss of shell material in the umbilical region. The species was found very sparingly in the upper Yazoo clay beds of Scott County.

PLANULARIA DANVILLENSIS Howe and Wallace

Plate III, 10

Planularia danvillensis Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 36, pl. 3, fig. 1, 1932.

"Test planispiral, much compressed, chambers becoming more elongate as added; periphery provided with a thin keel present on the first 8 to 10 visible chambers; chambers numerous, often 12 or more visible from either side; sutures clear, broad, slightly curved; wall calcareous, smooth; aperture located on the angle formed by the periphery and the face of the last-formed chamber, radiate, simple. Length 0.9 mm.; width with keel 0.5 mm."

The species is very rare in the upper Yazoo clay samples of Scott County.

PLANULARIA DANVILLENSIS Howe and Wallace var. YAZOOENSIS Bergquist n. var.

Plate III, 8, 9

Test elongate, biconvex in coiled portion, later much compressed, chambers more elongate as added, large specimens with final chamber considerably removed from early part of test; periphery slightly keeled along coiled part; sutures clear, raised and curved on coiled portion, separated from central boss of shell material; later sutures oblique and flush to slightly depressed; apertural face flattened. Length 0.8 mm. to 1.75 mm. width 0.4 mm. to 0.6 mm.

This variety differs from the typical form in the lack of a thin keel along the early part of the test and in the possession of raised, limbate sutures and a central boss of shell material on the coiled portion.

Specimens obtained were from lower Yazoo clay samples of Scott County.

Holotype: Lower Yazoo clay, test hole J1, Forest; Type slide III, 8, 9, Mississippi Geological Survey.

PLANULARIA OUACHITAENSIS Howe and Wallace var.

Plate III, 11

Planularia ouachitaensis Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 37, pl. 3, fig. 7a, b, 1932.

"Test elongate, much compressed, slightly trochoid, about twice as long as broad; periphery provided with a thin keel on the close-coiled portion; chambers numerous, 12 or more often visible; sutures limbate, on the close-coiled portion often provided with raised ribs or knobs, on the uncoiled portion flush with the surface or slightly depressed; wall calcareous, finely perforate, aperture located at the peripheral angle, round, radiate. Length 1.5 mm.; width 0.7 mm."

Yazoo clay specimens have the outer periphery provided with a continuous thin keel, which either is paralleled along margins of the uncoiled portion by sharp eneschelon-like ridges along each side or is shifted to one margin and has a secondary keel parallel to it. Length 1.25 mm.; width 0.75 mm. The form was found rarely in samples of the uppermost portion of the Yazoo clay in Scott County.

Type slide III, 11, Mississippi Geological Survey.

Genus MARGINULINA d'Orbigny, 1826

MARGINULINA COCOAENSIS Cushman

Plate IV, 15, 16, 17

Marginulina cocoaensis Cushman, Contr. Cushman Lab. Foram. Res., Vol. 1, p. 67, pl. 10, figs. 9, 10, 1925. Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 33, pl. 7, fig. 5, 1932. Ellisor, Bull. Am. Assoc. Petr. Geol., Vol. 17, No. 11, pl. 6, fig. 6, 1933. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 18, pl. 7, figs. 6, 7, 1935.

"Test elongate, compressed, initial and composed of a few partly coiled chambers much compressed, later and major portion composed of more rounded chambers, 6 to 10 in number in adult specimens; sutures fairly distinct, of clear shell material; ornamentation consisting of 9 or 11 lamellate costae running from the initial end to the base of the last-formed chamber in

adults, the last chamber being usually smooth in completely developed specimens, two of the costae forming keels on the compressed portion of the test; aperture at the peripheral side of the apertural face, radiate, at the end of a distinct projection. Maximum length 1.60 mm.; breadth 0.25 mm."

Specimens show various growth stages from short tests, composed of a few chambers, to elongate and somewhat arcuate adult forms. Some specimens are not compressed or coiled in the early portion of the tests and may be megalospheric types.

This species is fairly abundant throughout the Yazoo clay.

MARGINULINA EXIMIA Neugeboren

Plate IV, 8

Marginulina eximia Neugeboren, Verh. Mitt. Siebenburg. Ver. Nat., Jahrb. 2, p. 129, pl. 4, fig. 17, 1851. Cushman, Contr. Cushman Lab. Foram. Res., Vol. 15, pt. 3, p. 56, pl. 9, figs. 27, 28, 1939.

Test smooth, elongate, sigmoid; chambers rapidly increasing in size in uncoiled portion; sutures distinct, oblique in later part; aperture produced and radiate.

A few specimens which appear to belong to this small species were found in Yazoo clay and Moodys Branch marl of Scott County.

MARGINULINA FRAGARIA (Gumbel) var. TEXASENSIS (Cushman and Applin)

Plate IV, 9, 10

Cristellaria fragaria Gumbel var. *texasensis* Cushman and Applin, Bull. Am. Assoc. Petr. Geol., Vol. 10, p. 171, pl. 8, figs. 5-7, 1926.

Lenticulina fragaria (Gumbel) var. *texasensis* Howe and Wallace, La. Dept. Conservation Geol. Bull. 2, p. 32, pl. 5, figs. 3-5, 1932.

Marginulina fragaria (Gumbel) var. *texasensis* Ellisor, Bull. Am. Assoc. Petr. Geol., Vol. 17, no. 11, pl. 2, fig. 4, 1933. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 19, pl. 7, figs. 8-10, 1935.

Numerous specimens of this highly ornamented variety show extensive variation in ornamentation and development. In the young the test is somewhat compressed, but the elongate adult specimens are terminated by one or two nearly spherical chambers. Beads of clear shell material exist along the sutures in the compressed portion of the test, and spines or plications cover the surface of later inflated chambers. The species was common throughout the Yazoo clay of the Scott County samples.

MARGINULINA HAVANENSIS Cushman and Bermudez

Plate IV, 11

Marginulina havanensis Cushman and Bermudez, Contr. Cushman Lab. Foram. Res., Vol. 13, pt. 1, p. 9, pl. 1, figs. 31, 32, 1937.

"Test elongate, early portion close coiled, much compressed, later becoming uncoiled and nearly circular in section; chambers distinct, those of the uncoiled portion becoming somewhat inflated, and increasing in height as added; sutures distinct, early ones somewhat limbate, later ones becoming progressively more depressed; wall smooth, very finely perforate; aperture terminal, radiate. Length 1.50-1.75 mm.; diameter 0.40 mm."

A few specimens from the lower Yazoo clay of Scott County appear to be identical with the Cuban species described by Cushman and Bermudez.

MARGINULINA JACKSONENSIS (Cushman and Applin)

Plate IV, 2

Cristellaria jacksonensis Cushman and Applin, Bull. Am. Assoc. Petr. Geol., Vol. 10, p. 172, pl. 8, fig. 10, 1926. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 18, pl. 7, figs. 5a, b, 1935.

"Test much elongate, the greatest width being at the base, where there are a few close-coiled chambers, later portion consisting of 3 to 5 uniserial chambers, much inflated, especially toward the apertural end, early portion with the periphery acute, consisting of 4 or 5 chambers in the coil, the later uncoiled chamber progressively increasing in thickness so that the last-formed chamber is often circular in transverse section; sutures distinct, those of the later portion depressed; wall smooth; aperture radiate, terminal. Maximum length nearly 1.00 mm.; breadth at the base 0.20 mm."

This species was identified in samples from the Moodys Branch material and from the Yazoo clay of Scott County. Specimens show some variation in amount of inflation of later chambers and general shape of test.

MARGINULINA MULTIPLICATA Bergquist, n. sp.

Plate IV, 14a, 14b

Test elongate, sigmoid, composed of 7 or more chambers, early portion curved, compressed, slightly keeled; last two or three chambers inflated, circular in transverse section, comprising

over one-half of test; sutures distinct, oblique, depressed on inflated portion; wall ornamented by numerous fine costae, somewhat oblique, confined to individual chambers; aperture radiate, projecting at the periphery, apertures on earlier chambers faintly visible. Length 0.6 mm.

The species is present in the lower Yazoo clay and Moodys Branch marl of Scott County.

Holotype: Lower Yazoo clay, test hole J162C, 2½ miles southwest of Lake; Type slide IV, 14, Mississippi Geological Survey.

MARGINULINA SUBBULLATA Hantken

Plate IV, 4, 5, 6

Marginulina subbullata Hantken, A. magy. kir. foldt. int. evkonyve, Vol. 4, p. 39, pl. 4, figs. 9, 10, 1875 (1876); Mitth. Jahrb. ungar. geol. Anstalt, Vol. 4, p. 46, pl. 4, figs. 9, 10, 1875 (1881). Cushman, Contr. Cushman Lab. Foram. Res., Vol. 1, pt. 3, p. 62, pl. 10, figs. 3a, b, 1925. Cushman and G. D. Hanna, Proc. Calif. Acad. Sci., ser. 4, Vol. 16, p. 216, pl. 13, fig. 11, 1927. Cole, Bull. Amer. Pal., Vol. 14, no. 51, p. 14, pl. 5, fig. 10, 1927. Cushman, Contr. Cushman Lab. Foram. Res., Vol. 5, p. 85, pl. 12, fig. 20, 1929. Nuttall, Jour. Pal., Vol. 9, p. 125, pl. 14, fig. 16, 1935. Coryell and Embich, l. c., Vol. 11, p. 297, pl. 42, fig. 2, 1937. Cushman, Contr. Cushman Lab. Foram. Res., Vol. 15, pt. 3, p. 55, pl. 9, figs. 30, 31, 1939.

Adult specimens, composed of 2 to 4 spherical chambers above the partly coiled early portion, were found at a few localities in the Yazoo clay in Scott County.

MARGINULINA SUBLITUUS (Nuttall)

Plate IV, 1, 3

Cristellaria sublituus Nuttall, Jour. Pal., Vol. 6, p. 11, pl. 1, figs. 13-14, 1932.

"Test much compressed with sharp border, which in parts has a very narrow keel. Surface glossy, smooth, sutures narrow, oblique, not depressed. Aperture stellate, terminal. Maximum length 1.1 mm., width 0.1 mm. This species is much more compressed than *Marginulina jacksonensis* (Cushman and Applin), which has been recorded from the Alazan of Mexico. *M. tenuis* Bornemann is also more inflated."

Compressed specimens that check favorably with the species described by Nuttall are found in the Moodys Branch material and throughout the Yazoo clay of Scott County.

MARGINULINA TENUIS Bornemann

Plate IV, 20

Marginulina tenuis Bornemann, Zeitschr. deutsch. geol. Gesell., Vol. 7, p. 326, pl. 13, fig. 14, 1855. Cushman and McGlamery, Contr. Cushman Lab. Foram. Res., Vol. 15, pt. 3, p. 55, pl. 9, figs. 33, 34, 1939.

"Test very elongate, slightly curved, especially in the later half, the earlier portion compressed, later circular in transverse section; chambers of the early portion very oblique and low, overlapping, increasing rapidly in height in the adult, the final ones inflated, longer than the diameter; sutures not much depressed, somewhat indistinct, very oblique in the early portion, nearly transverse in the adult; wall smooth; aperture nearly central, radiate. Length up to 1.25 mm.; diameter of adult 0.18 mm."

A number of specimens in the lower Yazoo clay and in the upper beds belong to this species. Variations in curvature and height of test and amount of inflation are seen in the specimens identified.

MARGINULINA TRIANGULARIS d'Orbigny var. DANVILLENSIS Howe and Wallace

Plate III, 15, 18

Marginulina triangularis d'Orbigny var. *danvillensis* Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 34, pl. 5, figs. 6a, b, 1932.

"Test large, elongate, transverse section generally similar to an isosceles triangle with the angles slightly rounded, early portion close-coiled, later portions uncoiled; chambers fairly numerous, about 8 or more usually visible, only those in the uncoiled portion inflated; periphery rounded; sutures in the coiled portion radial, straight, not depressed, in the uncoiled portion meeting the periphery at an angle of about forty-five degrees, slightly depressed; wall calcareous, smooth; aperture circular, radiate, in some specimens becoming almost central. Width of close-coiled portion 0.25 mm.; length 0.9 mm. or more."

Specimens identified as this variety show considerable variation in the general shape of the tests. All came from the upper beds of the Yazoo clay in Scott County.

MARGINULINA (?) sp.

Plate IV, 7

Test elongate, composed of 5 or 6 chambers; axis of early portion curved; initial chamber bulbous, later chambers elongate, inflated, cylindrical in transverse section; wall smooth, transparent; aperture radiate, projecting at periphery.

A few specimens of this small form were found in a sample of lower Yazoo clay from a test hole at Forest.

Figured specimen, number 7 on type slide IV, Mississippi Geological Survey.

Genus DENTALINA d'Orbigny, 1826

DENTALINA ACUTA d'Orbigny var.

Plate IV, 25

Test slender, arcuate; chambers numerous, increasing in height as added, last one set apart and tapering; sutures distinct but not depressed except on final chamber; wall ornamented by a few strong continuous costae, 4 on young forms and about 8 on adult specimens, terminated at initial end in a short spine; aperture radiate, at end of tapering protuberance.

Figured specimen from test hole J1, Forest. Broken specimens were found sparingly in several of the Yazoo clay samples.

DENTALINA ADOLPHINA d'Orbigny

Plate V, 1

Dentalina adolphina d'Orbigny, Foraminiferes fossiles du bassin tertiaire de Vienne. Gide et Comp., p. 51, pl. 2, figs. 18-20, 1846. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 21, pl. 8, figs. 11, 12, 1935.

Segments and a few nearly complete specimens of an elongate form with short backward projecting spines around the base of each of the inflated chambers were found in several of the Scott County samples, indicating that this form ranges throughout the Jackson.

DENTALINA BASITORTA Cushman

Plate V, 6a, 6b, 15

Dentalina basitorta Cushman, Contr. Cushman Lab. Foram. Res., Vol. 14, pt. 2, p. 37, pl. 6, figs. 4, 5, 1938.

"Test elongate, slender, somewhat curved, initial end with a basal spine, early portion with the chambers somewhat twisted,

later uniserial; chambers distinct, the earliest ones elongate, twisted about the elongate axis or even appearing somewhat irregularly biserial, not inflated, later ones strongly inflated, less overlapping; sutures distinct, earlier ones very strongly oblique, not depressed, later ones gradually less oblique and progressively more depressed; wall smooth; aperture terminal, radiate. Length up to 1.00 mm.; diameter 0.18 mm."

Cushman's holotype is from near the top of the Selma chalk 2 miles south of Graham, Mississippi. The Jackson specimens check very closely with the Cretaceous form, the biserial arrangement of the early chambers being clearly visible. Specimens vary in the number of chambers and width of test. Most of the Scott County specimens were found in the lower Yazoo clay, but a few were obtained from the uppermost part of the formation.

DENTALINA cf. CATENULATA Brady

A segment of a few inflated chambers with numerous connecting costae over the depressed sutures was found in a test hole sample of upper Yazoo clay obtained near the Rankin County line, approximately 4 miles southwest of Morton.

DENTALINA COMMUNIS (d'Orbigny)

Plate V, 4

Nodosaria (Dentalina) communis d'Orbigny, Soc. nat. sci. Ann., Vol. 7, p. 254, no. 35, 1826.

Nodosaria communis Cushman, U. S. Nat. Mus. Bull. 104, pt. 4, p. 75, pl. 12, figs. 3, 4, 15-17, 1923.

Dentalina communis Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 24, pl. 6, fig. 8, 1932. Toulmin, Jour. Pal., Vol. 15, no. 6, p. 584, pl. 79, fig. 13, 1941.

A few specimens that appear to belong to this species range throughout the Jackson formation in Scott County.

DENTALINA CONSOBRINA d'Orbigny var. EMACIATA Reuss

Dentalina emaciata Reuss, Zeitschr. deutsch. geol. Ges., Vol. 3, p. 63, pl. 3, fig. 9, 1851.

Nodosaria (Dentalina) consobrina var. *emaciata* Reuss, Denkschr. Akad. Wiss. Wien, Vol. 25, p. 132, pl. 2, figs. 12, 13, 1865. (For further references see Cushman, Fla. G. S. Bull. 4, p. 28, 1930).

Dentalina consobrina d'Orbigny var. *emaciata* Reuss, Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 25, pl. 7, fig. 7, 1932.

In samples from two test holes in the upper Yazoo clay of Scott County, a few specimens have been identified as this variety.

DENTALINA COOPERENSIS Cushman

Plate V, 3

Dentalina cooperensis Cushman, Contr. Cushman Lab. Foram. Res., Vol. 9, p. 8, pl. 1, fig. 17, 1933; U. S. Geol. Survey Prof. Paper 181, p. 20, pl. 8, figs. 3, 4, 1935.

"Test elongate, slightly compressed, very slightly tapering, gently curved, periphery only slightly sinuate, apical end pointed or with a single small spine; chambers few, usually about 10 in the adult specimen, often indistinct; sutures fairly distinct, oblique; wall smooth, matte; aperture at the periphery of the chamber slightly projecting. Length 2.00-2.50 mm.; breadth 0.30 mm."

A few specimens obtained from the Scott County samples through the Jackson section compare fairly well with the species described by Cushman, but only rarely was an initial spine observed.

DENTALINA FILIFORMIS (d'Orbigny)

Plate V, 2

"Orthoceratia filiformia aut capillaria" Soldani, Testaceographia, Vol. 2, p. 35, pl. 10, fig. e, 1798.

Nodosaria filiformis d'Orbigny, Ann. Sci. Nat., Vol. 7, no. 14, p. 253, 1826. (For further references to this species see Cushman, U. S. Nat. Mus. Bull. 71, p. 55, 1913).

Dentalina filiformis d'Orbigny, Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 25, pl. 6, figs. 2a, b, 1932.

Segmentary specimens from samples in Scott County indicate that this species ranges throughout the Jackson formation.

DENTALINA HANTKENI Cushman

Dentalina hantkeni Cushman, Contr. Cushman Lab. Foram. Res., Vol. 9, p. 9, pl. 1, figs. 18, 19, 1933.

Dentalina budensis Hantken, Magy. kir. foldt. Evkonyve, Vol. 4, p. 28, pl. 3, fig. 12, 1875 (1876). (Not *Nodosaria budensis* Hantken) Cushman, U. S. Geol. Survey Prof. Paper 181, p. 20, pl. 8, figs. 5, 6, 1935.

"Test elongate, arcuate, somewhat compressed, composed of a few chambers, initial end rounded; chambers distinct, increasing in length as added, outer curve sinuate, inner curve nearly

uniform; sutures fairly distinct, somewhat oblique; aperture near the inner curve with a slightly produced neck. Length 1.25 mm.; greatest diameter 0.15 mm."

There are a few segments of several chambers each that appear to belong to this species. They came from both upper and lower horizons of the Yazoo clay in Scott County, suggesting that the species may be present sparingly throughout that member of the Jackson formation.

DENTALINA JACKSONENSIS (Cushman and Applin)

Plate V, 13

Nodosaria jacksonensis Cushman and Applin, Bull. Am. Assoc. Petr. Geol., Vol. 10, p. 170, pl. 7, figs. 14-16, 1926. Cushman, Jour. Pal., Vol. 1, p. 153, pl. 24, fig. 3, 1927. Cole, Bull. Am. Pal., Vol. 14, no. 53, p. 208, pl. 3, fig. 12, 1928. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 20, pl. 8, figs. 7-9, 1935.

"Test elongate, tapering, gently curved, initial end rounded, ornamented with one to several spines, sides lobulate throughout, more strongly so in later growth; chambers subglobular, fairly numerous, usually 10 in well-developed specimens, inflated, length and breadth about equal except the last 1 or 2 in the adult, which are slightly longer than broad; sutures distinct, somewhat depressed, of clear shell material, surface smooth, glossy to dull; aperture with a cylindrical neck, the aperture itself not well preserved. Maximum length 2.50 mm.; maximum breadth 0.35 mm."

A few segments of tests, that show the initial portion and that appear to belong to this species, were found in both lower and upper Yazoo clay samples in Scott County.

DENTALINA MEXICANA (Cushman) var. DANVILLENSIS Howe and Wallace

Plate V, 5

Dentalina mexicana (Cushman) var. *danvillensis* Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 26, pl. 6, fig. 4, 1932.

Test elongate, tapering, slightly curved; early chambers subcylindrical, later chambers inflated and rounded; sutures limbate, depressed in later portion of test; aperture eccentric and radiate. Specimens vary in length of test. On some the last chamber is smaller than the one preceding it.

This variety is common in many of the Jackson samples from Scott County.

DENTALINA MULTILINEATA (?) Bornemann

Plate IV, 19

Dentalina multilineata Bornemann, Deutsch. Geol. Ges. Zeitschr., Vol. 7, no. 2, p. 325, pl. 13, fig. 12, 1855.

Segmentary tests of chambers ornamented by numerous fine costae have been provisionally assigned to this species. They were found in lower Yazoo clay samples in Scott County.

DENTALINA NASUTA Cushman

Plate V, 9

Dentalina nasuta Cushman, Contr. Cushman Lab. Foram. Res., Vol. 15, pt. 3, p. 57, pl. 10, figs. 10, 11, 1939.

"Test elongate, slender, slightly curved, gradually tapering from the subacute initial end to the greatest breadth at the last-formed chamber, apertural end produced into a long, tapering cone; chambers distinct, somewhat inflated toward the apertural end, increasing rather rapidly in size and height in the adult portion, slightly overlapping; sutures distinct, depressed in the later portion, somewhat oblique; wall smooth; aperture radiate, at the end of a long, conical, tapering projection of the apertural end of the last-formed chamber. Length up to 1.75 mm.; diameter 0.15-0.25 mm."

Specimens with tapering apertural projections appear to belong to the form described from the east coast. These were noted in the Yazoo clay of Scott County.

DENTALINA SUBSPINOSA (?) Neugeboren

Plate IV, 28

Dentalina subspinosa Neugeboren, K. Akad. Wiss., Math. Naturw. Cl., Denkschr., Wien, Osterreich, Bd. 12, Abth. 2, p. 88, pl. 4, fig. 7a-c, 1856.

A segment of 4 slightly inflated chambers set off by depressed sutures and ornamented by numerous short spines, each projecting toward the initial end of the test, came from a sample of upper Yazoo clay in a test hole approximately 4 miles northeast of Pulaski. This appears to be very similar to the species described from the Miocene of Rumania.

DENTALINA sp. (A)

Plate IV, 18, 27, 29

Test with an initial spine, composed of a few inflated chambers, each ornamented by several low rounded costae which begin at the base or overhang the deeply constricted sutures and diminish toward the apertural end of each chamber; aperture produced, radiate.

Length of broken specimen, (fig. 18) 1.20 mm., width 0.35 mm.; length of three-chambered specimen, (fig. 27) 0.8 mm.

Specimens were found in the Yazoo clay in Scott County.

Type slide IV, 18, 27, 29, Mississippi Geological Survey.

DENTALINA sp. (B)

In one of the Scott County lower Yazoo clay samples there was found an incomplete test of four chambers, each covered by numerous fine oblique costae. It may possibly belong to *D. multilineata* Bornemann.

Genus NODOSARIA Lamarck, 1812

NODOSARIA FISSICOSTATA (Gumbel)

Dentalina fissicostata Gumbel, K. bayer. Akad. Wiss. Munchen, Cl. 2, Abh., Vol. 10, p. 626, pl. 1, fig. 46, 1868 (1870).
Nodosaria fissicostata Cushman, Contr. Cushman Lab. Foram. Res., Vol. 1, p. 66, pl. 10, fig. 8, 1925. U. S. Geol. Survey Prof. Paper 181, p. 22, pl. 5, figs. 8, 9, 1935.

Segments of this species were found in lower Yazoo clay samples from Scott County.

NODOSARIA LATEJUGATA Gumbel

Plate IV, 12, 13

Nodosaria latejugata Gumbel, K. bayer Akad. Wiss. Munchen, Cl. 2, Abh., Vol. 10, p. 619, pl. 1, fig. 32, 1868 (1870). Hantken, Magy. kir. foldt. int. evkonyve, Vol. 4, p. 21, pl. 2, figs. 6a-d, 1875 (1876). Cushman, Contr. Cushman Lab. Foram. Res., Vol. 1, p. 66, pl. 10, fig. 7, 1925. U. S. Geol. Survey Prof. Paper 181, p. 21, 1935. Cushman and McMasters, Jour. Pal., Vol. 10, p. 512, pl. 75, figs. 11, 12, 1936. Toulmin, Jour. Pal., Vol. 15, no. 6, p. 588, pl. 79, figs. 26, 27, 1941.

"Test elongate, subcylindrical, initial end with a single spine; chambers distinct, slightly inflated; sutures distinct, of clear shell material, slightly depressed; surface ornamented with a few very prominent longitudinal costae, averaging about 10,

continuous from initial to apertural ends, except occasionally the final chamber smooth; apertural end slightly prolonged; aperture radiate. Maximum length of American specimens 8.00 mm.; breadth 0.50 mm."

This species is found sparingly in the Moodys Branch material and lower Yazoo clay in Scott County. Complete specimens were rare.

NODOSARIA LATEJUGATA Gumbel var. CAROLINENSIS Cushman

Nodosaria latejugata Gumbel var. *carolinensis* Cushman, Contr. Cushman Lab. Foram. Res., Vol. 9, p. 5, pl. 1, fig. 16, 1933; U. S. Geol. Survey Prof. Paper 181, p. 21, pl. 5, figs. 10-13, 1935. Jennings, Bull. Am. Pal., Vol. 23, p. 177, pl. 29, fig. 10, 1936. Toulmin, Jour. Pal., Vol. 15, no. 6, p. 588, pl. 79, fig. 28, 1941.

"Variety differing from the typical form in having the chambers more distinct and more inflated, the costae similar, but double the number in the typical, and the whole test larger."

Segments of two or more inflated chambers with a large number of costae were fairly common in some of the lower Yazoo clay samples from Scott County. These appear to belong to Cushman's variety.

NODOSARIA LONGISCATA d'Orbigny

Plate IV, 26

Nodosaria longiscata d'Orbigny, Foram. Foss. Vienne, p. 32, pl. 1, figs. 10-12, 1826. Plummer, Univ. Tex. Bull. 2644, p. 82, pl. IV, figs. 17a, b, 1926. Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 35, pl. 7, fig. 8, 1932. Howe, La. Dept. Cons. Geol. Bull. 14, p. 47, pl. 5, fig. 10, 1939.

Segments of a long cylindrical form appear to compare best with the published data for this species. Several of the test samples from the upper Yazoo clay in Scott County yielded these broken tests.

NODOSARIA PYRULA d'Orbigny var. LONGI-COSTATA (?) Cushman

Plate V, 17

Nodosaria pyrula d'Orbigny var. *longi-costata* Cushman, U. S. Nat. Mus., Vol. 51, no. 2172, p. 653, 1917; U. S. Nat. Mus., Bull. 100, Vol. 4, pl. 33, figs. 8, 9, 1921.

Several longitudinally plicated segments, each a single elongate chamber terminated at each end by a section of a thin con-

necting neck, are similar to the species figured by Cushman. The costae converge at each end of the chamber but are not paired, for the same plications do not converge at opposite ends. A few segments from a basal Jackson sample are smooth on the middle portion of the chamber, and costae suggest a slight spiral onto connecting neck. Those closest to Cushman's variety came from upper Yazoo clay samples in Scott County.

NODOSARIA RADICULA (Linnaeus)

Plate IV, 21, 22, 23

Nautilus radicula Linnaeus, Syst. Nat. 12 ed. p. 285, 1164, 1767; Gmelin's ed. 13, vol. 1, pt. 6, p. 3373, no. 18, 1788.

