The type locality of the Pecan Gap Chalk member of the Taylor marl is in a cut of the Gulf, Colorado, and Santa Fe Railway, ½ mile east of Pecan Gap, Delta Co., Texas. Samples from this chalky material were collected by Cushman and Waters from two levels, called stations 31 and 32, the latter about six feet above the former.

By careful preparation, boiling with soda, and washing the residue gently, a very good fauna was obtained. It is interesting to note that in spite of the fact that the chalky deposits at the type locality are more or less uniform there is a considerable difference in some of the species even in the six-foot gap between the stations. For example, station 32 contains many specimens of *Stensioina americana*, but this species was not found in the material from station 31. On the other hand, station 31 has many more species than station 32 with an indication that ecologically it might have been deposited under somewhat deeper conditions.

Where the synonymy has been given for the various species in fairly recent papers, reference is made to the page where these may be found. Additional species are present from both localities, but represented by immature or poorly preserved specimens which cannot be identified with accuracy, and these are left out.

The following species were found:

**Family REOPHACIDAE**

*Genus REOPHAX* Montfort, 1808

**REOPHAX CONSTRUCTUS** (Reuss)  (Pl. 1, fig. 1)


Test composed of a few, usually 2 or 3, subglobular chambers, in-
creasing very little if at all in diameter; chambers distinct, the later
ones becoming constricted so that the sutures are much depressed;
wall coarsely arenaceous, roughly finished; apertural end when perfect
terminating in a definite neck. Length 1.25 mm.; diameter 0.45 mm.
The American specimens referred to this species may be distinguished
from Reophax texanus by the more elongate chambers and by the very
definitely constricted necks between the chambers. In America this
species occurs mostly in the Taylor marl and its members, but speci-
mens also occur in the Prairie Bluff chalk of Alabama. It is rare at
station 31.

Family AMMODISCIDAE
Genus AMMODISCUS Reuss, 1861
AMMODISCUS CRETAEUS (Reuss) (Pl. 1, fig. 2)
(For references see these Contributions, vol. 10, 1934, p. 45)
A single specimen was found at station 31.

Family LITUOLIDAE
Genus AMMOBACULITES Cushman, 1910
AMMOBACULITES STEPHENSONI Cushman (Pl. 1, fig. 3)
Ammobaculites stephensoni CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 9,
1933, p. 49, pl. 5, fig. 2.
The species is largely confined to the members of the Taylor group.
Specimens occur at station 31.

Family TEXTULARIIDAE
Genus SPIROPECTAMMINA Cushman, 1927
SPIROPECTAMMINA LAEVIS (Roemer), var. CRETOSA Cushman (Pl. 1, fig. 4)
Spiropectammina laevis (ROEMER), var. cretosa CUSHMAN, Contr. Cushman Lab.
Foram. Res., vol. 8, 1932, p. 87, pl. 11, fig. 3.—JENNINGS, Bull. Amer. Pal., vol. 23,
No. 78, 1936, p. 12, pl. 1, fig. 2.—CUSHMAN, Contr. Cushman Lab. Foram. Res.,
vol. 16, 1940, p. 52, pl. 9, fig. 3.—CUSHMAN and TODD, l. c., vol. 18, 1942, p. 25, pl.
5, fig. 1.
Spiropectammina semicomplanata PLUMMER (not CARSEY), Univ. Texas Bull. 3101,
1931, p. 129, pl. 8, fig. 8 (not fig. 7).
This is a common variety throughout the Taylor group with rare
occurrences in the Austin group. It occurs commonly at both stations.

Genus TEXTULARIA Defrance, 1824
TEXTULARIA RIPLEYENSIS W. Berry (Pl. 1, fig. 5)
Art. 19, 1929, p. 4, pl. 2, fig. 2.—CUSHMAN, Tenn. Div. Geol., Bull. 41, 1931, p.
This species is widely distributed throughout the upper and middle parts of the Taylor marl for which it is an excellent index fossil. A few records include the members of the lower part of the Navarro group which have numerous species in common with the Taylor group.

Family VERNEUILINIDAE

Genus TRITAXIA Reuss, 1860

TRITAXIA ELLISORAE Cushman (Pl. 1, fig. 6)

Tritaxia ellisorae Cushman, Special Publ. No. 6, Cushman Lab. Foram. Res., 1936, p. 5, pl. 1, fig. 9; Special Publ. No. 7, 1937, p. 28, pl. 4, figs. 9, 10.

This species was described from material of Pecan Gap chalk age. It occurs at both stations and seems to be an index fossil for this part of the Cretaceous.

Genus PSEUDOCLAVULINA Cushman, 1936

PSEUDOCLAVULINA CLAVATA (Cushman) (Pl. 1, fig. 8)

(For references see these Contributions, vol. 18, 1942, p. 53)

This widely ranging species occurs at both stations.

Genus CLAVULINOIDES Cushman, 1936

CLAVULINOIDES TRILATERA (Cushman) (Pl. 1, fig. 7)

(For references see Special Publ. No. 7, Cushman Lab. Foram. Res., 1937, p. 121)

Typical specimens occur at both stations.

CLAVULINOIDES TRILATERA (Cushman), var. CONCAVA (Cushman) (Pl. 1, fig. 9)

(For references see Special Publ. No. 7, 1937, p. 121)

Specimens were found only at station 32.

CLAVULINOIDES ASPERA (Cushman) (Pl. 1, fig. 10)

(For references see Special Publ. No. 7, 1937, p. 122)

Specimens were found only at station 31.

