1940

Louisiana Cane River Eocene Foraminifera.

Keith Morgan Hussey

Louisiana State University and Agricultural & Mechanical College

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A Dissertation

Submitted to the Graduate Faculty of the Louisiana State University and Agricultural and Mechanical College in partial fulfillment of the requirements for the degree of Doctor of Philosophy

in

The Department of Geology

By

Keith Morgan Hussey
A. B., Augustana College, 1936
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Check List of Cane River Species of Foraminifera—in pocket
FOREWORD

When the task of describing the foraminiferal assemblage of the Cane River (Tertiary) was undertaken, it was thought that its completion would be a decided contribution to the scientific and economic world. Now that the preliminary work has been done, it is known that the completed product will be but as the prologue to a large volume. Time permitting, the study of the conditions of sedimentation and of the ecological conditions which prevailed whilst this assemblage was among the living would prove most interesting and enlightening. The publication of the conclusions reached by such a study would indeed be a real contribution. However, the time involved was well spent and the paper should prove to be of some value, as the fauna therein described was the largest undescribed foraminiferal assemblage left in the important Tertiary section of the Gulf Coast.
ABSTRACT

A lithologic description of the Cane River formation is presented. A review of previous descriptions of the Cane River and descriptions of correlative formations in Texas and Mississippi are given. Two new genera, eighty-nine new species, one new variety, and five previously described species are described and pictured. An attempt is made to list all previously described foraminifera that are known to occur or which possibly do occur in the Cane River formation. A chart showing surface and subsurface lithologic correlation is included. A carefully prepared checklist compiled from over two-hundred samples forms an important part of the paper. A check of species common to the Cane River and equivalent beds is included on the checklist. A list of species considered to be strictly Cane River is submitted. Eleven plates and a complete bibliography complete the paper. A short autobiography is appended.
INTRODUCTION

Stratigraphically the Cane River formation includes the beds between the overlying Sparta sands and the underlying Sabine group. The stratigraphic extent, the lithologic content and the fossil assemblage of this formation have been only briefly dealt with.

The formation was originally described by W. C. Spooner (1926) as follows.

Cane River Beds—In the Cane River are included the 75-150 feet of beds above the Wilcox formation and below the massive Sparta sand. The name Cane River, from the excellent exposures on Cane River at Natchitoches, Louisiana, was suggested by H. V. Howe.

These beds outcrop in a narrow belt trending northeast across southern Sabine and Natchitoches parishes. A few miles east of Red River the strike changes to northwest, and continues in that direction to the Arkansas line. The width of the outcrop is 3-7 miles.

An erosional unconformity separates the Cane River and Wilcox beds. The basal member consists of glauconitic sand and sandy clay, but in some places marine tuff is present at the base. Glauconitic clays predominate in the southern portion of the outcrop, but northward from Bienville Parish they become sandier, until, in northern Bossier Parish, they are represented entirely by sands, in part glauconitic, and containing a meager representation of the prolific fauna found farther south. The fauna of the Cane River beds have been described by Harris¹ and Vaughan².


Harris groups the fauna under the St. Maurice and Claiborne stage, and Vaughan makes the following
statement concerning these beds: "For Alabama, Mississippi, and Louisiana, excepting Natchitoches, the species are very nearly the same in all of these states for this division of the Claiborne, and apparently all belong to that horizon of the Lower Claiborne called the Lisbon beds." Vaughan lists the following species typical of the Cane River beds from Natchitoches, Louisiana: Amphihelia natchitochensis Vaughan, Madracis ganei Vaughan, Endopachys maculurii (Lea), Balanophyslla augustensis Vaughan.

From this statement it is obvious that Vaughan recognized a faunal province distinct from the remainder of the Lower Claiborne.

The Cane River beds, as shown in records of wells drilled east and southeast of the outcrop, are made up chiefly of glauconitic clays with subordinate beds of sand. The thickness increases slightly in the eastern and southeastern parts of the salt-dome region.

The following quotation is H. K. Shearer’s (1930) description of the Cane River formation.

Cane River fm. (Eocene). -- The name Cane River fm., derived from Cane River near the city of Natchitoches, is now in general use for the lower marine beds of the Claiborne group. The formation may be divided into two members, the Cane River clay above and the Cane River marl below.

The top member is sandy shale, which grades downward into smooth, plastic, slightly calcareous clay-shale. This material is characterized by its chocolate-brown color, generally specked and streaked with light green. It is all marine, and Foraminifera are plentiful.

The lower member consists of fossiliferous, sandy, highly glauconitic marl or soft limestone. It is commonly logged as "salt and pepper sand", because of the appearance of the white limestone with grains of dark glauconite.

The thickness of the Cane River ranges from about 333 ft. in The Texas Company’s Tensas Delta No. B-1, to more than 500 feet, becoming thicker toward the southeast. The Texas Com-
pany's Harris-Hyman No. 1 was drilled 537 feet into the Cane River without passing through it, but this well was evidently very near the base of the formation when abandoned.

The thickening is principally in the lower marl member. At the Standard Oil Company's Tensas Delta No. 1, where no marl was recognized in drilling and only a few fragments were found in the cuttings, the thickness correlated as Cane River is only 401 feet, increasing about 90 feet in 3 miles southeast to the Lehnager Oil and Gas Company's McMillan No. 1, where the lower marl is approximately 30 feet thick. Such local variations are evidently due to an erosional unconformity which left small hills in the Wilcox surface on which the Cane River formation was laid down.

In a paper on correlation of the Claiborne, A. C. Ellisor (1929) defines and describes the Cane River of Texas as follows.

_Cane River._—The lithology of the Cane River as limited in this paper is a glauconitic, sandy marl and a glauconitic, clayey sand. *Ostrea selloaformis* var. *lisbonensis* Harris and *Orthophragmina advena* Cushman characterize the Cane River member. The type locality is at Badin Hill on Cane River, ½ mile north of Natchitoches, Louisiana. Excellent exposures of the Cane River member are found within the town of Natchitoches, at Victoria Mills, 2.1 miles north of Provencal, and ½ mile west of Provencal in Natchitoches Parish, Louisiana. The Cane River member occurs stratigraphically above the Wilcox formation and below the Reklaw member in Louisiana.

It is unfortunate that the above correlation was published, as it is now recognized that the Cane River lies above, or at best is partially equivalent to the Reklaw member. It most certainly does not lie below the Reklaw.

Other papers of significance which have mentioned the beds of Cane River age are one by G. D. Harris and A. C.
Veatch (1899), in which is found one of the earliest descriptions of the beds at the type locality near Natchitoches, Louisiana; one by C. L. Moody (1931), which briefly describes some of the structural expressions of the Cane River beds around the Sabine uplift; and one by H. V. Howe (1933), which briefly discusses the economic possibilities of the Cane River formation.

On the bases of stratigraphic, lithologic and paleontologic evidence, the beds which most closely correlate with the Cane River beds of Louisiana are undoubtedly the Enterprise green marl of Mississippi and the Weches greensand of Texas.

The following quoted description of the Enterprise green marl by E. N. Lowe (1915), will serve to identify the Mississippi equivalent of the Cane River.

The materials of the Lisbon formation consist in the lower parts of marine marls and calcareous sands, in the upper parts very largely of lignitic clays and lignite.

The lower member we have named the Enterprise Green Marl, from the town of Enterprise in Clarke County, where it is well exposed. This member is composed principally of fossiliferous marl beds that vary in color from light gray to dark green, the depth of color being largely determined by the relative proportions of clauconite, or greensand. The lighter colored marls are highly calcareous and often clayey, showing abundant evidences of comminuted shells. The dark green marls, however, are also highly fossiliferous, fish teeth, oyster shells, sea urchins, and numerous other fossils being abundantly found.....

.....On the Chickasawhay half a mile below Enterprise the green marl becomes indurated and forms a bluff 12 feet high on the east side of
the river. This indurated bed shows abundant flat sea urchins, called Soutella lyelli, as well as oysters, shark’s teeth, and other fossils.....

saddle-shaped oyster, Ostrea semieiformis, so characteristic of this division of the Claiborne.

Present day description restricts the Enterprise to the greensand marl bed in the lower part of the Winona sand which is upper Tallahatcha in age.

The Weehaw of Texas was named by Wendlandt and Knebel (1929) and described as a remarkable deposit of rather pure glauconite with an average thickness of approximately 50 feet, but thicker in Nacogdoches and San Augustine Counties. A. C. Ellisor (1929) also described the member as the massive greensand bed below the Sparta sand member and above the Queen City sand member, but did not think it correlated with the Cane River of Louisiana. The following section given by Renick and Stensel (1931) is one of the most complete published to date and is quite similar to the Cane River section given in this paper.

Gray clay with laminae of buff glauconitic clay. Locally grades into sand. Marine. plus or minus 20’

Concretionary ironstone bed. Buff glauconitic clay with local beds of glauconitic marl plus or minus 10’

Argillaceous limestone and glauconitic marl. Very fossiliferous. Buff and gray glauconitic clay. Marine. plus 25’

Fossiliferous glauconitic sand. Buff and
gray glauconitic clay. plus or minus 10'

The detailed study of numerous surface samples and well cores connected with this work fails to support the present general concept that the Cane River beds of Louisiana are entirely the equivalent of the Weches and Reklaw members of the Mt. Selman group of Texas. The only striking departure from a typical Weches lithology found in the Cane River beds is the chocolate-brown to gray shale section which overlies the greensand marl and green-clay section. No Reklaw equivalent is recognized.

In brief the lithology of the formation is such as to allow a threefold division. The upper part is a chocolate-brown to gray-brown lignitic shale. The middle division is composed of a glauconitic marl which grades downward into the third division, a glauconite and quartz sand with thin shale partings.

Through rare good fortune a continuous set of cores, representing every inch of what is generally recognized as the Cane River formation, was obtained. A careful lithological as well as paleontological study of those cores furnished the information on which the following section is based, and revealed that there is a transition zone both above and below the Cane River as was suggested by H. N. Fisk (1939) and supported by J. Rukas (1939) from evidence obtained by them in their survey of Grant and LaSalle, and of Natchitoches Parishes, La. Thus it is difficult to state
exactly how thick the Cane River formation is, in that there is no definite Sparta-Cane River, or Cane River-Wilcox contact. For the purposes of this paper the fossiliferous zone lying between the relatively unfossiliferous overlying Sparta and underlying Wilcox will serve to limit the Cane River beds. One must bear in mind, however, that this same definition will not hold down-dip, as both the Sparta and the Wilcox become fossiliferous in their down-dip facies. However, the Cane River fauna is distinct enough so that it should serve well to delimit the formation even though it lie between two equally fossiliferous horizons.

transition zone of lignitic sands and shales very sparingly fossiliferous, thickness varying from less than 10' to over 100'

gray-brown to chocolate-brown lignitic silty shale with glauconitic content increasing with depth, very fossiliferous, characterized by Cyclammina caneriverensis approx. 24'

gray-green to dark green shale containing pockets of greensand, very fossiliferous, Lumarckina clai bornensis approx. 10'

greensand marl with silt-stone and shale partings, becoming more sandy with depth, very fossiliferous, Discocyclina advena approx. 31'

"salt and pepper" sand with well developed green shale partings and thin gray-green silt-stone beds, considerable pyrite in lower part, becoming more quartzose with depth, fossiliferous, Bifurina turritiformis in upper part, Asterigerina taxana prolific in lower few feet approx. 29'

lower transition zone non-fossil, lignitic, slightly glauconitic quartz sand, considerable pyrite
and mica
7'
fossil. gray-brown silty shale, some sand and glauconite, fauna similar to that in upper shale section of formation.
3'
non-fossil. lignitic, pyritic, micaeous sand with very little shale
2'
fossil. gray-brown, lignitic shale some glauconite, and qtz. sand 4' tough gumbo-shale, some glauconite, quartz sand, lignite, and mica, cuttings from here to bottom of well

64'
total thickness of transition zone present in well

60'

The accompanying correlation chart is an attempt to show the relationship of surface to subsurface lithologic divisions of the Cane River. The surface section from Natchitoches parish is a composite from information obtained from a study of the Badin Hill (type locality) exposure and from information supplied by J. Rukas (1939), who has just completed a survey of the parish. The surface section from Bienville parish is a composite from information obtained from a careful study of the Prothro dome exposure, and from further information supplied by Dr. F. Dana Russell, who is completing a survey of that parish. The subsurface sections are considerably more accurate in that they are made from a study of very completely cored Cane River sections from wells in Grant and LaSalle parishes. A survey of the chart will serve to show how much the lithology of the formation changes from north to south and how little the change is from east to west. The interesting fact is not that the formation becomes much thinner to the north-
west, that is to be expected. However, the fact that the thinning is almost entirely at the expense of the definitely marine marl section, whereas the rest of the formation becomes much more sandy, is very significant. That lithologic change seems to herald the approach of the old Cane River shoreline. Landward of which one could not expect to differentiate the Cane River beds from either the overlying Sparta sands or the underlying Wilcox sands.

A study of the paleontology and lithology of the Cane River brings out ecological points of considerable interest. For instance, a good many of the species which occur quite abundantly in the upper clay facies of the formation are not found in either the marl or greensand facies below, yet many of them reappear in thin chocolate-brown clay beds below the greensand section. Again, there are some species which occur only in the marl section or, with abundance, only in the greensand section. Thus the ecological relationship of the fauna to the type of sediment permits even a better sonation than can be made on lithology.

A study of the accompanying check-list will reveal that the following distinctive species will serve well to zone the Cane River in Louisiana wherever comparable ecological conditions existed during the time the formation was deposited.