Nodosaria radicula Cushman, U. S. Nat. Mus. Bull. 100, Vol. 4, p. 190, pl. 34, fig. 4. Plummer, Univ. Texas Bull. 2644, p. 77, pl. 4, fig. 9, 1926. (Other references listed here).

"Test elongate, stout; chambers few and somewhat overlapping, smooth, short, compact, enlarging very little; sutures transverse, slightly depressed in early part of test but increasingly more constricted toward the oral extremity; shell wall thick, glossy; aperture small, round, protruding, radiate. Length up to 1 mm."

Specimens in the Jackson material exhibit variation in number and shape of chambers. Figured specimens show tests composed of two, four and five chambers. Usually the last-formed is more inflated and larger than the preceding chambers, but some specimens gradually enlarge with the sutures only faintly distinguishable. These were found in both the lower and upper Yazoo clay samples in the Scott County material.

Genus PSEUDOGLANDULINA Cushman, 1929

PSEUDOGLANDULINA LAEVIGATA (d'Orbigny)

Plate IV, 24

Nodosaria (Glandulina) laevigata d'Orbigny, Ann. Sci. Nat., Vol. 7, p. 252, pl. 10, figs. 1-3, 1826.

Pseudoglandulina laevigata (d'Orbigny) Cushman, Contr. Cushman Lab. Foram. Res., Vol. 15, pt. 3, p. 58, pl. 10, figs. 15, 16, 1939.

Specimens which show the features of the genus have been identified as this species. All those noted came from the upper Yazoo clay in Scott County.

Genus SARACENARIA Defrance, 1824

SARACENARIA ARCUATA (d'Orbigny) var. HANTKENI Cushman

Plate III, 16, 17

Cristellaria arcuata Hantken (not d'Orbigny), Magy. kir. foldt. int. Evkonyve, Vol. 4, p. 45, pl. 5, figs. 5a-c, 6, 1875 (1876); K. ungar. geol. Anstalt Mitt. Jahrb., Vol. 4, p. 53, pl. 5, figs. 5a-c, 6, 1875 (1881).

Saracenaria arcuata (d'Orbigny) var. *hantkeni* Cushman, Contr. Cushman Lab. Foram. Res., Vol. 9, p. 4, pl. 1, figs. 11, 12, 1933; U. S. Geol. Survey Prof Paper 181, p. 17, pl. 5, figs. 6, 7, 1935.

"Test longer than broad, periphery subacute, apertural face truncate, test triangular in transverse section, early portion somewhat close-coiled in the first few chambers, soon becoming uncoiled; chambers comparatively few, usually only 7 or 8, distinct but not inflated, angles subacute, almost keeled in the last-formed chambers; sutures distinct, very slightly if at all depressed; wall smooth and polished; aperture peripheral, radiate, slightly projecting. Maximum length 1.30 mm.; breadth of final chamber 0.50 mm."

Specimens show considerable variation in curvature and amount of inflation of tests and may represent more than one variety. They appear to range throughout the Jackson beds in Scott County.

SARACENARIA MORESIANA Howe and Wallace

Plate III, 14a, 14b

Saracenaria moresiana Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 42, pl. 2, figs. 8a, b, c, 1932.

"Test elongate, roughly triangular, periphery well rounded, apertural face flaring; chambers few, about six usually visible, each succeeding chamber becoming more elongate and broader; sutures distinct, slightly depressed, slightly curved; wall calcareous, glassy; aperture radiate. Length 0.5 mm."

This common species, specimens of which exhibit little variation from the described and illustrated material, was found in most of the samples from Scott County and ranges throughout the Jackson formation.

Genus VAGINULINA d'Orbigny, 1826

VAGINULINA sp.

Plate V, 16

A few small specimens like the one figured or with the last two chambers somewhat inflated were found in some of the Yazoo clay samples from Scott County.

Genus FRONDICULARIA Defrance, 1826

FRONDICULARIA TENUISSIMA Hantken

Plate V, 14, 25

Frondicularia tenuissima Hantken, K. Ungar. Geol. Anst., Mitt. Jahrb., Vol. 4, no. 1, p. 43, pl. 13, fig. 11a, b, 1875.

Test small, elliptical, flat, apertural end somewhat extended, initial chamber projecting in a stout basal spine; chambers thin, elongate, each extending nearly to base; sutures distinct, limbate, slightly raised; wall smooth; aperture at end of a slight neck.

This species is rare in the lower Yazoo clay of Scott County.

Genus LAGENA Walker and Jacob, 1798

LAGENA ACUTICOSTA Reuss

Plate V, 30

Lagena acuticosta Reuss, Akad. Wiss. Wien Sitzungsber., Vol. 44, pt. 1, p. 305, pl. 1, fig. 4, 1861 (1862). Cushman, U. S. Geol. Survey Prof. Paper 181, p. 23, pl. 9, figs. 5, 6, 1935.

Specimens from samples of both lower and upper Jackson material from Scott County seem to be referable to this somewhat variable species.

LAGENA COSTATA (?) (Williamson)

Plate V, 23

Entosolenia costata Williamson, Recent Foraminifera of Great Britain, p. 9, pl. 1, fig. 18, 1858.

Lagena costata Reuss, Akad. Wiss. Wien Sitzungsber., Vol. 46, pt. 1, p. 329, pl. 4, fig. 54, 1862 (1863). Cushman, U. S. Geol. Survey Prof. Paper 181, p. 23, pl. 9, figs. 7, 8, 1935.

A few specimens from Scott County samples of lower Yazoo clay seem to be referable to this species.

LAGENA GLOBOSA (Montagu)

Plate V, 20

"Serpula (Lagena) laevis globosa" Walker and Boys, Test. Min., p. 3, pl. 1, fig. 8, 1784.

Vermiculum globosum Montagu, Test. Brit., p. 523, 1803.

Lagena globosa (Montagu) Cushman, U. S. Nat. Mus., Bull. 104, pt. 4, p. 20, pl. 4, figs. 1-2, 1923. Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 27, pl. 6, figs. 15, 16, 1932.

Subglobose little specimens that appear to belong to this species were found in one lower Yazoo clay sample from Scott County.

LAGENA HEXAGONA (Williamson)

Plate V, 24

Entosolenia squammosa Montagu var. *hexagona* Williamson, Annals and Mag. Nat. Hist., 2d ser., Vol. 1, p. 20, pl. 2, fig. 23, 1848; Recent Foraminifera of Great Britain, p. 13, pl. 1, fig. 31, 1858.

Lagena hexagona (Williamson) Siddall, Catalogue of Rec. Brit. Foram. p. 6, 1879. Cushman, U. S. Geol. Survey Prof. Paper 129, p. 129, pl. 29, fig. 12, 1922. Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 28, pl. 6, fig. 14, 1932. Howe, La. Dept. Cons. Geol. Bull. 14, p. 50, pl. 6, fig. 16, 1939.

This tiny distinctive form is found sparingly scattered throughout the Jackson formation.

LAGENA HISPIDA Reuss

Plate V, 31

"Sphaerulae hispidae" Soldani, Testaceographica, Vol. 2, p. 53, pl. 17, figs. 5, 10, 1798.

Lagena hispida Reuss, Zeitschr. deutsch. geol. Ges., Vol. 10, p. 43, 1858. (For other references to this species see: Cushman, U. S. Nat. Mus., Bull. 104, pt. 4, p. 26, pl. 4, figs. 7, 8, 1923). Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 28, pl. 6, fig. 13, 1932.

"Test pyriform, circular in cross section, neck elongate, slender, very gently tapering, unornamented; wall thin, covered with numerous delicate spines uniformly distributed over the surface of the chamber; aperture located at the end of the elongate neck, probably radiate. Length 0.35 mm.; diameter 0.15 mm."

This species was recognized in one sample of lower Yazoo clay and also in a sample of clay from the upper part of the formation in Scott County.

LAGENA HOWEI Bergquist, n. sp.

Plate V, 19

Lagena sp. (C) Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 31, pl. 6, fig. 6, 1932.

Test ampullaceal, smooth, circular in cross section; neck elongate, slender, approximately equal in length to height of chamber, ornamented by two to three spiral costae, each making a complete revolution; aperture circular, surrounded by a phialine lip; rounded base of chamber ornamented with about ten short, radial ridges.

This species is named in honor of Dr. Henry V. Howe of

Louisiana State University. It is found in both the lower and upper Yazoo clay beds of Scott County.

Holotype: Type slide V, 19, Mississippi State Geological Survey.

LAGENA LAEVIS (Montagu) var.

Plate V, 7, 8

"Serpula (Lagena) laevis ovalis" Walker and Boys, Testacaea minuta, p. 3, pl. 1, fig. 9, 1784.

Vermiculum laeve Montagu, Testacea Britannica, p. 524, 1803.

Lagena laevis Williamson, Annals and Mag. Nat. Hist., 2d ser., Vol. 1, p. 12, pl. 1, figs. 1, 2, 1848. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 22, pl. 9, figs. 3, 4, 1935. Howe, La. Dept. Cons. Geol. Bull. 14, p. 50, pl. 6, fig. 12, 1939.

This small relatively smooth form ranges throughout the Jackson formation. Scott County samples yielded a number of specimens.

LAGENA OUACHITAENSIS Howe and Wallace

Plate V, 29

Lagena ouachitaensis Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 29, pl. 6, fig. 9, 1932.

"Test elongate, pyriform, cross section of chamber circular; surface ornamentation consisting of about twelve costae, six being slightly more prominent and extending up on to the neck, the other six being slightly less prominent and ending at the base of the neck; neck elongate, slender, ornamented with several revolutions of a spiral costa. Length 0.35 mm.; diameter 0.15 mm."

This species is rather common throughout the Jackson formation in Scott County.

LAGENA STRIATA (Montagu) cf. var. INTERRUPTA Williamson

Plate V, 18, 27

Lagena striata (Montagu) var. *interrupta* Williamson, Ann. Mag. Nat. Hist., Vol. 1, ser. 2, p. 14, pl. 1, fig. 7, 1848.

A few specimens which may belong to this variety were found in upper Yazoo clay samples from Scott County. The figures show the variation in shape. The form is comparatively rare.

LAGENA STRIATA (d'Orbigny) var. STRUMOSA Reuss

Lagena strumosa Reuss, Zeitschr. geol. Ges., p. 434, 1858; Sitz. Akad. Wiss. Wien., Vol. 46, pt. 1, p. 328, pl. 4, fig. 49, 1862 (1863).

Lagena striata (d'Orbigny) var. *strumosa* Reuss, Cushman, Contr. Cushman Lab. Foram. Res., Vol. 5, pt. 3, p. 70, pl. 11, figs. 7, 8, 1929. Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 30, pl. 6, fig. 11, 1932. Howe, La. Dept. Cons. Geol. Bull. 14, p. 52, pl. 6, fig. 19, 1939.

"Test clavate, body portion subglobular or slightly fusiform, the base with the costae ending in spinose projections; wall with numerous coarse costae; neck elongate, cylindrical with numerous, annular thickenings. Length 0.28 mm."

This species was found rarely in samples of upper Yazoo clay obtained from test holes in Scott County.

LAGENA SUBSTRIATA Williamson

Plate V, 10

Lagena substriata Williamson, Ann. Mag. Nat. Hist., ser. 2, Vol. 1, p. 15, pl. 2, fig. 12, 1848. Cushman, Contr. Cushman Lab. Foram. Res., Vol. 5, pt. 3, p. 68, pl. 11, fig. 4, 1929; Rept. Tenn. Div. Geol. Bull. 41, p. 37, pl. 5, fig. 7, 1931.

The species is characterized by an elongate test with very fine and numerous costae, some continuing onto the neck. A few of the specimens referred to this species from the Jackson formation have spiral costae on the neck and may represent a variety. The specimens came from both lower and upper beds of Yazoo clay in Scott County.

LAGENA SULCATA (Walker and Jacob) var. SEMIINTERUPTA Berry

Plate V, 21, 22

Lagena sulcata (Walker and Jacob) var. *semiinterupta* W. Berry, in Berry and Kelly, Proc. U. S. Nat. Mus., Vol. 76, art. 19, p. 5, pl. 3, fig. 19, 1929. Cushman, Rept. Tenn. Div. Geol. Bull. 41, p. 37, pl. 5, figs. 9-11, 1931.

Jackson specimens that have coalescing costae which form loops either near the basal portion of the test or at the base of the neck are very similar to the form described from the Ripley formation of Tennessee. These came from samples of lower Yazoo clay from Scott County.

LAGENA sp. (A) Howe and Wallace

Lagena sp. (A) Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 30, pl. 6, fig. 12, 1932.

"Test subglobose, only slightly longer than broad, ornamented with about nine remote ribs or costae running from the base

to a point slightly below the short neck; costae thin, fairly prominent; wall calcareous, vitreous, thin. Length 0.22 mm.; diameter 0.15 mm."

Some of the specimens from lower Yazoo clay beds of Scott County are sufficiently similar to this unnamed form to be placed with it.

LAGENA sp. (B) Howe and Wallace

Plate V, 26

Lagena sp. (B) Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 30, pl. 6, fig. 10, 1932.

"Test unilocular, shape ampullaceal, circular in cross section; surface ornamentation on the chamber consisting of numerous fine costae, evenly spaced, but extending various distances toward the base of the chamber; wall calcareous, vitreous, very finely perforate; neck elongate, terminal, ornamented with four or more raised rings; aperture circular, at the end of the neck. Length 0.4 mm.; diameter 0.2 mm."

A number of finely costate specimens of this genus are represented in the samples studied from Scott County. They show variations as to the shape of the test and as to the number of costae. A few of them are provisionally placed with the unnamed form described from Louisiana.

LAGENA sp.

Plate V, 28

Test subglobular, covered with numerous fine, discontinuous or branching spiral costae; neck slender, elongate with reticulated spiral ribs. The figured specimen which was the only one obtained is from a sample of uppermost Yazoo clay from a test hole near the Rankin County line, approximately 4 miles southwest of Morton.

FAMILY POLYMORPHINIDAE

Genus GUTTULINA d'Orbigny, 1839

GUTTULINA AUSTRIACA d'Orbigny

Plate VI, 4

Guttulina austriaca d'Orbigny, Foraminiferes fossiles du basin tertiaire de Vienne, p. 223, pl. 12, figs. 23-25, 1846. Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 47, pl. 8, fig. 3, 1932. Howe, La. Dept. Cons. Geol. Bull. 14, p. 52, pl. 6, figs. 21, 22, 1939.

Specimens are common throughout the Jackson and are easily distinguishable from *G. irregularis* by the more elongate test and oval inflated chambers, each being farther removed from the base of the test than the succeeding one. Samples from several test holes in Scott County yielded this species.

GUTTULINA IRREGULARIS (d'Orbigny)

Plate VI, 5, 6

Globulina irregularis d'Orbigny, Foraminiferes fossiles du basin tertiaire de Vienne, p. 226, pl. 13, figs. 9, 10, 1846. Cushman and Thomas, Jour. Pal., Vol. 3, p. 177, pl. 23, figs. 2a-c, 1929.

Guttulina irregularis Cushman and Ozawa, U. S. Nat. Mus. Proc., Vol. 77, Art. 6, p. 25, pl. 3, figs. 4, 5; pl. 7, figs. 1, 2, 1930. Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 48, pl. 8, fig. 8, 1932. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 24, pl. 9, figs. 13-16, 1935 (and other references). Howe, La. Dept. Cons. Geol. Bull. 14, p. 52, pl. 6, fig. 20, 1939.

This is a common species in the Jackson formation. Samples from several localities in Scott County yielded specimens.

GUTTULINA PROBLEMA d'Orbigny

Plate VI, 1

Guttulina problema d'Orbigny, Annales sci. nat., Vol. 7, no. 14, p. 266, 1826. Cushman and Schenck, California Univ., Bull. Dept. Geol. Sci., Vol. 17, p. 310, pl. 43, figs. 9-11, 1928. Cushman and Ozawa, U. S. Nat. Mus. Proc., Vol. 77, art. 6, p. 19, pl. 2, figs. 1-6; pl. 3, figs. 1a-c, 1930. Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 49, pl. 7, fig. 9, 1932. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 23, pl. 9, fig. 12, 1935 (and other references). Toulmin, Jour. Pal., Vol. 15, no. 6, p. 594, pl. 80, fig. 8, 1941.

Jackson samples from Scott County furnished a few specimens which belong to this species. A few like the figured specimen are unusually large.

GUTTULINA SPICAEFORMIS (Roemer)

Polymorphina spicaeformis Roemer, Neues Jahrb., pl. 3, p. 386, fig. 31, 1838.
Guttulina spicaeformis Cushman and Ozawa, U. S. Nat. Mus. Proc., Vol. 77, art. 6, p. 31, pl. 5, figs. 1, 2, 1930. Ellisor, Bull. Am. Assoc. Petr. Geol., Vol. 17, no. 11, pl. 7, fig. 3, 1933. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 24, pl. 9, fig. 17; pl. 10, figs. 9, 10, 1935.

This species was reported by Cushman from several localities in Mississippi but was not identified in the Scott County Jackson material.

GUTTULINA sp.

Plate VI, 11

Test elongate, fusiform, greatest breadth about the middle, initial end rounded; chambers numerous, inflated, elongate, last-

formed nearly one-half length of test; sutures distinct, slightly depressed in later part; wall smooth, polished; aperture radiate, terminal.

A single specimen was found in upper Yazoo clay from a test hole (J226A) on a hill (near center of east edge Sec. 32, T.6 N., R.7 E.) approximately one mile east of the Morton and Pulaski road.

Genus GLOBULINA d'Orbigny, 1839

GLOBULINA AMPULLA (Jones)

Plate VI, 10

A few small specimens which appear to resemble most closely this species came from test hole J40 (NE. ¼, SW. ¼, NW. ¼, Sec. 12, T.5 N., R.6 E.) ½ mile northwest of the Stage road junction.

GLOBULINA GIBBA d'Orbigny

Plate VI, 8, 9

Globulina gibba d'Orbigny, Annales sci. nat., Vol. 7, p. 266, no. 10, Modeles, no. 63, 1826; Foraminiferes fossiles du bassin tertiaire de Vienne, p. 227, pl. 13, figs. 13, 14, 1846. Terquem, Essai sur le classement des animaux de Dunkerque, p. 38, pl. 5, fig. 15, 1875; Soc. geol. France Mem., ser. 3, Vol. 1, p. 43, pl. 4 (9), figs. 1-5, 1878; Vol. 2, p. 130, pl. 13 (21), figs. 22-27, 1882. Jones and Chapman, Linnean Soc. London Jour., Zoology, Vol. 25, pp. 509, 515, figs. 6, 7, 40 (in text), 1896. Cushman and Ozawa, U. S. Nat. Mus. Proc., Vol. 77, art. 6, p. 60, pl. 16, figs. 1-4, 1930. Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 46, pl. 8, figs. 11a, b, 1932. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 25, pl. 9, fig. 18, 1935 (and other references). Howe, La. Dept. Cons. Geol. Bull. 14, p. 53, pl. 6, figs. 25, 26, 1939. Toulmin, Jour. Pal., Vol. 15, no. 6, p. 594, pl. 80, fig. 9, 1941.

This is a very common species in the Jackson of Mississippi and is present in many of the Scott County samples.

GLOBULINA GIBBA d'Orbigny var. GLOBOSA (Von Munster)

Plate VI, 12

Polymorphina globosa Von Munster, in Roemer, Neues Jahrb., 1838, p. 386, pl. 3, fig. 33. Reuss, Versteinerungen der bohmischen Kreideformation, p. 40, pl. 13, fig. 82, 1845. Egger, K. bayer. Akad. Wiss. Munchen, Cl. 2, Abh., Vol. 21, pt. 1, p. 129, pl. 17, fig. 26, 1899.

Globulina gibba d'Orbigny var. *globosa* Cushman and Ozawa, U. S. Nat. Mus. Proc., Vol. 77, art. 6, p. 64, pl. 17, figs. 8, 9, 1930. Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 46, pl. 8, fig. 10, 1932. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 26, pl. 9, fig. 21, 1935 (and other references).

A few specimens identified as this variety were found in samples of the lower Yazoo clay of Scott County.

GLOBULINA GIBBA d'Orbigny var. TUBERCULATA d'Orbigny

Plate VI, 13, 18

Globulina tuberculata d'Orbigny, Foraminiferes fossiles du bassin tertiaire de Vienne, p. 230, pl. 13, figs. 21, 22, 1846. Terquem, Soc. geol. France Mem., ser. 3, Vol. 2, p. 132, pl. 13 (21), figs. 33, 34, 1882.

Globulina gibba d'Orbigny var. *tuberculata* Cushman and Ozawa, U. S. Nat. Mus. Proc., Vol. 77, art. 6, p. 68, pl. 17, figs. 6, 7, 1930. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 26, pl. 9, figs. 19, 20, 1935 (and other references).

Several lower Jackson samples from Scott County yielded specimens of this spinosa variety, some with fistulose tubes as shown by the figured specimen.

GLOBULINA INAEQUALIS Reuss

Globulina inaequalis Reuss, K. Akad. Wiss. Wien Denkschr., Vol. 1, p. 377, pl. 48, fig. 9, 1850. Cushman and Ozawa, U. S. Nat. Mus. Proc., Vol. 77, art. 6, p. 73, pl. 18, figs. 2-4, 1930. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 26, pl. 9, fig. 22, 1935.

There are a few specimens in the collection of foraminifera obtained from lower Yazoo clay Scott County samples that are somewhat compressed and appear to be most like this form. It has been found rarely in the Eocene sediments of the Gulf Coastal Plain.

GLOBULINA MINUTA (Roemer)

Plate VI, 7

Polymorphina minuta Roemer, Neues Jahrb., 1838, p. 386, pl. 3, fig. 35. Reuss, Akad. Wiss. Wien Sitzungsber., Vol. 62, pt. 1, p. 486, 1870. Von Schlicht, Die Foraminiferen des Septarienthones von Pietzpuhl, pl. 27, figs. 13-15; pl. 25, figs. 51-56, 1870. Bornemann, Deutsch. geol. Gesell. Zeitschr., Vol. 7, p. 344, pl. 17, fig. 3, 1855.

Globulina minuta Cushman and Ozawa, U. S. Nat. Mus. Proc., Vol. 77, art. 6, p. 83, pl. 20, figs. 3, 4, 1930. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 27, pl. 9, fig. 23, 1935 (and other references).

This small species, which is pointed at both ends of the test and circular to elliptical in section, was found in a few samples of lower Jackson in Scott County.

GLOBULINA ROTUNDATA (Bornemann)

Guttulina rotundata Bornemann, Zeitschr. deutsch. geol. Gesell., Vol. 7, p. 346, pl. 18, fig. 3, 1855.

Globulina rotundata Cushman, U. S. Nat. Mus. Proc., Vol. 77, art. 6, p. 86-88, pl. 21, figs. 3, 4, 1930. Howe, La. Dept. Cons. Geol. Bull. 2, p. 47, pl. 15, fig. 4, 1932.

A single specimen that seems to be related most closely to this species came from a sample of uppermost Yazoo clay obtained from a test hole near the Rankin County line, approximately 4 miles southwest of Morton.

Genus SIGMOMORPHINA Cushman and Ozawa, 1928

SIGMOMORPHINA JACKSONENSIS (Cushman)

Polymorphina jacksonensis Cushman, Contr. Cushman Lab. Foram. Res., Vol. 2, p. 36, pl. 5, figs. 5a, b, 1926.

Sigmomorphina jacksonensis Cushman and Ozawa, U. S. Nat. Mus. Proc., Vol. 77, art. 6, p. 123, pl. 32, figs. 2a, b, 1930. Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 49, pl. 8, fig. 2, 1932.

Polymorphina compressa Nuttall (not d'Orbigny), Geol. Soc. London Quart. Jour., Vol. 84, p. 93, pl. 6, figs. 18, 19, 1928. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 28, pl. 10, figs. 1-4, 1935.

"Test broad and compressed, periphery broadly rounded, apertural end narrowed to a slightly produced aperture; chambers elongate, slightly inflated, embracing, arranged in a contraclockwise sigmoid series, each succeeding chamber removed farther from the base; sutures very slightly depressed, distinct, almost straight; wall thick, smooth; aperture radiate. Maximum length 1.10 mm.; breadth 0.65 mm.; thickness 0.25 mm."

This species was found in several samples of lower Yazoo clay and also in the Moodys Branch marl obtained from test holes drilled in Scott County.

SIGMOMORPHINA JACKSONENSIS (Cushman) var. COSTIFERA

Cushman and Ozawa

Plate VI, 2, 3

Polymorphina jacksonensis Cushman var. *costifera* Cushman, Contr. Cushman Lab. Foram. Res., Vol. 2, p. 35, 1926.

Sigmomorphina jacksonensis (Cushman) var. *costifera* Cushman and Ozawa, U. S. Nat. Mus. Proc., Vol. 77, art. 6, p. 123, pl. 32, figs. 3a, b, 1930. Ellisor, Bull. Am. Assoc. Petr. Geol., Vol. 17, no. 11, pl. 7, fig. 1, 1933. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 28, pl. 10, figs. 5, 6, 1935. Howe, La. Dept. Cons. Geol. Bull. 14, p. 54, pl. 7, fig. 1, 1939.

"Variety differing from the typical form in the ornamentation of the test, which has several rounded longitudinal costae on the basal portion, sometimes covering a large part of the surface. Maximum length 1.20 mm.; breadth 0.50 mm.; thickness 0.13 mm."

Excellent large specimens of this variety, some associated with the typical form, were found in a number of lower Jackson

samples. The amount of ornamentation developed on individuals shows some variation. Though found in samples of both the Moodys Branch marl and the lower Yazoo clay, the best specimens came from the latter material in Scott County.

Genus POLYMORPHINA d'Orbigny, 1826

POLYMORPHINA ADVENA Cushman

Plate VI, 14, 15

Polymorphina advena Cushman, U. S. Geol. Survey Prof. Paper 129, p. 132, pl. 31, fig. 4, 1922; Contr. Cushman Lab. Foram. Res., Vol. 5, p. 41, pl. 7, fig. 5, 1929. Cushman and Ozawa, U. S. Nat. Mus. Proc., Vol. 77, art. 6, p. 118, pl. 30, figs. 10a, b, 1930. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 29, pl. 10, fig. 8, 1935. Cushman and McGlamery, U. S. Geol. Survey Prof. Paper 189-D, p. 106, pl. 24, fig. 21, 1937.

"Test much compressed, broadly ovate; chambers numerous, elongate, alternating, much the broadest near the apertural end; sutures slightly depressed, very oblique; surface ornamented with numerous fine longitudinal costae, often obscure, except the last-formed one or two chambers, which are smooth, at least at the apertural end; aperture radiate. Length 0.40-0.65 mm.; breadth 0.22-0.30 mm.; thickness 0.05-0.06 mm."

A few specimens from lower Yazoo clay samples from Scott County resemble this form closely. The species was not noted in the upper beds, although Cushman reported it from the Moodys Branch marl at Jackson.

POLYMORPHINA FRONDEA (Cushman) var. ?

Plate VI, 16, 17

Bolivina frondea Cushman, U. S. Geol. Survey Prof. Paper 129-F, p. 126, pl. 29, fig. 3, 1922; Prof. Paper 133, p. 20, 1923.

Polymorphina frondea Cushman, Contr. Cushman Lab. Foram. Res., Vol. 5, p. 41, 1929. Cushman and Ozawa, U. S. Nat. Mus. Proc., Vol. 77, art. 6, p. 118, pl. 30, figs. 11a, b, 1930.

"Test compressed, of uniform thickness, the broad sides nearly parallel, oblong, broadest above the middle, acuminate toward the initial end, margins with a raised rim; chambers compressed, elongated, alternating; sutures depressed, distinct; wall smooth, often with obscure fine costae; aperture radiate. Length 0.50-0.65 mm.; breadth 0.30-0.40 mm.; thickness 0.04-0.05 mm."

The Jackson specimens may be a variety of this species, for the later chambers are elongate and terminate in the initial third of the test. A slight concavity is produced in the early

portion of the test by the later chambers rising somewhat above this part. All the specimens obtained came from lower Yazoo clay beds in Scott County.

Genus RAMULINA Rupert Jones, 1875

RAMULINA GLOBULIFERA H. B. Brady

Plate VI, 21

Ramulina globulifera H. B. Brady, Quart. Jour., Micr. Sci., Vol. 19, p. 272, pl. 8, figs. 32, 33, 1879. White, Jour. Pal., Vol. 2, p. 214, pl. 29, fig. 2, 1928. Plummer, Univ. Texas Bull. 3101, p. 174, pl. 11, fig. 15, 1931. Toulmin, Jour. Pal., Vol. 15, no. 6, p. 596, pl. 80, fig. 21, 1941.

"Test free, branching, composed of segments of different sizes connected by stoloniferous tubes. Segments numerous (two to eight or more), globular or subglobular, each with several (two to six) tubulated apertures extended from different portions of the periphery, some of which terminate in fresh chambers. Stoloniferous tubes narrow, circular in section, about equal in length to the diameter of the larger chambers. Texture hyaline; surface hispid or aculeate. Length, when complete, 1/15 inch (1.7 millim.) or more."

A few segmentary specimens composed of inflated hispid chambers with 5 to 7 stolen tubes are identified as this species. It appears to range sparingly throughout the Jackson.

FAMILY NONIONIDAE

Genus NONION Montfort, 1808

NONION ADVENUM (Cushman)

Plate VI, 20

Nonionina advena Cushman, U. S. Geol. Survey Prof. Paper 129, p. 139, pl. 32, fig. 8, 1922; Prof. Paper 133, p. 50, 1923. Cushman and Applin, Bull. Am. Assoc. Petr. Geol., Vol. 10, p. 181, pl. 10, figs. 16, 17, 1926. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 30, pl. 11, figs. 1-4, 1935; Prof. Paper 191, p. 9, pl. 20, figs. 3, 4, 1939.

This species was recognized in Scott County in one basal Jackson sample, and it is listed by Cushman as present in the formation at Jackson and at Garlands Creek.

NONION APPLINI Howe and Wallace

Plate VI, 19

Nonionina scapha (Fichtel and Moll) var. Cushman and Applin, Bull. Am. Assoc. Petr. Geol., Vol. 10, p. 182, pl. 10, figs. 12, 13, 1926.

Nonion applini Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 51, pl. 9. figs. 4a, b, 1932. Cushman, U. S. Geol. Survey Prof. Paper 191, p. 8, pl. 2, fig. 7, 1939.

"Test compressed, sides almost parallel, planispiral, involute; periphery almost circular in outline, slightly rounded; chambers slightly inflated, about eight or nine in the last-formed coil; umbilical area slightly depressed; sutures radial, almost straight, distinct, depressed; wall finely perforate, calcareous, thin, umbilicus filled with calcareous beads; aperture a curved slit at the base of the last-formed chamber, protected by a faint lip. Diameter 0.45 mm.; thickness 0.2 mm."

This is a very common species in the Scott County samples, ranging throughout the Jackson formation. On many of the specimens the beaded area of the umbilicus was obscured by a filling of foreign material.

NONION CHAPAPOTENSE Cole

Nonion chapapotensis Cole, Bull. Am. Paleontology, Vol. 14, no. 53, p. 210 (10), pl. 1, figs. 18, 19, 1928. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 30, pl. 11, figs 9-13, 1935; Prof. Paper 191, p. 6, pl. 2, figs. 1-3, 1939.

This species was not recognized in the Scott County samples of the Jackson formation, but Cushman reports it from the formation at Yazoo City.

NONION DANVILLENSIS Howe and Wallace

Plate VI, 25

Nonion danvillensis Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 51, pl. 9, fig. 3, 1932. Cushman, U. S. Geol. Survey Prof. Paper 191, p. 5, pl. 1, fig. 19, 1939.

"Test much compressed, planispiral, sides almost parallel, slightly involute, slightly elongate; periphery rounded, distinctly lobate; chambers fairly numerous, about seven in the last-formed whorl, inflated; sutures distinct, radial, slightly curved, depressed; wall calcareous, thin, finely perforate; aperture a curved slit at the base of the last-formed chamber, bordered by a faint lip. Diameter 0.27 mm.; thickness 0.1 mm."

This species was very abundant in samples from several localities in Scott County and ranges through the entire Jackson formation. It is related to *N. micrum* Cole which has fewer chambers showing in the last-formed whorl. The latter has been reported by Cushman from the formation at Hays Chapel, Wayne County.

NONION INEXCAVATUM (Cushman and Applin)

Nonionina advena Cushman var. *inexcavata* Cushman and Applin, Bull. Am. Assoc. Petr. Geol., Vol. 10, p. 182, pl. 10, figs. 18, 19, 1926.

Nonion inexcavatum Ellisor, Bull. Am. Assoc. Petr. Geol., Vol. 17, no. 11, pl. 2, fig. 7, 1933.

Nonion inexcavatum (Cushman and Applin) var. Ellisor, op. cit., pl. 7, figs. 10a, b; Cushman, U. S. Geol. Survey Prof. Paper 181, p. 30, pl. 11, figs. 5-8, 1935, Prof. Paper 191, p. 7, pl. 2, fig. 4, 1939.

Cushman lists this species from the Moodys Branch member of the Jackson at Jackson, but it was not identified in any of the Scott County samples.

NONION PLANATUM Cushman and Thomas

Plate VI, 24

Nonion planatum Cushman and Thomas, Jour. Pal., Vol. 4, p. 37, pl. 3, figs. 5a, b, 1930. Cushman and Dusenbury, Contr. Cushman Lab. Foram. Res., Vol. 10, p. 60, pl. 8, figs. 6a, b, 1934. Howe, La. Dept. Cons. Geol. Bull. 14, p. 68, pl. 7, figs. 24, 25, 1939. Cushman, U. S. Geol. Survey Prof. Paper 191, p. 4, pl. 1, fig. 15, 1939.

"Test planispiral, close-coiled, compressed, bilaterally symmetrical, biumbilicate, periphery rounded; chambers distinct, but not inflated, about 10 in the last-formed coil, which is almost completely involute, peripheral face of the last chamber convex; sutures distinct, earlier ones flush with the surface, later ones very slightly depressed, ending in a thickened ring about the umbilici; wall smooth, finely perforate; aperture a crescent-like slit at the base of the last-formed chamber. Maximum diameter, 0.25 mm.; minimum diameter, 0.22 mm.; thickness, 0.11 mm."

A number of specimens of this species came from samples from the Moodys Branch marl and lower Yazoo clay of Scott County. Many of the specimens showed the features of the species clearly.

Genus NONIONELLA Cushman, 1926

NONIONELLA HANTKENI (Cushman and Applin) var. SPISSA Cushman

Plate VI, 22

Nonionella hantkeni (Cushman and Applin) var. *spissa* Cushman, Contr. Cushman Lab. Foram. Res., Vol. 7, p. 58, pl. 7, figs. 13a-c, 1931. Ellisor, Bull. Am. Assoc. Petr. Geol., Vol. 17, no. 11, pl. 2, figs. 10, 12, 1933. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 31, pl. 12, figs. 6a-c, 1935; Prof. Paper 191, p. 30, pl. 8, fig. 5, 1939.

"Variety differing from the typical form in the much thicker

test, usually smaller number of chambers, and less limbate sutures."

Specimens that compare with this variety were in several samples of Moodys Branch marl and lower Yazoo clay from Scott County. Its presence at Garlands Creek and Jackson has been reported by Cushman.

NONIONELLA JACKSONENSIS Cushman

Plate VI, 23

Nonionella jacksonensis Cushman, Contr. Cushman Lab. Foram. Res., Vol. 9, p. 10, pl. 1, figs. 23a-c, 1933; U. S. Geol. Survey Prof. Paper 181, p. 31, pl. 12, figs. 3, 4, 1935; Prof. Paper 191, p. 29, pl. 8, fig. 2, 1939.

"Test longer than broad, periphery rounded, ventral side involute and the chambers extending over the umbilical region, dorsal side with the chambers ending at the umbilical region; chambers distinct, about 8 in the final whorl, becoming increasingly elongate in the adult, the inner end of the final chamber extending across the umbilical area nearly to the periphery on the ventral side, inflated; sutures distinct, slightly if at all depressed; wall smooth, finely perforate; aperture peripheral at the base of the apertural face, low. Length 0.35 mm.; breadth 0.20 mm.; thickness 0.10 mm."

This species was obtained from several samples through the Jackson section in Scott County. It does not appear to be very abundant.

FAMILY CAMERINIDAE

Genus OPERCULINA d'Orbigny, 1826

OPERCULINA COOKEI Cushman

Operculina cookei Cushman, U. S. Geol. Survey Prof. Paper 128, p. 127, pl. 18, figs. 1, 2, 1921; U. S. Geol. Survey Prof. Paper 181, p. 32, 1935.

This large species was not seen in any of the test hole samples from Scott County, but it is reported by Cushman from the Moodys Branch member of the Jackson at Jackson.

FAMILY HETEROHELICIDAE

Genus GUMBELINA Egger, 1899

GUMBELINA CUBENSIS Palmer

Plate VI, 26, 27

Gumbelina cubensis Palmer, Soc. Cubana Hist. Nat., Mem., Vol. 8, no. 2, p. 74, figs. 1-6, 1934.

"Test minute. Comprising approximately 7 pairs of chambers biserially arranged throughout. Chambers inflated; in-

creasing regularly but rapidly in width so that the last 2 pairs form half the length of the test. Maximum width at apertural extremity. Sutures depressed. In side view periphery only moderately lobulate. Aperture a very low opening at the base of the final chamber. Wall calcareous, very finely perforated, slightly roughened.

"Dimensions: Length approximately .25 mm. There is considerable variation in the width. Average specimens have a width of .15 mm., but specimens .1 mm. in width are not uncommon."

Small tests that are identified as this species, which was described from the Oligocene of Cuba, are found in the finer screenings of several of the samples from the entire Jackson section in Scott County.

GUMBELINA CUBENSIS Palmer var. HETEROSTOMA Bermudez

Gumbelina cubensis Palmer var. *heterostoma* Bermudez, Soc. cubana Hist. Nat., Mem., Vol. 11, p. 143, pl. 17, figs. 5-7, 1937.

This variety differs from the species proper in having an eccentric aperture with a thin collar. Its length is approximately 0.25 mm. Specimens from the upper Yazoo clay of Scott County show the apertural feature of this variety.

Genus PLECTOFRONDICULARIA Liebus, 1903

PLECTOFRONDICULARIA MEXICANA (Cushman)

Plate VI, 28

Frondicularia mexicana Cushman, Contr. Cushman Lab. Foram. Res., Vol. 1, pt. 4, p. 88, pl. 13, fig. 5, 1926.

"Test somewhat compressed, very elongate, narrow, the peripheral portion with 3 sharp, plate-like carinae, one in the middle line, the other two lateral; the sides except for the initial end parallel, initial end rounded, slightly tapering, the early portion of the test convex, ornamented by a few longitudinal raised costae, the later portion concave, smooth; chambers rather indistinct; sutures hardly if at all depressed, aperture terminal, central, radiate. Length up to nearly 1 mm."

A single specimen of this species was found in a sample of upper Yazoo clay from a test hole near the Rankin County line, approximately 4 miles southwest of Morton.

Genus AMPHIMORPHINA Neugeboren, 1850

AMPHIMORPHINA YAZOOENSIS Bergquist, n. sp.

Plate VII, 26

Test elongate, sides nearly parallel, earliest portion biserial and somewhat compressed with periphery keeled, later uniserial; chambers distinct, last two or three inflated, much higher than preceding, rounded in transverse section; sutures distinct, limbate, arched on early uniserial portion, later depressed and transverse; walls ornamented by a few high longitudinal costae, continuous over length of test, on later chambers increasing in number by implantation; aperture dendritic with irregular ridges penetrating from margin. Length 1.75 mm.; maximum width 0.17 mm.

This form somewhat resembles *A. lirata* Cushman and Bermudez described from the upper Eocene of Cuba.

Holotype: Lower Yazoo clay, test hole J1A, Forest; Type slide VII, 26, Mississippi Geological Survey.

FAMILY BULIMINIDAE

Genus BULIMINELLA Cushman, 1911

BULIMINELLA BASISTRIATA Cushman and Jarvis var. NUDA Howe and Wallace

Plate VII, 7

Buliminella basistriata Cushman and Jarvis var. *nuda* Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 60, pl. 11, fig. 4, 1932.

"Test small, tapering, with the greatest width usually toward the apertural end, 3 to 5 chambers in a coil, fairly distinct, very slightly inflated; sutures distinct, slightly depressed; wall smooth; aperture comparatively large, broadest toward the inner end, slightly oblique. Length 0.38 mm. This variety differs from the typical species in its lack of ornamentation on the initial end."

As they exhibit marked expansion of the tests early in the development, some specimens vary from the form figured from Louisiana.

Specimens assigned to this variety are found sparingly in samples throughout the Jackson of Scott County.

BULIMINELLA cf. BASSENDORFENSIS Cushman and Parker

Plate VII, 9

Buliminella bassendorfensis Cushman and Parker, Contr. Cushman Lab. Foram. Res., Vol. 13, pt. 1, p. 40, pl. 4, figs. 13a, b, 1937.

A few specimens from the lower Yazoo clay samples from Scott County resemble most closely the species described from the Bassendorf shale of the Oligocene of Oregon.

BULIMINELLA ELEGANTISSIMA (d'Orbigny)

Bulimina elegantissima d'Orbigny, Voy. Amer. Merid., Vol. 5, No. 5, "Foraminiferes," p. 51, pl. 7, figs. 13, 14, 1839.

Buliminella elegantissima Cushman, U. S. Nat. Mus., Bull. 71, pt. 2, p. 89, 1911; Fla. Geol. Surv. Bull. 4, p. 42, pl. 8, figs. 2, 3, 1930. (For other references to this species see this reference). Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 61, pl. 11, fig. 3, 1932.

"Test elongate, spiral, making about three volutions, initial end pointed, much more so in the microspheric form; chambers numerous, seven to ten in the last-formed whorl, narrow, slightly inflated; sutures distinct, slightly curved, very slightly depressed; wall smooth, finely perforate; aperture elongate, narrow, somewhat enlarged toward the middle of the apertural face. Length 0.3 mm.; diameter 0.1 mm."

A few tiny specimens that belong to this species came from a sample of upper Yazoo clay about 4 miles southwest of Morton.

BULIMINELLA sp.

Plate VII, 1, 2, 3, 4, 5, 6

Test spiral, much elongate, composed of 5 or more whorls, early portion tapering, greatest width about middle or near apertural end, periphery lobulate; chambers numerous, inflated, 3 or 4 comprising a coil; sutures distinct, depressed; wall smooth; aperture comparatively large and broad. Length 0.5 mm.; maximum width 0.17 mm.

Specimens show some variation and bear resemblance to *B. bassendorfensis* Cushman and Parker, but the aperture is larger and occupies most of the apertural face. The species was found sparingly throughout the Yazoo clay of Scott County.

Genus ROBERTINA d'Orbigny, 1846

ROBERTINA SUBTERES (H. B. Brady) var. ANGUSTA (Cushman)

Plate VII, 8

Buliminella subteres H. B. Brady var. *angusta* Cushman, U. S. Geol. Survey Prof. Paper 129-F, p. 127, pl. 29, figs. 8, 9, 1922.

"Variety differing from the typical species in the more elongate, narrower shape of the test and the larger number of chambers; aperture elongate, nearly in the long axis of the test; sutures not depressed, marked by darker lines of shell material. Length 0.6 mm."

Specimens that appear to compare favorably with this variety were found in samples of basal Yazoo clay obtained from three test holes located respectively in the eastern, central, and western portions of the Jackson belt of Scott County.

Genus BULIMINA d'Orbigny, 1826

BULIMINA JACKSONENSIS Cushman

Bulimina jacksonensis Cushman, Contr. Cushman Lab. Foram. Res., Vol. 1, pt. 1, p. 6, pl. 1, figs. 6, 7, 1925. Cushman and Applin, Bull. Am. Assoc. Petr. Geol., Vol. 10, p. 168, pl. 7, figs. 8a, b, 1926. Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 59, pl. 11, fig. 5, 1932. Ellisor, Bull. Am. Assoc. Petr. Geol., Vol. 17, no. 11, pl. 7, fig. 5, 1933. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 35, pl. 13, figs. 7-9, 1935.

This species is a conspicuous form with an elongate tapering test, rounded at the apertural end. The surface ornamentation consists of 6 to 8 raised plate-like continuous longitudinal costae, the edges of some being serrated.

It ranges throughout the Yazoo clay; some samples failed to yield any specimens, although they were abundant at some localities.

BULIMINA JACKSONENSIS Cushman var. CUNEATA Cushman

Plate VII, 18

Bulimina jacksonensis Cushman var. *cuneata* Cushman, Contr. Cushman Lab. Foram. Res., Vol. 2, p. 35, 1926; U. S. Geol. Survey Prof. Paper 181, p. 35, pl. 13, figs. 10, 11, 1935.

The variety differs from the species proper in being more tapered, many being larger. The costae are more numerous, 10 to 12, and are finely serrate. In the Yazoo clay of Scott County the variety was the more common. Many fine specimens were obtained, some darkened by internal deposits of pyrite so that the features of the test were clearly revealed.

BULIMINA OVATA d'Orbigny

Plate VII, 23

Bulimina ovata d'Orbigny, Foram. Foss. Bass. Tert. Vienne, p. 185, pl. 11, figs. 13, 14, 1846. Cushman and Ponton, Contr. Cushman Lab. Foram. Res., Vol. 8, p. 67, pl. 9, figs. 1, 2, 1932. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 35, pl. 13, figs. 15, 16, 1935. Cushman and Parker, Contr. Cushman Lab. Foram. Res., Vol. 13, p. 47, pl. 6, figs. 4, 5, 1936. Toulmin, Jour. Pal., Vol. 15, no. 6, p. 597, pl. 80, figs. 25, 26, 1941.

Specimens assigned to this species show some variation in shape and size and may represent two or three species. All are circular in end view and have slightly inflated elongate chambers. Some specimens are translucent. Well preserved individuals show a plate-like tooth. This form is common throughout the Jackson samples.

Genus ENTOSOLENIA Ehrenberg, 1848

ENTOSOLENIA INCURVATA (?) Green

Plate VII, 11

Lagena incurvata Green, Amer. Jour. Micr. Pop. Sci., Vol. 6, p. 46, pl. opp. p. 45, fig. 3, 1881. (Description and horizon not given).

Test minute, somewhat compressed, elliptical in outline, periphery bluntly angled; wall translucent; aperture circular, at end of short compressed neck, internal tube curved against wall.

Since only a figure without the description or horizon appears in the reference, it is difficult to place definitely the Jackson species with the English form so that its assignment at the present is merely tentative. It is found rarely in the finer screenings of lower Jackson samples from Scott County.

ENTOSOLENIA MARGINATA (Walker and Boys)

Plate VII, 10

Serpula (Lagena) marginata Walker and Boys, Minute Shells, p. 2, pl. 1, fig. 7, 1784.

Vermiculum marginatum Montagu, Testacea Britannica, or natural history of British shells, marine, land and fresh-water, including the most minute, p. 254, 1803.

Lagena marginata (Walker and Jacob) Cushman, Contr. Cushman Lab. Foram. Res., Vol. 5, pt. 3, p. 71, pl. 11, fig. 15, 1929; Vol. 15, pt. 3, p. 66, pl. 11, figs. 1, 3, 1939.

Test small, compressed, oval to elliptical, translucent, surrounded with a longitudinal thin peripheral carina, apertural end with a short neck, grooved on each side.

This form is found sparingly in the lower Jackson material from Scott County. Tests are so minute that they are easily overlooked.

Genus VIRGULINA d'Orbigny, 1826

VIRGULINA ALABAMENSIS Cushman and McGlamery

Plate VII, 22

? *Virgulina bramlettei* Galloway and Morrey, Cushman and McGlamery, U. S. Geol. Survey Prof. Paper 189-D, p. 107, pl. 25, fig. 10, 1938. Cushman, Contr. Cushman Lab. Foram. Res. Spec. Pub. No. 9, pl. 3, fig. 8, 1937.

Virgulina alabamensis Cushman and McGlamery, Contr. Cushman Lab. Foram. Res., Vol. 15, pt. 3, p. 48, pl. 9, figs. 7a, b, 1939.

"Test elongate, somewhat compressed, about three times as long as broad, sides for the most part nearly parallel or decreasing in breadth toward the apertural end which is somewhat truncate, initial end triserial, bluntly pointed, periphery rounded; chambers numerous, very distinct, about three pairs of biserial ones in the adult, slightly inflated; sutures distinct, curved, slightly depressed; wall thin and nearly transparent, very finely perforate, smooth and polished; aperture rather large, comma-shaped, oblique, with a slight lip. Length 0.45-0.50 mm.; breadth 0.12-0.15 mm.; thickness 0.10 mm."

Jackson specimens, identified as belonging to this species, compare very favorably with the described Oligocene form, but on each the aperture tends to be in a more terminal position and to have a slight lip. Those from the lower Yazoo clay are relatively short, but elongate specimens are present in the upper beds. This form is found sparingly in a few Scott County samples from both lower and upper Yazoo clay.

VIRGULINA DIBOLLENSIS Cushman and Applin

Plate VII, 16

Virgulina dibollensis Cushman and Applin, Bull. Am. Assoc. Petr. Geol., Vol. 10, p. 168, pl. 7, figs. 7a-c, 1926. Howe, Jour. Pal., Vol. 2, p. 175, 1928. Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 66, pl. 11, fig. 1, 1932. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 36, pl. 14, figs. 1-3, 1935.

"Test much compressed, very slender, tapering, about 4½ times as long as broad, the whole test twisted through about 180°, initial end rounded, greatest breadth at about three-quarters of the length from the initial end; periphery rounded;

chambers distinct, 15 or more, early ones spiral, later ones biserial, the last three chambers, making up half the test; sutures oblique, distinct, slightly depressed; wall thin, punctate, the punctae in longitudinal rows; aperture elongate, elliptical. Length, 0.60 mm.; maximum breadth, 0.12-0.15 mm."

This species is very common throughout the Jackson formation of Scott County.

VIRGULINA RECTA (?) Cushman

Plate VII, 17

Virgulina recta Cushman, Contr. Cushman Lab. Foram. Res., Vol. 9, p. 12, pl. 1, figs. 31a, b, 1933.

Virgulina sp. ?, Cushman, U. S. Geol. Survey Prof. Paper 129, p. 92, pl. 16, figs. 2, 3, 1922; U. S. Geol. Survey Prof. Paper 181, p. 36, pl. 14, figs. 4a, b, 1935.

One specimen that may belong to this species came from a sample of lower Yazoo clay at Forest.

VIRGULINA RECTA Cushman var. HOWEI Cushman

Plate VII, 13, 14, 15

Virgulina recta Cushman var. *howei* Cushman, Contr. Cushman Lab. Foram. Res., Spec. Pub. No. 6, p. 47, pl. 7, fig. 4, 1936.

"Variety differing from the typical in the ornamentation of the wall, consisting of fine longitudinal costae, and the basal angles of the chambers which often distinctly overhang."

Specimens of this little variety were found in a sample of uppermost Yazoo clay from a shallow test hole approximately 3 miles southwest of Morton and in a test hole near the Smith-Rankin County line in the southwest corner of Scott County.

Genus BOLIVINA d'Orbigny, 1839

BOLIVINA ATTENUATA Cushman

Plate VII, 33

Bolivina attenuata Cushman, Contr. Cushman Lab. Foram. Res., Vol. 2, p. 30, pl. 4, fig. 4, 1926. U. S. Geol. Survey Prof. Paper 181, p. 36, pl. 14, fig. 5, 1935.

A few small tests that appear to belong to this species were found sparingly in some of the finer screenings of lower Yazoo clay samples from Scott County.

BOLIVINA DANVILLENSIS Howe and Wallace

Plate VII, 19

Bolivina danvillensis Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 56, pl. 11, figs. 8a, b, 1932.

This species is distinguishable from other members of the genus in the Jackson by the lobate depressed areas along the sutures in the later portion of the test.

Specimens which are similar to those described by Howe and Wallace were found in Scott County samples and ranged throughout the Yazoo clay. Some specimens are considerably compressed with a slight keel along the periphery of the last-formed chamber.

BOLIVINA GARDNERAE Cushman

Bolivina cf. B. punctata Cushman, U. S. Geol. Survey Prof. Paper 133, p. 19, pl. 2, fig. 1, 1923.

Bolivina gardnerae Cushman, Contr. Cushman Lab. Foram. Res., Vol. 2, p. 31, pl. 4, figs. 7a, b, 1926. U. S. Geol. Surv. Prof. Paper 181, p. 37, pl. 14, figs. 6, 7, 1935.

"Test elongate, compressed, slightly tapering from the rounded initial end, periphery rounded, test broadly oval in transverse section, sides nearly parallel; chambers numerous, slightly inflated, distinct; sutures distinct, depressed; wall coarsely perforate, without a definite arrangement of the perforations; aperture elongate. Maximum length 0.40 mm."

Specimens of this form were found in lower Yazoo clay samples from Scott County.

BOLIVINA GRACILIS Cushman and Applin

Plate VII, 20

Bolivina gracilis Cushman and Applin, Bull. Am. Assoc. Petr. Geol., Vol. 10, p. 167, pl. 7, figs. 1, 2, 1926. Howe and Wallace, La. Dept. Conservation Geol. Bull. 2, p. 57, 1932. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 37, pl. 14, figs. 8-10, 1935.

This form is easily recognized because of its slender slightly compressed test and the coarse perforations of the wall.

It is one of the more common species in the samples examined and ranges throughout the Jackson formation.

BOLIVINA JACKSONENSIS Cushman and Applin

Plate VII, 21, 27

Bolivina jacksonensis Cushman and Applin, Bull. Am. Assoc. Petr. Geol., Vol. 10, p. 167, pl. 7, figs. 3, 4, 1926. Howe and Wallace, Louisiana Dept. Cons. Geol. Bull. 2, p. 59, pl. 11, fig. 11, 1932. Ellisor, Bull. Am. Assoc. Petr. Geol., Vol. 17, no. 11, pl. 3, fig. 3, 1933. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 37, pl. 14, figs. 11-13, 1935.

The test of this species is compressed, finely punctate, and usually the wall is thin and translucent with distinct sutures. Some specimens are slightly keeled. A few of those noted exhibit faint plications on the initial portion but none clearly enough to merit assignment to the variety "striatella."

It is one of the most common species in the Jackson formation.