*Cyclammina caneriverensis*

Quinqueloculina gibbosa upper choc-brown shale

Quinqueloculina striaturata

*Marginulina variata* --- abundant in marl and upper shale
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<td>dome</td>
<td>Bienville</td>
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<td>Field</td>
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<td>Webster Par.</td>
<td>Parish</td>
<td>ches Par.</td>
<td>LaSalle Par.</td>
<td>Grant Par.</td>
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<td>Pleistocene sand and gravel</td>
<td>Transition zone, sands, silts, clays, sparingly fossiliferous</td>
<td>Chocolate-brown clay, some sand, silt, glauconite and lignite.</td>
<td>Cyclammina caneriverensis zone</td>
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Bifarina turriformis  
Lamarckina claihbornensis  
Discocyclina adventa

Asterigerina texana --- abundant only in lower part of greensand section

There are several other good "marker-fossils" in the formation, as the check list will show, but the above are the most distinctive and persistent. The following is a list of species which were found only in Cane River samples. For a list of species which are common to the Cane River and equivalent beds consult the check list.

Cylammina caneriverensis
Ammonmarginulina decorata
Haplophragmoides complanata
Textulariella polygona
Plectina robusta
Pseudoelavulina elongata
Listerella minuta
Plectina regularis
Goesella gibbosa
Quinqueloculina gibbosa
Quinqueloculina subgibbosa
Quinqueloculina gracilis
Quinqueloculina striatula
Spiroloculina lamposa
Marginulina darbyellaensis
Marginulina anconoides
Marginulina arcuata
Marginulina subglobosa
Marginulina variata
Marginulina striata-glabrata
Marginulina bulbosa
Marginulina simplex
Robulus limbata
Robulus umbonata
Robulus trans-lucida
Planularia parva
Astacolus complanata
Nodosaria pyriformis
Nodosaria luniformis
Nodosaria fragilis
Dentalina paradoxa
Dentalina acinacoides
Saracenaria triangularis
Saracenaria limbata
There have been a few papers written describing partial faunas of formations outside Louisiana that are correlated with the Cane River.

J. A. Cushman and N. L. Thomas (1929) noted the following species from the Cook Mountain and Mt. Selman of Texas.

*Textularia* cf. *mississippiensis* Cushman
*Guttulina irregularis* (d'Orbigny)
*Sigmomorpha* (Sigmoidinina) *pseudoregularis* Cushman and Thomas
*Ceratobulimina eximia* (Rzehak)
*Eponides guayabalensis* Cole
*Lamarckina claibornensis* Cushman
*Siphonina claibornensis* Cushman
*Asterigerina texana* (Stadnichenko)

J. A. Cushman and N. L. Thomas (1930), in a subsequent paper noted the following additional species from the Cook
Mountain and Mt. Selman of Texas.

*Quinqueloculina yeguensis* Weinsierl and Applin

*Triloculina trigonula* (Lamarck) (1904)

*Discorbis yeguensis* Weinsierl and Applin

*GyrOIDINA SOLIDANII* d'Orbigny var. octocamerata

Cushman and O. D. Hanna

**Cibicides sasseni** Cole

J. A. Cushman and A. C. Ellisor (1933) described *Textularia smithvillensis* from the (Claiborne) Weches outcrop at Smithville, Texas.

E. H. Sellards, W. S. Adkins and F. B. Plummer (1932) listed *Asterigerina texana* (Stadnichenko) (1927), from the (Claiborne) Weches of Texas.

H. V. Howe (1939) monographed the foraminifera of the Cook Mountain formation of Louisiana. After a complete check of the included species, the author found the following also present in the Cane River formation:

- *Lagena fenestriSSima* Howe and Ellis
- *Lagena striata* (d’Orbigny) var. strunosa Reuss
- *Gutulina irregularis* d’Orbigny
- *Globulina gibba* d’Orbigny
- *Sigmoidalina plummerae* (Cushman and Osawa)
- *Montionella mauricenesis* Howe
- *Montion miorum* Cole
- *Montion planatum* Cushman and Thomas
- *Montionella winniana* Howe
- *Ombelitria COLUMBiana* Howe
- *Bulimina robertsi* Howe and Ellis
- *Bitubuligerina ellisi* Howe
- *Loxostoma hamrai* Howe
- *Solvina taylori* Howe
- *Loxostoma claiiborense* Cushman
- *GyrOIDINA SOLIDANII* d’Orbigny var. octocamerata

Cushman and O. D. Hanna

*Ceratobulimina eximia* (Rzebak)

*Fulvinulinella exigua* (H. E. Brady) var. obtusa

(Barrows and Holland)

*Globigerina topilensis* Cushman

*Globigerina centrata* Cushman and Bermudez

**Cibicides sasseni** Cole

**Cibicides vesti** Howe

**Eponides patelliformis** Stadnichenko
Asteregerina texana (Stadnichenko)
Textularia sapotensis Cole
Corrugiplana olygocyra Hantken
Quinqueloculina mauricensis Howe
Nodosarca longicosta d'Orbigny
Dentalina mauricensis Howe and Roberts
Dentalina sp. (3) Howe
Marginalina hunesi Howe
Lagena mauricensis Howe and Ellis

The new genera and species of foraminifera described in this paper were obtained from core samples of two very carefully cored wells in the Urania oil field of Grant and LaSalle parishes, from core samples of a completely cored Cane River section of a well in the Georgetown oil field in Grant parish, from surface samples collected by Justin Rukas during his survey of Natchitoches parish, and from similar samples collected by Dr. R. Dana Russell and the author during the former's survey of Bienville parish.

A comparison of the foraminiferal assemblages of the Wedges formation of Texas and that of the Enterprise greensand of Mississippi with that of the Cane River formation of Louisiana reveals a close relationship between the three of them. This fact coupled with the fact that the lithology is also quite similar indicates that the Cane River is at least in part equivalent to the other two.

The accompanying check list has been prepared with great care. It is the opinion of the author that he was justified in making up the greater part of the list from well cores, as it is hoped that this work will best serve the economic field. The well core samples give much more accurate information on the range of the useful species.
than do surface samples. A sufficient number of surface samples were picked to give anyone interested an opportunity to learn the locality of the better surface outcrops.

The check-list is designed to serve as more than just a list of which species occur in each sample. The well core samples are arranged on the list in descending order. Thus, the check-list will also serve to some extent as a range chart. The specimens which are common to both the Cook Mountain and the Cane River formations are listed below those which are restricted to Cane River or equivalent beds. The list of species checked under the Weches and Enterprise columns is in each case a composite from all the samples examined from those two members.
SYSTEMATIC DESCRIPTIONS

Order FORAMINIFERA

Family LITUOLIDAE

Genus Cyclammina H. R. Brady, 1876

Cyclammina caneriverensis Hussey n. sp.

Plate I, figure 5; Plate II, figure 1

Test planispiral, entirely involute; chambers numerous about ten to a whorl, interior labyrinthic, with well developed chitinous inner lining; suture only slightly depressed; wall thick, of well sorted, fine arenaceous material, well cemented, giving exterior a subvitreous luster; aperture consists of a curved slit at base of last formed chamber and of a curved row of small rounded openings across the apertural face, indistinct except on very well preserved specimens.

Dimensions of Holotype No. 2500 from Sample No. Ru. 468, Natchitoches Parish, La.: diameter, 0.74 mm.

Dimensions of Cotype No. 2501 from Sample No. 7, Grant Parish, La.: diameter, 1.20 mm.

This species serves well to mark the upper part of the Cane River formation, as it is of fairly large size, is easy to distinguish, and occurs in abundance in the uppermost chocolate-brown clays of the formation.

The specimen selected as the type is considered to be a well preserved one. However, a large number, perhaps even a majority of the specimens examined have a variety
of distorted forms which, if found separately, might be considered as a different species. However, all but the type figured are undoubtedly distorted forms and should be so considered. This species is also found in the chocolate brown clays found in some places at the base of the Cane River. There it is of slightly smaller size and the distorted forms are not so prevalent.
Genus Naplophragmoides Cushman, 1910

Naplophragmoides complanata Hussey n. sp.

Plate 1, figure 10

Test free, much compressed, planispiral, involute with a slight tendency toward becoming evolute; periphery lobate; chambers distinct, about seven in the last formed whorl; sutures distinct, depressed; wall composed of well sorted arenaceous material, well cemented, smoothly finished; aperture a simple arched slit at base of apertural face of the last formed chamber.

Dimensions of Holotype No. 2503 from Sample No. 126, LaSalle Parish, La.: long diameter 0.32 mm.; short diameter 0.30 mm.; thickness 0.08 mm.

Ecologically this proves to be a very interesting specimen in that it is found only in that part of the formation characterized by clay with a considerably amount of fine sand.
Genus Ammoni marginulina Wiesner, 1931

Ammomarginulina decorata Hussey n. sp.

Plate 1, figures 12, 13

Text free, compressed, close coiled, planispiral, in early part, later chambers added in a linear series; sutures indistinct; wall agglutinated, thick, composed of tests of small foraminifers, and of fairly well sorted sand grains, the whole well cemented; aperture terminal, evolute, with slight tendency toward development of a neck.

Dimensions of Holotype No. 2502 from Sample No. 166, LaSalle Parish, La.: length 0.92 mm.; width 0.40 mm.; thickness 0.19 mm.

This very interesting species occurs too rarely to be of any economic value. However, its outstanding characteristics make it quite easy to identify when it is found.
Family TEXTULARIDAE

Genus Textularia DeFrance, 1884

Textularia smithvillensis Cushman and Ellisor

Plate 11, figure 5

Textularia smithvillensis Cushman and Ellisor, 1833, Contributions from the Cushman Laboratory for Foraminiferal Research Vol. 9, part 4, p. 95, pl. 10, figs. 10a, b.

The following is the original description as quoted from Cushman and Ellisor (1933).

Test large, broad at the apertural end, tapering nearly to a point at the initial end, compressed, thickest along the median line, periphery subacute; chambers numerous consisting of 8-10 pairs in the adult, somewhat overlapping, very slightly inflated, of uniform shape, increasing very evenly in size as added; sutures slightly depressed, slightly oblique, often with an anterior bend about midway of the chamber; wall coarsely arenaceous, but fairly smoothly finished; aperture in a semi-circular reentrant of the base of the apertural face.

Length up to 1.50 mm.; breadth 0.80 mm.; thickness 0.40 mm.

Holotype (Cushman Coll. No. 19243) from Claiborne Eocene, Wesches formation, South bank of Colorado River at Smithville, Bastrop Co., Texas.

This species seems to be characteristic of the Wesches formation of Texas. It is probably the ancestor of the related species T. hookleyensis Cushman and Applin of the Jackson Eocene, and of T. tumidulum Cushman of the Lower Oligocene.

This species is not very abundant in the Cane River. The few specimens which have been found were in the upper chocolate-brown clay section of the formation.

Dimensions of Holotype No. 2605 from Sample No. 4, Grant Parish, La.: length 1.45 mm.; width 0.61 mm.; thickness 0.50 mm.
Family VERNEUILINIDAE

Genus Pseudocolavulina Cushman, 1936

Pseudocolavulina elongata Hussey n. sp.

Plate I, figures 4, 5; Plate II, figure 4

Test very elongate in well developed specimens, triserial in early stages, sub-triangular in transverse section, later greater portion of test uniserial, round in transverse section; chambers fairly distinct in early portion, well defined in uniserial portion, inflated, increase in size as added; sutures fairly distinct, slightly depressed; aperture appears to be textularian in early stages, later terminal, rounded, without neck or tooth.

Dimensions of Holotype No. 2510 from Sample No. 137, length 1.85 mm.; width 0.40 mm.

Dimensions of Paratype No. 2511 from Sample No. 137, length 1.50 mm.; width 0.45 mm., both specimens from LaSalle Parish, La.

This is a very distinctive species and should prove to be a good "marker fossil" for the greensand section of the Cane River. It is of large size and occurs in considerable abundance in the greensand marl.
Family VALVULINIDAE

Genus Textulariella Cushman, 1927

Textulariella polygona Hussey n. sp.

Plate 1, figure 9

Test sub-pyramidal, elongate, chamber arrangement in early stages gives polygonal shape to a transverse-section, more adult stages elliptical in transverse-section, early stage triserial, adult biserial; chambers numerous, distinct not inflated; sutures distinct, nearly at right-angles to long dimension of the test, slightly depressed; wall of fairly well-sorted, fine arenaceous material, well cemented; aperture a low slit at the inner margin of last formed chamber.

Dimensions of Holotype No. 2504 from Sample No. 151, LaSalle Parish, La.; length 0.52 mm.; greatest diameter 0.31 mm.
Genus Plectina Nareson, 1878

Plectina robusta Hussey n. sp.

Plate I, figure 1; Plate II, figure 2

Test coiled in the early stages, later reduced to two chambers to a whorl; chambers indistinct, inflated, with chitinous inner-lining; wall arenaceous, of fairly well sorted well cemented grains; aperture textularian in the early stages, terminal, without neck in adult stage.

Dimensions of Holotype No. 2505 from Sample No. 110, length 0.70 mm.; diameter 0.35 mm.

Dimensions of Paratype No. 2506 from Sample No. 110, length 1.62 mm.; diameter 0.72 mm., both specimens from LaSalle Parish, La.

The young of this species may be mistaken for young of Pseudoclavulina elongata. However, correct identification is easy upon comparison, for even in the young stages the chambers of this species are very indistinct, whereas those of P. elongata are fairly distinct.
**Plectina regularis** Hussey n. sp.

Plate 1, figures 7, 8

Test elongate, biserial for much the greater part, early stage indistinct but transverse sections prove it to be coiled; chambers distinct, inflated; sutures distinct, depressed; wall arenaceous, of well sorted well cemented grains; aperture in early chambers textularian, in adult rounded, terminal with a tendency toward development of a neck.

Dimensions of Holotype No. 2507 from Sample No. 182, LaSalle Parish, La.: length 0.70 mm.; greatest width 0.21 mm.; greatest thickness 0.15 mm.

The conspicuous biserial stage and characteristic aperture of this species make it quite easy to identify.
Genus Geesella Cushman, 1933

Geesella gibbosa Russey n. sp.