BOLIVINA JACKSONENSIS Cushman and Applin var. STRIATELLA Cushman and Applin

Bolivina jacksonensis Cushman and Applin var. *striatella* Cushman and Applin, Bull. Am. Assoc. Petr. Geol., Vol. 10, p. 167, pl. 7, figs. 5, 6, 1926. Ellisor, Bull. Am. Assoc. Petr. Geol., Vol. 17, no. 11, pl. 3, fig. 4, 1933. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 37, pl. 14, figs. 14-18, 1935.

Cushman reports this variety from several localities of the Jackson formation in Mississippi. None of the specimens obtained in the Scott County clays appeared to be sufficiently striated to merit variety designation.

BOLIVINA MEXICANA Cushman

Bolivina mexicana Cushman, Contr. Cushman Lab. Foram. Res., Vol. 1, pt. 4, p. 81, pl. 12, fig. 2, 1926. Jour. Pal., Vol. 1, no. 2, p. 161, pl. 28, fig. 9, 1927.

"Test much compressed, the early portion with a slight keel, later chambers developing a wider keel; chambers of the early portion low, several times as broad as high, gradually increasing in height as added until in the adult the chambers are only slightly greater in width than in height, inflated slightly in later development; sutures distinct, in the early portion appearing at the surface as a double line between the chambers, in later development less marked and slightly obscured by a slight imbrication of the chambers; wall smooth, finely punctate; aperture elongate with a slight lip. Length up to 1.2 mm."

The species is present in upper Jackson samples from Scott County.

BOLIVINA MEXICANA Cushman var. HORIZONTALIS Cushman

Plate VII, 28

Bolivina mexicana Cushman var. *horizontalis* Cushman, Contr. Cushman Lab. Foram. Res., Vol. 1, pt. 4, p. 82, pl. 12, figs. 5a-b, 1926. Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 58, pl. 11, fig. 10, 1932.

Tests of this form are much compressed, smooth and finely punctate, and have a keel that widens with each chamber and that exhibits a serrate appearance by horizontal angulations. Some of the specimens studied show a slightly irregular clear shell thickening along the median line.

This form ranges throughout the Yazoo clay but was not found in any degree of abundance in the Scott County samples.

Genus BITUBULOGENERINA Howe, 1934

BITUBULOGENERINA HOWEI Cushman

Plate VII, 25

Gaudryina sp. Cushman, U. S. Geol. Survey Prof. Paper 129F, p. 127, pl. 29, fig. 6, 1922.

Bitubulogenerina sp. Howe, Jour. Pal., Vol. 8, pl. 51, fig. 4, 1934.

Bitubulogenerina howei Cushman, Contr. Cushman Lab. Foram. Res., Vol. 11, pt. 1, p. 20, pl. 3, figs. 10-12, 1935.

"Test elongate, early portion tapering, triserial, later adult portion biserial, with the sides nearly parallel, very slightly compressed, periphery rounded, lobulate; chambers distinct, somewhat inflated, the earlier triserial ones increasing gradually in size, later ones very slightly increasing as added; sutures distinct, strongly depressed; wall calcareous, finely perforate, exterior, covered with numerous small, bluntly spinose projections; aperture in the adult terminal, occupying a median position, large and rounded, with a distinct, raised lip. Length 0.28-0.33 mm.; breadth 0.12-0.15 mm.; thickness 0.10-0.12 mm."

This species is spinose over the entire test, whereas *B. mauricensis* Howe from the Claiborne is smooth on the initial triserial portion.

A few specimens which appear to belong to this species, described by Cushman from the Oligocene Red Bluff clay of Mississippi, were found in samples of basal Yazoo clay from two localities in Scott County.

BITUBULOGENERINA MONTGOMERYENSIS Howe

Plate VII, 24

Bitubulogenerina montgomeryensis Howe, Jour. Pal., Vol. 8, p. 421, pl. 51, figs. 9a, b, 1934.

"Test elongate, free, somewhat compressed; the first few chambers rounded and triserial in arrangement, quickly becoming biserial, and as the chambers are added they become more and more angular, the angulations being above the middle of the chamber; wall nearly smooth above the angulation, but spinose below; aperture siphonate with a short neck, the phialine lip being oval in outline, the apertural opening being small and spade-shaped. Length 0.23 mm.; width 0.11 mm."

A few specimens of this peculiarly shaped minute fossil were found in Scott County samples of the basal Yazoo clay and Moodys Branch marl. The species appears to be relatively rare.

Genus TRITUBULOGENERINA Howe, 1939

TRITUBULOGENERINA MAURICENSIS Howe

Plate VII, 29

Tritubulogenerina mauricensis Howe, La. Dept. Cons. Geol. Bull. 14, p. 69, pl. 8, figs. 34, 35, 1939.

"Test small short, broad, composed of a number of inflated chambers arranged triserially, the basal portions of the chambers tending to project beyond the suture line which produces a spiny effect at the initial end when viewed laterally; wall hyaline, granular; sutures depressed; aperture large, terminal, ovate, with a broad collar."

Basal Jackson samples from test holes in the northwestern part of Scott County yielded a few small granular specimens that appear to belong to this species described from the Cook Mountain of Louisiana.

Genus REUSSELLA Galloway, 1933

REUSSELLA EOCENA (Cushman) var.

Plate VII, 31a, b, 32, 34a, b

Reussia eocena Cushman, Contr. Cushman Lab. Foram. Res., Vol. 9, p. 13, pl. 1, fig. 25, 1933; U. S. Geol. Survey Prof. Paper 181, p. 38, pl. 15, figs. 4, 5, 1935.

"Test short and broad, pyramidal, three-sided, widest above the middle, triangular in transverse section, the sides in the

adult deeply concave, in the young stages nearly flat; angles in the young sharp, in the adult becoming thick and rounded; surface smooth; aperture at the inner border of the last-formed chamber. Maximum length 0.80 mm."

Specimens obtained differ from the described species in the following characteristics: walls of adult test only slightly concave, sutures are limbate but flush with the surface, and the top of each of the last three chambers is deeply concave as seen from the apertural view. This variety was found in several samples of lower Yazoo clay and Moodys Branch material from Scott County. A very similar form is present in the Byram marl at Vicksburg.

REUSSELLA RECTIMARGO (Cushman)

Plate VII, 30

Verneuilina rectimargo Cushman, U. S. Geol. Survey Prof. Paper 129-F, p. 127, pl. 29, figs. 4, 5, 1922.

"Test elongate, triangular in cross section, early portion tapering, adult portion with the sides nearly parallel and straight; chambers numerous, arranged triserially; sutures not depressed, often slightly limbate; sides of the test flattened or very slightly concave; peripheral angles rounded; aperture slightly elongate at the base of the inner margin of the last-formed chamber; wall finely punctate. Length 1 millimeter or less."

A few very small specimens, that, with the exception of size, exhibit characteristics of the species described from the Vicksburg formation, were found in a lower Yazoo clay sample from a test hole at Forest.

REUSSELLA cf. SUBROTUNDATA (Cushman and Thomas)

Reussia subrotundata Cushman and Thomas, Jour. Pal., Vol. 4, no. 1, p. 38, pl. 3, figs. 7a-c, 1930.

Reussella subrotundata (Cushman and Thomas), Howe, La. Dept. Cons. Geol. Bull. 14, p. 70, pl. 8, figs. 40-42, 1930.

A few specimens from lower Jackson material from Scott County are referred to this species. They show variation in the amount of rounding of the angles and shape of chambers.

Genus UVIGERINA d'Orbigny, 1826

UVIGERINA COCOAENSIS Cushman

Plate VIII, 9

Uvigerina cocoaensis Cushman, Contr. Cushman Lab. Foram. Res., Vol. 1, p. 68, pl. 10, fig. 12, 1925. Cushman and Applin, Bull. Am. Assoc. Petr. Geol., Vol. 10, p. 174, pl. 8, fig. 15, 1926. Ellisor, Bull. Am. Assoc. Petr. Geol., Vol. 17, no. 11, pl. 3. fig. 13, 1933. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 39, pl. 15, figs. 11-13, 1935.

"Test of medium size for the genus, elongate, fusiform, greatest width slightly above the middle, periphery very slightly lobulate; chambers rather few, inflated, evenly rounded; sutures slightly depressed; wall ornamented with coarse longitudinal costae, not usually confluent with those of the chambers above or below, becoming lower and less conspicuous in later chambers, the last-formed chamber in the adult usually smooth, about 12 to 16 costae in the complete circumference in the widest region; wall finely punctate; apertural end with a short cylindrical neck and phialine lip. Maximum length 0.80 mm.; width 0.30-0.35 mm."

This is a fairly common species throughout the Yazoo clay in Scott County.

UVIGERINA COOKEI Cushman

Plate VIII, 7

Uvigerina cookei Cushman, U. S. Geol. Survey Prof. Paper 181, p. 39, pl. 15, figs. 14-16, 1935.

"Test of large size for the genus, elongated, subcylindrical, slightly fusiform, greatest width above the middle, periphery slightly lobulate; chambers numerous, inflated, evenly rounded; sutures slightly depressed; wall ornamented with sharp, low, longitudinal costae, in part confluent with those above and below, usually reduced on the last-formed chamber, about 24 to 30 costae in the complete circumference in the widest region; wall finely punctate; apertural end with a very short cylindrical neck and wide phialine lip. Maximum length 1.20 mm.; width 0.35-0.40 mm."

This species was fairly abundant in some of the lower Jackson samples of Scott County.

UVIGERINA DANVILLENSIS Howe and Wallace

Plate VIII, 1

Uvigerina danvillensis Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 62, pl. 12, fig. 5, 1932.

"Test subfusiform, greatest diameter near the midportion, about twice as long as broad, almost circular in cross section; chambers inflated, arranged in a loose triserial series; sutures more or less indistinct, depressed; all chambers except the last possess high, plate-like costae, some extending across two or three chambers, the initial end ornamented with four of these costae extending vane-like well beyond the posterior limits of the test; wall calcareous, finely perforate, costae clear, glassy; aperture circular, eccentric, at the end of a moderately long neck, surrounded by a phialine lip. Length 0.5 mm."

A few samples of upper Yazoo clay from Scott County yielded numerous specimens of this characteristically costate species.

UVIGERINA ELONGATA Cole

Plate VIII, 3

Uvigerina elongata Cole, Bull. Am. Paleontology, Vol. 14, No. 51, p. 26, pl. 4, figs. 2, 3, 1927. Cushman and Edwards, Contr. Cushman Lab. Foram. Res., Vol. 13, p. 78, pl. 11, figs. 15, 16, 1937. Cushman, Contr. Cushman Lab. Foram. Res., Vol. 15, pt. 3, p. 65, pl. 11, fig. 11, 1939.

"Test small, elongate, composed of a compact, early portion, with a tendency for the final chamber to be added uniserially; surface slightly hispid; aperture an elongate neck and with a narrow, rimmed phialine neck. Length 0.35-0.40 mm."

Small hispid specimens are present in the Jackson, particularly the lower Yazoo clay. The Scott County forms resemble very closely the topotype specimens figured by Cushman. Howe lists the species from the Cook Mountain formation of Louisiana.

UVIGERINA GARDNERAE Cushman

Plate VIII, 8

Uvigerina gardnerae Cushman, in Cushman and Applin, Bull. Am. Assoc. Petr. Geol., Vol. 10, p. 175, pl. 8, figs. 16, 17, 1926. Cole, Bull. Am. Paleontology, Vol. 14, no. 53, p. 213 (13), pl. 2, fig. 5, 1928. Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 63, pl. 12, fig. 6, 1932. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 40, pl. 15, figs. 18, 19, 1935. Cushman, Contr. Cushman Lab. Foram. Res., Vol. 13, pt. 3, p. 79, pl. 11, figs. 19, 20, 1937.

"Test of medium size for the genus, much elongated, slender, early portion fusiform, later portion with the chambers somewhat loosely arranged, periphery somewhat lobulate; chambers numerous, inflated, especially the later ones, earlier ones with the basal end of the chambers tending to overhang the preceding ones; wall ornamented with longitudinal costae in the earlier portion, the costae not confluent with those of chambers above or below, costae later tending to break up into lines of spines, and the later portion of the test in adults generally hispid, over 20 costae in the complete circumference before breaking into spines; apertural end with a slightly tapering subcylindrical neck and slight phialine lip. Maximum length 0.80 mm.; width 0.25 mm."

This is one of the most common species in the Jackson formation and is found in nearly every sample examined. Specimens vary from the shortened forms to those that are somewhat elongate.

UVIGERINA GARDNERAE Cushman var. TEXANA Cushman and Applin

Plate VIII, 4

Uvigerina gardnerae Cushman var. *texana* Cushman and Applin, Bull. Am. Assoc. Petr. Geol., Vol. 10, p. 175, pl. 8, fig. 13, 1926. Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 64, pl. 12, figs. 3, 9, 1932. Ellisor, Bull. Am. Assoc. Petr. Geol., Vol. 17, no. 11, pl. 3, fig. 15, 1933. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 40, pl. 15, fig. 20, 1935. Contr. Cushman Lab. Foram. Res., Vol. 13, pt. 3, p. 79, pl. 11, fig. 18, 1937.

"Variety differing from the typical form in being much more elongate; the later portion is somewhat less in diameter than the earlier part. Length 0.60 mm.; breadth 0.20 mm."

Many specimens of this elongate variety show hispid features on the later portions of the tests. This variety was found throughout the Jackson formation and beautiful specimens were especially abundant in some of the samples of the upper Yazoo clay.

UVIGERINA GLABRANS Cushman

Plate VIII, 2

Uvigerina glabrans Cushman, Contr. Cushman Lab. Foram. Res., Vol. 9, p. 13, pl. 1, fig. 28, 1933; U. S. Geol. Survey Prof. Paper 181, p. 40, pl. 15, fig. 21, 1935. Contr. Cushman Lab. Foram. Res., Vol. 13, pt. 3, p. 80, pl. 11, fig. 21, 1937.

"Test of medium size for the genus, elongated, subcylindrical, or slightly fusiform, greatest width usually below the middle,

periphery only slightly lobulate; chambers comparatively few, inflated, evenly rounded; sutures very slightly depressed; wall smooth, or with faint traces of costae near the initial end, finely perforate; apertural end truncate, with a short delicate cylindrical neck and phialine lip, the neck often broken. Maximum length 0.75 mm.; breadth 0.30-0.35 mm."

Smooth specimens and some with faint costae were found in several samples of lower Yazoo clay in Scott County.

UVIGERINA JACKSONENSIS Cushman

Uvigerina jacksonensis Cushman, Contr. Cushman Lab. Foram. Res., Vol. 1, pt. 3, p. 67, pl. 10, fig. 13, 1925; Jour. Pal., Vol. 1, p. 163, pl. 25, fig. 3, 1927. Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 65, pl. 12, figs. 7, 8, 1932. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 40, pl. 16, figs. 1-3, 1935; Contr. Cushman Lab. Foram. Res., Vol. 13, pt. 3, p. 81, pl. 12, figs. 4, 5, 1937.

"Test large for the genus, stout, broadly fusiform, greatest width at about the middle, periphery slightly lobulate; chambers rather few, inflated; sutures somewhat depressed, basal part of chamber not conspicuously overhanging, evenly curved; wall ornamented with coarse longitudinal costae, in the early portion usually limited to the individual chamber, in the adult portion usually becoming confluent with those of the adjacent chambers above and below, outer edge of the costae entire; about 18 to 22 costae in the complete circumference in the widest region; wall rather coarsely punctate; apertural end with a tendency in the last-formed chamber to lose or reduce the costae, with a cylindrical neck of medium length and phialine lip. Maximum length 0.90 mm.; width 0.45 mm."

Specimens referred to this species were found in several representative samples of the Jackson formation from Scott County. The form is not abundant but appears to range throughout the formation. It has been reported from several localities in the state.

UVIGERINA TOPILENSIS Cushman

Plate VIII, 5

Uvigerina topilensis Cushman, Contr. Cushman Lab. Foram. Res., Vol. 1, p. 5, pl. 1, figs. 5a, b, 1925. Cushman and Applin, Bull. Am. Assoc. Petr. Geol., Vol. 10, p. 176, pl. 8, fig. 14, 1926. Ellisor, Bull. Am. Assoc. Petr. Geol., Vol. 17, no. 11, pl. 3, fig. 14, 1933. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 41, pl. 16, fig. 4, 1935; Contr. Cushman Lab. Foram. Res., Vol. 13, pt. 3, p. 83, pl. 12, fig. 14, 1937.

"Test generally fusiform, broadest in the middle, initial and apertural ends both rounded; chambers irregularly spiral, inflated; sutures distinct, depressed; wall ornamented with a very few costae, progressively decreasing in height toward the apertural end of the test and usually continuous from one chamber to another, the last-formed chamber usually smooth; wall finely punctate, the costae on the earliest portion sometimes projecting backward into plate-like processes; aperture with a very narrow cylindrical neck. Length 0.70 mm.; breadth 0.30 mm."

Scott County specimens are elongate with the last 2 to 4 chambers arranged nearly uniserially. Rarely specimens have two apertures separately developed on the last chamber. Species ranges through the Yazoo clay.

UVIGERINA YAZOOENSIS Cushman

Plate VIII, 6

Uvigerina yazooensis Cushman, Contr. Cushman Lab. Foram. Res., Vol. 9, p. 13, pl. 1, fig. 29, 1933; U. S. Geol. Survey Prof. Paper 181, p. 41, pl. 16, figs. 5, 6, 1935; Contr. Cushman Lab. Foram. Res., Vol. 13, pt. 3, p. 85, pl. 12, figs. 16, 17, 1937.

"Test small, elongate, fusiform, greatest width toward the apertural end, periphery strongly lobulate; chambers numerous, inflated; sutures strongly depressed, the basal portion of the chamber overhanging the preceding ones; wall ornamented with sharp, longitudinal costae, limited to the individual chamber, those preceding the succeeding chambers not usually in the same line, the outer edge of the costae often serrate, about 22 to 26 costae in the complete circumference in the widest region; wall rather coarsely punctate; apertural end with a short, narrow cylindrical neck and phialine lip. Maximum length 0.70 mm.; width 0.28 mm."

A few specimens from the upper Yazoo clay in Scott County have been assigned to this species, but it was not recognized in the material from the basal portion of the Jackson formation. A greatly elongated form came from a test hole sample obtained from the top of the formation in the southwest corner of the county. This elongated type is the one figured and may be a variety of the typical.

UVIGERINA sp.

Plate VIII, 10

Test elongate, tapering, broadest at apertural end; chambers numerous, inflated, rapidly expanding, evenly rounded in later portion; sutures distinct, depressed; initial part of test ornamented by a few longitudinal costae which project beyond base, later portion smooth; apertural end with a short neck at center of base of last-formed chamber. Length 0.4 mm.

This specimen came from test hole J32 in the uppermost Yazoo clay, southwest corner of Scott County.

Genus ANGULOGERINA Cushman, 1927

ANGULOGERINA DANVILLENSIS Howe and Wallace

Plate VIII, 15

Angulogerina danvillensis Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 56, pl. 12, fig. 2, 1932.

"Test elongate, fusiform, the adult one-half of the test being triangular in shape with almost concave faces; chambers numerous, arranged in an irregular triserial series, the earlier chambers slightly inflated and covered with coarse longitudinal costae which do not extend beyond the limits of each chamber; sutures fairly distinct, depressed; wall calcareous, finely perforate; aperture, a circular opening at the end of a fairly long neck, provided with a faint phialine lip. Length 0.41 mm."

This species was identified in one sample of upper Yazoo clay from Scott County.

ANGULOGERINA OCALANA Cushman

Plate VIII, 14

Angulogerina ocalana Cushman, Contr. Cushman Lab. Foram. Res., Vol. 9, p. 14, pl. 1, fig. 30, 1933; U. S. Geol. Survey Prof. Paper 181, p. 41, pl. 16. figs. 7, 8, 1935.

"Test small for the genus, elongate, fusiform, periphery very slightly lobulate, somewhat triangular in section, the angles rounded, especially in the early portion; wall ornamented with numerous very fine, slightly raised costae, the outer edge broken into a finely serrate line; apertural end with the chambers somewhat loosely arranged, the costae less prominent or nearly wanting, the chambers more definitely triangular, angles sharper;

apertural end extended into a short neck with a slight lip. Maximum length 0.35 mm.; width 0.15 mm."

Specimens which compare with this finely plicated small species range throughout the Jackson formation of Scott County.

ANGULOGERINA MULTICOSTATA Bergquist, n. sp.

Plate VIII, 22, 23

Test elongate, very slender, initial end bluntly pointed; chambers numerous, slightly inflated; last half of adult test nearly uniserial with each chamber flattened or concave on inner side; sutures distinct; surface ornamented by numerous closely spaced, longitudinal low costae, not continuous from one chamber to another; aperture elliptical, at end of a short compressed neck with a slight lip. Length 0.65 mm.; diameter 0.17 mm.

Near top of Yazoo clay in Scott County.

Holotype: Top Yazoo clay, test hole J177, 27 feet beneath surface, 3½ miles southwest of Morton; Type slide VIII, 22, Mississippi Geological Survey.

ANGULOGERINA MULTICOSTATA Bergquist, n. sp.
var. YAZOOENSIS Bergquist, n. var.

Plate VIII, 16, 17

Variety differs from typical form in being smooth and having the last two chambers compressed and somewhat twisted and very concave on inner side. Length 0.40 mm.; maximum diameter 0.10 mm.

Upper Yazoo clay, Scott County.

Holotype: Upper Yazoo clay, test hole J40, 15 to 18 feet beneath the surface, 4 miles south of Morton; Type slide VIII, 16, Mississippi Geological Survey.

ANGULOGERINA RUGOPLICATA Cushman

Plate VIII, 12

Angulogerina rugoplicata Cushman, Contr. Cushman Lab. Foram. Res., Vol. 11, p. 33, pl. 5, figs. 5a, b, 1935; idem, Vol. 14, pt. 4, p. 88, pl. 15, fig. 20, 1938.

"Test about twice as long as broad, generally triangular in end view, the sides slightly concave, and the angles in the adult

truncate, somewhat fusiform in side view, greatest diameter at about the middle; chambers distinct, strongly concave at the base, irregular, increasing in height toward the apertural end; sutures strongly depressed; wall distinctly perforate, with slight traces of longitudinal striae; aperture circular, terminal, with a very short, cylindrical neck and a very slight, rounded lip. Length 0.30 mm.; diameter 0.15 mm."

Specimens assigned to this species came from a sample of basal Yazoo clay from a test hole beside the road, 3½ miles northwest of Forkville.

Genus TRIFARINA Cushman, 1923

TRIFARINA ADVENA Cushman

Plate VIII, 13

Trifarina bradyi Cushman var. *advena* Cushman, Contr. Cushman Lab. Foram. Res., Vol. 1, pt. 4, p. 87, 1926; U. S. Geol. Survey Prof. Paper 181, p. 42, pl. 16, figs. 10a, b, 1935.

Trifarina advena Cushman, Contr. Cushman Lab. Foram. Res., Vol. 15, pt. 3, p. 66, pl. 11, fig. 15, 1939.

Test elongate, tapering at each end, triangular in transverse section, sides flattened to slightly convex, surface coarsely punctate, angles rounded to carinate; sutures distinct and on some specimens are deeply depressed and give an irregular to somewhat twisted effect to test; aperture rounded, at end of short neck.

Tests show variations in amount of triangularity, some being somewhat rounded and having very little development of the angle carinae. The species ranges throughout the Jackson formation in Scott County.

FAMILY ELLIPSOIDINIDAE

Genus PLEUROSTOMELLA Reuss, 1860

PLEUROSTOMELLA CUBENSIS Cushman and Bermudez

Plate VIII, 11

Pleurostomella alazanensis Cushman var. *cubensis* Cushman and Bermudez, Contr. Cushman Lab. Foram. Res., Vol. 13, p. 17, pl. 1, figs. 64, 65, 1937.
Pleurostomella cubensis Cushman and Bermudez, Contr. Cushman Lab. Foram. Res., Vol. 15, pt. 3, p. 67, pl. 11, figs. 25, 26, 1939.

Test fusiform, chambers inflated; sutures distinct, slightly depressed; wall smooth, finely punctate; aperture an elongate slit in oblique apertural face.

A single specimen was found in a sample of basal Yazoo clay from test hole J84 drilled by a roadside approximately 4½ miles northwest of Forkville.

Genus ELLIPSONODOSARIA A. Silvestri, 1900

ELLIPSONODOSARIA COCOAENSIS (Cushman)

Plate V, 11, 12

Nodosaria sp. Cushman and Applin, Bull. Am. Assoc. Petr. Geol., Vol. 10, p. 170, pl. 7, fig. 17, 1926.

Nodosaria cocoaensis Cushman, Contr. Cushman Lab. Foram. Res., Vol. 1, p. 66, pl. 10, figs. 5, 6, 1925; Jour. Pal., Vol. 1, p. 153, pl. 24, fig. 1, 1927.

Dentalina cocoaensis Ellisor, Bull. Am. Assoc. Petr. Geol., Vol. 17, no. 11, pl. 2, fig. 5, 1933. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 19, pl. 8, figs. 1, 2, 1935.

Ellipsonodosaria cocoaensis (Cushman), Contr. Cushman Lab. Foram. Res., Vol. 15, pt. 3, p. 68-69, pl. 11, figs. 27-33, 1939.

Nearly complete adult specimens of this long slender species are common in the Yazoo clay at several localities in Scott County.

Genus ELLIPSOLAGENA A. Silvestri, 1923

ELLIPSOLAGENA sp.

Plate VII, 12

Test minute, monothalmous, slightly compressed with faint carina development at periphery near apertural end; ovate in side view; wall translucent; aperture a terminal elongate slit with a raised lip on each side, one being slightly higher, and from this the internal neck curves back against the wall.

This form was found very sparingly in the finer screenings of lower Jackson samples from Scott County.

FAMILY ROTALIIDAE

Genus DISCORBIS Lamarck, 1804

DISCORBIS ALVEATA Cushman

Plate VIII, 18

Discorbis alveata Cushman, Contr. Cushman Lab. Foram. Res., Vol. 9, p. 16, pl. 2, figs. 4a-c, 1933; U. S. Geol. Survey Prof. Paper 181, p. 44, pl. 17, figs. 4a-c, 1935.

"Test planoconvex, dorsal side raised in a low spire, ventral side nearly flat, periphery acute and slightly keeled; chambers distinct, about 5 in the adult whorl, of uniform shape, increasing gradually in size as added, the ventral side with the inner

portion broken up into a series of channels radiating from the umbilicus; sutures distinct, slightly limbate on the dorsal side, strongly curved, flush with the surface, on the ventral side nearly radial, slightly curved and distinctly depressed; wall smooth except for the channeling of the umbilical area on the ventral side; aperture narrow, at the umbilical end of the chamber. Diameter 0.35 mm.; height 0.12 mm."

Cushman's holotype came from the Jackson at Garlands Creek. A few specimens from the lower Yazoo clay and one from the uppermost portion of the formation in Scott County belong to this species.

DISCORBIS ASSULATA (?) Cushman

Discorbis assulata Cushman, Contr. Cushman Lab. Foram. Res., Vol. 9, p. 15, pl. 2, figs. 2a-c, 1933; U. S. Geol. Survey Prof. Paper 181, p. 44, pl. 17, figs. 1, 2, 1935.

Three small specimens from samples of basal Yazoo clay from test holes in Scott County may belong to this species. All the listed features check except that the specimens are coarsely perforate, so that the surface has a roughened appearance.

DISCORBIS GLOBULO-SPINOSA Cushman

Plate VIII, 21

Discorbis globulo-spinosa Cushman, Contr. Cushman Lab. Foram. Res., Vol. 9, p. 14, pl. 2, figs. 1a-c, 1933; U. S. Geol. Survey Prof. Paper 181, p. 43, pl. 16, figs. 14a-c, 1935.

This form is an easily recognized species. The small test is flat on the ventral side and strongly convex dorsally with a raised ridge on the inner area of the whorls that is usually produced into blunt spines in the central portion. It was found to be fairly common in the Moodys Branch marl and in one sample of lower Yazoo clay in Scott County. Cushman described the species from the Jackson formation at Jackson and also listed it from Garlands Creek.

DISCORBIS HEMISPHAERICA Cushman

Plate VIII, 19, 20

Discorbis hemisphaerica Cushman, Contr. Cushman Lab. Foram. Res., Vol. 7, p. 59, pl. 7, figs. 14a-c, 1931. Ellisor, Bull. Am. Assoc. Petr. Geol., Vol. 17, no. 11, pl. 3, figs. 17, 18, 1933. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 43, pl. 16, figs. 13a-c, 1935.

"Test small, hemispherical, the ventral side flattened, dorsal side strongly convex, composed of several whorls, last-formed one with 4 chambers, ventral peripheral portions rounded; chambers of the early whorls somewhat covered by a secondary clear growth, later chambers more distinct, somewhat narrowed, smooth; sutures distinct, oblique, slightly depressed, on the ventral side radial; wall coarsely and conspicuously perforate, less distinctly so on the ventral side, which is peculiar, as the last-formed whorl of chambers only partly covers the earlier ones; aperture a curved arched opening on the ventral side of the test from near the periphery, well back from the umbilical region, developing a slight raised lip and apertural face. Diameter 0.35 mm.; thickness 0.20-0.30 mm."

This species was common in the basal Jackson of some of the Scott County test holes. Cushman's holotype came from Jackson; he also noted it from Garlands Creek.

Genus VALVULINERIA Cushman, 1926

VALVULINERIA TEXANA Cushman and Ellisor

Plate VIII, 24, 25

Valvulineria texana Cushman and Ellisor, Contr. Cushman Lab. Foram. Res., Vol. 7, pt. 3, p. 56, pl. 7, figs. 9a-c, 1931. Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 70, pl. 13, figs. 6a, b, 1932.

"Test small, slightly longer than broad, periphery broadly rounded; chambers comparatively few, usually five making up the last-formed whorl in the adult, inflated on the ventral side with a distinct prolongation forming a semicircular lip, and extending out over the aperture; sutures distinct, depressed, on the dorsal side very slightly curved, on the ventral side radial; wall smooth, very finely perforate; aperture an elongate slit below the projecting lip in the umbilical region of the ventral side. Diameter 0.36 mm."

This species was found in one sample of lower Yazoo clay and in a few of the samples from the upper part of the formation in Scott County.

Genus GYROIDINA d'Orbigny, 1826

GYROIDINA DANVILLENSIS Howe and Wallace

Plate VIII, 31, 32, 33

Gyroidina danvillensis Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 69, pl. 13, figs. 3a-c, 1932.

"Test small, trochoid, ventral side steeply convex, dorsal side

almost a plane, umbilicus faint; chambers few, about five or six visible on the ventral side, seven or eight visible on the dorsal side, chambers slightly inflated; sutures distinct, depressed, radial; wall calcareous, finely perforate; aperture a low arched opening on the ventral side extending from the umbilicus almost to the periphery, provided with a distinct lip. Diameter 0.2 mm."

The species has fewer chambers visible in the last whorl than has *G. soldani* d'Orbigny var. *octocamerata* Cushman and G. D. Hanna. Some specimens from Scott County are somewhat convex on the dorsal side with clear shell material that tends to obscure the early chambers.

Small tests which have been identified as this species are common in the fine screenings of most of the Jackson samples from Scott County.

GYROIDINA sp.

Plate VIII, 26a, 26b

Test medium-sized, trochoid, ventral side convex with large umbilicus, dorsal side almost a plane, periphery rounded, wall finely punctate; chambers slightly inflated, gradually enlarging, about 10 visible on ventral side; sutures distinct, radial, somewhat limbate, flush with surface in initial part, slightly depressed in later part and on ventral side each terminates in a small pit at edge of umbilicus; aperture a short, low opening along ventral side, extending almost to periphery. Diameter 0.2 mm.

Two specimens of this form were found in a sample of lower Yazoo clay from a test hole J162C on the northeast slope of Bald hill, approximately 2½ miles southwest of Lake.

Figured specimen on type slide VIII, number 26, Mississippi Geological Survey.

Genus ROTALIATINA Cushman, 1925

ROTALIATINA QUADRALOCULA Bergquist, n. sp.

Plate VIII, 27, 28, 29

Test minute, subspherical, composed of about 3 whorls, earlier coils forming a low spire on the dorsal side; chambers distinct, four in last coil comprise most of test; sutures distinct, slightly

depressed on last whorl; wall smooth, polished; aperture an elongated low arched slit with a lip, at base of last-formed chamber. Length 0.18 mm.; diameter 0.17 mm.

This minute form is found in the finer screenings and ranges throughout the Jackson of Scott County.

Cotypes: Top of Yazoo clay, test hole J42, 5½ miles southwest of Morton; Type slide VIII, 27, 28, 29, Mississippi Geological Survey.

ROTALIATINA QUADRALOCULA Bergquist, n. sp. var. ELONGATA Bergquist, n. var.

Plate VIII, 30

Variety differs from typical in being longer than broad and in having a higher spire; last coil comprises about one-half of the test. Length 0.23 mm.; diameter 0.12 mm.

This variety is associated with the typical form in the Jackson formation.

Holotype: Basal Jackson, test hole J193, 3½ miles north of Forkville; Type slide VIII, 30, Mississippi Geological Survey.

Genus EPONIDES Montfort, 1808

EPONIDES COCOAENSIS Cushman

Plate VIII, 34, 35

Eponides cocoaensis Cushman, Contr. Cushman Lab. Foram. Res., Vol. 4, p. 73, pl. 10, figs. 2a-c, 1928; U. S. Geol. Survey Prof. Paper 181, p. 47, pl. 19, figs. 1, 2, 1935.

"Test planoconvex, dorsal side flattened or very slightly umbonate, ventral side very strongly convex; chambers few, usually four in the last-formed coil, the last one large and occupying nearly half the surface on the ventral side; periphery subacute or even with a blunt keel; sutures distinct and depressed, on the ventral side nearly radiate, on the dorsal curved; wall in well-preserved specimens rather distinctly perforate, although the perforations are not coarse, and occasionally with small spines or papillae scattered over the surface; aperture elongate, semielliptical, at about the middle of the inner margin of the chamber on the ventral side. Diameter 0.50 mm.; thickness 0.45 mm."

A few specimens from Scott County samples indicate this species is found sparingly throughout the Jackson formation. Cushman lists it from 1½ miles south of Shubuta.

EPONIDES JACKSONENSIS (Cushman and Applin)

Plate VIII, 36a, 36b

Pulvinulina jacksonensis Cushman and Applin, Bull. Am. Assoc. Petr. Geol., Vol. 10, p. 181, pl. 9, figs. 24, 25, 1926.

Eponides jacksonensis (Cushman and Applin), Cushman, U. S. Geol. Survey Prof. Paper 181, p. 46, pl. 19, figs. 4-8, 1935.

"Test with a fairly high spire, the periphery not keeled but only slightly rounded, the dorsal side much more convex than the ventral; chambers numerous, 6 or 7 in the last-formed coil; sutures distinct but on the dorsal side very oblique, on the ventral side only slightly curved and somewhat depressed; wall smooth; aperture on the ventral side, forming a distinct angle in the border of the test and extending to the umbilicus. Diameter 1.00 mm."

This form, abundant throughout the Jackson formation, was found in most of the Scott County samples. Clear shell material darkened by mineralization is present along the ventral sutures near the umbilicus of some specimens. Cushman reports this species from Jackson, Garlands Creek, and 1½ miles south of Shubuta.

Genus EPISTOMINA Terquem, 1883

EPISTOMINA ELEGANS (d'Orbigny)

Plate IX, 6, 7

"Nautili *Ammoniformes* sive *trochiformes*," Soldani, Test., Vol. 2, App., pl. 2, fig. R, 1798.

Rotalia (Turbinulina) elegans d'Orbigny, Ann. Sci. Nat., Vol. 7, p. 276, no. 54, 1826.

Epistomina elegans (d'Orbigny) Cushman, U. S. Nat. Mus., Bull. 104, p. 65, pl. 13, figs. 6a-c, 1931. (For the many references to this species see this reference) Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 68, pl. 13, fig. 2, 1932.

This biconvex form with rounded to acute periphery has distinct limbate sutures that are oblique on the dorsal side and radial on the ventral side where they end in a center umbonate mass. The polished surface and suture pattern make this a distinctive type. Though found sparingly throughout the Jack-

son formation, the largest and most numerous specimens obtained in Scott County came from the upper Yazoo clay.

Genus SIPHONINA Reuss, 1850

SIPHONINA DANVILLENSIS Howe and Wallace

Plate IX, 3a, b, c

Siphonina danvillensis Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 70, pl. 13, figs. 1a, b, 1932.

"Test biconvex, trochoid; last-formed coil with about five chambers, distinct on the ventral side, but less so on the dorsal; sutures on the ventral side distinct, very slightly depressed, indistinct on the dorsal side; periphery with a broad, thin, denticulate keel; aperture elongate, elliptical, slightly on the ventral side, provided with a distinct neck, and a thin, flaring lip. Diameter 0.52 mm."

The species was found to range throughout the Jackson formation of Scott County.

SIPHONINA JACKSONENSIS Cushman and Applin

Plate IX, 1, 2

Siphonina jacksonensis Cushman and Applin, Am. Assoc. Petr. Geol., Vol. 10, p. 180, pl. 9, figs. 20-23, 1926. Ellisor, Bull. Am. Assoc. Petr. Geol., Vol. 17, no. 11, pl. 3, fig. 21, 1933. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 48, pl. 20, figs. 2-8, 1935.

"Test much compressed, chambers slightly projecting at the posterior angle, at the periphery, keeled, 5 chambers in the last-formed coil, fairly distinct; sutures very slightly limbate on the dorsal side, spiral suture not prominent; wall ornamented by very numerous small spinose processes, in some specimens distinctly developed so that the periphery of the test is itself spinose, central portion strongly reticulate; aperture elongate, with a slightly projecting neck and lip. Diameter 0.50 mm."

This is one of the most common species in the Jackson formation. Specimens show variations in size, amount of ornamentation, and inflation. Some tests are greatly compressed and somewhat distorted. Others have slight biconvexity and resemble *S. danvillensis* Howe and Wallace, but the differences are not critical enough to merit assignment to that species. Most of the Jackson samples of Scott County yielded abundant

specimens, and the species has been reported from numerous localities in the formation in the state.

Genus CANCRIS Montfort, 1808

CANCRIS DANVILLENSIS Howe and Wallace

Plate IX, 11, 12

Cancris danvillensis Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 67, pl. 13, figs. 4, 5, 1932.

"Test longer than broad, biconvex, the ventral side more strongly convex than the dorsal; periphery acute, outlined by a thin, clear keel; chambers fairly numerous, all can be seen from the dorsal side, about six appear on the ventral side of adult specimens, in younger specimens the last chamber is about one-half the size of the entire test, in more mature specimens the last few chambers become more elongate and extend the periphery so that the outline becomes almost circular; sutures on the dorsal side slightly limbate and strongly curved, on the ventral side strongly depressed, radial and only slightly recurved near the outer end; umbilicus deep and in adult specimens surrounded by prominent bosses caused by the thickening of the inner edges of the chambers; wall smooth, finely perforate; aperture a slit at the inner margin of the last chamber on the ventral side, provided with a thin lip. Length 0.55 mm.; breadth 0.4 mm."

A few well preserved specimens of this species were found in samples from the uppermost portion of the Yazoo clay in Scott County.

FAMILY CYMBALOPORIDAE

Genus CYMBALOPORETTA Cushman, 1928

CYMBALOPORETTA (?) SQUAMMOSA (d'Orbigny)

Plate IX, 26, 27, 28

Cymbaloporetta squammosa (d'Orbigny) Cushman, Contr. Cushman Lab. Foram. Res., Vol. 4, pt. 1, no. 54, p. 7, 1928.

Rare specimens that are referred to this species came from a basal Yazoo clay sample from a test hole in the northwest portion of Scott County.

CYMBALOPORETTA (?) SQUAMMOSA (d'Orbigny) var.

Plate IX, 22, 23

Test conical, minute, composed of few chambers, the last two or three somewhat inflated, surface of each ornamented by stout spines.

Rare specimens which are tentatively referred to this genus and species came from the basal Yazoo clay from a test hole in the northwest portion of Scott County.

FAMILY CASSIDULINIDAE

Genus CERATOBULIMINA Toula, 1915

CERATOBULIMINA ALAZANENSIS Cushman and Harris

Plate IX, 17, 18

Ceratobulimina alazanensis Cushman and Harris, Contr. Cushman Lab. Foram. Res., Vol. 3, pt. 4, no. 51, p. 174, pl. 29, figs. 5a-c, pl. 30, figs. 3-5, 1927.

"Test very slightly longer than broad, periphery broadly rounded, usually 6 chambers in the last-formed whorl; sutures distinct, slightly depressed, not limbate; wall smooth and polished; aperture more elongate than in the older species and nearer the axis of coiling. Length 0.75 mm.; breadth 0.60 mm.; thickness 0.40 mm. The chambers of the last-formed coil gradually become wider and more involute on the dorsal side than in any other older species and in this character resemble the later Tertiary species."

The specimens obtained in Scott County came from test holes in the uppermost Yazoo clay directly below the Forest Hill beds. They compare closely with the described and illustrated material from the Alazon clays of Mexico.

Genus PULVINULINELLA Cushman, 1926

PULVINULINELLA DANVILLENSIS Howe and Wallace

Plate IX, 4a, b

Pulvinulinella danvillensis Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 71, pl. 13, figs. 7a-c, 1932.

"Test small, almost equally biconvex, almost circular in outline; periphery acute; chambers numerous, about nine in the last-formed coil; sutures distinct, on the ventral side straight, radial, on the dorsal side straight, but intersecting acutely with the previous coil; central area on the ventral side filled with

clear calcareous material; wall calcareous, very finely perforate; aperture an elongate slit parallel to the periphery, located in a depressed notch in the apertural face on the ventral side midway between the periphery and the umbilicus. Diameter 0.15 mm.; thickness 0.07 mm."

This tiny species was observed in the finer material of samples obtained from several test holes that penetrated beds throughout the Jackson section in Scott County.

Genus CASSIDULINA d'Orbigny, 1826

CASSIDULINA CRASSA d'Orbigny

Plate IX, 19

Cassidulina crassa d'Orbigny, Voyage dans l'Amerique meridionale, Foraminiferes, p. 56, pl. 7, figs. 18-20, 1839. H. B. Brady, *Challenger* Rept., Zoology, Vol. 9, p. 429, pl. 54, figs. 4, 5, 1884. Cushman, U. S. Nat. Mus., Bull. 71, pt. 2, p. 97, figs. 151a-c (in text), 1911; U. S. Geol. Survey Prof. Paper 129, p. 128, 1922; Prof. Paper 133, p. 24, pl. 3, fig. 7, 1923.

Specimens compared favorably in size, convexity of test, and shape of chambers with those from the Byram marl. They were found in abundance in some of the fine screenings of the Jackson material from Scott County.

CASSIDULINA GLOBOSA Hantken

Plate IX, 13, 14

Cassidulina globosa Hantken, Magy. kir. foldt. int. Evkonyve, Vol. 4, p. 54, pl. 16, fig. 2, 1875 (1876). Cushman, Contr. Cushman Lab. Foram. Res., Vol. 1, p. 56, pl. 9, figs. 25, 26, 1925. Cole, Bull. Am. Paleontology, Vol. 14, no. 51, p. 32, 1927. Cushman, Jour. Pal., Vol. 1, p. 167, pl. 26, fig. 13, 1927. Cole, Bull. Am. Paleontology, Vol. 14, no. 63, p. 216 (16), 1928. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 49, pl. 20, figs. 12a, b, 1935.

This form is small, subglobose, with broadly rounded periphery. The gently curved sutures are distinct but not depressed. Specimens obtained in Scott County ranged from the Moodys Branch member of the Jackson to the top of the Yazoo clay.

CASSIDULINA WINNIANA Howe

Plate IX, 5

Cassidulina winniana Howe, La. Dept. Cons. Geol. Bull. 14, p. 82, pl. 11, figs. 7, 8, 1939.

"Test minute, consisting of subglobular chambers, nine chambers being visible from either side; periphery strongly lobu-

lated; chambers very distinct, inflated, in alternating pairs at each side at the periphery; sutures deeply depressed, distinct; wall smooth; aperture an arched slit in the line of coiling. Holotype breadth 0.11 mm.; thickness 0.08 mm."

Specimens of a minute form with deep sutures and eight or nine subglobular chambers in the last whorl are common in the finer screenings of lower Yazoo clay and Moodys Branch marl from Scott County. These forms appear to belong to the species described from the Cook Mountain formation of Louisiana.

Genus CASSIDULINOIDES Cushman, 1927

CASSIDULINOIDES BRAZILIENSIS (Cushman)

Plate IX, 9, 10, 15, 16

Cassidulina braziliensis Cushman, U. S. Nat. Mus., Bull. 104, pt. 3, p. 130, pl. 25, figs. 4, 5, 1922.

Cassidulinoides braziliensis (Cushman), Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 72, pl. 10, figs. 6a, b, 1932.

Most specimens are like those illustrated by Howe from Danville Landing, Louisiana, but variations of tests exhibit all stages from a compact type to those that show marked elongation and curvature like the featured specimens. These latter may merit assignment to a new variety.

This form is fairly common in the fine material of the samples studied and appears to range throughout the Jackson formation.

FAMILY CHILOSTOMELLIDAE

Genus CHILOSTOMELLA Reuss, 1850

CHILOSTOMELLA CYLINDROIDES Reuss

Plate IX, 33

Chilostomella cylindroides Reuss, Zeitschr. deutsch. geol. Ges., Vol. 3, p. 60, pl. 6, fig. 43, 1851. Bornemann, l.c., Vol. 7, p. 343, pl. 17, fig. 1, 1855. Hantken, Mitth. Jahrb. ungar. geol. Anstalt., Vol. 4, p. 63, pl. 7, fig. 7, (1881). Cushman, in Contr. Cushman Lab. Foram. Res., Vol. 1, pt. 4, p. 76, pl. 11, figs. 14a-c, 15a-d, 1926. Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 72, pl. 14, figs. 1a, b, 1932.

A few specimens which belong to this small species came from a sample from the uppermost portion of the Yazoo clay from a test hole near the county line approximately 4 miles southwest of Morton and from another approximately 3 miles south of Morton.

Genus CHILOSTOMELLOIDES Cushman, 1926

CHILOSTOMELLOIDES OVIFORMIS (Sherborn and Chapman)

Plate IX, 31

Lagena (Obliquina) oviformis Sherborn and Chapman, Jour. Roy. Mic. Soc., p. 745, pl. 14, figs. 19a-d, 1886.

Chilostomella oviformis Sherborn and Chapman, Jour. Roy. Mic. Soc., p. 485, pl. 11, fig. 13, 1899.

Chilostomelloides oviformis Cushman, in Contr. Cushman Lab. Foram. Res., Vol. 1, pt. 4, p. 77, pl. 11, figs. 17a-d, 21a-c, 1926. Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 73, pl. 15, fig. 5, 1932.

"Test oval in front view, ends broadly rounded; wall smooth; aperture circular or nearly so, standing out at a distinct angle from the general contour of the test, with a thickened lip."

Two specimens were obtained from the sample of upper Yazoo clay which yielded *Chilostomella cylindroides* Reuss.

Genus PULLENIA Parker and Jones, 1862

PULLENIA QUINQUELOBA (Reuss)

Plate IX, 8

Nonionina quinqueloba Reuss, Deutsch. Geol. Gesell. Zeit., Vol. 3, p. 71, pl. 5, fig. 31, 1851.

Pullenia quinqueloba Cushman, U. S. Nat. Mus., Bull. 104, pt. 5, p. 42, pl. 8, figs. 5-9, 11, 1924. Plummer, Univ. Texas Bull. 2644, p. 136, pl. 8, figs. 12a, b, 1927. Nuttall, Jour. Pal., Vol. 4, p. 289, 1930. Cushman, Contr. Cushman Lab. Foram. Res., Vol. 16, p. 72, pl. 12, figs. 13, 14, 1940. Toulmin, Jour. Pal., Vol. 15, no. 6, p. 607, pl. 81, fig. 24, 1941.

"Test planispiral, completely involute, bilaterally symmetrical, somewhat compressed, periphery rounded, slightly lobate; chambers four or five in the final whorl, increasing regularly in size as added; sutures distinct, straight, slightly depressed; wall smooth, polished; aperture a highly arched slit across the periphery at the base of the final chamber. Diameter 0.24-0.42 mm.; thickness up to 0.26 mm."

The species ranges sparingly through the Jackson formation and was found in several of the Scott County samples.

FAMILY GLOBIGERINIDAE

Genus GLOBIGERINA d'Orbigny, 1826

GLOBIGERINA BULLOIDES d'Orbigny

Globigerina bulloides d'Orbigny, Ann. Sci. Nat., Vol. 7, no. 1, Modeles, Nos. 17 and 76, p. 227, 1826. Cushman, U. S. Nat. Mus., Bull. 71, pt. IV, p. 5, pl. 5, figs. 7-9, 1914. (Lists numerous references). Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 73, pl. 10, fig. 10, 1932.

This species ranges through the Jackson formation and was found abundantly in the finer material of most of the samples from Scott County.

GLOBIGERINA DANVILLENSIS Howe and Wallace

Plate IX, 24, 25

Globigerina danvillensis Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 74, pl. 10, figs. 9a, b, 1932.

"Test small, trochoid but nearly planispiral, periphery lobate; chambers few, about eight visible on the dorsal side, about four in the last-formed whorl, almost spherical in shape; sutures depressed; wall calcareous, finely spinose, perforate; aperture an almost circular opening on the ventral side not quite centered on the periphery. Diameter 0.2 mm.; diameter of largest chamber 0.13 mm."

Small tests which belong to this species are common in the fine screenings of most Jackson samples from Scott County.

GLOBIGERINA sp. (A) Howe and Wallace

Globigerina sp. (A) Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 75, pl. 10, figs. 8a, b, 1932.

"Test small, trochoid with low spire, periphery broadly rounded, lobate; chambers few, about eleven usually present, five making up the last formed coil; sutures distinct, depressed; umbilical area deep; wall calcareous, finely spinose. Diameter 0.19 mm."

One of the samples of lower Yazoo clay from a test hole at Forest furnished a few specimens that appear to be the same as the form described from the beds at Danville Landing, Louisiana, where it is common.

GLOBIGERINA sp. (B) Howe and Wallace

Plate IX, 20, 21, 29, 30

Globigerina sp. (B) Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 75, pl. 10, fig. 5, 1932.

"Test about as long as broad, trochoid with low spire, periphery broadly rounded, lobate; chambers numerous, the principal part of the test consisting of the last four, of these the last is slightly compressed, the other three being almost spherical

in shape; sutures distinct, depressed; wall calcareous, coarsely perforate; aperture a large, low-arched opening with a faint lip. Diameter of the last chamber 0.3 mm."

Specimens which seem to compare with this unnamed species, described from the Jackson formation of Louisiana and reported to be common there, were noted in both the lower and upper beds of the Yazoo clay in Scott County.

FAMILY HANTKENINIDAE

Genus HANTKENINA Cushman, 1924

HANTKENINA ALABAMENSIS Cushman

Plate X, 2, 4

Hantkenina alabamensis Cushman, U. S. Nat. Mus. Proc., Vol. 66, art. 3, p. 3, pl. 1, figs. 1-6, pl. 2, fig. 5, 1924; Contr. Cushman Lab. Foram. Res., Vol. 1, pp. 7, 68, pl. 1, fig. 11, 1925. Cushman and Applin, Bull. Am. Assoc. Petr. Geol., Vol. 10, p. 177, pl. 10, fig. 3, 1926. Cushman, Jour. Pal., Vol. 1, p. 160, pl. 25, fig. 17, 1927. Howe, l.c., Vol. 2, p. 14, text fig. 1, 1928. Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 54, pl. 10, fig. 3, 1932. Ellisor, Bull. Am. Assoc. Petr. Geol., Vol. 17, no. 11, pl. 6, fig. 5, 1933. Howe and Wallace, Jour. Pal., Vol. 8, p. 35, pl. 5, fig. 13, 1934. Hadley, Bull. Am. Paleontology, Vol. 20, no. 70A, p. 15, pl. 2, fig. 4, 1934. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 49, pl. 13, figs. 1-5, 1935. Coryell and Embich, Jour. Pal., Vol. 11, p. 299, pl. 43, fig. 10, 1937. Bermudez, Mem. Soc. Cubana Hist. Nat., Vol. 12, p. 13, 1938. Cushman, Contr. Cushman Lab. Foram. Res., Vol. 15, pt. 3, p. 74, pl. 12, fig. 18, 1939.

Specimens show variation in length of spines and in the size, shape, and amount of inflation of chambers. Young specimens in the finer material exhibit a solitary spine on the last formed chamber.

The Scott County samples furnished abundant specimens which are very common in the Yazoo clay.

HANTKENINA DANVILLENSIS Howe and Wallace

Plate X, 1a, b

Hantkenina danvillensis Howe and Wallace, Jour. Pal., Vol. 8, p. 37, pl. 5, figs. 14, 17, 1934.

"Test planispiral, bilaterally symmetrical; periphery lobate; chambers inflated, five in the last coil, each provided with a long hollow spine, located on the periphery near the contact with the next younger chamber; wall smooth, calcareous, finely perforate; aperture an elliptical opening at the base of the last chamber, above which is an elaborate supplementary apertural

plate out of which extend four tubular openings which are round or elliptical in shape. Diameter without spines, 0.55 mm."

Specimens identified as belonging to this species have three to five tubular openings on the apertural plate. All came from lower Yazoo clay samples obtained from test holes in the southeastern part of the county. The form is very rare.

FAMILY GLOBOROTALIIDAE

Genus GLOBOROTALIA Cushman, 1927

GLOBOROTALIA CENTRALIS Cushman and Bermudez

Plate IX, 34, 36, 37

Globorotalia centralis Cushman and Bermudez, Contr. Cushman Lab. Foram. Res., Vol. 13, pt. 1, p. 26, pl. 2, figs. 62-65, 1937. Howe, La. Dept. Cons. Geol. Bull. 14, p. 84, pl. 12, figs. 4-6, 1939.

"Test unequally biconvex, dorsal side only slightly so, ventrally very strongly convex, periphery rounded; chambers few, about 4 in the adult whorl, inflated, increasing rapidly in size as added; sutures distinct, depressed, on the dorsal side strongly oblique, gently curved or nearly straight, ventrally radial; wall smooth, distinctly perforate; aperture an elongate, low, arched opening about midway of the ventral side from periphery to umbilicus. Diameter 0.45-0.55 mm.; thickness 0.35-0.45 mm."

Species differs from *G. cocoaensis* Cushman in the more inflated form, more convex ventral side, and more rounded periphery.

Good specimens which compare with those described from Cuba were obtained from lower Yazoo clay samples at two localities in Scott County.