Plate 1, figure 11; Plate 11, figure 3

Test in early stages coiled with number of chambers to a whorl reducing to three then to two, and in the adult a well developed uniserial stage; chambers indistinct; sutures indistinct; wall agglutinated, material poorly sorted, includes some tests of small foraminifera, well cemented; aperture appears to be testularian in the early stages but is rounded to elongate, terminal, without tooth in the adult.

Dimensions of Holotype No. 2508 from Sample No. 118, length 1.50 mm.; diameter 0.75 mm.

Dimensions of Paratype No. 2509 from Sample No. 119, length 1.70 mm.; diameter 0.70 mm., both specimens from LaSalle Parish, La.

Probably the most distinctive feature of this species is its lack of distinctive external features. It is necessary to make several sections if the chamber arrangement is to be definitely determined.
Genus Karreriella Cushman, 1933

Karreriella ovata Hussey n. sp.

Plate 1, figure 6

Test elongate, tapering evenly throughout length, slightly compressed giving ovate shape to transverse section; chambers distinct, somewhat more inflated in adult stages than in earlier portion, slightly overlapping; sutures distinct, depressed; wall arenaceous, composed of well sorted, fine, well cemented grains, aperture on central part of apertural face with a well developed tubular neck.

Dimensions of Holotype No. 2512 from Sample No. 169, LaSalle Parish, La.: length 0.46 mm.; diameter 0.26 mm.

This distinctive little species occurs in considerable abundance in the lower part of the Cane River formation.
Genus Listerella Cushman, 1933

Listerella minuta Hussey n. sp.

Plate 1, figure 2

Test elongate, chamber arrangement in early stages indistinct but appears to be coiled, well developed triserial stage gives way to a very short biserial stage which in turn gives way to a uniserial stage in the adult; wall arenaceous, fine grained, well cemented; aperture terminal, with a distinct slender neck.

Dimensions of Holotype No. 2515 from Sample No. 107, LaSalle Parish, La.: length 0.34 mm.; width 0.10 mm.

This species though quite small for the genus is very distinctive and was found in a large number of samples from the upper clay section of the Cane River.
Family MILIOLIDAE

Genus Quinqueloculina d'Orbigny, 1826

Quinqueloculina gibbosa Russey n. sp.

Plate 2, figures 7, 8

Test of large size for the genus, almost as broad as it is long, triangular in transverse section with the angles subrounded; chambers distinct one from the other; periphery bluntly keeled; sutures very distinct, depressed; wall calcareous, polished, slightly roughened by shallow, longitudinal, elongated grooves; aperture circular with a rather small bifid tooth, no distinct lip.

Dimensions of Holotype No. 2514 from Sample No. 107, LaSalle Parish, La.: length 0.85 mm.; greater width 0.64 mm.; lesser width 0.55 mm.

This species is quite like Quinqueloculina subgibbosa but is more triangular in transverse section, being nearly as broad as long. Both seem to have about the same range in the Cane River formation.
Quinqueloculina subgibbosa Hussey n. sp.

Plate 2, figure 1, 2

Test of large size for the genus, only about two-thirds as broad as long, subquadrate in transverse section, chambers distinct one from the other; periphery broad, tending toward development of a blunt keel; sutures very distinct; wall polished, only slightly roughened by longitudinal, shallow grooves; aperture circular with a bifid tooth, a well developed neck and lip.

Dimensions of Holotype No. 2515 from Sample No. 107, LaSalle Parish, La.: length 0.85 mm.; greater width 0.70 mm.; lesser width 0.45 mm.

This species might be mistaken for Quinqueloculina gibbosa but is found to be sufficiently different on comparison. Q. gibbosa has only a faint lip and is subtriangular in transverse section whereas Q. subgibbosa has a distinct lip and is subquadrate in transverse section.
Quinqueloculina ovata Hussey n. sp.

Plate 2, figures 5, 6

Test of medium size for the genus, about two-thirds as broad as long, subtriangular in transverse section, ovate in longitudinal section; chambers distinct, slightly inflated; periphery rounded to bluntly keeled; sutures sharply marked; wall very slightly pitted, not polished; aperture simple, oval, without tooth, neck only slightly developed, no lip.

Dimensions of Holotype No. 2816 from Sample No. 152, LaSalle Parish, La.: length 0.48 mm.; greater width 0.30 mm.; lesser width 0.20 mm.

This species occurs most abundantly in the greensand marl section of the Cane River. There its test is almost glassy rather than the characteristic porcellaneous test usually developed by members of the Miliolidae. Where found elsewhere in the formation the test is of the typical porcellaneous material.
Quinquiloculina gracilis Hussey n. sp.

Plate 2, figures 3, 4

Test elongate, about twice as long as broad, subtriangular in end view, of about medium size for the genus; periphery acute, not keeled; chambers distinct, slightly inflated; sutures very distinct, depressed; wall polished, marked by shallow, longitudinal pits; aperture round, with well developed neck, subdued lip, small, simple tooth.

Dimensions of Holotype No. 2517 from Sample No. 118, LaSalle Parish, La.: length 0.71 mm.; greater width 0.44 mm.; lesser width 0.40 mm.

This is a rather sturdy looking species, has a somewhat translucent test very graceful lines. Is found most abundantly in the upper chocolate-brown clay section of the formation.
Quinqueloculina striaturata Russey n. sp.

Plate 3, figures 1, 2

Test elongate, the type specimen being about two times as long as broad, other specimens studied were as much as three times as long as broad, ovate in transverse section; periphery broadly rounded; chambers distinct, considerably broader at base than at apertural end; sutures distinct, incised; wall polished, heavily marked by elongate, narrow, discontinuous furrows or striae; aperture subtriangular, without tooth, neck preduced with only a slight lip.

Dimensions of Holotype No. 2518 from Sample No. 107, LaSalle Parish, La.: length 0.83 mm.; greater width 0.41 mm.; lesser width 0.30 mm.

This species is the most distinctive Quinqueloculina found in the Cane River formation, most common in the lower part of the upper clay section.
Quinqueloculina parva-triangularis Hussey n. sp.

Plate 5, figures 5, 4

Test small for the genus, nearly round in side view, triangular, in transverse section, angles sharp; chambers distinct, not inflated, maintain about the same width from the base to the aperture; sutures distinct, not depressed; periphery almost doubly keeled due to slightly concave outside face of the chambers; wall smooth, semi-polished; aperture rounded with simple tooth, no neck or lip.

Dimensions of Holotype No. 2519 from Sample No. 109, LaSalle Parish, La.: length 0.27 mm.; greater width 0.22 mm.; lesser width 0.12 mm.

This is a distinctive species, occurs most abundantly in the upper chocolate-brown clay section of the formation.
Quinqueloculina fragilissima Russey n. sp.

Plate 5, figures 5, 6

Test nearly as broad as long, of small size, quite fragile, somewhat translucent; periphery acute but not keeled; sutures only fairly distinct, depressed; wall thin, subhyaline, smooth, polished; aperture rounded without a tooth, neck well developed, no lip.

Dimensions of Holotype No. 2520 from Sample No. 111, LaSalle Parish, La.: length 0.37 mm.; greater width 0.21 mm.; lesser width 0.15 mm.

The fragile, translucent character of the test of this species makes it comparatively easy for one to identify it.
Genus Spireloculina d'Orbigny, 1826

Spiroloculina lamposa Russey, n. sp.

Plate 2, figure 3

Test elliptical in outline, much compressed, slightly biconcave; chambers slightly inflated, added in a single plane, two to a whorl, quinqueloculine stage not discernible; wall calcareous, porcellaneous; aperture terminal, simple, round, without tooth, neck well developed, without lip.

Dimensions of Holotype No. 2521 from Sample No. Ru. 510-D, Natchitoches Parish, La.: length 0.61 mm.; width 0.30 mm.

This species occurs very abundantly in the Cane River. It is very distinctive, and is especially characteristic of the greensand marl section of the formation. In peripheral outline it greatly resembles the profile view of the oil lamp of Alladin's time.
Family LAGENIDAE

Genus Marginulina d'Orbigny, 1826

Marginulina irregularis Hussey n. sp.

Plate 5, figure 9

Test an uncoiling uniserial series of chambers, initial chamber large globular, later chambers increase irregularly in size, few in number, four or five in adult; sutures limbate, slightly depressed; wall calcareous, hyaline, very finely perforate; aperture radiate, quite large for the size of the species, terminal.

Dimensions of Holotype No. 2522 from Sample No. 151, LaSalle Parish, La.: length 0.45 mm.; width 0.20 mm.; thickness 0.10 mm.

This species, though distinctive enough, is not very common, occurs mostly in the lower part of the greensand marl section of the formation.
Marginalina darbyellaensis Hussey n. sp.

Plate 3, figure 8

Test close coiled and planispiral in early portion, later stages developed in uncoiled uniserial manner with chambers added in plane to one side of previous plane of coiling; chambers numerous about nine or ten visible in adult; periphery with thin glassy keel, well developed; sutures strongly limbate, raised, glassy, limbate character does not extend all the way to the front of the specimen; apertural face broad, triangular in shape, aperture radiate, with slight neck.

Dimensions of Holotype No. 2525 from Sample No. 173, LaSalle Parish, La.: length 0.61 mm.; width 0.47 mm.; thickness 0.26 mm.

Although at first this species might be regarded as a freak specimen of Marginalina variata it occurs with sufficient abundance to warrant its being described as a new species. However, the placing of it in the genus Marginalina may be an error, but it posses more Marginalina than Darbyella characteristics, and so, is placed with that genus.
Marginalina ansonoides Russey n. sp.

Plate 3, figure 7

Test close coiled in early portion, planispiral, later portion uncoiled, uniserial; chambers numerous, ten to twelve visible in the adult; periphery bluntly keeled; sutures strongly limbate, glassy, limbate character extends almost to face of specimen; apertural face broad but short, oval-shaped; aperture radiate, without neck.

Dimensions of Holotype No. 232d from Sample No. 125, LaSalle Parish, La.: length 0.38 mm.; width 0.36 mm.; thickness 0.28 mm.

The distinguishing features of this species are the shape of the apertural face and the abrupt angle between the coiled and uncoiled stages. Very noticeable when specimen is viewed from side.
Marginalina arcauta Hussey n. sp.

Plate 5, figure 11

Test in the very early stages coiled, uncoiled uni-
serial, arcuate portion forms greater part of test; chambers
slightly compressed, numerous, about twelve or thirteen
visible in the adult; periphery bluntly keeled; sutures
limbate, glassy, extend to face of specimen; apertural face
long and narrow, aperture radiate with a short neck.

Dimensions of Holotype No. 2525 from Sample No. 123,
LaSalle Parish, La.: length 0.76 mm.; width 0.35 mm.;
thickness 0.30 mm.

This species is characterized by arcuate shape of the
test and by its very narrow apertural face.
Marginalina subglobosa Russey n. sp.

Plate 3, figure 15

Test an uncoiling uniserial series of chambers, initial chamber globular, large, later chambers increase in size are subglobular, about five or six in the adult; periphery rounded; sutures indistinct, slightly depressed; apertural face broad, concave, aperture radiate, at peripheral angle, no neck.

Dimensions of Holotype No. 2526 from Sample No. 157, LaSalle Parish, La.: length 0.46 mm.; width 0.26 mm.; thickness 0.20 mm.

This species is comparatively small for the genus, differs from *Marginalina irregularis* in the size and shape of the apertural face. That of this species being much more broad than that of *M. irregularis*. 
Marginulina minuta Hussey n. sp.

Plate 3, figure 10

Test of comparatively small size for the genus, very early stage coiled, indistinct, later greater part a uniserial series of chambers; chambers increase in size rapidly, slightly involute, few in number, about five in adult, round in transverse section; sutures distinct, slightly depressed; aperture radiate, at peripheral angle, no neck.

Dimensions of Holotype No. 2527 from Sample No. 157, LaSalle Parish, La.: length 0.39 mm.; diameter 1.7 mm.

This species lies very close to the common stock of Denticula and Marginulina. It is placed in the latter genus on the basis of its very evidently coiled early stage.
Marginalina elongata Hussey n. sp.

Plate 5, figure 12

Test elongate, compressed, coiled in the early stages, later becoming uncoiled, uniserial, later portion forms much the greater part of the test; chambers numerous, about fourteen visible in the adult; periphery only slightly keeled; sutures limbate, glassy, limbate feature does not extend to the face of the specimen; apertural face narrow, nearly horizontal, somewhat recessed, aperture radiate, at peripheral angle.

Dimensions of Holotype No. 2528 from Sample No. 139, LaSalle Parish, La.; length 1.58 mm.; width 0.43 mm.; thickness 0.25 mm.

This species is characterized by its large size, length of its uniserial portion and by the shape and position of its apertural face.
Marginalina variata Russey n. sp.

Plate 4, figures 1-8

Test elongate, compressed, subtriangular in transverse section, close coiled early portion may form greater part of the test, later uniserial portion may describe arcuate pattern with chambers increasing in size as added, or may be in linear series, last one or two chambers may be smaller and more globose than preceding; periphery varies from broadly rounded through a heavy, thread-like, rounded keel, to a thin blade-like, translucent keel; sutures all limbate except those between the subglobular chambers of those specimens which develop that type of chamber in their adult stage, those sutures are depressed, limbate feature may extend to face of specimen or may only extend about half-way around; wall calcareous, vitreous, very finely perforate; apertural face varies in shape from rounded vase-shaped to elongate-triangular, to broadly rounded; aperture radiate, at peripheral angle.

Dimensions of Paratypes of M. variata:
No. 2529 from Sample No. Nu. 226, Natchitoches Parish, La.: length 0.94 mm.; width 0.34 mm.; thickness 0.30 mm.
No. 2530 from Sample No. 119, LaSalle Parish, La.: length 0.70 mm.; width 0.36 mm.; thickness 0.26 mm.
No. 2531 from Sample No. 120, LaSalle Parish, La.: length 0.76 mm.; width 0.40 mm.; thickness 0.26 mm.
No. 2532 from Sample No. 118, LaSalle Parish, La.:
length 1.02 mm.; width 0.50 mm.; thickness 0.30 mm.
No. 2533 from Sample No. 123, LaSalle Parish, La.;
length 1.60 mm.; width 0.64 mm.; thickness 0.58 mm.
No. 2534 from Sample No. 123, LaSalle Parish, La.;
length 1.06 mm.; width 0.60 mm.; thickness 0.30 mm.
No. 2535 from Sample No. 123, LaSalle Parish, La.;
length 1.10 mm.; width 0.51 mm.; thickness 0.35 mm.
No. 2536 from Sample No. 148, LaSalle Parish, La.;
length 1.22 mm.; width 0.45 mm.; thickness 0.24 mm.

This species affords a very interesting study in the
great amount of variation that can be developed in a single
species in one formation. The author has attempted to pic-
ture most of the representative variations. There are many
others which fall in between some of those pictured. Speci-
mens can be found which will portray every step from one
extreme to the other, even to the variety with beaded
sutures which occurs near the top of the Cane River.

At the present time this species is being called
Cristellaria nudicostata in the paleontology reports of the
various oil companies. According to G. D. Hanna and C. C.
Church (1937), Cristellaria mexicana, nudicostata and
Cristellaria mexicana var. nudicostata and Marginulina
vacavillensis are all the same species, of which group M.
vacavillensis has the priority.

Through the kindness of Mr. C. C. Church, some speci-
mens of M. vacavillensis were obtained from the type local-
ity.
The Cane River type has a finer, more delicate test. It develops rather bizarre types and appears to be in the gerontic stage of its evolutionary development. Whereas, *M. vasavillensis* is a conservative type. Therefore, it is the opinion of the author that *M. variata* is sufficiently different from the described form to warrant being set up as a new species.
Marginulina striata-glabrata Hussey n. sp.

Plate 5, figure 2

Test elongate, early stages indistinct, later stage a uniserial series of chambers, nearly round in transverse section, chambers few, three or more in the adult; sutures broadly depressed, distinct in uniserial portion; wall calcareous, ornamented with numerous longitudinal ridges which extend the length of the early chambers but only half the length of the later chambers, leaving the upper half of each adult chamber smooth; aperture terminal, radiate.

Dimensions of Holotype No. 2537 from Sample No. 113, LaSalle Parish, La.: length 0.70 mm.; diameter 0.88 mm.

This species may at first inspection be confused with Marginulina humeri Howe, however, upon comparison of the two, it will be noted that there are distinct specific differences in the sutures and in the longitudinal ridges. The sutures of M. striata-glabrata are more depressed than those of M. humeri, whereas, the ridges of M. humeri are much more numerous and more persistent than those of M. striata-glabrata.
Marginalina simplex Russey n. sp.

Plate 5, figures 10, 11

Test elongate, small for the genus, subtriangular in transverse section, initial chamber globular others tri-
angular, broadest in front, arranged in uniserial manner;
chambers distinct, few in number, slightly inflated; su-
tures distinct, depressed; wall calcareous, vitreous, un-
ornamented; aperture radiate, circular, at peripheral
angle.

Dimensions of Holotype No. 2558 from Sample No. Ru.
510-D, Natchitoches Parish, La.: length 0.40 mm.; width
0.16 mm.
Marginalina buliosa Hussey n. sp.

Plate 5, figures 5, 6

Test elongate, early stage coiled, later portion un­
coiled in a uniseria! manner, slightly arcuata, slightly
involute, nearly round in transverse section; chambers dis­
tinct, as many as six or seven in the adult; sutures only
slightly depressed; wall calcarious, smooth, without orna­
mentation, individual chambers inflated, bulbous; aperture
terminal, radiate.

Dimensions of Holotype No. 2539 from Sample No. 128,
LaSalle Parish, La.: length 0.70 mm.; diameter 0.34 mm.

The distinguishing features of this specimen are its
total lack of ornamentation, its bulbous chambers, and the
fact that the early coiled portion appears to have develop­
ed in a plane at right angles to that of the later uni­
serial uncoiled portion.
Genus Robulus Montfort, 1808

Robulus limbata Hussey n. sp.

Plate 5, figure 1

Test close coiled with a tendency toward becoming uncoiled developed in the last chamber, bilaterally symmetrical, involute; chambers numerous, ten or eleven in the last formed volutions; periphery bluntly keeled; sutures heavily limbate; wall calcareous, vitreous, quite heavy; aperture radiate, at the peripheral angle, somewhat up-tilted.

Dimensions of Holotype No. 2540 from Sample No. 165, LaSalle Parish, La.: short diameter 0.69 mm.; long diameter 0.80 mm.; thickness 0.40 mm.
Eobulus trochoides Hussey n. sp.

Plate 5, figure 4

Test close coiled, large for the genus; chambers numerous, twelve or more in the last formed whorl; sutures quite distinct, heavily limbate, raised; periphery slightly carinate; wall calcareous, vitreous, umbilical plug very small; aperture radiate, at the peripheral angle.

Dimensions of Heletype No. 2541 from Sample No. 164, LaSalle Parish, La.: diameter 1.25 mm.; thickness 0.70 mm.

This species is characterized by its almost circular outline, by the large number of chambers and by its distinctive sutures.
Rebulus umbonata Hussey n. sp.

Plate 5, figure 7

Test close coiled, bilaterally symmetrical, of large size; chambers moderately numerous, not more than ten or eleven in the last formed volutions; sutures limbate, glassy, only slightly raised; periphery with well developed, broadly rounded keel; wall calcareous, smooth, umbilical plug, very large, glassy; apertural face of medium height, aperture radiate, elongated medium slit, at peripheral angle.

Dimensions of Holotype No. 2542 from Sample No. 124, LaSalle Parish, La.: diameter 1.15 mm.; thickness 0.64 mm.

This species may be identified primarily by its very large, glassy umbilical plug, other specific features are its large size and the character of its sutures.
Rebulus trans-lucida Russey n. sp.

Plate 5, figure 18

Test close coiled, of better than medium size for the genus; chambers triangular in side view, about eight or nine in the last formed volution, very distinct; sutures broad, of clear glassy material, not raised, distinct; wall smooth, vitreous, calcareous, with a large, clear, glassy umbilical plug; apertural face triangular, aperture radiate, elongated median slit.

Dimensions of Holotype No. 2543 from Sample No. 107, LaSalle Parish, La.: diameter 0.70 mm.; width 0.38 mm.

The clear glassy condition of the sutures and umbilical plug easily distinguish this species. It is possible, on good specimens to see the early evolutions through the umbonate center.
Genus Astacolus Montfort, 1808

Astacolus complanata Hussey n. sp.

Plate 6, figure 2

Test an uncoiling uniserial series of chambers, compressed; chambers comparatively few, only seven visible, very slightly inflated; sutures distinct, slightly depressed; wall calcareous, smooth, glassy, unornamented; aperture terminal, at peripheral angle, radiate.

Dimensions of Holotype No. 2545 from Sample No. 162, LaSalle Parish, La.: length 0.88 mm.; width 0.19 mm.

This species very closely resembles the early stage form of Prondicularia elegantissima. However, it occurs frequently enough to warrant its description as a distinct species. It has nearly twice as many chambers as the stage of Prondicularia elegantissima.
Genus Frondicularia Defrance, 1886

Frondicularia elegantissima Hussey n. sp.

Plate 6, figure 8

Test very thin, fragile, compressed, early chambers triangular in side view, later ones chevron-shaped, extending down both sides but not across base of earlier portion of test, greatest width about midway between initial end and apertural end; chambers distinct, slightly inflated, numerous; sutures distinct, depressed; wall calcareous, smooth translucent; aperture terminal, radiate.

Dimensions of Holotype No. 2556 from Sample No. 107, LaSalle Parish, La.: length 0.69 mm.; width 0.47 mm.
Genus Planularia DeFrance, 1884

Planularia parva Russey n. sp.

Plate 5, figure 9

Test small, tear-drop shaped in outline, close coiled with tendency toward becoming uncoiled developed in the adult stage, compressed; chambers fairly numerous, eight or more in the last formed whorl; sutures, distinct, flush with the wall; wall calcareous, vitreous, polished in well preserved specimens, unornamented; aperture at peripheral angle, radiate.

Dimensions of Holotype No. 2544 from Sample No. Ru. 226, Hatchiteches Parish, La.: length 0.39 mm.; width 0.18 mm.

The distinguishing features of this species are its small size and the tear-drop shape of its outline.
Genus Saracenaria Defrance, 1824

Saracenaria triangularis Hussey n. sp.

Plate 5, figure 3

Test triangular in transverse section, broadly concave in front, close coiled in early stages, later becoming uncoiled with chambers arranged in uniserial series; sutures distinct, flush with surface of test; wall calcareous, distinctly perforate; aperture at peripheral angle, radiate, apertural face at angle of sixty degrees or more with long dimensional axis of the test.

Dimensions of Holotype No. 2553 from Sample No. 148, LaSalle Parish, La.: length 0.75 mm.; width 0.39 mm.

The almost horizontal position of the apertural face and the distinctly perforate wall are the specific features of the species.
Saracenaria parva Hussey n. sp.

Plate 5, figure 8

Test small for the genus, early chambers close coiled, uncoiled in adult stage, triangular in transverse section; sutures indistinct, flush with wall of test; wall calcareous, smooth; aperture at peripheral angle, radiate, apertural face slightly rounded, nearly at right angles with axis of coiling.

Dimensions of Holotype No. 2555 from Sample No. 110, LaSalle Parish, La.: length 0.39 mm.; width 0.26 mm.

Superficially this species resembles Saracenaria triangularis, however, it differs in being smaller, in not being concave in front, in not being distinctly perforate, and in having a rounded instead of slightly concave apertural face.
Sorosemaria limbata Russey n. sp.

Plate 8, figures 13, 14

Test close coiled in all but the last one or two chambers, subtriangular in transverse section; sutures limbate, not raised, glassy; wall calcareous, translucent, polished, very finely perforate; aperture at peripheral angle, radiate, apertural face broadly rounded; periphery keeled.

Dimensions of Holotype No. 2554 from Sample No. 113, LaSalle Parish, La.: length 0.54 mm.; width 0.39 mm.

The distinctive features of this species are the limbate sutures, polished appearance of the test and the strong rounded keel.
Genus Dentalina d'Orbigny, 1836

Dentalina paradenta Hussey n. sp.

Plate 6, figure 12

Test elongate, subfusiform, one side arcuate the other nearly straight, ovate in transverse section; chambers few, only about four or five in adult; wall calcareous, glassy, unornamented; sutures indistinct, flush with surface of wall, form angle of about 60° with periphery; aperture terminal, radiate.

Dimensions of Holotype No. 2550 from Sample No. Ru. 463, Hatchitoosh Parish, La.: length 0.67 mm.; diameter 0.20 mm.

This species, while distinct in itself, is one of those types which lie near the dividing line between the genera Marginulina and Dentalina. However, it is placed with the genus Dentalina, as it has no apparent early coiled stage.
Dentalina globata Russey n. sp.

Plate 6, figure 3

Test elongate, subconical; chambers globose, fairly numerous, seven or more in the adult, distinct; sutures distinct, broadly depressed, form greater angle with periphery in adult stage (nearly 90°) than in the early stage; wall calcareous, glassy, translucent, unornamented; aperture terminal, radiate.

Dimensions of Holotype No. 2651 from Sample No. 115, LaSalle Parish, La.: length 0.34 mm.; greatest diameter 0.13 mm.

This species is easy to identify due to the globose shape of the chambers and to the subconical shape of the test.
Dentalina-acinaceoides Hussey n. sp.

Plate 6, figure 5

Test elongate, roughly saber-shaped; chambers about six or more in the adult, increase rapidly in length but slowly in width toward adult portion; sutures very distinct, broadly depressed, maintain about the same angle with the periphery throughout; wall calcareous, translucent; aperture terminal, radiate, at peripheral angle.

Dimension of Holotype No. 2552 from Sample No. 107, LaSalle Parish, La.: length 0.78 mm.; greatest width 0.18 mm.

This species can easily be recognized by the peculiar shape of the individual chambers and by the shape of the test as a whole.
Genus Hodesaria Lamarck, 1812

Hodesaria pyriformis Hussey n. sp.

Plate 6, figure 4

Test elongate, subpyriform in outline; chambers globular, few in number, only three or four in adult; sutures distinct, wide, broadly depressed, at right angle to axis of test; wall calcareous, translucent, ornamented by eight continuous, strong, longitudinal ridges which extend from the spike-like spine at the base of the test to the aperture terminal, radiate.

Dimensions of Holotype No. 2546 from Sample No. 150, LaSalle Parish, La.: length 0.70 mm.; average diameter 0.13 mm.

This species is featured by its subpyriform shape and by the small number of chambers which comprise the adult test.
Rodocaria selencoides Russey n. sp.

Plate 6, figure 6

Test elongate, arcuate, spike-like spines on initial end; chambers numerous, as many as eleven or more in the adult, increase in size uniformly, subglobular in shape; sutures flush in early stages, later become broadly depressed; wall calcareous, translucent, unornamented; aperture large for the genus, round with well developed neck.

Dimensions of Holotype No. 2347 from Sample No. 119, LaSalle Parish, La.: length 1.54 mm.; average diameter 0.16 mm.

This species is easy to identify because of its fairly large size, numerous chambers and its general shape.
Hodosaria fragilis Hussey n. sp.

Plate 6, figure 7

Test elongate, areolate, quite fragile; chambers numerous, as many as twelve or more in the adult, increase in size uniformly, rather barrel-shaped; sutures become increasingly depressed toward adult stage, distinct; wall calcareous, translucent, only ornamentation a tendency toward development of spines at base of each chamber, especially so in adult stages; aperture terminal, small, radiate, at peripheral angle.