GLOBOROTALIA COCOAENSIS Cushman

Plate IX, 32, 35, 38

Globorotalia cocoaensis Cushman, Contr. Cushman Lab. Foram. Res., Vol. 4, p. 75, pl. 10, figs. 3a-c, 1928. Howe and Wallace, La. Dept. Conservation Geol. Bull. 2, p. 75, pl. 14, fig. 4, 1932. Ellisor, Bull. Am. Assoc. Petr. Geol., Vol. 17, no. 11, pl. 4, figs. 6a, b, 1933. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 50, pl. 21, figs. 1-3, 1935.

Both small and large specimens of this species are common in the lower Yazoo clay and the Moodys Branch marl of Scott County. This form has been noted in material from Yazoo County, and Cushman records it from a locality 1½ miles south of Shubuta.

FAMILY ANOMALINIDAE

Genus ANOMALINA d'Orbigny, 1826

ANOMALINA BILATERALIS Cushman

Anomalina bilateralis Cushman, U. S. Geol. Survey Prof. Paper 129, pp. 97, 137, pl. 21, figs. 1, 2, 1922; Prof. Paper 133, p. 42, 1923. Ellisor, Bull. Am. Assoc. Petr. Geol., Vol. 17, no. 11, pl. 4, fig. 7, 1933. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 50, pl. 21, figs. 4, 5, 1935.

"Test of about 4 coils, bilateral or nearly so, composed of numerous chambers, 10 or more in the last-formed whorl, umbilical region on both sides with a knob of clear shell material, more pronounced on the dorsal side; chambers smooth but coarsely punctate, more coarsely so on the ventral side; sutures broad and somewhat limbate with clear shell material; aperture a narrow curved opening at the base of the final chamber. Maximum diameter 1.00 mm."

Specimens are distinguished by the clear shell material in the umbilical region and by the curved limbate sutures. Some of the larger specimens tend to show depressed sutures without clear shell material in the later portion of the test.

This species was found sparingly in some of the samples studied and seems to range through the Jackson. Cushman lists it from several localities in the Jackson of the state.

ANOMALINA COCOAENSIS Cushman

Anomalina cocoaensis Cushman, Contr. Cushman Lab. Foram. Res., Vol. 4, p. 75, pl. 10, figs. 4a-c, 1928; U. S. Geol. Survey Prof. Paper 181, p. 51, pl. 21, figs. 13a-c, 1935.

Cushman lists this species from a locality 1½ miles south of Shubuta. It was not observed in the Scott County material.

ANOMALINA COSTIANA Weinzierl and Applin

Plate X, 20, 21

Anomalina costiana Weinzierl and Applin, Jour. Pal., Vol. 3, no. 4, p. 409, pl. 44, figs. 7a-c, 1929.

"Test small, compressed, involute, almost equally biconvex, peripheral margin angled, chambers numerous, 9 or 10 in the last-formed coil, comparatively long and narrow; sutures on the ventral side limbate, slightly raised, extending from the margin to the umbilicus which is covered by a low boss of clear shell material; on the dorsal side, also limbate, extending from the periphery to within a short distance from the inner end of

the chamber, where the limbate covering broadens rapidly, is more elevated and ends abruptly. These prominent sutural endings show through the central opening from the earlier whorls and give the center of the test a beaded appearance, which is accentuated by the narrow, smooth band of unornamented material which separates it from the remainder of the test, decorated with the suture lines described above. Mouth opening a narrow slit at the periphery on the last formed chamber."

The species is abundant through the Jackson formation of Scott County.

ANOMALINA GRANOSA (Hantken) var. DIBOLLENSIS Cushman and Applin

Plate X, 3

Anomalina granosa (Hantken) var. *dibollensis* Cushman and Applin, Bull. Am. Assoc. Petr. Geol., Vol. 10, p. 179, pl. 9, fig. 15, 1926. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 50, pl. 21, figs. 6, 7, 1935.

A few specimens referable to this variety were found in upper Yazoo clay samples from Scott County. Cushman reported the variety from a locality 1½ miles south of Shubuta.

ANOMALINA JACKSONENSIS (Cushman and Applin)

Discorbis jacksonensis Cushman and Applin, Bull. Am. Assoc. Petr. Geol., Vol. 10, p. 178, pl. 9, figs. 8, 9, 1926.

Anomalina jacksonensis Ellisor, Bull. Am. Assoc. Petr. Geol., Vol. 17, no. 11, pl. 4, figs. 10a, b, 1933. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 51, pl. 21, figs. 8a-c, 1935.

This species is listed by Cushman from the Jackson formation 1½ miles south of Shubuta.

ANOMALINA JACKSONENSIS (Cushman and Applin) var. DIBOLLENSIS (Cushman and Applin)

Discorbis jacksonensis Cushman and Applin var. *dibollensis* Cushman and Applin, Bull. Am. Assoc. Petr. Geol., Vol. 10, p. 178, pl. 9, fig. 10, 1926.

Anomalina jacksonensis (Cushman and Applin) var. *dibollensis* (Cushman and Applin), Cushman, U. S. Geol. Survey Prof. Paper 181, p. 51, pl. 21, fig. 9, 1935.

Cushman lists this species from Jackson and Garlands Creek.

Genus PLANULINA d'Orbigny, 1826

PLANULINA COCOAENSIS Cushman var. COOPERENSIS Cushman

Plate X, 5, 6

Planulina cocoaensis Cushman var. *cooperensis* Cushman, Contr. Cushman Lab. Foram. Res., Vol. 9, p. 20, pl. 2, figs. 12a-c, 1933; U. S. Geol. Survey Prof. Paper 181, p. 52, pl. 22, figs. 8a-c, 1935.

Large specimens of this variety showing 7 to 9 chambers in the last coil were found in a few of the upper Yazoo clay samples from Scott County. The form appears to be relatively rare.

Genus CIBICIDES Montfort, 1808

CIBICIDES AMERICANUS (Cushman) var. ANTIQUUS (Cushman and Applin)

Plate X, 22

Truncatulina americana Cushman var. *antiqua* Cushman and Applin, Bull. Am. Assoc. Petr. Geol., Vol. 10, p. 179, pl. 9, figs. 12, 13, 1926; U. S. Geol. Survey Prof. Paper 181, p. 53, pl. 22, figs. 1, 2, 1935.

A few specimens which may belong to this variety came from lower Jackson samples from Scott County. Cushman lists it at Garlands Creek and Jackson.

CIBICIDES AMERICANUS (Cushman) var. JACKSONENSIS Bergquist, n. var.

Plate X, 17, 18

Test compressed, periphery angled, outline slightly lobulate, ventral side convex, dorsal side flattened or slightly convex; chambers numerous, ten to twelve in last-formed coil, last few failing to meet umbilicus on dorsal side; strongly curved sutures outlined by clear shell material, each thinned at periphery and umbilicus from wide raised arch in middle area; umbilicus on each side filled by boss of shell material; aperture peripheral with a slight lip extending backward along dorsal side for one or two chambers. Length 0.47 mm.; width 0.30 mm.

This form is conspicuous with raised limbate sutures which on large specimens are somewhat sigmoid and closely spaced in middle area. This variety is present in many of the Jackson samples in Scott County. It resembles *C. americanus* var. *crassiseptus* Cushman and Laiming from the Miocene of Los Sauces Creek, Ventura County, California, but the limbate sutures do not fuse at the periphery to form a keel.

Cotypes: Lower Yazoo clay, test hole J89, 1½ miles southeast of Forkville; Type slide X, 17, 18, Mississippi Geological Survey.

CIBICIDES LOBATULUS (Walker and Jacob)

Plate X, 11, 12, 13

Nautilus lobatula Walker and Jacob, Adam's Essays on the microscope, Kanmacher's ed., p. 642, pl. 14, fig. 36, 1798.

Truncatulina lobatula (Walker and Jacob) Cushman, U. S. Geol. Survey, Bull. 676, p. 16, pl. 1, fig. 10; p. 60, pl. 17, figs. 1-3, 1918; Carnegie Inst.

Washington Pub. 291, p. 41, 1919; U. S. Geol. Survey Prof. Paper 129, pp. 96, 135, pl. 20, figs. 1-3, 1923; Prof. Paper 133, p. 40, 1923.

Cibicides lobatulus Cushman, Jour. Pal., Vol. 1, p. 170, pl. 27, figs. 12, 13, 1927. Hanna and Church, Jour. Pal., Vol. 1, p. 201, 1928. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 52, pl. 22, figs. 4-6, 1935.

"Test planoconvex, flattened on the ventral face, moderately convex dorsally or nearly flat, sometimes slightly concave, peripheral margin rounded; chambers numerous, 7 or 8 in the last-formed whorl; sutures depressed, especially on the dorsal face; wall smooth, conspicuously punctate."

This is a highly variable species. Small specimens are nearly circular in outline, but the chambers of larger forms are lobulate along the periphery. On some specimens the dorsal face is very concave or irregular due to attachment during growth. Scott County samples indicate the species is distributed through the Jackson formation.

CIBICIDES LOBATULUS (Walker and Jacob) var. ?

Plate X, 14a, b, 15a, b

A coarsely punctate small form, with strongly lobate chambers and keeled periphery and with sutures limbate on dorsal side and deep ventrally, was fairly common in some of the samples of Moodys Branch material from Scott County test holes. It is provisionally placed as a variety of this highly variable species. Maximum diameter 0.40 mm.; figure 15, length 0.37 mm.; width 0.34 mm.

CIBICIDES MISSISSIPPIENSIS (Cushman)

Plate X, 7a, b, c

Anomalina mississippiensis Cushman, U. S. Geol. Survey Prof. Paper 129, pp. 98, 137, pl. 21, figs. 6-8, 1922; Prof. Paper 133, p. 43, 1923.

Cibicides mississippiensis Ellisor, Bull. Am. Assoc. Petr. Geol., Vol. 17, no. 11, pl. 5, figs. 6, 7, 1933. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 54, pl. 22, figs. 3a-c, 1935.

"Test small, planoconvex, of about 2½ coils, periphery slightly lobulate, bluntly rounded, dorsal side very much flattened, even slightly concave, ventral side very convex; chambers comparatively few, 6 to 8 in the last-formed coil; sutures curved, on the dorsal side broad and limbate, even with the surface of clear shell material, on the ventral side narrower and depressed; the last-formed 2 or 3 chambers on the inner margin on the dorsal side slightly above the general surface; wall thin and

translucent, especially on the dorsal side, smooth, on the ventral side finely punctate and not so clear; aperture a curved opening at the inner margin at the periphery, extending to the dorsal side. Length 0.25-0.35 mm.; breadth 0.20-0.30 mm."

This species was found in abundance throughout the Jackson formation in Scott County.

CIBICIDES OUACHITAENSIS Howe and Wallace

Plate X, 8, 9

Cibicides ouachitaensis Howe and Wallace, La. Dept. Cons. Geol. Bull. 2, p. 78, pl. 14, figs. 6a-c, 1932.

"Test fairly large for the genus, planoconvex, trochoid, compressed, in outline almost circular, periphery keeled, slightly lobate; chambers numerous, about nine in the last-formed coil, slightly inflated; sutures distinct, depressed, curved, on the dorsal side raised and limbate, except on the last three chambers where the sutures are depressed; umbilical area on the ventral side provided with a small boss; wall calcareous, perforate; aperture a curved slit on the periphery, extending back about two-thirds the length of the chamber on the dorsal side, provided with a small lip; unclosed apertures of the two preceding chambers still present. Diameter 0.75 mm.; thickness 0.2 mm."

Some of the Scott County specimens depart from the near circular outline of the species and show irregularity in the late chambers and even exhibit some flattening in this portion of the test. The dorsal surface of some individuals shows slight concavity. On most specimens the keel is poorly developed.

The specimens are from a test hole in the top of the Yazoo clay 4 miles southwest of Morton.

CIBICIDES PSEUDOUNGERIANUS (Cushman)

Truncatulina ungeriana H. B. Brady, *Challenger* Rept., Zoology, Vol. 9, pl. 94, figs. 9a-c, 1884 (not *Rotalina ungeriana* d'Orbigny). Cushman, U. S. Nat. Mus., Bull. 103, p. 69, pl. 24, fig. 1, 1918.

Truncatulina pseudoungeriana Cushman, U. S. Geol. Survey Prof. Paper 129, pp. 97, 136, pl. 20, fig. 9, 1922; Prof. Paper 133, p. 40, 1923.

Cibicides pseudoungerianus (Cushman), Prof. Paper 181, p. 52, pl. 23, figs. 1a-c, 1935.

Cushman has reported this species from the Jackson formation at Jackson and Garlands Creek. It was not noted in the Scott County samples.

CIBICIDES YAZOOENSIS Cushman

Plate X, 10

Cibicides yazooensis Cushman, Contr. Cushman Lab. Foram. Res., Vol. 7, p. 59, pl. 7, figs. 12a-c, 1931. Ellisor, Bull. Am. Assoc. Petr. Geol., Vol. 17, no. 11, pl. 5, figs. 2, 5, 1933. Cushman, U. S. Geol. Survey Prof. Paper 181, p. 53, pl. 23, figs. 2a-c, 1935.

"Test slightly longer than broad, compressed, periphery angled, slightly lobulate, ventral side convex, dorsal side flattened or slightly convex, nearly involute on both sides; chambers distinct, usually 8 in the last-formed coil; sutures distinct, curved, very strongly limbate and somewhat raised, increasing in thickness toward the inner end; wall distinctly but finely perforate, with a clouding of the surface except at the sutures, which are clear and transparent; aperture a curved, somewhat arched opening near the periphery on the ventral side. Length 0.60 mm.; breadth 0.50 mm.; thickness 0.25 mm."

This species is sparingly present in the lower Yazoo clay in Scott County.

Genus CIBICIDELLA Cushman, 1927

CIBICIDELLA sp.

Plate X, 19

Rare specimens of this genus were found in a few upper Yazoo clay samples. They show a central area similar to *Cibicides lobatulus* bordered by smaller chambers. The apertures on the latter chambers are small and are visible on only a few of the chambers.

FAMILY PLANORBULINIDAE

Genus GYPSINA Carter, 1877

GYPSINA GLOBULA (Reuss) var. ?

Plate X, 16

Ceriopora globulus Reuss, Haidinger's Naturwiss. Abh., Vol. 2, p. 23, pl. 5, fig. 7, 1847.

Gypsina globula (Reuss), Cushman, U. S. Geol. Survey Prof. Paper 181, p. 54, pl. 23, figs. 4, 5, 1935.

"Test globular, usually spherical, consisting of numerous chambers in irregular concentric layers, surface postulose, as all the chambers are not added at the same time, the last-formed chambers protruding beyond earlier-formed ones; wall coarsely perforate, between adjacent chambers somewhat thickened but not raised. Maximum diameter 2.00 mm."

Excellent specimens of spherical shape, like the featured individual, were found in Moodys Branch material from Jackson and in one sample from Yazoo County. The surfaces of most of the specimens examined are strikingly marked by closely spaced coarsely perforate polygonal depressions, separated from one another by a continuous network of slightly elevated shell material. These specimens may represent a new variety. None was noted in the Scott County samples.

DESCRIPTION OF OSTRACODA

FAMILY CYTHERELLIDAE SARS

Genus CYTHERELLA Jones

CYTHERELLA sp.

Plate XI, 1

Cytherella sp., Howe and Chambers, La. Dept. Cons. Geol. Bull. 5, p. 6, pl. 4, figs. 17, 18; pl. 5, figs. 11, 12, 1935.

Specimens of a smooth nearly ovate form are found sparingly throughout the Yazoo clay of Scott County.

Genus CYTHERELLOIDEA Alexander

CYTHERELLOIDEA DANVILLENSIS Howe var.

Plate XI, 2

Cytherelloidea danvillensis Howe, Jour. Pal., Vol. 8, no. 1, p. 31, 1934; Howe and Chambers, La. Dept. Cons. Geol. Bull. 5, p. 6, pl. 5, figs. 5, 6, 1935.

Carapace is small, oblong, subquadrangular with a slightly raised ridge encircling the periphery. Valves are flattened, and a prominent pit below center of dorsal margin is bounded by a low ridge which is convex upward. A shorter ridge parallels it.

Figured specimen came from test hole J40 in the upper Yazoo clay. It appears to be rare in the Scott County material.

FAMILY CYPRIDAE BAIRD

Genus BYTHOCYPRIS Brady

BYTHOCYPRIS (?) GIBSONENSIS Howe and Chambers

Plate XI, 3

Bythocypris (?) *gibsonensis* Howe and Chambers, La. Dept. Cons. Geol. Bull. 5, p. 9, pl. 3, fig. 10; pl. 4, fig. 3, 1935.

Carapace is smooth, elongate, arched along dorsal margin and convex along ventral margin. This species was found in several of the Scott County samples and ranges throughout the Jackson formation.

Genus PARACYPRIS Sars

PARACYPRIS FRANQUESI Howe and Chambers

Plate XI, 4

Paracypris franquesi Howe and Chambers, La. Dept. Cons. Geol. Bull. 5, p. 10, pl. 3, fig. 13; pl. 4, figs. 15, 19, 1935.

Carapace smooth, elongated, posterior end acutely pointed, anterior end broadly and obliquely rounded. Specimens of this

form were obtained only from samples of lower Jackson material in Scott County.

FAMILY CYTHERIDAE BAIRD

Genus CYTHERIDEA Bosquet

CYTHERIDEA MONTGOMERYENSIS Howe and Chambers

Plate XI, 5

Cytheridea montgomeryensis Howe and Chambers, La. Dept. Cons. Geol. Bull. 5, p. 17, pl. 1, fig. 1; pl. 2, figs. 1-3, 7, 9; pl. 6, figs. 17, 18, 1935.

Carapace tumid, subpyiform, ornamented by a few marginal spines at anterior and posterior ends and the surface by pits arranged in curvilinear rows at right angles to the long axis.

The species is common throughout the Yazoo clay in Scott County.

Genus CYTHEROPTERON Sars

CYTHEROPTERON MONTGOMERYENSIS Howe and Chambers

Plate XI, 6

Cytheropteron montgomeryensis Howe and Chambers, La. Dept. Cons. Geol. Bull. 5, p. 19, pl. 3, figs. 14-16; pl. 4, figs. 11, 12, 16, 1935.

Carapace minute, dorsal margin arched, ventral margin gently curved and overhung by prominent alae which are strongly produced and slightly keeled, and each terminated by a blunt spine. Surface with a few round pits in posterior half. Specimens were found sparingly in some of the lower Yazoo clay samples from Scott County.

Genus CYTHEREIS Jones

CYTHEREIS BROUSSARDI Howe and Chambers

Plate XI, 7

Cythereis broussardi Howe and Chambers, La. Dept. Cons. Geol. Bull. 5, p. 24, pl. 1, fig. 12; pl. 4, fig. 6, 1935.

The figured specimen represents the only valve of this species that was found in the Scott County samples. It came from test hole J89 in the lower Jackson.

CYTHEREIS FLORIENENSIS Howe and Chambers

Plate XI, 8

Cythereis floriencnsis Howe and Chambers, La. Dept. Cons. Geol. Bull. 5, pl. 1, fig. 14; pl. 6, figs. 14, 15, 1935.

The carapace of this species is coarsely reticulate with some of the reticulations forming low spines; five spines are along

the dorsal margin. Specimens are rare, those found came from samples of lower Yazoo clay from test holes J89 and J162C.

CYTHEREIS GIBSONENSIS Howe and Chambers

Plate XI, 9, 10

Cythereis gibsonensis Howe and Chambers, La. Dept. Cons. Geol. Bull. 5, pl. 1, fig. 22; pl. 6, figs. 21, 22, 1935.

Carapace elongated with rounded anterior end bearing a double row of spines, posterior end pointed and coarsely spinose; two irregular rows of spines are present on the surface of the carapace. Specimens were not common, but those obtained came from test hole J89 in the lower part of the formation and from test hole J40 in the upper Yazoo clay.

CYTHEREIS HYSONENSIS Howe and Chambers var. DOHMI Howe and Chambers

Plate XI, 11

Cythereis hysonensis Howe and Chambers var. *dohmi* Howe and Chambers, La. Dept. Cons. Geol. Bull. 5, pl. 1, fig. 9, 1935.

Carapace small, subrectangular, dorsal and ventral margins straight but converge slightly toward the posterior end which bears a few spines. Surface smooth with a ridge parallel to ventral margin terminating in a spine in the posterior third of the carapace where it connects by a short vertical ridge with a dorsal ridge also ending in a spine posteriorly.

Specimens were found rarely in Moodys Branch material and basal Yazoo clay in test holes J84 and J89 respectively.

CYTHEREIS (?) ISRAELSKYI Howe and Pyeatt

Plate XI, 12

Cythereis (?) israelskyi Howe and Pyeatt, Howe and Chambers, La. Dept. Cons. Geol. Bull. 5, p. 33, pl. 1, figs. 19-21; pl. 4, figs. 7-9, 1935.

Carapace minute, highest in front of middle, anterior end broadly rounded, posterior end somewhat acute. Surface marked by strong longitudinal ribs on posterior half of shell, anterior half coarsely and irregularly perforate.

This small form is present in several of the Scott County samples and ranges throughout the Yazoo clay.

CYTHEREIS (?) ISRAELSKYI Howe and Pyeatt var. MORSEI Howe and Pyeatt

Plate XI, 13

Cytheris (?) israelskyi Howe and Pyeatt var. *morsei* Howe and Pyeatt, Howe and Chambers, La. Dept. Cons. Geol. Bull. 5, p. 34, pl. 3, figs. 11, 12, 1935.

Variety is strongly pitted over entire surface of carapace. A few specimens were found in basal Yazoo clay in test hole J84.

CYTHEREIS (?) ISRAELSKYI Howe and Pyeatt var. WARNERI Howe and Pyeatt

Cythereis (?) *israelskyi* Howe and Pyeatt var. *warneri* Howe and Pyeatt, Howe and Chambers, La. Dept. Cons. Geol. Bull. 5, p. 35, pl. 3, fig. 8, 1935.

This unornamented form is reported to be very common in the upper Jackson and rather rare in the lower part of the formation. Only one specimen which seems to belong to this variety was noted in the Scott County material. It came from test hole J40 in the upper part of the formation.

CYTHEREIS (?) JACKSONENSIS Howe and Pyeatt

Plate XI, 14

Cythereis (?) jacksonensis Howe and Pyeatt, La. Dept. Cons. Geol. Bull. 5, p. 35, pl. 1, figs. 23, 24; pl. 6, fig. 31, 1935.

The figured specimen is a form having a reticulated ridged surface with low pits and spine. It was noted only in the lower Yazoo clay in test hole J86.

CYTHEREIS MONTGOMERYENSIS Howe and Chambers

Plate XI, 15, 16

Cythereis montgomeryensis Howe and Chambers, La. Dept. Cons. Geol. Bull. 5, p. 37, pl. 1, figs. 13, 16; pl. 2, figs. 22, 23; pl. 6, figs. 19, 20, 1935.

This form is an elongate spinose species that ranges throughout the Yazoo clay of Scott County.

CYTHEREIS YAZOOENSIS Howe and Chambers

Plate XI, 17

Cythereis yazooensis Howe and Chambers, La. Dept. Cons. Geol. Bull. 5, p. 38, pl. 1, fig. 6; pl. 6, figs. 29, 30, 1935.

Carapace small, delicate, transparent, anterior end broadly rounded with 8 or 9 compressed T-shaped spines. A few spines are present along the other margins. This little form is represented in the Scott County material only by the figured specimen which came from test hole J1A at Forest.

Genus LOXOCONCHA Sars

LOXOCONCHA JACKSONENSIS Howe and Chambers

Plate XI, 18

Loxoconcha jacksonensis Howe and Chambers, La. Dept. Cons. Geol. Bull. 5, p. 41, pl. 4, fig. 20; pl. 5, fig. 14; pl. 6, figs. 8, 9, 1935.

The form is small, subovate in side view with the surface minutely pitted. A number of specimens were found in lower Jackson material from Scott County test holes.

Genus CYTHEROMORPHA Hirschmann

CYTHEROMORPHA OUACHITAENSIS Howe and Chambers

Plate XI, 19

Cytheromorpha ouachitaensis Howe and Chambers, La. Dept. Cons. Geol. Bull. 5, p. 44, pl. 5, fig. 8; pl. 6, figs. 4, 5, 1935.

Carapace narrow, elongate ovate, surface ornamented by rows of small pits, or nearly smooth. The specimen figured came from the lower Yazoo clay from test hole J86.

Genus CYTHERETTA Muller

CYTHERETTA ALEXANDERI Howe and Chambers

Plate XI, 20

Cytheretta alexanderi Howe and Chambers, La. Dept. Cons. Geol. Bull. 5, p. 45, pl. 5, figs. 17-21; pl. 6, figs. 27, 28, 1935.

This species, ornamented by longitudinal ribs, was found in two upper Yazoo clay test holes, J42 and J27, and in the lower Yazoo clay in test hole J86.

Genus BRACHYCYTHERE Alexander

BRACHYCYTHERE WATERVALLEYENSIS Howe and Chambers

Plate XI, 21, 22

Brachycythere watervalleyensis Howe and Chambers, La. Dept. Cons. Geol. Bull 5, p. 46, pl. 3, figs. 1-6; pl. 4, fig. 1; pl. 6, fig. 7, 1935.

This form is rather characteristically shaped with pronounced alae that are terminated by spines on the males. The carapace is smooth but slightly punctate. All specimens obtained from the Scott County material came from test holes in the lower portion of the Yazoo clay.

TEST HOLE LOCALITIES OF FIGURED SPECIMENS WITH BRIEF DESCRIPTIVE LOGS

J1A Peavy property (NE.1/4, SW.1/4, NE.1/4, Sec.15, T.6 N., R.8 E.) East edge of corporate limits of Forest, 100 feet south of U. S. Highway 80

	Feet
Alluvial sandy clay	9.2
Yazoo clay (lower beds)	
Clay, fossiliferous silty to smooth light-tan; slightly gypsiferous in lower part S3 to S5	18.7
	27.9

J27 U. S. Gov't. property (SW.1/4, SE.1/4, SE.1/4, Sec.15, T.5 N., R.6 E.) Beside fence on north side of roadcut, 100 yards from road corner

	Feet
Alluvial silt and fine-grained sand, clay laminae	12.4
Yazoo clay (upper beds)	
Clay, fossiliferous greenish-gray; weathered tan in upper 2 feet, P2	12.6
	25.0

J32 R. M. Mize property (SW.1/4, SE.1/4, SW.1/4, Sec.31, T.5 N., R.6 E.) Beside pine tree 50 yards north of road at a point 1/4 mile east of Rankin County line

	Feet
Forest Hill colluvial sand, clay, and silt	11.2
Forest Hill clay, silt, and sand	27.5
Yazoo clay (top)	
Clay, slightly silty plastic greenish-gray, C2	5.5
	44.2

J38 B. R. Rogers property (SW.1/4, SE.1/4, SW.1/4, Sec.5, T.5 N., R.6 E.) In small gully, 10 feet east of road and 100 yards south of bridge over Line Creek

	Feet
Alluvial sand	1.2
Yazoo clay (upper beds)	
Clay, smooth to silty tan, S1	10.8
Clay, fossiliferous and gypsiferous greenish-gray, C2 to C4	34.5
	46.5

J40 W. C. Cooper property (NE.1/4, SW.1/4, NW.1/4, Sec.12, T.5 N., R.6 E.) Location 30 yards north of road, approximately 1/2 mile northwest of Stage road junction

	Feet
Alluvial fine-grained sand	11.8
Yazoo clay (upper beds)	
Clay, fossiliferous silty light-gray and tan, S1	3.5
Clay, fossiliferous and gypsiferous greenish-gray, C1	2.6
	17.9

J42 Tip Stuart property (NW.1/4, NW.1/4, SW.1/4, Sec.6, T.5 N., R.5 E.) In old roadbed 150 yards east of house and 10 yards northwest of road

	Feet
Alluvial sand	4.8
Yazoo clay (upper beds)	
Clay, fossiliferous and somewhat gypsiferous grayish-tan, C1	9.8
Clay, fossiliferous and pyritiferous silty gray, C2	10.0
	24.6

J43 J. P. Donald property (NW.1/4, SE.1/4, NE.1/4, Sec.35, T.6 N., R.6 E.) West side of creek, 10 yards north of road and approximately 100 yards east of house

	Feet
Alluvial clay and sand	9.4
Yazoo clay (upper beds)	
Clay, slightly fossiliferous light-tan, S5	10.1
Clay, fossiliferous and pyritiferous dark greenish-gray, S6	3.5
	23.0

J48 Jim Meassell property (NE.1/4, SE.1/4, SW.1/4, Sec.7, T.7 N., R.6 E.) In grove 50 yards east of road and approximately 1/2 mile northwest of Meassell's store

	Feet
Alluvial sand	8.2
Yazoo clay (fossiliferous basal beds)	
Clay, silty tan mottled gray and brown	5.6
Clay, light-tan	13.3
Clay, gray to greenish-gray; silty in upper part and glauconitic in lower portion, S4	31.2
	58.3

J53 W. R. and C. M. Fairchild property (N. edge of NE.1/4, NE.1/4, NW.1/4, Sec.4, T.7 N., R.6 E.) Beside large gum tree 10 feet south of road and 100 feet east of bridge over Coffee Bogue

	Feet
Alluvial sand	18.2
Moodys Branch marl member	
Sand, fossiliferous fine-grained glauconitic greenish-brown, S3	3.2
Sand, fossiliferous fine-grained glauconitic greenish-gray, S4	3.4
Sand, fossiliferous fine-grained to silty somewhat glauconitic dark gray; pyritic, micaceous lignitic layers in lower part, S5	4.2
Yegua silt	10.4
	39.4

J57 U. S. Gov't. property (SE.1/4, NE.1/4, NE.1/4, Sec.3, T.6 N., R.7 E.) 300 yards south of crossroads and 10 yards west of N-S road

	Feet
Yazoo clay (basal)	
Clay, silty light-tan brown streaked; ferruginous and lime concretions	8.5
Clay, silty light-tan brown streaked; gypsiferous and fossiliferous in lower part, C2 to C5	19.1

Clay, fossiliferous smooth to silty slightly pyritiferous and gypsiferous greenish-gray, C6 ..... 14.4

Moodys Branch marl member (?)
Clay, glauconitic silty greenish-gray; indurated at top, S2, S3..... 3.7
45.7

J59 Mrs. J. M. Bates property (SE.1/4, NE.1/4, SE.1/4, Sec.19, T.7 N., R.6 E.) 50 yards west of road and 0.2 mile north of road fork

Feet

Alluvial sand and clay 2.8

Yazoo clay (middle ? portion)
Clay, silty tan and gray 8.2
Clay, fossiliferous light-tan; gypsiferous streaks in lower 4 feet, S4, S5 ..... 16.4
Clay, fossiliferous greenish-gray, pyritic in lower 10 feet, S6..... 22.1
49.5

J73 W. M. Walker property (SE.1/4, NE.1/4, SW.1/4, Sec.35, T.8 N., R.6 E.) Base of large oak near corner of pasture northwest of junction of unimproved road and county highway

Feet

Yazoo clay (basal beds)
Clay, silty to arenaceous tan mottled brown; concretions of lime and siderite in basal foot 4.6
Sand, dark concretionary; minor arenaceous tan clay mottlings.... 4.2
Clay, fossiliferous brown; streaked by lime layers..... 1.8
Moodys Branch marl member
Clay, fossiliferous glauconitic, arenaceous light-tan, S3..... 2.0
Marl, very fossiliferous glauconitic gray to green, S4..... 2.5
Sand, fossiliferous fine-grained glauconitic gray to green, S5..... 12.5
Yegua fine-grained lignitic sand 4.4
32.0

J84 Wm. Coward property (SW.1/4, SE.1/4, NE.1/4, Sec.30, T.8 N., R.6 E.) In woods, 10 feet north of road at a point approximately 1/4 mile southwest of Coward home

Feet

Yazoo clay (basal)
Clay, silty tan mottled brown; scattered lime nodules in lower 4 feet 7.8
Clay, slightly fossiliferous silty brown; gray and black streaked; some chalky lime streaks 4.2
Clay, fossiliferous silty tan brown streaked, C2..... 14.6
Moodys Branch marl member
Clay, fossiliferous glauconitic greenish-gray, C3..... 3.4
30.0

J85 Casper Ueltchey property (SW.1/4, NW.1/4, NE.1/4, Sec.11, T.5 N., R.6 E.) In gully on hillside 200 yards southwest of Ueltchey home

Feet

Alluvial sand 2.0

Yazoo clay (upper beds)
Clay, fossiliferous and somewhat gypsiferous smooth tannish-gray brown streaked, S2 ..... 16.6
Clay, fossiliferous and somewhat pyritiferous smooth greenish-gray, S3 ..... 20.8
39.4

J86 U. S. Gov't. property (NW.1/4, NW.1/4, NW.1/4, Sec.25, T.8 N., R.6 E.) 30 feet west of road at a point 1/4 mile south of Forkville fire tower

	Feet
Yazoo clay (Lower beds)	
Clay, silty tan brown streaked	6.5
Clay, fossiliferous dark-brown; chalky streaks	4.0
Clay, fossiliferous grayish-tan; chalky lime and brown streaks, S4	13.8
Clay, fossiliferous somewhat pyritiferous greenish-gray; glauconitic in lower part, S5	25.2
Moodys Branch marl member	
Clay and calcareous silt, fossiliferous greenish-gray	4.5
Greensand marl, fossiliferous glauconitic; lignitic in basal 2 feet, S7	13.0
	67.0

J89 R. C. Baker property (near edge of NE.1/4, SE.1/4, NE.1/4, Sec.23, T.7 N., R.6 E.) On slope north of barn, 20 feet east of fence and 75 yards northwest of house. *Ostrea trigonalis* bed 3 feet above hole

	Feet
Yazoo clay (lower beds)	
Clay, fossiliferous light-tan, S1	6.2
Clay, highly fossiliferous crumbly greenish-gray, S2	27.3
Moodys Branch marl member	
Clay, fossiliferous, glauconitic, S2G	5.0
	38.5

J91 Will Miles property (W. edge SW.1/4, NW.1/4, SW.1/4, Sec.16, T.5 N., R.7 E.) In gully on hillside north of road, 1/4 mile east of Robinson Creek

	Feet
Alluvial fine sand and clay	4.5
Yazoo clay (upper ? portion)	
Clay, fossiliferous and gypsiferous tan brown mottled, C2	24.3
Clay, fossiliferous smooth greenish-gray, C3	6.0
	34.8

J162B H. W. Brooks and Sons property (NW.1/4, NW.1/4, SW.1/4, Sec.35, T.6 N., R.9 E.) Beside pine tree on north slope of Bald Hill, 26 feet below summit

	Feet
Yazoo clay	
Clay, fossiliferous and gypsiferous grayish-tan brown streaked, S2	26.7
Clay, highly fossiliferous stiff greenish-gray, S3	29.8
	56.5

J162C H. W. Brooks and Sons property (SW.1/4, SW.1/4, NW.1/4, Sec.35, T.6 N., R.9 E.) Beside gully west of branch near base of Bald Hill, 66 feet below top and 1/4 mile north of road

	Feet
Yazoo clay colluvium	
Clay, fossiliferous arenaceous tan to gray	4.6
Yazoo clay (lower beds)	
Clay, fossiliferous and gypsiferous silty dark-gray to brown	4.1
Clay, fossiliferous and gypsiferous light-tan brown streaked, S3	23.5
Clay, fossiliferous greenish-gray, S4	36.3
	68.5

J164 C. Jones property (SE.1/4, SW.1/4, SE.1/4, Sec.15 T.5 N., R.9 E.) In grove 50 feet west of road and 50 yards northwest of road fork at a point 1 mile east of Sherman Hill church

	Feet
Yazoo clay (lower beds ?)	
Clay, silty tan and gray brown streaked; ferruginous nodules	6.8
Clay, fossiliferous ocherous tan brown streaked	5.2
Clay, fossiliferous and gypsiferous grayish-tan brown mottled, S4	14.0
Clay, fossiliferous greenish-gray, C5	16.0
	42.0

J165 S. E. Lackey Lumber Co. property (SE.1/4, NW.1/4, SW.1/4, Sec.34, T.6 N., R.9 E.) 20 feet north of road and opposite deep gully at a point 1 mile west of Bald Hill

	Feet
Yazoo clay (middle ? beds)	
Clay, sparingly fossiliferous tan mottled reddish-brown; scattered concretions of lime and siderite	7.2
Clay, fossiliferous and gypsiferous dark-tan to grayish-tan brown streaked, S3	20.8
Clay, fossiliferous and pyritiferous dark slate-gray; calcareous silt streaks below 50 feet, S4	57.5
	85.5

J177 Felix A. Scales property (NW.1/4, SW.1/4, NW.1/4, Sec.4, T.5 N., R.6 E.) On hill slope west of wagon road

	Feet
Forest Hill colluvial sandy clay	8.0
Yazoo clay (upper beds)	
Clay, fossiliferous and gypsiferous tan, S3	18.8
Clay, fossiliferous and pyritiferous greenish-gray, S4	1.2
	28.0

J186 (SE.1/4, NW.1/4, SE.1/4, Sec.28, T.6 N., R.6 E.) On south side of secondary road at a point 1 mile west of Ridge Road

	Feet
Forest Hill (?) formation	
Sand, fine-grained to silty gray and tan; streaks of tan silty clay	12.8
Clay, silty brown yellow streaked	5.1
Yazoo clay (top)	
Bentonite, silty grayish-tan	0.3
Clay, fossiliferous and pyritiferous gray, S2	5.8
	24.0

J188 Henry Risher property (SW.1/4, SE.1/4, NE.1/4, Sec.34, T.6 N., R.7 E.) By large oak 30 feet west of road, 25 feet below hill top

	Feet
Colluvial terrace	
Sand, fine-grained yellow and red to gray; silty clay layers and scattered quartz pebbles	15.5
Yazoo clay (middle ? beds)	
Clay, fossiliferous and gypsiferous grayish-tan brown mottled	8.5
Clay, fossiliferous and pyritiferous greenish-gray, S2	1.0
	25.0

J191 Noval James property (SW.1/4, NW.1/4, SE.1/4, Sec.27, T.7 N., R.7 E.) By abandoned road bend west of bridge 1-1/2 miles north of Sparkville

	Feet
Alluvial clay, grayish-tan and brown; scattered quartz pebbles	4.2
Yazoo clay (basal beds)	
Clay, tan brown mottled	9.3
Clay, fossiliferous creamy-tan brown mottled	12.0
Clay, fossiliferous greenish-gray, S5	9.7
Moodys Branch marl member	
Clay-marl, fossiliferous, pyritiferous and glauconitic; grading to sand, S6	12.3
Sand, fossiliferous fine-grained glauconitic and pyritiferous dark gray-green, S7	2.7
Yegua fine-grained argillaceous and pyritiferous greenish-gray sand; streaks of lignite and lignitic clay	7.3
	57.5

J193 Jack Armstrong property (NE.1/4, SW.1/4, Sec.28, T.8 N., R.6 E.) 60 feet west of highway and 25 feet south of tenant house north of Armstrong home

	Feet
Alluvial silty to arenaceous tan and brown clay	12.0
Yazoo clay (basal)	
Clay, fossiliferous and glauconitic mealy silty tan	4.8
Moodys Branch marl member	
Silt, fossiliferous glauconitic gray, S3	3.8
Sand, fossiliferous pyritiferous and glauconitic fine-grained greenish-gray, S4	13.0
Sand, fine-grained glauconitic; interbedded with black lignitic silt, S5	4.0
Yegua silt and fine-grained micaceous and lignitic sand	1.4
	39.0

J211 Jake Picket property (SW.1/4, SW.1/4, SE.1/4, Sec.29, T.6 N., R.6 E.) On west hill slope, 20 yards south of road and about 75 yards northeast on road Y

	Feet
Forest Hill sandy gray and yellow clay	10.0
Yazoo clay	
Clay, fossiliferous and gypsiferous smooth grayish-tan, S2	13.4
Clay, fossiliferous and pyritiferous greenish-gray; streaks of tan	4.2
	27.6

J212 M. S. Myers property (NE. cor., NE.1/4, NW.1/4, NW.1/4, Sec.32, T.6 N., R.6 E.) Near mid-line on west hill slope at a point 150 yards south of Myers home

	Feet
Forest Hill fine-grained tan and gray sand grading to bluish-gray	11.5
Yazoo clay (top)	
Clay, grayish-tan yellow streaked; thin streaks of gray and tan sand	7.5
Clay, fossiliferous gray, S3	2.2
	21.2

J220 (NE.1/4, SE.1/4, NW.1/4, Sec.25, T.6 N., R.6 E.) At intersection of Pulaski and Stage roads

	Feet
Yazoo clay (middle ? beds)	
Clay, grayish-tan brown mottled; patches of small lime concretions	10.5
Clay, fossiliferous and gypsiferous grayish-tan, S3	2.0
	12.5

J226 John McGough property (Center of E. edge, Sec.32, T.6 N., R.7 E.) Hilltop south of road

	Feet
Citronelle (?) fine-grained tan and gray sand	5.6
Yazoo clay (upper beds)	
Clay, fossiliferous and gypsiferous tan brown streaked, S2	17.2
	22.8

J226A North of road; 29.5 feet below J226

	Feet
Yazoo clay	
Clay, grayish-tan brown streaked; scattered lime concretions	6.2
Clay, highly fossiliferous and gypsiferous tan; streaks of sand, S3	13.0
	19.2

J227 Lee Hunter property (SE. cor., Sec.4, T.5 N., R.7 E.) 30 feet west of road at a point 1/4 mile north of road corner

	Feet
Terrace (?) material	
Clay-silt, yellow and gray	10.0
Sand, fine-grained yellow	1.0
Yazoo clay (upper beds)	
Clay, fossiliferous and gypsiferous grayish-tan; lenses of white sand, S3	12.5
	23.5

J228 Craig property (SE.1/4, SW.1/4, SE.1/4, Sec.8, T.5 N., R.7 E.) At edge of field on hill slope east of road bend

	Feet
Terrace colluvial clay	6.0
Yazoo clay (upper beds)	
Clay, fossiliferous grayish-tan red mottled, S3	14.0
	20.0

J233 (SE.1/4, NE.1/4, SW.1/4, Sec. 16, T.5 N., R.7 E.) On north slope of hill 28 feet below road on summit; 100 yards west of cemetery

	Feet
Alluvial sand	1.0
Forest Hill (?) fine-grained tan and gray sand	7.4
Yazoo clay (top ?)	
Clay, silty chocolate-brown; mottled by ocherous yellow silt; silt laminae and *Textularia* imprints	7.6
Clay, fossiliferous and gypsiferous greenish-gray, S4	3.2
	19.2

J241A (Sec.29, T.5 N., R.8 E.) On knoll in pasture north of Boyles home, 1/4 mile northeast of Homewood

	Feet
Yazoo clay (upper beds)	
Clay, silty grayish-tan brown mottled; scattered lime concretions..	6.8
Clay, fossiliferous and gypsiferous grayish-tan, S3	12.2
	19.0

J244 (Sec.32, T.5 N., R.8 E.) One mile southeast of Homewood, 100 yards northeast of house and 10 feet west of road

	Feet
Forest Hill formation	
Sand, fine-grained yellow	4.0
Clay, silty yellow gray and red	4.1
Clay, silty chocolate-brown; laminated with gray silt	3.3
Yazoo clay (top)	
Clay, fossiliferous silty pyritiferous greenish-gray, S4	14.6
	26.0

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DRAWINGS
BY
MARY LOUISE PEGUES

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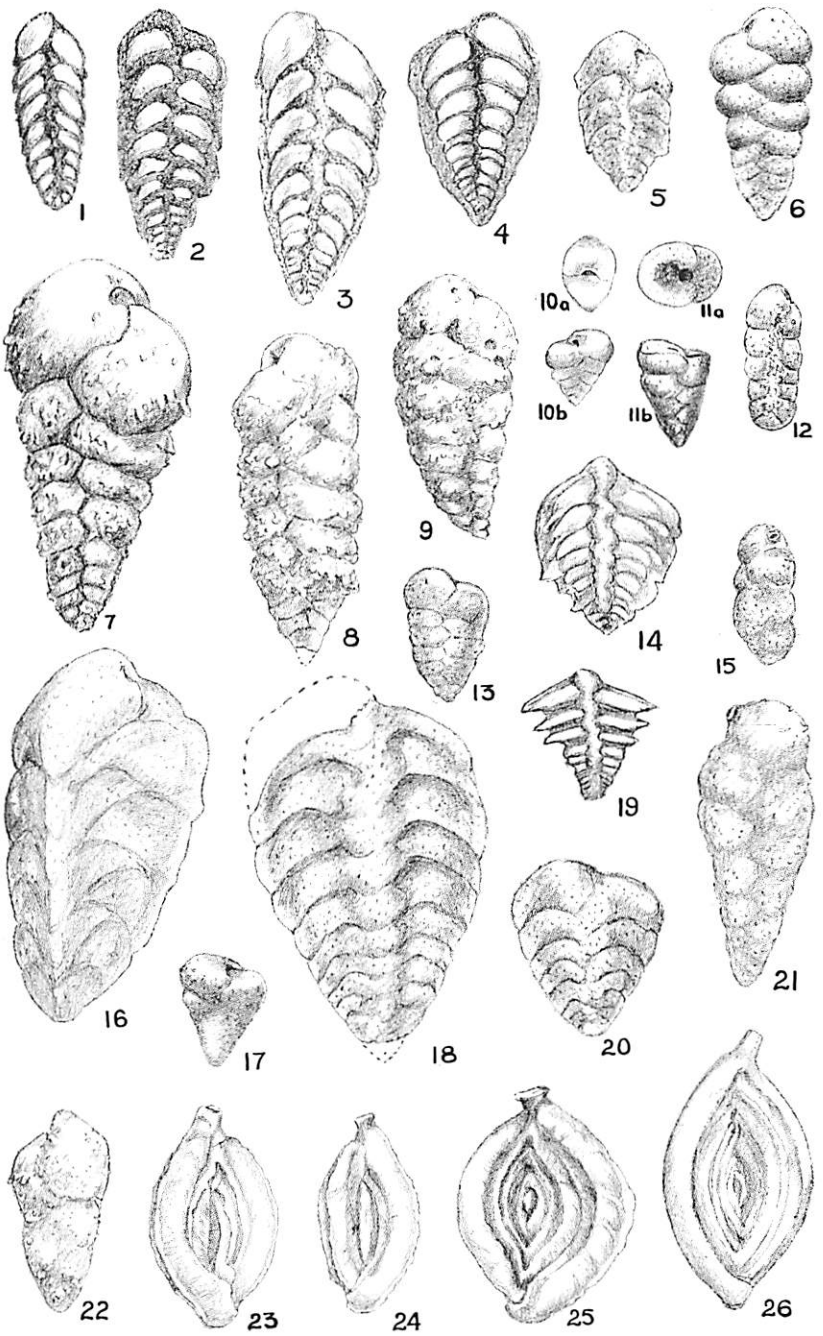

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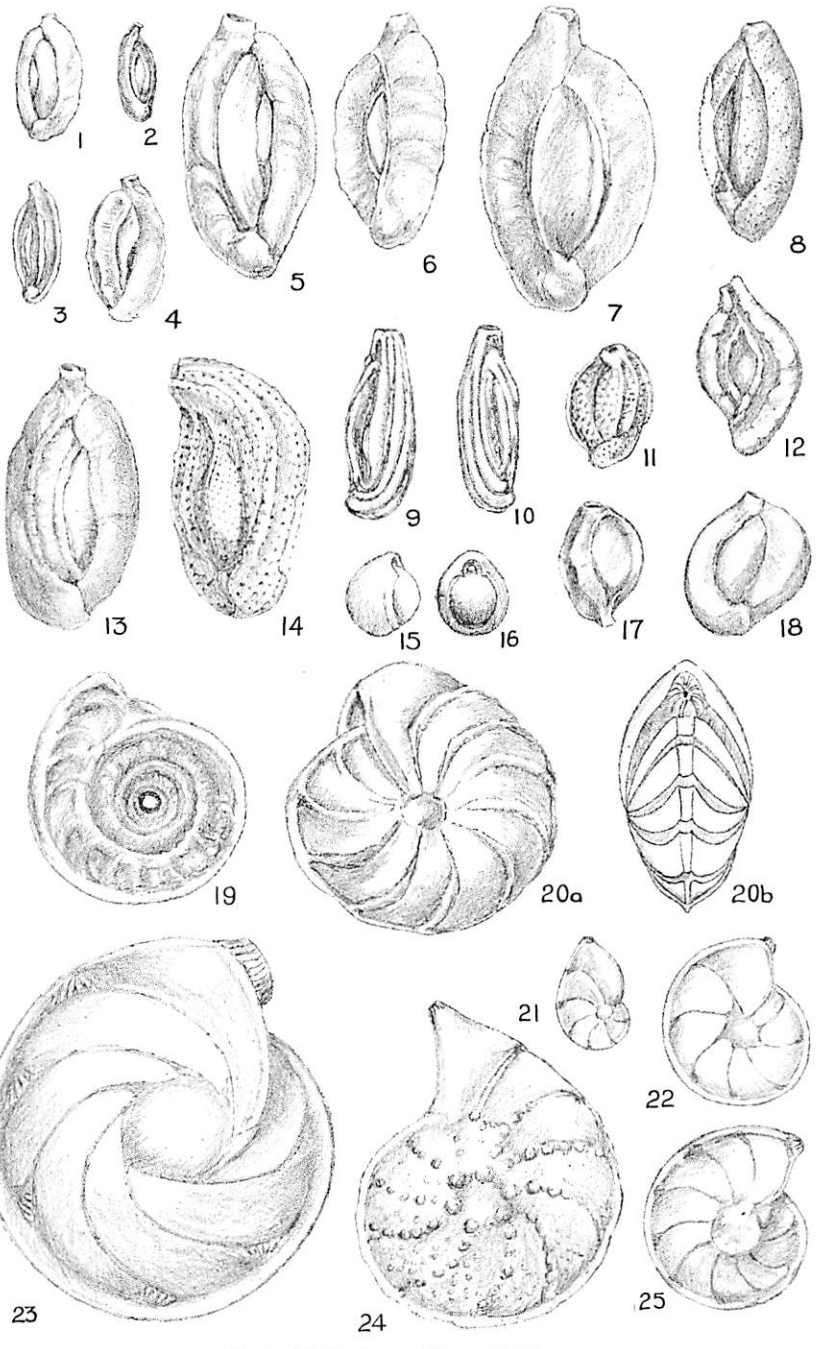


Plate II, Jackson Foraminifera

PLATE III

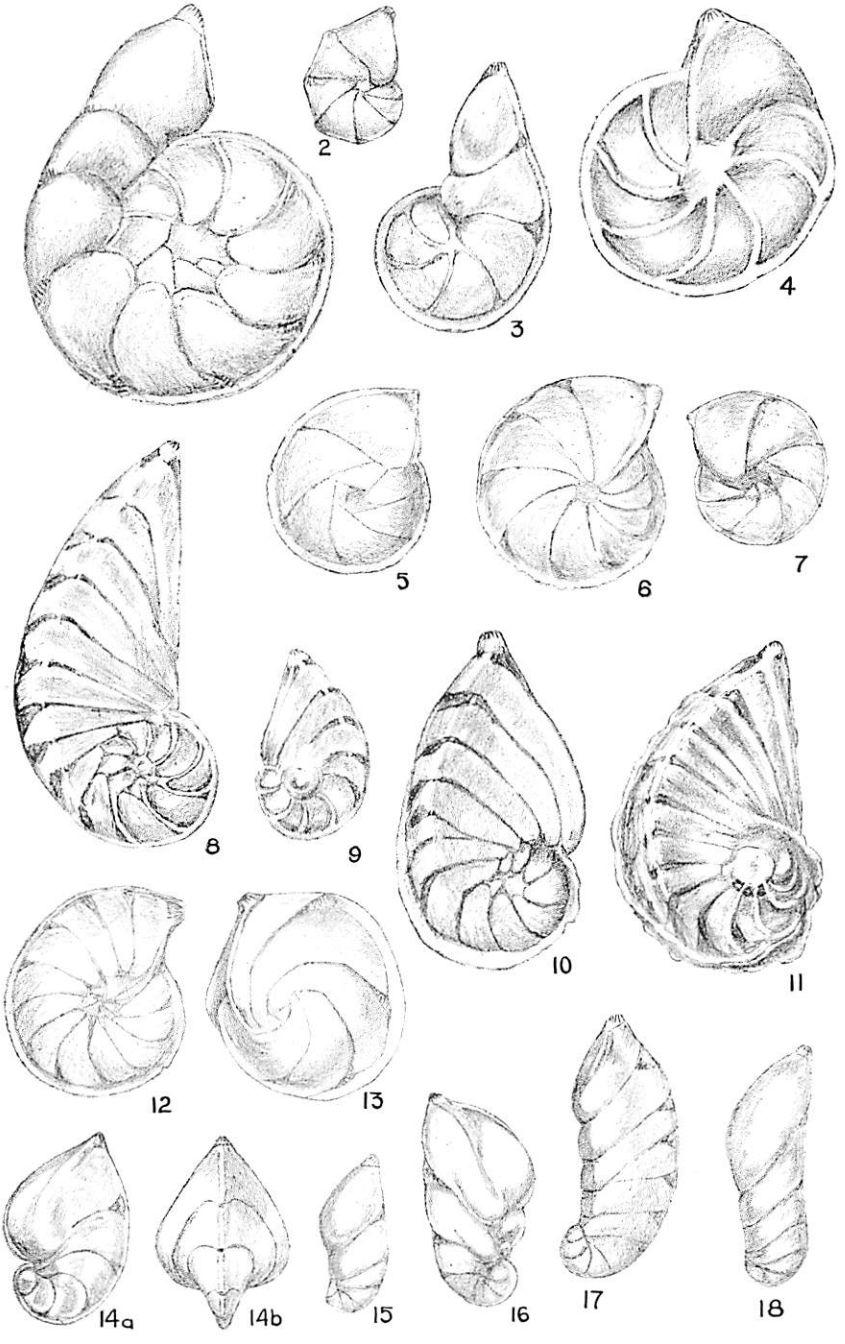
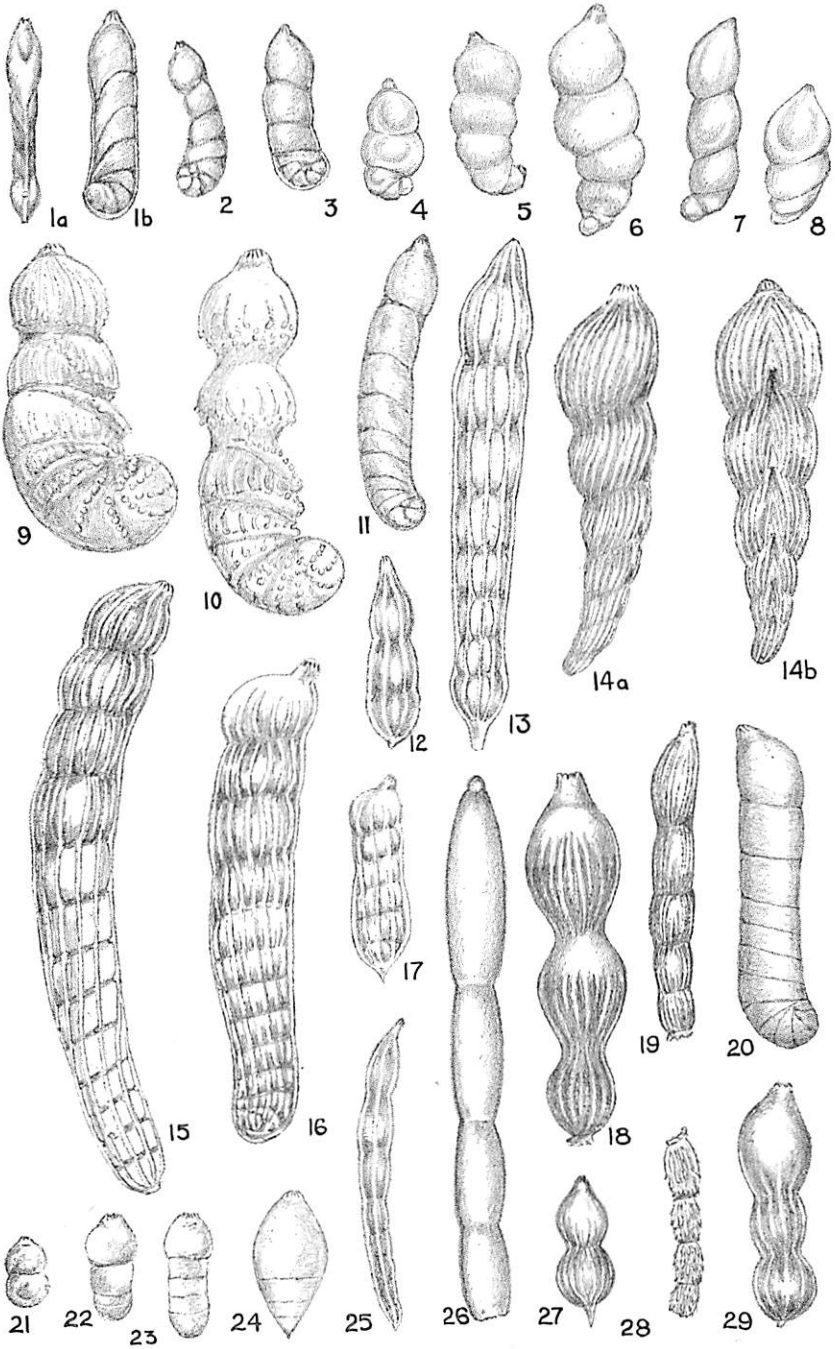