Dimensions of Holotype No. 2543 from Sample No. 158, LaSalle Parish, La.: length 0.75 mm.; diameter 0.09 mm.

This species is fairly abundant in the greensand marl section of the Cane River formation but is so fragile that it is seldom found complete.
Nodosaria primitiva Hussey n. sp.

Plate 6, figure 1

Test elongate, subfusiform, sides nearly parallel; chambers few not more than six, initial chamber large, later ones increase in size only slightly, uniserial; sutures distinct, broadly depressed; wall calcareous, subporcellaneous, polished; aperture terminal, radiate.

Dimensions of Holotype No. 2549 from Sample No. 118, LaSalle Parish, La.: length 0.49 mm.; diameter 0.25 mm.

This species is a very distinctive one. It may on casual inspection be mistaken for a member of the Genus Glandulina. However, on close inspection it will be noted that there is no biserial early stage, neither are the chambers embracing as they do in Pseudoglandulina. It is a very simple species of the genus Nodosaria characterized by the small number of chambers and by the subporcellaneous, polished character of the test.
Genus Falmula Isaac Lea, 1833

Palmula decorata Hussey n. sp.

Plate 6, figure 11

Test elongate, early portion close coiled, later portion uncoiled, uniserial; chambers indistinct in close coiled portion, very distinct in uniserial portion; sutures distinct only between chambers in the uniserial portion of the test, limbate, raised; wall calcareous, reticulate in the early close coiled portion, coarsely perforate in adult portion; aperture terminal, elongate, internally fluted, with a slightly developed lip.

Dimensions of Holotype No. 2557 from Sample No. 156, LaSalle Parish, LA: length 0.80 mm.; width 0.49 mm.

This species is very distinctive but not abundant enough to be of importance as a "marker-fossil". It somewhat resembles Coleites reticulosis (Plummer) of the Wilcox of Alabama and the Midway of Texas, and also Palmula muneri Howe of the Cook Mountain of Louisiana. However, upon comparison it is found to be distinctly different from both of the above mentioned species. It may well be, however, that the species is wrongly placed in the Lagenidae, as the young forms seem to greatly resemble some species of the genus Sipnonina, except for the aperture, which is internally quite irregularly notched or fluted.
Family POLYMORPHINIDAE

Genus Polymorphina Cushman and Osawa, 1930

Paleopolymorphina eocaenica Russey n. sp.

Plate 6, figure 9

Test elongate, coiled in very early stage, later becoming biserial; chambers few in adult stage, only four or five, inflated; sutures distinct, depressed; wall calcareous, hyaline; aperture terminal, simple, round.

Dimensions of Holotype No. 2558 from Sample No. 162, LaSalle Parish, La.: length 0.42 mm.; diameter 0.09 mm.

This species is characterized by the very small size or the early chambers. It occurs with fair abundance in the lower and middle part of the Cane River formation, thus extending the range of this genus from the Upper Cretaceous well up into the Eocene.
Gutulina d'Orbigny, 1859

Gutulina obscura Hussey n. sp.

Plate 6, figure 10

Test small for the genus, biconical in outline; chambers few, increasing rapidly in size as added, early ones obscure; sutures indistinct, flush with surface; wall smooth, very finely perforate, glassy; aperture terminal, radiate.

Dimensions of Holotype No. 2559 from Sample No. 149, LaSalle Parish, La.: length 0.36 mm.; width 0.18 mm.

The small size and the shape of this species are its most distinguishing features.
Guttulina fusiformis Hussey n. sp.

Plate 6, figure 14

Test definitely fusiform, of medium size; chambers increase rapidly in size as added, fairly numerous, only those in the more adult stage being distinct; sutures indistinct, flush with surface; wall calcareous, hyaline; aperture terminal, radiate.

Dimensions of Holotype No. 2560 from Sample No. 158, LaSalle Parish, La.: length 0.89 mm.; greatest diameter 0.36 mm.

This species may be identified by its definite fusiform shape and by its fairly large size.
Genus Glandulina d'Orbigny, 1826

Glandulina simplex Hussey n. sp.

Plate 6, figure 13

Test sub fusiform in outline, very early chambers biserial, later ones uniserial; chambers rapidly increase in size as added; sutures slightly depressed, rather indistinct; wall smooth, hyaline, finely perforate; aperture terminal, radiate.

Dimensions of Holotype No. 2561 from Sample No. 159, LaSalle Parish, La.: length 0.52 mm.; greatest diameter 0.22 mm.

This is a typical Glandulina with only the very small biserial stage as a specific characteristic. Except on very close inspection this species might easily be placed under the genus Pseudoglandulina.
Family HETERONELICIDAE

Genus Gumbelina Egger, 1899

Gumbelina multicellularis Hussey n. sp.

Plate 7, figure 7

Test nearly twice as long as broad; chambers numerous, eighteen average number, arranged biserially, increase gradually in size about half way and then increase rapidly in size, globose, inflated; sutures distinct, depressed; wall calcareous, hyaline, unornamented; aperture a large opening at base of last formed chamber, arched.

Dimensions of Holotype No. 2562 from Sample No. 137, LaSalle Parish, La.: length 0.25 mm.; greatest width 0.12 mm.

This species may be identified by the comparatively large number of chambers in the adult, by its elongate shape, and by the sudden increase in size of chambers about half way in the development of the test.
Genus Hodoplanulis Hussey n. gen.

Genocholeotype Hodoplanulis elongata Hussey n. sp.

Plate 7, figure 20

Test in early stages showing indications of planispiral ancestry, first three or four chambers have indistinct planispiral arrangement, uniserial arrangement develops directly from initial stage, includes much the greater part of the test; chambers slightly involute; wall calcareous, hyaline, finely perforate; aperture terminal, rounded with neck.

This is one of the more specialised genera of the Heterocheilocidae, in which the spiral stage is greatly reduced and the biserial stage is wanting.

Hodoplanulis elongata Hussey n. sp.

Plate 7, figure 20

Test indistinctly planispiral in very early stage, uniserial stage develops immediately from initial stage and includes much the greater part of the test, two or more short, sharp spines on initial end; chambers three or more in planispiral stage, five or more in adult uniserial portion, increase in size as added, slightly compressed; sutures distinct, incised; wall calcareous, hyaline, finely perforate, decorated with a row of blunt, short spines just above the suture line of each chamber; aperture terminal, round, with a very short neck and a flaring lip.

Dimensions of Genocholeotype No. 2563 from Sample No. 136, LaSalle Parish, La.: length 0.52 mm.; width 0.08 mm.
Only the very small size of this species keeps it from being one of the most useful "marker-fossils" of the Cane River formation. It occurs abundantly enough and appears to be confined to a fairly thin section of the upper part of the formation.
Family BULIMINIDAE

Genus Robertina d'Orbigny, 1846

Robertina howei Hussey n. sp.

Plate 7, figures 8, 9

Test an elongate biserial close spiral, spiral suture distinct, other sutures less so; chambers numerous, several in each whorl, slightly inflated; wall calcareous, hyaline to subporcellaneous, polished; aperture on elongate loop, large for the genus.

Dimensions of Holotype No. 2564 from Sample No. Ru. 510-D, Natchitoches Parish, La.: length 0.29 mm.; diameter 0.11 mm.

This species is named in honor of Dr. H. V. Howe, Director of School of Geology, Louisiana State University.
Genus Bulimina d'Orbigny, 1826

Bulimina rotunda Hussey n. sp.

Plate 7, figure 6

Test subovate, nearly as broad as long, circular in end view; chambers numerous, inflated; sutures distinct, depressed; wall calcareous, hyaline, distinctly perforate; aperture a loop-shaped opening about half concealed by a thin plate extending from one side of the chamber, nearly terminal.

Dimensions of Holotype No. 2565 from Sample No. 137, LaSalle Parish, La.: length 0.46 mm.; diameter 0.31 mm.

This species greatly resembles Bulimina ovata d'Orbigny, but differs in that it is not so elongate, and in the character of the aperture, and in being more distinctly perforate.
Genus Uvigerinella Cushman, 1926

Uvigerinella subquadrate Russey n. sp.

Plate 7, figure 4

Test elongate, in adult stage subquadrate in transverse section, more nearly circular in early portion; chambers in early portion arranged triserially, biserially in adult stage; sutures distinct, irregular, very slightly depressed; wall calcareous, hyaline, distinctly perforate; aperture ovate, with a well developed neck and phialine lip.

Dimensions of Holotype No. 2571 from Sample No. 118, LaSalle Parish, La.: length 0.45 mm.; diameter 0.15 mm.

This species may be identified with certainty by its subquadrate shape, its distinctly perforate wall and its definite biserial adult stage.
Genus *Uvigerina* d’Orbigny, 1826

*Uvigerina costata-spinulosa* Hussey n. sp.

Plate 7, figure 3

Test elongate, subfusiform; chambers in early portion triserial with tendency toward becoming biserial in adult stage, early chambers small, slightly inflated, later ones fairly large, definitely inflated; sutures distinct, depressed, especially so in adult stage; wall calcareous, ornamented in early portion with discontinuous short costae, adult chambers covered with spines; aperture round, terminal, with short neck and phialine lip.

Dimensions of Holotype No. 2572 from Sample No. 107, LaSalle Parish, La.: length 0.40 mm.; greatest diameter 0.19 mm.

This species, while distinctive in itself, probably gave rise to *Siphogenerina spinulosa*, as both of them are very similar in their earlier stages.
Genus Siphogenerina Schlumberger, 1933

Siphogenerina spimulosa Hussey n. sp.

Plate 7, figure 5

Test elongate, triserial in early stage, greater part biserial, last one or more chambers uniserial; chambers in very early stage indistinct, later chambers distinct, globular; sutures indistinct in early stage, later very distinct, depressed; wall calcareous, decorated in very early portion with short, discontinuous costae, greater part of test covered with short spines; aperture terminal, simple, with a well developed neck and lip.

Dimensions of Holotype No. 2573 from Sample No. 137, LaSalle Parish, La.; length 0.52 mm.; diameter 0.16 mm.

This species undoubtedly came from the same stock as *U. costata-spimulosa*, as both are very similar in the early stage. However, the chamber arrangement over the greater part of the test definitely separates the two. They are easy to distinguish.
Genus Angulogerina Cushman, 1927

Angulogerina inflata Hussey n. sp.

Plate 7, figure 1

Test subfusiform, triserial, roundly triangular in transverse section; chambers indistinct in early stage, later ones distinct, somewhat inflated but not enough so to destroy triangular shape; sutures distinct, especially so in adult stage, depressed; wall calcareous, hyaline, covered with fine, short spines, perforate; aperture a round opening at the end of a well developed neck, with a phialine lip.

Dimensions of Holotype No. 2574 from Sample No. 136, LaSalle Parish, La.: length 0.34 mm.; greatest diameter 0.19 mm.

This very distinctive species is a good index-fossil for the Cane River formation. It is abundant, easy to identify, and does not, to the authors knowledge, occur either above or below the Cane River.
Genus Reussella Galloway, 1933

Reussella costata Hussey n. sp.

Plate 7, figure 2

Test distinctly triangular in transverse section, broadest at apertural end; chambers arranged triserially; sutures indistinct; wall calcareous, ornamented by heavy longitudinal costae which obscure the sutures as well as the individual chambers; aperture elongate, somewhat comma-shaped, extends from near base of chamber to apex of test.

Dimensions of Holotype No. 2570 from Sample No. 137, LaSalle Parish, La.: length 0.31 mm.; greatest width 0.15 mm.

This very distinctive species occurs abundantly throughout the greater part of the Cane River formation. But for the fact that it is quite small, it might well serve as a good "marker-fossil" for the formation.
Genus Entosolenia Ehrenberg, 1848

Entosolenia vasiformis Hussey n. sp.

Plate 7, figure 17

Test a single chamber, elliptical in outline, compressed, internal tube free at bottom end visible from exterior; wall calcareous, smooth, unornamented, translucent; periphery keeled; aperture terminal, an elliptical slit.

Dimensions of Holotype No. 2566 from Sample No. 123, LaSalle Parish, La.: length 0.14 mm.; width 0.11 mm.

This species occurs with fair abundance. Its simplicity of form is probably its most distinctive feature.
Genus Virgulina d'orbigny, 1826

Virgulina spinulosa Hussey n. sp.

Plate 7, figure 11

Test elongate, well compressed; chambers arranged biserially; periphery slightly jagged due to extension of chambers in spine-like projections beyond chamber below; sutures distinct, slightly depressed; wall calcareous, finely perforate, smooth, translucent; aperture terminal, loop-shaped.

Dimensions of Holotype No. 2567 from Sample No. 152, LaSalle Parish, La.: length 0.32 mm.; width 0.09 mm.

This species can be quickly identified by the spine-like terminations of the chambers which give a jagged outline to the periphery.
Virgulina regularis Russey n. sp.

Plate 7, figure 12

Test elongate, fusiform, compressed; chambers slightly inflated, arranged spirally in early stages, later ones bi-serial; sutures distinct, slightly depressed; wall calcareous, hyaline, translucent, perforate; aperture a narrow, loop-shaped opening extending from apex of test to base of last formed chamber.

Dimensions of Holotype No. 2568 from Sample No. 137, LaSalle Parish, La.: length 0.51 mm.; width 0.13 mm.
Genus Bolivina d'Orbigny, 1839

Bolivina striata Hussey n. sp.

Plate 7, figures 15, 16

Test elongate, tapering, nearly circular in transverse section; chambers biserially arranged; sutures slightly depressed, notched, noticeably so in the more adult portion of the test; wall calcareous, distinctly perforate, ornamented by low, longitudinal ribs which extend almost the length of the test; aperture nearly terminal, ovate to somewhat loop-shaped.

Dimensions of Holotype No. 2569 from Sample No. Ru.
503-B, Natchitoches Parish, La.: length 0.56 mm.; diameter 0.13 mm.