Plate III, Jackson Foraminifera

PLATE IV



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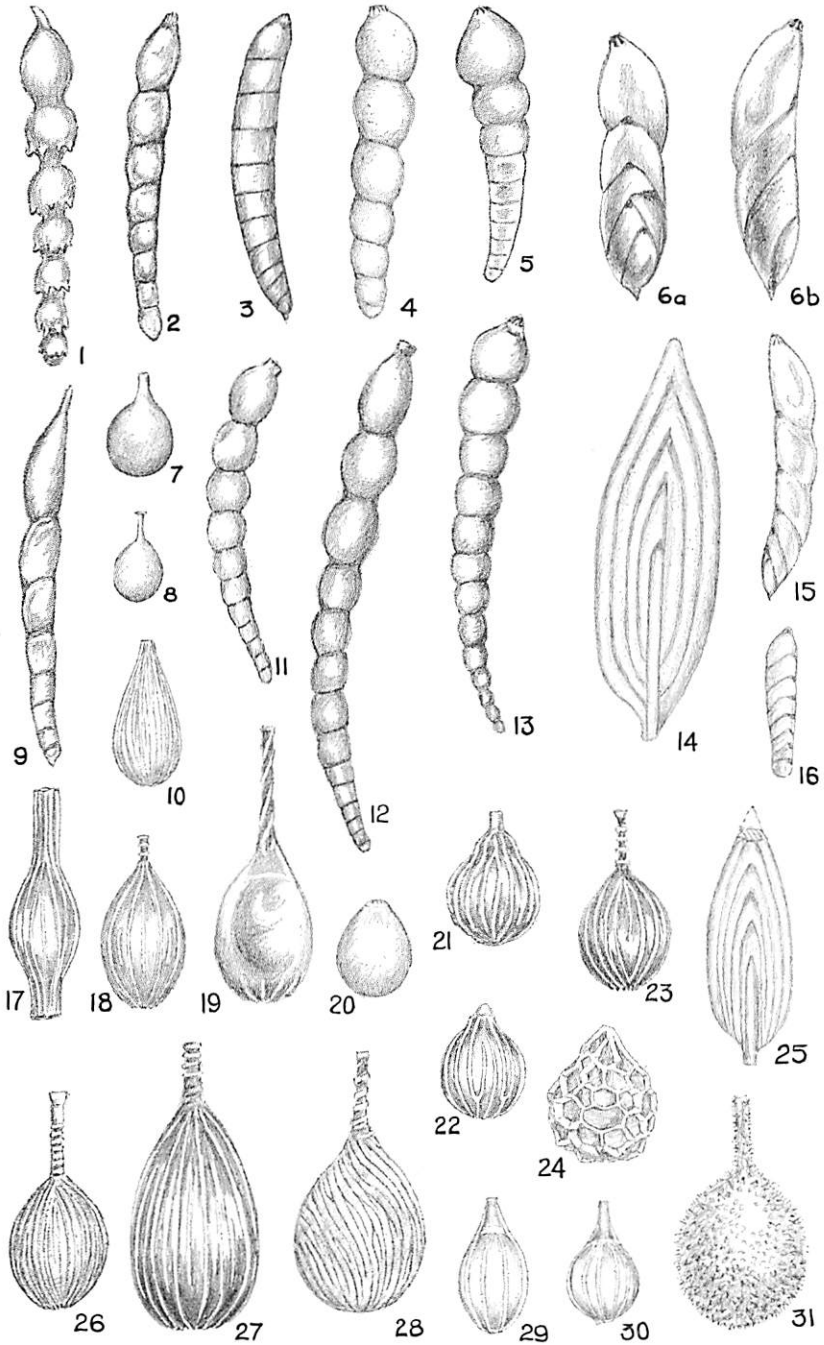

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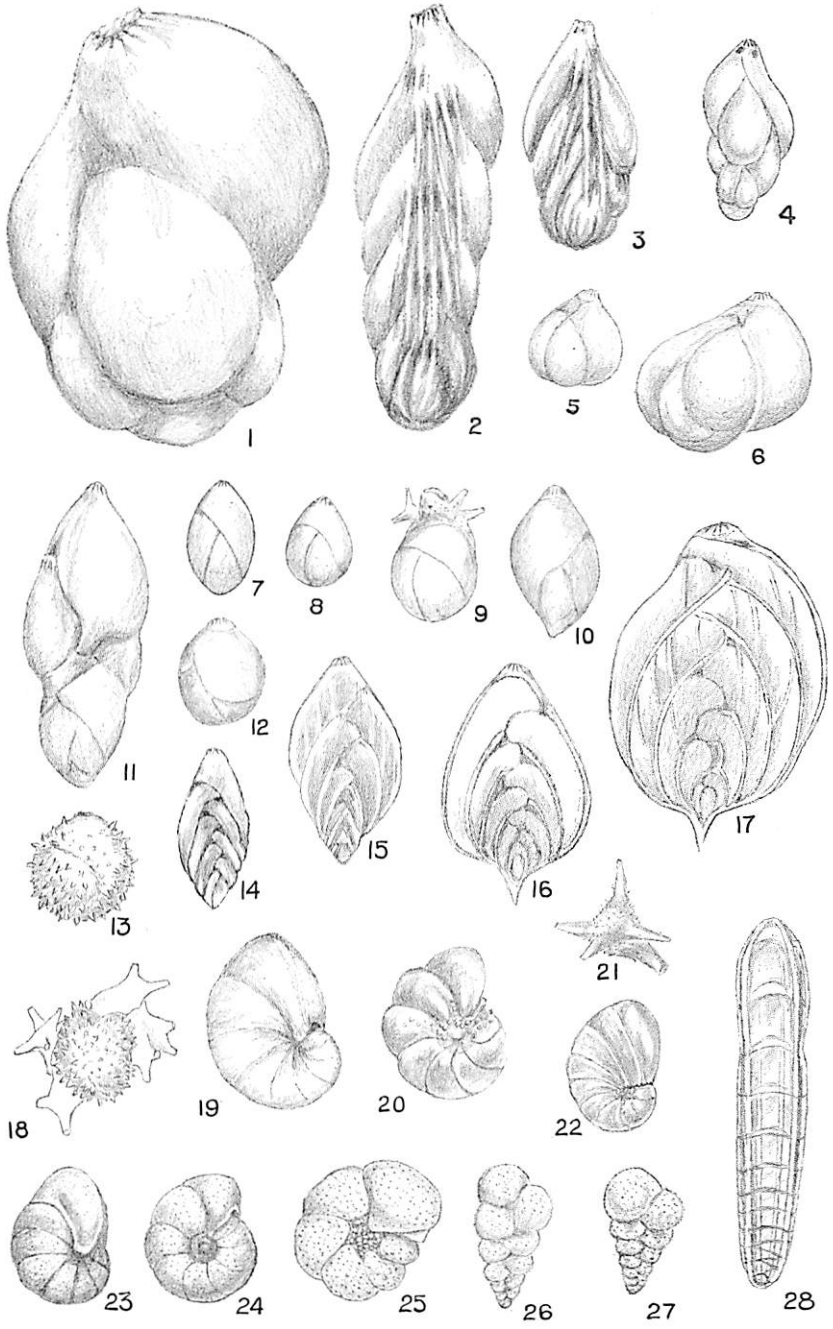

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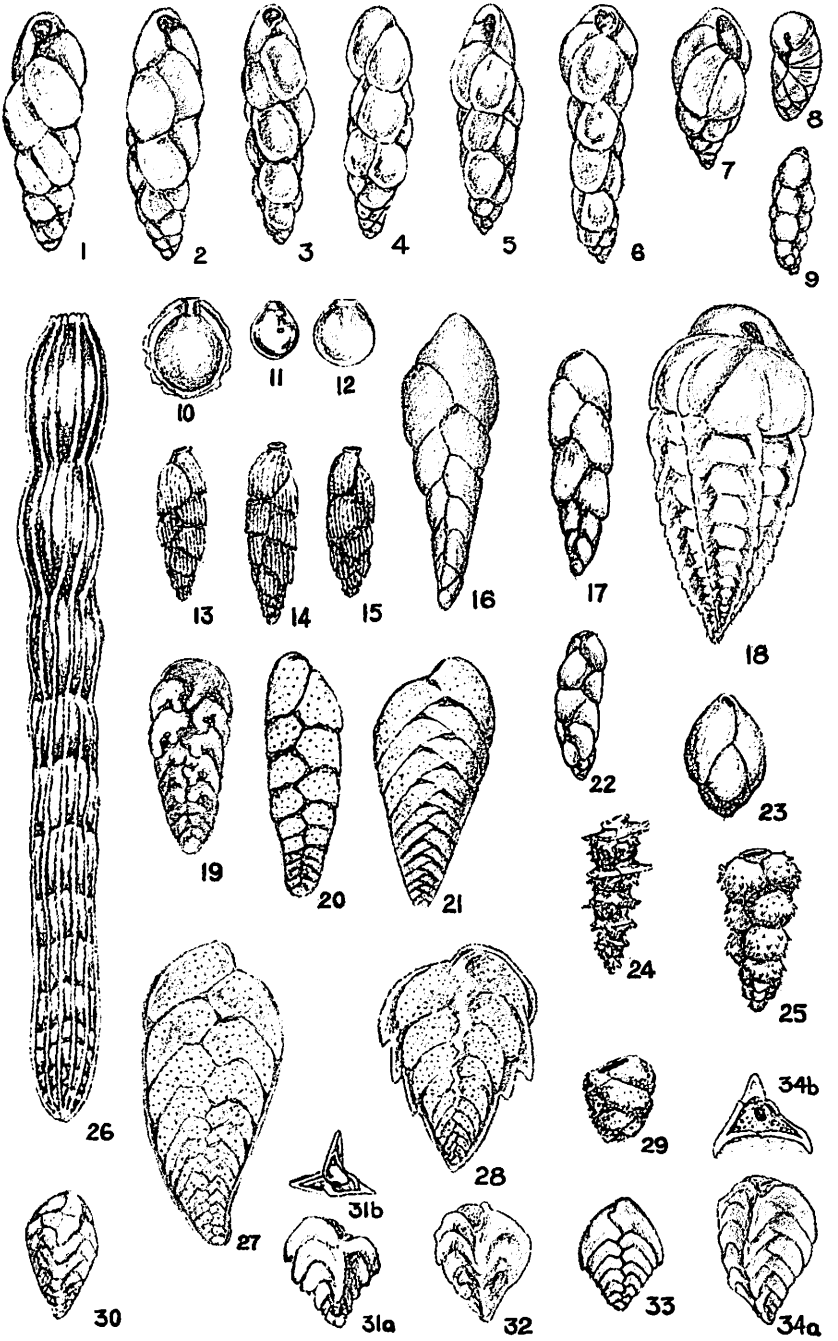

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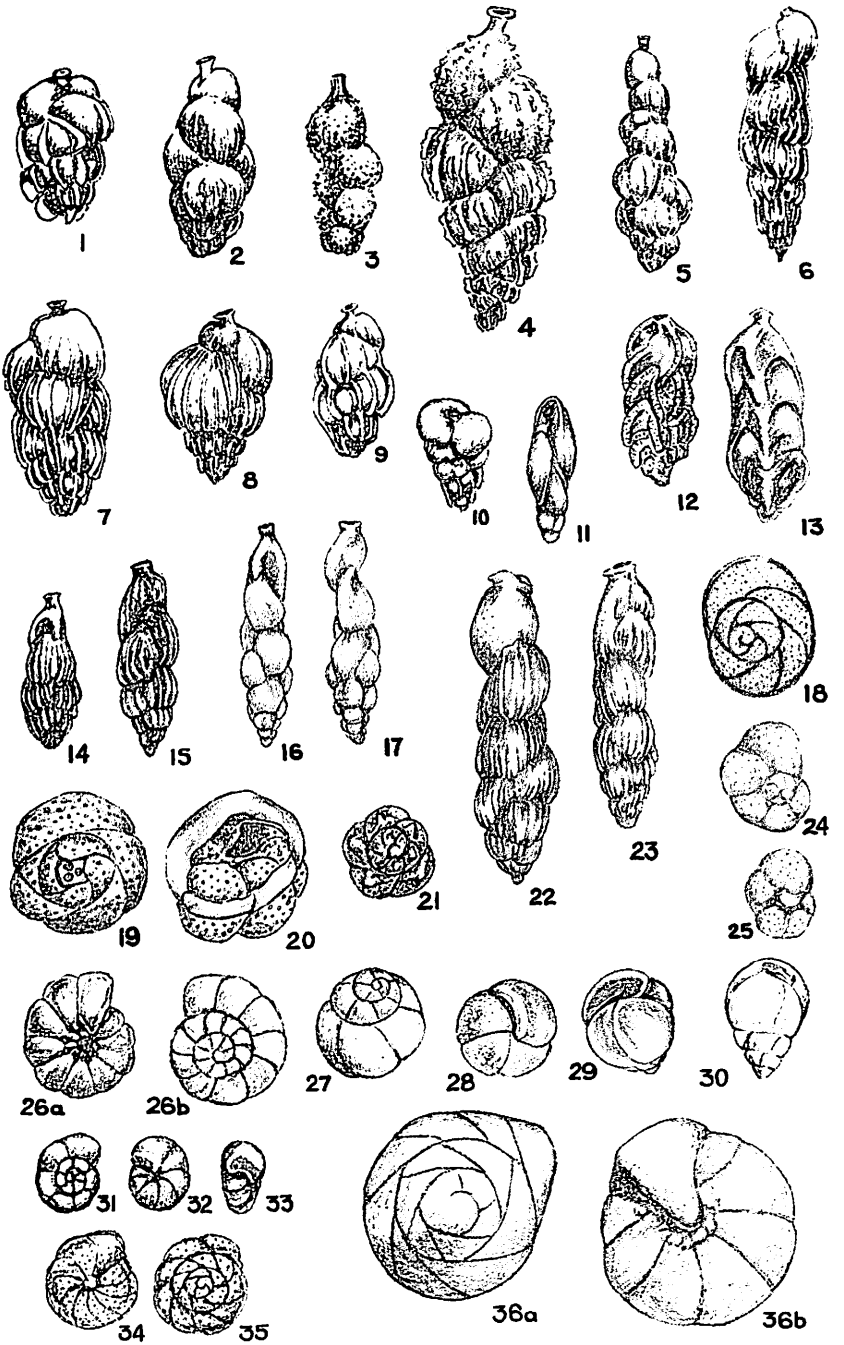

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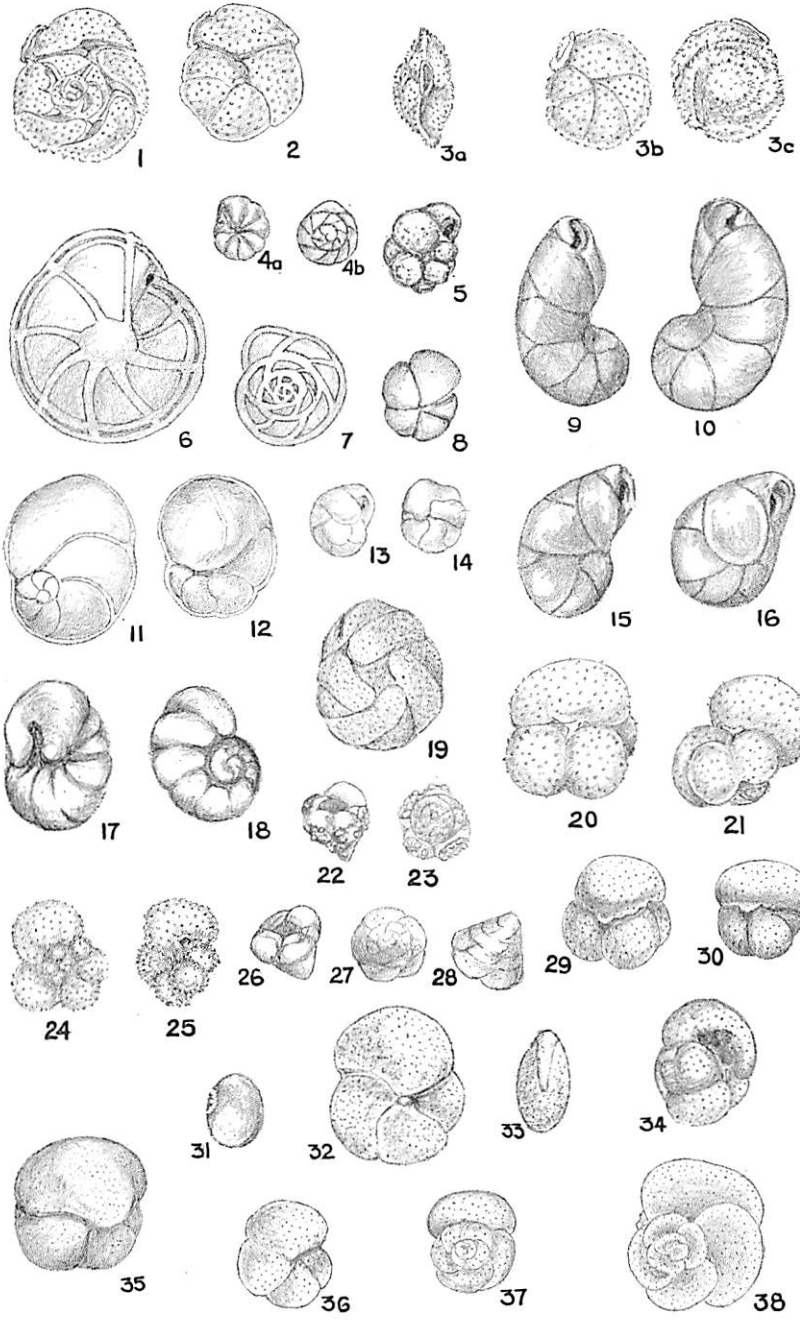

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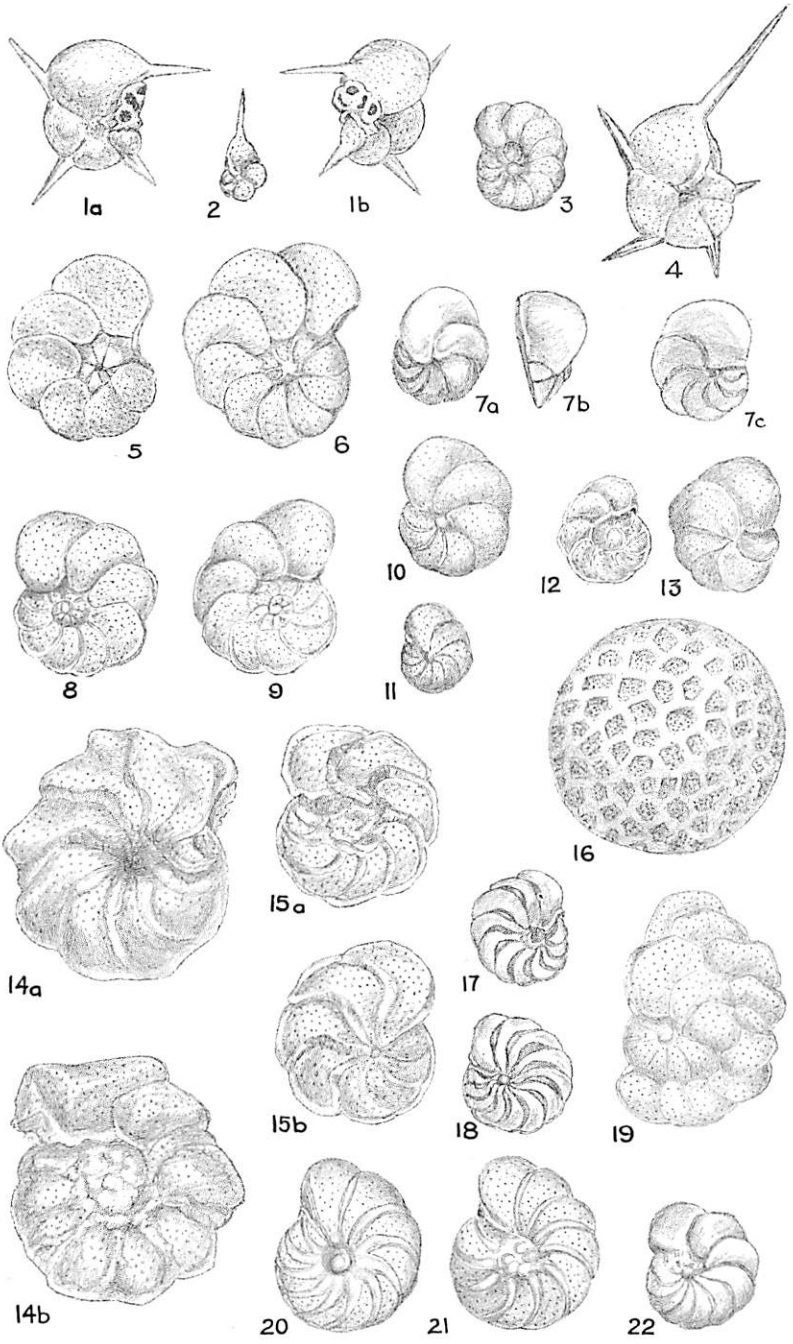

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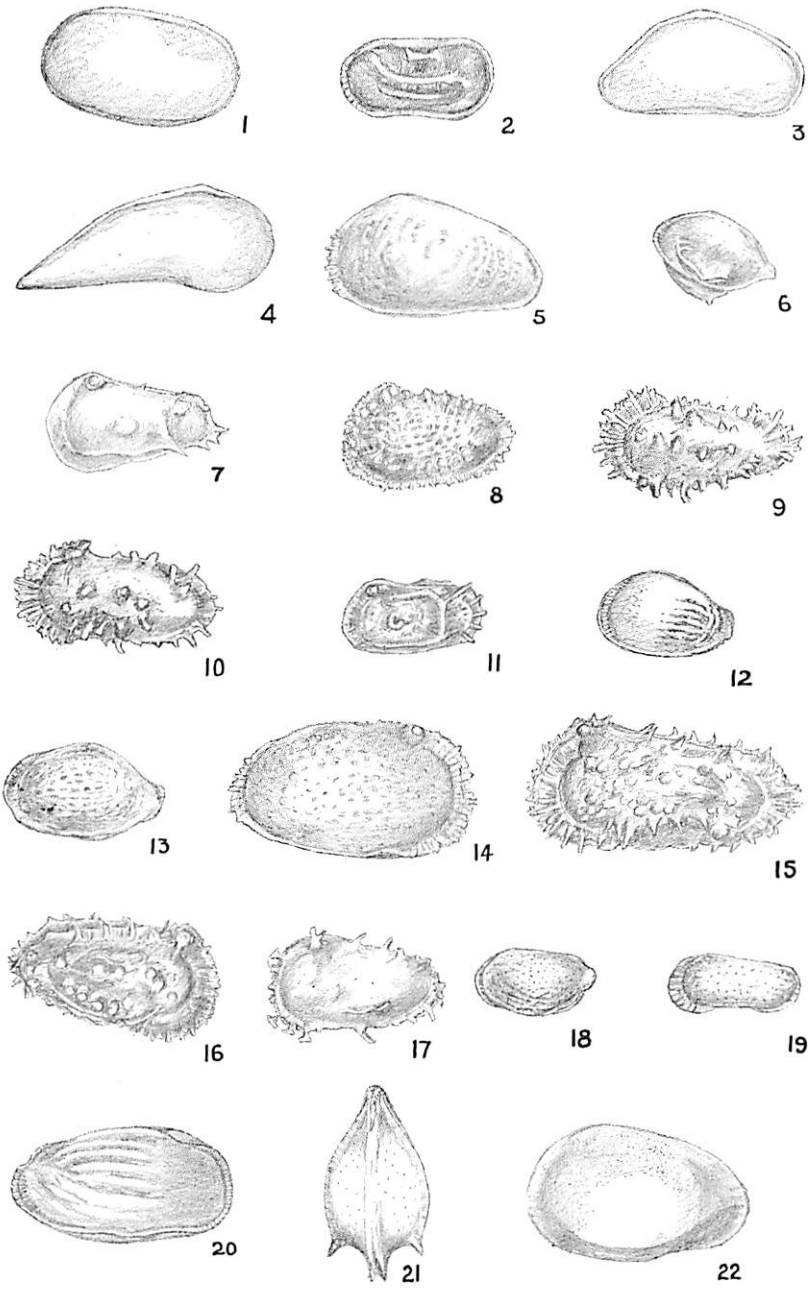

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