This is a very distinctive species which occurs in the lower part of the greensand section of the Cane River formation. The striations, the notched character of the sutures, and the nearly circular shape in transverse section are its most identifying features.
Genus Bifarina Parker and Jones, 1972

Bifarina turritiformis Hussey, n. sp.

Plate 7, figure 10

Test elongate, circular in transverse section, arcuate; chambers in early portion biserial, later ones uniserial, uniserial portion makes up greater part of test; sutures distinct, slightly depressed, distinctly notched; wall calcareous, perforated, pitted, pits arranged in rows, gives striated appearance to test when viewed with direction of light at right angle to longitudinal axis of test; aperture terminal, simple, rounded, encircled by row of blunt spines, not radiate.

Dimensions of Holotype No. 2603 from Sample No. 137, LaSalle Parish, La.: length 1.18 mm.; diameter 0.17 mm.

This is both a very distinctive and a very useful species, as it is of fairly large size, is abundant enough and is limited to the greensand marl part of the formation. Its coarsely perforated test, notched sutures and general shape make it easy to identify.
Family ELLIPSOIDINIDAE

Genus Nodosarella Rzebik, 1966

Nodosarella elongata Bussey n. sp.

Plate 7, figures 13, 14

Test elongate, slightly tapering, very early chambers biserial, later ones uniserial, uniserial portion about five-sixths of the whole test; chambers fairly numerous, subovate longitudinally, round in cross-section; sutures distinct, flush with wall in biserial stage, depressed in uniserial portion; wall calcareous, hyaline, finely perforate; aperture terminal, narrow, semi-elliptical with a small overhanging, hood-like lip.

Dimensions of Holotype No. 2575 from Sample No. 171, LaSalle Parish, La.: length 0.77 mm.; greatest diameter 0.11 mm.

Dimensions of Paratype No. 2576 from Sample No. 156, LaSalle Parish, La.: length 0.66 mm.; greatest diameter 0.11 mm.

This species, while distinctive upon close inspection, may easily be confused with some of the simple forms of Nodosaria which occur in the assemblage. It is abundant enough, but not outstanding enough to be used as a "marker-fossil" for that part of the Cane River greensand in which it occurs.
Family ROTALIIDAE

Genus Discorbis Lamarck, 1804

Discorbis minutus Hussey n. sp.

Plate 7, figures 18, 19

Test very small for the genus, concavo-convex in transverse-section; chambers numerous, arranged in trochoid coil; sutures distinct, slightly depressed on ventral side, raised on dorsal side; wall calcareous, vitreous, finely perforate, unornamented; aperture distinct, on dorsal side, uncovered.

Dimensions of Holotype No. 2677 from Sample No. 166, LaSalle Parish, La.: greater diameter 0.14 mm.; lesser diameter 0.11 mm.

The small size of this species is probably its most distinctive feature. However, it is very easy to identify by the shape and the chamber arrangement also.
Discorbis petalana Hussey n. sp.

Plate 7, figures 25, 26

Test plano-convex, subelliptical in outline, last few chambers definitely keeled; chambers few, only about nine or ten visible on dorsal side, increase rapidly in size as added, greatest width lies along periphery, somewhat inflated; sutures distinct, slightly limbate, depressed; wall calcareous, hyaline, distinctly perforate; umbilical margin on ventral side, partially concealed by extension of last formed chamber.

Dimensions of Holotype No. 2575 from Sample No. Ru. 513-J, Natchitoches Parish, La.: greater diameter 0.40 mm.; lesser diameter 0.30 mm.

Superficially this species resembles Cibicides discorbisiformis. It will require close inspection to determine that the two do belong to two different genera.
Genus Valvulineria Cushman, 1926

Valvulineria gracilis Hussey n. sp.

Plate 8, figures 4, 5

Test trochoid, broadly convex on dorsal side, sharply convex on ventral side, close-coiled, umbilicate on ventral side; chambers distinct, numerous; sutures depressed on ventral side, limbate and raised in early portion on dorsal side, depressed slightly in adult stage; wall calcareous, hyaline, very finely perforate; aperture on ventral side, extending from umbilicus almost to periphery, concealed by thin plate its entire length.

Dimensions of Holotype No. 2579 from Sample No. 165, LaSalle Parish, La.: diameter 0.40 mm.; thickness 0.20 mm.

This species has been placed with the genus Valvulineria on the basis of the plate over the aperture and on its close resemblance to species of the genus Gyroidina.
Genus Lamarckina Berthelin, 1881

Lamarckina claibornensis (Cushman) Cushman and Thomas

Plate 8, figures 1, 2


Lamarckina claibornensis (Cushman) Cushman and Thomas, 1929, Jour. of Pal. Vol. 3, p. 130, pl. 24, figs. 1a-c.

The following is the description quoted from Cushman and Thomas.

Test calcareous, finely perforate, plano-convex, composed of two and a half coils showing on the convex dorsal side, and last coil and small umbilicus showing on flat ventral side; periphery moderately sharp, circular and not lobate; sutures distinctly limbate on dorsal side giving characteristic ornamentation, sutures practically obsolete on ventral side leaving surface smooth; aperture, a slit reaching from the comma-like umbilicus to the periphery. Length 0.42 mm.; width 0.40 mm.; thickness 0.15 mm.

Locality.—Two miles east of Alto, Cherokee County, Texas.

Range.—Mt. Selman greensand of Eocene.

U. S. Nat. Mus. Coll. No. 371022

There is a considerable amount of variation in this species within the Cane River formation. It varies from the typical rather large, ventrally fairly flat, dorsally broadly arched form with sutures which are limbate but only slightly raised; to one which is smaller in diameter, quite highly arched on the dorsal side, with sutures which are very distinctly raised. The range of the species is confined to the greensand section of the formation.

Dimensions of Holotype No. 2556 from Sample No. 129, LaSalle Parish, La.: diameter 0.39 mm.; thickness 0.30 mm.
Lamarckina claibornensis (Cushman)

Cushman and Thomas var. gemmulata Hussey n. var.

Plate 3, figure 3

The variety differs from the species only in that it has distinctly beaded sutures.

Dimensions of Holotype No. 2589 from Sample No. 126, LaSalle Parish, La.: diameter 0.44 mm.; thickness 0.20 mm.
Genus Gyroidina d'Orbigny, 1826

Gyroidina limbata Russey n. sp.

Plate 8, figures 6, 7

Test trochoid, distinctly convex on ventral side, slightly so on dorsal side, close-coiled, umbilicate on ventral side; chambers fairly numerous, distinct; sutures distinct, limbate, raised, spiral suture a depressed channel; wall calcareous, semi-porcellaneous; aperture a low arched slit extending from the umbilicus nearly to the periphery, not concealed.

Dimensions of Holotype No. 2580 from Sample No. 175, LaSalle Parish, La.: diameter 0.68 mm.; thickness 0.21 mm.

This interesting species should serve as an excellent "marker-fossil" for the Cane River formation. It is the only Gyroidina, known to the author, that has raised sutures. It occurs with sufficient abundance and is easy to identify.
Genus Eponides Montfort, 1808

Eponides simplex Hussey n. sp.

Plate 8, figures 11, 12

Test trochoid, broadly arched on dorsal side, distinctly convex on ventral side, umbilicate on ventral side; chambers indistinct in early stage, distinct and slightly inflated in adult stage; sutures limbate in early portion, later depressed, distinct; wall calcareous, hyaline, distinctly perforate; aperture an arched opening extending from near the umbilicus almost to the periphery, hooded but not concealed by a thin plate-like extension of the last formed chamber.

Dimensions of Holotype No. 2581 from Sample No. 137, LaSalle Parish, La.: diameter 0.48 mm.; thickness 0.26 mm.

This species is easy to distinguish from the more elaborate Eponides mexicana and E. guayabalensis by its more simple form, being neither as flat or concave on the ventral side as are some variations of E. mexicana, nor so highly convex on the dorsal side as is E. guayabalensis.
Genus Epistomina Terquem, 1883

Epistomina chromata Hussey n. sp.

Plate 9, figures 13, 14

Test almost equally biconvex, close coiled, trochoid, umbilical area closed with a plug; chambers numerous, seven or more in adult whorl; sutures limbate, only very slightly raised, very distinct; wall calcareous, usually colored (either dark tan with cream colored sutures and peripheral apertures or entirely iridescent), very finely perforate; aperture of two types, the main one in the apertural face a large comma-shaped opening, the other a series of narrow slits parallel with and just ventral to the periphery.

Dimensions of Holotype No. 2582 from Sample No. 118, LaSalle Parish, La.: diameter 0.54 mm.; thickness 0.28 mm.

The distinctive features of this outstanding species are the fact that it is invariably colored as noted above, and the striking manner in which the sutures stand out from the chambers due to this coloring effect. To date the author has not noted this species in any other than samples from the Cane River beds.
Genus Siphonina Reuss, 1850

Siphonina carinata Hussey n. sp.

Plate 9, figures 2, 3

Test trochoid, biconvex, compressed, with well developed broad, thin keel; chambers numerous, early ones indistinct, later ones distinct; sutures indistinct in early stage on ventral side, hidden by reticulate ridges, later ones distinct, depressed, early ones on dorsal side indistinct later ones distinct, limbate, raised; wall calcareous, coarsely perforate; aperture located to ventral side of peripheral line, elongate, puckered internally, a very short neck with a wide, heavy lip.

Dimensions of Holotype No. 2533 from Sample No. 120, LaSalle Parish, La.: diameter 0.52 mm.; thickness 0.22 mm.

A very distinctive species with a very unusual aperture, this appears to be an off-shoot from the true Siphonina but not enough so to warrant its being set up as a new genus.
Siphonina umbonata Hussey n. sp.

Plate 9, figures 4, 5

Test close coiled, trochoid, biconvex, early chambers on dorsal side concealed by a large, glassy knob, other chambers distinct, slightly inflated; sutures distinct where not covered, depressed; wall calcareous, hyaline, coarsely perforate; aperture elongate, slightly twisted from peripheral line, with very short neck and well developed flaring lip.

Dimensions of Holotype No. 2594 from Sample No. 109, LaSalle Parish, La.: diameter 0.39 mm.; thickness 0.21 mm.

The distinctive feature of this species is the large, glassy knob developed over the central portion of the dorsal side. There is a strong tendency toward the development of a uniserial stage. Several specimens were found in which the final chamber had departed from the coiled stage. It may well be that there will be found specimens within the formation which are true species of the genus Siphoninella that have developed from this species.
Siphonina howei Cushman

Plate 9, figures 8, 9


The following description is quoted from Cushman.

Test small, nearly circular, nearly equally biconvex, much compressed, periphery angled, sharply acute and with distinctly serrate keel, lobulate, chambers usually six in the last-formed whorl, the last few very slightly inflated on both sides; sutures distinct, depressed, slightly limbate, very slightly curved; wall distinctly spinose with short blunt spines and the periphery very serrate; aperture broadly elliptical, occupying nearly the whole height of the last-formed chamber, with a distinctly thickened lip and short neck.

Diameter, 0.30 mm.; thickness, 0.10 mm.
Holotype—(Cushman coll. 6726) from Lower Claiborne, Cane River formation at Natchitoches, La. This species is named for Dr. Henry V. Howe, who has done much work on the paleontology of Louisiana.

This species is easily distinguished by its high degree of ornamentation and much compressed test.

The spines, which are so conspicuous in this species, are comparatively of large diameter, are hollow and seem to extend well down into the test. Thus giving a coarsely pitted appearance to the test.

Dimensions of Holotype No. 2585 from Sample No. 113, LaSalle Parish, La.: diameter 0.30 mm.; thickness 0.14 mm.
Genus Siphoninella Cushman, 1927

Siphoninella parva Hussey n. sp.

Plate 9, figure 1

Test in the early stages trochoid, close coiled, three blunt spines on periphery of each chamber in coiled portion, later, greater part of test uncoiled, chambers added in linear uniserial series; chambers not numerous, five or six usually in uniserial portion, distinct; sutures indistinct in coiled part, distinct, deeply depressed in uniserial part; wall calcareous, hyaline, decorated by a row of short blunt spines just above the base of each chamber; aperture terminal, round, with short neck and heavy lip.

Dimensions of Holotype No. 2526 from Sample No. Hu. 518-J, Natchitoches Parish, La.: length 0.57 mm.; width 0.10 mm.

The small size of this species for the genus and the comparatively long length of the uniserial portion make this species a very distinctive member of the genus Siphoninella. It occurs in fair abundance but is a bit too small and too fragile to be an important "marker-fossil" for the formation.
Genus Siphobifarina Hussey n. gen.

Genoholotype Siphobifarina caneriverensis

Hussey n. sp.

Test trochoid in the early stages, later becoming biserial then uniserial; chambers numerous, compressed; wall calcareous, very finely perforate, glassy; aperture with a neck and lip.

This genus has been placed with the Rotaliidae on the basis of its being distinctly trochoid in its early stage and, because it rather closely resembles some other genera of that family.

At present the genus is known only from the Cane River formation of Louisiana and from the Weches formation of Texas.

Siphobifarina caneriverensis

Hussey n. sp.

Plate 7, figures 21, 22

Test trochoid in the early stage, later becoming biserial then uniserial; chambers numerous, compressed, with a row of nodes on the ventral side just above the suture line of each chamber; sutures depressed, featured on the dorsal side by a prominent downward directed V; wall calcareous, vitreous, very finely perforate; aperture oval, with a short neck and a phialine lip, dorsally viewed the aperture is situated to left of top of last formed chamber.

Dimensions of Genoholotype No. 2587 from Sample No. 110, LaSalle Parish, La.: length 0.20 mm.; width 0.08 mm.
This species, though too small to be of value as a "marker-fossil", is very distinctive and appears to be confined to the Cane River and its equivalent formations, particularly to the upper part.
Family AMPHISTIGINIDAE

Genus Asterigerina d'Orbigny, 1839

Asterigerina texana (Stadnichenko) Cushman and Thomas

Plates 9, figures 14, 15

Eponides texana Stadnichenko, 1927, Jour. of Pal., vol. 1, p. 238, pl. 38, figs. 1-5.

Asterigerina texana (Stadnichenko) Cushman and Thomas, 1929, Jour. of Pal. vol. 3, p. 181, pl. 24, figs. 5a-c.

The following description is quoted from Cushman and Thomas.

Shell calcareous, finely perforate, comparatively large, plano-convex, composed of about three and a half coils, those near the center covered by a smooth, transparent boss which partly hides the sutures of the first chambers, dorsal side flat in many specimens but convex in many others, ten to twelve chambers in the last whorl; ventral side with small raised boss and the last coil showing and having the secondary sutures developed giving a distinct star pattern so characteristic of this genus, ventral side usually papillose especially near the aperture which is covered by these decorations in almost all specimens. Length 0.68 mm.; width 0.60 mm.; thickness 0.33 mm.

Locality.—One mile north of Elkhart near railroad at Hopkins fault, Anderson County, Texas.

Range.—Mt. Selman greensand of Eocene.


The occurrence of this species in the Cane River is confined to the greensand section of the Formation. A very few specimens have been found in the Discocyclina advena zone, but it is absent otherwise until near the base of the greensand where it occurs in greatest abundance, almost to the exclusion of all other species.

Dimensions of Holotype No. 2590 from Sample No. 161, LaSalle Parish, La.: diameter 0.46 mm.; thickness 0.23 mm.
Family CASSIDULINIDAE

Genus Ceratobulimina Toula, 1915

Ceratobulimina limbata Hussey n. sp.

Plate 9, figures 6, 7

Test of about medium size for the genus, close coiled, trochoid, biconvex, dorsal side deeply umbilicate; chambers distinct on both sides, seven or eight in last formed volu­tion, inflated; sutures distinct on both sides, sharply de­pressed on the ventral side, distinctly limbate and with de­cided angle on the dorsal side, spiral-suture distinct, de­pressed; wall smooth, semi-porcellaneous, polished, finely perforate; aperture a large arched opening in apertural face extending from the umbilicus to near the periphery, but almost entirely hidden in well preserved specimens by a thin plate-like extension of the last formed chamber.

Dimensions of Holotype No. 2591 from Sample No. 123, LaSalle Parish, La.: diameter 0.34 mm.; thickness 0.25 mm.

This species bears a general resemblance to Ceratobulimina exima. However, it differs markedly in the limbate, raised character of its dorsal sutures, in the fact that all the chambers are clearly visible on the dorsal side and all in the last formed whorl are clearly visible on the ventral side, in the covering of the aperture, and in its comparatively smaller size.
Genus Fulvinulinella Cushman, 1926

Fulvinulinella bella Hussey n. sp.

Plate 3, figures 8-10

Test close coiled, trochoid, above average in size for the genus, subrounded in outline from dorsal view; chambers distinct, about six in last formed volutions, very slightly umbilicate on ventral side; sutures distinct, depressed slightly, radial on ventral side, flush with surface, oblique on dorsal side; wall calcareous, smooth, subvitreous; aperture just ventral of periphery; extends from parallel to periphery toward the umbilicus, somewhat loop-shaped.

Dimensions of Holotype No. 2592 from Sample No. Ru. 518-N, Natchitoches Parish, La.: diameter 0.41 mm.; thickness 0.19 mm.

The comparatively large size and trim, compact appearance of this species are its distinctive features.
Genus Cassidulina d'Orbigny, 1826

Cassidulina parva Russey n. sp.

Plate 9, figures 12, 15

Test subglobular, close coiled, involute; chambers indistinct, alternate on both sides of and extending across the periphery; sutures indistinct, very slightly depressed; aperture a comparatively large comma-shaped opening just to one side of and subparallel to the periphery.

Dimensions of Holotype No. 2593 from Sample No. 118, LaSalle Parish, La.: longer diameter 0.14 mm.; short diameter 0.11 mm.
Family GLOBOROTALIIDAE

Genus Globorotalia Cushman, 1927

Globorotalia inflata Hussey n. sp.

Plate 9, figures 10, 11

Test trochoid, close coiled, nearly flat on dorsal side, strongly convex ventrally, deeply umbilicate; chambers numerous, distinct, strongly inflated especially in later stage; sutures distinct, slightly depressed; wall calcareous, thin, coarsely perforate; aperture a large opening extending into umbilicus, partially covered by lip.

Dimensions of Holotype No. 2594 from Sample No. 137, LaSalle Parish, La.: long diameter 0.36 mm.; thickness 0.26 mm.

This species occurs with such great abundance in the lower part of the Cane River formation that it is used in economic work to mark the approach of the Cane River-Wilcox contact. It greatly resembles some species of Globigerina but has been placed in the genus Globorotalia on the basis of its close coiling and on the character of its aperture.
Globochonallia perforata-minuta Hussey n. sp.

Plate 9, figures 16, 17

Test small for the genus, trochoid, biconvex, umbilicate; periphery acute to slightly keeled; chambers in early portion indistinct later distinct, slightly inflated; sutures distinct in later stage, slightly depressed; wall calcareous, hyaline, for the size of the species quite coarsely perforate; aperture on ventral side, large, extends into umbilicus, almost completely hidden by lip.

Dimensions of Holotype No. 2895 from Sample No. 123, LaSalle Parish, La.: diameter 0.19 mm.; thickness 0.11 mm.

The small size and comparatively coarsely perforated condition of the test are the distinguishing features of this interesting little species.
Family ANOMALINIDAE

Genus Anomalina d'Orbigny, 1826

Anomalina nodosa Hussey n. sp.

Plate 10, figures 1, 2

Test trochoid in early stage, later tending to become planispiral and involute; chambers numerous, twelve or more making up last whorl, early chambers on dorsal side hidden by large umbone, ventrally the inner edge of each chamber terminates in a small node thus forming a ring of nodes along the depressed spiral suture; sutures distinct only in the last formed whorl, limbate; wall calcareous, heavy, perforate; aperture extends across periphery back along base of last formed chamber on ventral side.

Dimensions of Holotype No. 2596 from Sample No. 151, LaSalle Parish, La.: diameter 0.49 mm.; thickness 0.21 mm.

Although this species occurs with and somewhat resembles *Anomalina umbonata* it is a distinct species. It can very easily be identified by the node-like terminations of the chambers along the spiral suture and by the fact that it is a smaller species than *A. umbonata*. 
Genus Cibicides Montfort, 1803

Cibicides glabrata Hussey n. sp.

Plate 10, figures 3, 4

Test plano-convex, close coiled, trochoid; chambers slightly inflated, about seven in the last formed whorl; sutures indistinct slightly depressed; wall calcareous, smooth very finely perforate, hyaline, a small glassy knob in center of ventral side; aperture extends from periphery back along base of one or more chambers on dorsal side.

Dimensions of Holotype No. 2597 from Sample No. 174, LaSalle Parish, La.: long diameter 0.29 mm.; short diameter 0.31 mm.; thickness 0.13 mm.

The characteristic feature of this species is its smooth wall, lack of coarse perforations.
Cibicides hypoconoides Bussey n. sp.

Plate 10, figures 7-9

Test small for the genus, plano-convex, subcone-shaped, trochoid; chambers fairly well defined, eight or more in last formed volution; sutures distinct, slightly depressed in adult stage; wall calcareous, hyaline, finely perforate; aperture extends from periphery back along base of last two chambers.

Dimensions of Holotype No. 2598 from Sample No. Ru. 518-J, Natchitoches Parish, La.: diameter 0.27 mm.; thickness 0.14 mm.

This species though very distinctive is very small and quite rare. Its more specific features being its size and shape.
Cibicides mammaformis Hussey n. sp.

Plate 10, figures 5, 6

Test trochoid, plano-convex, mammaform; periphery with slight tendency toward development of a keel; chambers on ventral side distinct only in adult stage, all distinct on dorsal side; sutures slightly depressed; wall calcareous, distinctly perforate, decorated with a rounded knob over umbilicus on ventral side; aperture typical for the genus.

Dimensions of Holotype No. 2599 from Sample No. Ru. 236, Natchitoches Parish, La.: diameter 0.30 mm.; thickness 0.14 mm.

The general mammaform shape of this species is its most distinctive feature.
Cibicides umbilicatus Russey n. sp.

Plate 10, figures 10, 11

Test unequally biconvex, close coiled, trochoïd; chambers distinct on both sides, only those of last formed whorl visible on ventral side; sutures distinct, limbate, raised on both ventral and dorsal sides, spiral suture also raised; wall calcareous, distinctly perforate, slight but distinct depression in umbilicus on ventral side; aperture typical for the genus, extending across periphery and back along base of last formed chamber.

Dimensions of Holotype No. 2600 from Sample No. 174, LaSalle Parish, La.: diameter 0.40 mm.; thickness 0.19 mm.

This species is easy to distinguish by its biconvex shape, limbate raised sutures, and depressed umbilicus.
Cibicides discorfisiformis Hussey n. sp.

Plate 7, figures 23, 24

Test rather loosely coiled, slightly concavo-convex, trochoid; chambers distinct on both sides, with all visible only from dorsal side, nine or more in last formed whorl, distinctly inflated; sutures distinct, depressed; wall calcareous clear, vitreous, perforate, a small glassy knob fills umbilicus; aperture extends from the periphery along the base of the last formed chamber.

Dimensions of Holotype No. 2601 from Sample No. 169, LaSalle Parish, La.: long diameter 0.38 mm.; short diameter 0.30 mm.; thickness 0.09 mm.

Except upon close inspection this species might well be placed with the genus Discorbia. However, the aperture definitely places the species with the genus Cibicides.
Cibicides mcguirti Hussey n. sp.

Plate 10, figures 14, 15

Test plano-convex, trochoid, somewhat loosely coiled; periphery acute to slightly keeled, lobate; chambers inflated ventrally, distinct, about eight in last formed whorl, rapidly increase in size as added; sutures slightly limbate, distinct, depressed; wall calcareous, distinctly perforate, smooth, vitreous, a small glassy knob fills umbilicus on ventral side; aperture extends across periphery and back along base of last formed chamber.

Dimensions of Holotype No. 2602 from Sample No. 175, LaSalle Parish, La.: long diameter 0.54 mm.; short diameter 0.44 mm.; thickness 0.14 mm.

Though of fairly large size and of distinctive general appearance, this species does not occur in sufficient abundance to warrant its being of value as a "marker-fossil" of the Cane River formation.

It is named in honor of Dr. J. H. McGuirt of Louisiana State University, School of Geology.
Cibicides submammaformis Russey n. sp.

Plate 10, figures 12, 15

Test trochoïd, close coiled, slightly biconvex, somewhat complanate; periphery acute to slightly keeled, slightly lobate; chambers distinct, about nine in last formed whorl, increase in size moderate; sutures distinct, slightly depressed, very definite angle to posterior near periphery; wall calcareous, distinctly perforate, small knob fills umbilicus on ventral side; aperture extends across periphery back to umbilicus on ventral side and along base of last chamber on dorsal side.

Dimensions of Holotype No. 2603 from Sample No. Ru. 510-D, Matchitoches Parish, La.: diameter 0.40 mm.; thickness 0.15 mm.

This species superficially resembles C. mammaformis, however, it is slightly biconvex instead of plano-convex and is somewhat compressed.
Family ORBITOIDIDAE

Genus Discocyclina Gömbel, 1868

Discocyclina advena Cushman

Plate 11, figures 6, 7

Discocyclina advena Cushman, 1921 U. S. G. S., F. P. P. 128, p. 139, pl. XXI, figs. 1-5.

The following is the original description as quoted from Cushman, 1921.

Test circular, compressed, center depressed, surrounded by a thicker excentric area, beyond which toward the periphery the test again becomes thinner; unequally biconvex, one side usually being flatter than the other; the surface comparatively smooth, slightly granular, representing the peripheral ends of slender pillars.

Diameter 5 to 7 millimeters.

Vertical sections show the general form of the test, with a concave thin center, thickening and then thinning again toward the periphery, and the very narrow band of equatorial chambers, which increase but slightly toward the periphery. The numerous vertical chambers are largest in the thickest portion of the test, where they are separated by numerous small pillars.

Horizontal sections show the equatorial chambers, two in number, both circular, excentric, the wall of the smaller coinciding with the wall of the larger, so that the larger chamber forms with it a complete circle; equatorial chambers rectangular, nearly square, annuli being very numerous but close together, much more so than in other American species of Orthophragmina.

Type specimen, U. S. N. M. No. 325252, from Natchitoches, La.; L. C. Johnson, collector. At this station the species is very abundant. Large numbers of this species were collected by T. W. Vaughan at U. S. G. S. stations 2904, near Provencal, Natchitoches Parish, La., and 3570, "Foraminifera horizon" of the Ostrea selloaformis
The above specimen originally described as *Orthophragmina advena*, was later placed in the genus *Discocyclina* by T. W. Vaughan (1924), due to the fact that the name *Orthophragmina* was invalid, because the organisms to which it had been applied had been previously described as belonging to several other families, one of which was *Discocyclina*.

Dimensions of Holotype No. 2604 from Sample No. 155, LaSalle Parish, La.: diameter 3.00 mm.
Figures 1. *Plectina robusta* Hussey, n. sp., x74. Holotype slide No. 2605. Sample No. 110------------------ 25

2. *Listerella minuta* Hussey, n. sp., x74. Holotype slide No. 2615. Sample No. 107----------------- 27


4-5. *Pseudocolavulina elongata* Hussey, n. sp., x55. Holotype slide No. 2510. Sample No. 137----------------- 21


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4. *Quinqueloculina gracilis* Hussey, n. sp., X74. Holotype slide No. 2517. Sample No. 119----------------------------- 31

5-6. *Quinqueloculina ovata* Hussey, n. sp., X74. Holotype slide No. 2516. Sample No. 152----------------------------- 30

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<td>3-4. Quinqueloculina parva-triangularis Hussey, n. sp., x74. Holotype slide No. 2519. Sample No. 109</td>
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<td></td>
<td>Sample No. 190-------------------</td>
<td></td>
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<tr>
<td>2</td>
<td>X65. Cotype slide No. 2530.</td>
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<td>Sample No. 119-------------------</td>
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<tr>
<td>3</td>
<td>X65. Cotype slide No. 2533.</td>
<td>43</td>
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<td>Sample No. 123-------------------</td>
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<tr>
<td>4</td>
<td>X65. Cotype slide No. 2532.</td>
<td>43</td>
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<tr>
<td></td>
<td>Sample No. 118-------------------</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>X65. Cotype slide No. 2534.</td>
<td>43</td>
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<tr>
<td></td>
<td>Sample No. 123-------------------</td>
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<tr>
<td>6</td>
<td>X65. Cotype slide No. 2531.</td>
<td>43</td>
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<td>Sample No. 120-------------------</td>
<td></td>
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<td>7</td>
<td>X65. Cotype slide No. 2535.</td>
<td>43</td>
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<td>8</td>
<td>X65. Cotype slide No. 2536.</td>
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<td></td>
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<td></td>
</tr>
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<td>---------</td>
<td>------</td>
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X70. Holotype slide No. 2598.
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110

sp., X70. Holotype slide No. 2599.
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109

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111

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<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Depth (ft)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1436</td>
<td>Sparta-Gans River contact (?) brown-gray, lignitic, silty shale.</td>
</tr>
<tr>
<td>2</td>
<td>1446</td>
<td>gray-brown clayey, silty sand.</td>
</tr>
<tr>
<td>3</td>
<td>1541</td>
<td>brown to black silty sand, maybe cuttings.</td>
</tr>
<tr>
<td>4</td>
<td>1541</td>
<td>dark brown-gray shale, beginning of continuous cores.</td>
</tr>
<tr>
<td>5</td>
<td>1542</td>
<td>dark chocolate-brown shale.</td>
</tr>
<tr>
<td>6</td>
<td>1543</td>
<td>&quot;</td>
</tr>
<tr>
<td>7</td>
<td>1544</td>
<td>&quot;</td>
</tr>
<tr>
<td>8</td>
<td>1548</td>
<td>&quot;</td>
</tr>
<tr>
<td>9</td>
<td>1549</td>
<td>dark chocolate-brown silty shale.</td>
</tr>
<tr>
<td>10</td>
<td>1552</td>
<td>&quot;</td>
</tr>
<tr>
<td>11</td>
<td>1553</td>
<td>&quot;</td>
</tr>
<tr>
<td>12</td>
<td>1554</td>
<td>&quot;</td>
</tr>
<tr>
<td>13</td>
<td>1555</td>
<td>&quot;</td>
</tr>
<tr>
<td>14</td>
<td>1556</td>
<td>&quot; except darker in color.</td>
</tr>
<tr>
<td>15</td>
<td>1557</td>
<td>quite a distinct change, light to dark gray silty shale with a good show of greensand.</td>
</tr>
<tr>
<td>16</td>
<td>1557½</td>
<td>back in chocolate-brown shale, silty.</td>
</tr>
<tr>
<td>17</td>
<td>1558</td>
<td>&quot;</td>
</tr>
<tr>
<td>18</td>
<td>1559</td>
<td>&quot;</td>
</tr>
<tr>
<td>19</td>
<td>1560</td>
<td>&quot;</td>
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<tr>
<td>20</td>
<td>1561</td>
<td>&quot;</td>
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<tr>
<td>21</td>
<td>1562</td>
<td>&quot;</td>
</tr>
<tr>
<td>22</td>
<td>1564</td>
<td>&quot;</td>
</tr>
<tr>
<td>23</td>
<td>1565</td>
<td>&quot; except slightly more silty.</td>
</tr>
<tr>
<td>24</td>
<td>1566</td>
<td>distinct break, light to dark gray silty shale with greensand.</td>
</tr>
<tr>
<td>25</td>
<td>1567</td>
<td>&quot; except more silty.</td>
</tr>
<tr>
<td>26</td>
<td>1568</td>
<td>back into dark gray shale, contains pockets of greensand.</td>
</tr>
<tr>
<td>27</td>
<td>1569</td>
<td>dark gray shale.</td>
</tr>
<tr>
<td>28</td>
<td>1570</td>
<td>dark green-gray shale.</td>
</tr>
<tr>
<td>29</td>
<td>1571</td>
<td>light green-gray shale.</td>
</tr>
<tr>
<td>30</td>
<td>1572</td>
<td>dark gray shale with some greensand.</td>
</tr>
<tr>
<td>31</td>
<td>1572½</td>
<td>&quot;</td>
</tr>
<tr>
<td>32</td>
<td>1573</td>
<td>greensand marl with some shale.</td>
</tr>
<tr>
<td>33</td>
<td>1574</td>
<td>&quot;</td>
</tr>
<tr>
<td>34</td>
<td>1575</td>
<td>&quot; with increase in amount of greensand, very little shale.</td>
</tr>
<tr>
<td>35</td>
<td>1577</td>
<td>gray-green shale with pockets of</td>
</tr>
</tbody>
</table>
36 1578'  greensand.  " with considerable greensand.
37 1579'  "  "  "  "  top of Discocyclina advena
38 1580'  "  "  "  "  zone.
39 1581'  "  "  "  "  fine-grained light gray-green silt-
40 1582'  "  "  "  "  stone with some greensand.
41 1583'  "  "  "  "  much like above but with more green-
42 1584'  "  "  "  "  sand.
43 1585'  "  "  "  "  more sandy approaching character of
44 1586'  "  "  "  "  "  salt and pepper" sand.
45 1587'  "  "  "  "  greensand and shale.
46 1588'  "  "  "  "  "  base of D. advena zone.
47 1590'  "  "  "  "  "  light green-gray siltstone and shale
48 1591'  "  "  "  "  "  with some greensand.
49 1592'  "  "  "  "  "  a little more sandy.
50 1593'  "  "  "  "  "  definitely more glauconitic.
51 1594'  "  "  "  "  "  with well developed shale part-
52 1595'  "  "  "  "  "  ings.
53 1596'  "  "  "  "  "  but with very little shale.
<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Depth (ft)</th>
<th>Description</th>
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<tbody>
<tr>
<td>107</td>
<td>1468</td>
<td>brown silty shale.</td>
</tr>
<tr>
<td>108</td>
<td>1469</td>
<td>&quot;</td>
</tr>
<tr>
<td>109</td>
<td>1470</td>
<td>&quot;</td>
</tr>
<tr>
<td>110</td>
<td>1472</td>
<td>&quot; with some glauconite.</td>
</tr>
<tr>
<td>111</td>
<td>1473</td>
<td>&quot;</td>
</tr>
<tr>
<td>112</td>
<td>1475</td>
<td>&quot;</td>
</tr>
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Samples No. 107-144, La. Oil and Ref. Co., Tremont No. 2, 38 core samples ranging in depth from 1468' to 1555'; 312.5' East and 345' North of the Southwest corner of the S. W. 1/4 of Sec. 29, T. 10 N., R. 2 E. LaSalle Parish.
113 1476' "
114 1477' "
115 1479' "
116 1480' with some lignite.
117 1481' with some glauconite.
118 1482' gray-brown shale and greensand.
119 1483' chocolate-brown shale and greensand.
120 1484' " with some lignite.
121 1485' "
122 1486' "
123 1487' "
124 1488' " with some greensand.
125 No sample
126 1489' "
127 1490' "
128 1491' " with some lignite.
129 1492' gray-brown silty shale.
130 1493' chocolate-brown silty shale.
131 1494' "
132 1495' "
133 1496' "
134 1497' "
135 1498' dark gray shale.
136 1499' light gray-brown silty shale, lignitic.
137 1503'-1509' light gray silty shale and greensand.
138 1510'-1520' " Discocyclina advena zone.
139 1521'-1531' "
140 1532'-1538' "
141 1539'-1546' greensand and shale.
142 1547'-1550' "
143 1551'-1552' "
144 1553'-1555' gray shale.

Samples No. 145-183, La. Oil and Ref. Co., Tremont No. 1, 39 core samples ranging in depth from 1500' to 1566';
115' South and 150' East of the Northwest corner of the
N. W. ¼ of the E. E. ¼ of Sec. 30, T. 10 N., R. 2 E.
LaSalle Parish.

Sample No. 145 1500' chocolate-brown shale.
146 1501' "
147 1503' gray-brown silty shale, glauconitic.
148 1508' gray shale, very little glauconite.
149 1507½' glauconitic shale and sand, D. advena zone.
150 1508½' gray-brown shale containing glauconite.
151 1511' light gray shale and glauconite.
152 1512: light gray shale and glauconite.
153 1515: "
154 1514: "
155 1515: light to dark gray silty shale and greensand.
156 1516: "
157 1518: "
158 1519: "
159 1522: mostly glauconite, base of D. advena zone.
160 1523: "
161 1525: gray silty shale with some greensand.
162 1526: "
163 1527: "
164 1528: brown-gray shale with some greensand.
165 1530: "
166 1531: gray silty shale with some greensand.
167 1532: "
168 1533: mostly greensand, "salt and pepper" sand.
169 1534: "
170 1536: "
171 1538: "salt and pepper" sand and silty shale.
172 1539: "
173 1540: "
174 1541: "
175 1542: "
176 1543: "
177 1544: "
178 1545: green shale and silty shale.
179 1551: glauconitic silty shale.
180 1552: "
181 1553: "
182 1554: quartz and glauconitic sand and silt.
183 1564: "-1566: "

Samples No. 104-219, Ru. (J. W. Rukas) surface localities in

Natchitoches Parish, Louisiana.

Sample No. 184 Ru. 531, NE 1 of sec. 3, Ashland twp. on road to Strange, La., D. advena zone.
135 Ru. 510, SE 1 3E 1 NW 1 of sec. 8, T. 8 N., R. 8 W.
136 Ru. 503, type locality of Cane River formation, 1 mile N. of Natchitoches, La.
137 Ru. 463, from a hand dug well 42' deep at Limekiln church, NW 1 of sec. 85, T. 9 N., R. 7 W., greensand marl section.
138 Ru. 465, 1.4 miles north of Provencal on Provencal-Kagewood road and .2 mile east of road in creek bed, D. advena zone.
189 Ru. 356, 1.2 miles west of cross-roads east of Victoria Hill, SW ¼ NW ¼ NE ¼ of sec. 24, T. 8 N., R. 9 W., road-cut, top of D. advena zone.

190 Ru. 226, about 0.6 mile west of Provencal on N. side of tracks of T. & F. RR., NW ¼ SW ¼ SE ¼ of sec. 20, T. 9 N., R. 8 W., D. advena zone.

191 Ru. 221, about 3/4 mile south-east of Victoria on road south of and parallel to rail-road, SW ¼ SE ¼ NW ¼ of sec. 19, T. 8 N., R. 8 W., D. advena zone.


198-214 Ru. 516A-Q, NW ¼ NE ¼ NW ¼ of sec. 6, R. 6 W., in center of negro settlement, 40' hole extending from 12' above D. advena zone to 8' below it.

215 Ru. 555, SE ¼ SE ¼ SE ¼ of sec. 17, T. 8 N., R. 8 W., bore-hole atop upper Cane River locality, through lower part of chocolate-brown clay into greensand marl.

216 Ru. 524; 200 yards east of Ru. 523 on north side of road, lower part of chocolate-brown clay section.

217 Ru. 523, SW ¼ NW ¼ SW ¼ of sec. 2, T. 13 N., R. 7 W., in lower part of chocolate-brown clay section.

218 Ru. 511, NW ¼ NW ¼ of sec. 8, Provencal twp., D. advena zone.

219 Ru. 350, about 2.3 miles south of Hagewood on La. route 39 took side-road to west for about 400 yards, in SW ¼ of sec. 8, Provencal twp., D. advena zone.
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<th>Author</th>
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<tr>
<td>Moody, C. L.</td>
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BIOGRAPHY

Keith M. Hussey, was born December 2, 1908, in Rock Island, Illinois. He attended the Rock Island public schools, was graduated from high school in June, 1926. During the summer of 1930, his interest in geology was aroused. The fall of 1931 found him enrolled at Augustana College in his home town. Due to financial difficulties, he was forced to drop out of school for the year of '32-'33. Studies were again resumed, thanks to a position as laboratory assistant, the following year. He lettered in track, joined a Greek letter fraternity, and was charter member of a geology club during the ensuing three years of his undergraduate career. Upon being graduated with an A. B. degree in 1936, he applied for and received a fellowship in the School of Geology at Louisiana State University. There as student and instructor he has spent four very pleasant, very enlightening years. He has spent three summers at the geology field camp in Colorado; has had the privilege of working in the field in Louisiana with various members of the Louisiana Geological Survey; has taken several highly instructive field trips to different points in the Gulf Coast region. He is a member of the Geological and Mining Society of American Universities and an associate member of the American Association of Petroleum Geologists. He collaborated with a fellow graduate student in the writing of a paper which is to be published in the Journal of Paleontology. He received the degree of Master of Science in June, 1939.
The past year has been spent in describing the foraminiferal assemblage of the Cane River, Eocene formation of Louisiana. The completed monograph is to serve as a dissertation in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the School of Geology. Which degree he hopes to merit before leaving Louisiana State University in June, 1940.
EXAMINATION AND THESIS REPORT

Candidate: Keith Morgan Hussey

Major Field: Geology

Title of Thesis: "The Foraminifera of the Cane River Eocene"

Approved:

[Signatures of Major Professor and Chairman and Dean of the Graduate School]

EXAMINING COMMITTEE:

[Signatures of committee members]

Date of Examination: May 7, 1940