Genus HETEROSTOMELLA Reuss, 1865

HETEROSTOMELLA AMERICANA Cushman (Pl. 1, figs. 11, 12)

(For references see Special Publ. No. 7, 1937, p. 142)

This is an index fossil for the Taylor group, although a few specimens from the Navarro resemble it. The microspheric and megalo-spheri c forms are quite different in shape as shown in the figures. It is common at both stations.
CONTRIBUTIONS FROM THE CUSHMAN LABORATORY

Family VALVULINIDAE

Genus ARENOBULIMINA Cushman, 1927
ARENOBULIMINA AMERICANA Cushman (Pl. 1, fig. 13)
(For references see Special Pub!. No. 8, 1937, p. 44)

This species ranges from the Austin group upward into the Navarro, but is most abundant in the Taylor group. It occurs at both stations.

Genus EGGERELLA Cushman, 1933
EGGERELLA (?) TROCHOIDES (Reuss) (Pl. 1, fig. 14)
(For references see Special Pub!. No. 8, 1937, p. 46)

This seems to be a characteristic fossil of the upper part of the Taylor group with a very few records from the lower part of the Navarro group. It is rare at station 31.

Genus DOROTHIA Plummer, 1931
DOROTHIA STEPHENSONI Cushman (Pl. 1, figs. 15, 16)

Dorothy stephensoni CUSHMAN, Special Pub!. No. 6, Cushman Lab. Foram. Res., 1936, p. 28, pl. 4, fig. 15; Special Pub!. No. 8, 1937, p. 82, pl. 8, figs. 31, 32.

This is a common species with a wide range in the American Upper Cretaceous, but is especially abundant in the Taylor marl. It occurs at both stations.

Family LAGENIDAE

Genus ROBULUS Montfort, 1808

There are numerous specimens belonging to this genus, but most of the available specimens represent young stages, and, in the present chaotic condition of the Cretaceous species of Robulus, cannot be identified with any reasonable degree of certainty.

EXPLANATION OF PLATE 1
(All figures × 50)

FOR FORAMINIFERAL RESEARCH

Genus PLANULARIA Defrance, 1824

PLANULARIA TRICARINELLA (Reuss) (Pl. 1, fig. 17)

(For references see these Contributions, vol. 17, 1941, p. 69)

The only American Cretaceous record for this species is from the Pecan Gap chalk. It is rare at station 31.

Genus MARGINULINA d’Orbigny, 1826

MARGINULINA STEPHENSONI Cushman


This species apparently ranges from the Austin group to the lower part of the Navarro group. It is rare at station 31.

MARGINULINA MUNDA Cushman (Pl. 1, fig. 22)


This species is recorded only from its type locality, the upper part of the Taylor marl, 0.3 miles by road SE. of Gastonia, Kaufman Co., Texas. It is rare at station 31.

MARGINULINA cf. RECTA (d’Orbigny) (Pl. 1, fig. 18)

A few specimens from station 31 are apparently related to this species described by d’Orbigny from the Cretaceous, White Chalk, of the Paris Basin. It occurs rarely in the upper part of the Taylor marl of Texas.

MARGINULINA CRETACEA Cushman (Pl. 1, fig. 18)


The range of this species is apparently confined to the Taylor group and the lower part of the Navarro group. It occurs at both stations.

EXPLANATION OF PLATE 2

(Figs. 1 and 33, X 38; others, X 50)

CONTRIBUTIONS FROM THE CUSHMAN LABORATORY

**Marginulina cf. Triplicata** (Reuss) (Pl. 1, fig. 20)


The few occurrences of this form are from the Taylor group and the Neylandville marl of the lower part of the Navarro group. It occurs rarely at station 31.

**Marginulina bullata** Reuss (Pl. 1, fig. 21)


The American Cretaceous occurrences of this species are almost entirely in the Taylor group, with very rare ones in the lower part of the Navarro group. It is rare at station 31.

**Marginulina sp.** (Pl. 1, fig. 23)

A single incomplete specimen from station 32 is figured. The same form was found in a sample of the upper part of the Taylor marl, branch of Kickapoo Creek, 1200 feet S. of public road, 1.8 miles NW. of Annona, Red River Co., Texas. It may prove to be a good index fossil for this part of the Taylor.

**Genus Dentalina** d'Orbigny, 1826

**Dentalina Alternata** (Jones) (Pl. 1, fig. 31)

(For references see these Contributions, vol. 16, 1940, p. 76)

Specimens of this species are easily broken and only fragmentary ones occur at both stations. It ranges from the upper part of the Austin group into the lower part of the Navarro group.

**Dentalina Gracilis** d'Orbigny (Pl. 1, fig. 28)

(For references see these Contributions, vol. 18, 1942, p. 57)

Specimens referable to this species occur throughout most of the American Upper Cretaceous section. It is rare at station 31.

**Dentalina Lorneliana** d'Orbigny (Pl. 1, fig. 24)

(For references see these Contributions, vol. 16, 1940, p. 77)

This widely ranging species occurs at station 31.

**Dentalina Basitorta** Cushman (Pl. 1, fig. 25)

Dentalina basitorta CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 14, 1938, p. 37, pl. 6, figs. 4, 5; vol. 16, 1940, p. 80, pl. 13, figs. 21, 22.—CUSHMAN and HEDBERG, I. c., vol. 17, 1941, p. 88, pl. 21, fig. 24.

This species is almost entirely confined to the Taylor marl or its equivalents. It occurs at station 31.

**Dentalina Aculeata** d'Orbigny (Pl. 2, fig. 11)

FOR FORAMINIFERAL RESEARCH

1, figs. 2, 3.—Reuss, in Geinitz, Grundr. Verstein., 1845-46, p. 654, pl. 24, fig. 10.
—Cushman, Journ. Pal., vol. 6, 1932, p. 335, pl. 50, fig. 7.

Broken specimens referable to this species occur at both stations. No complete specimens have been obtained. They may possibly belong to Ramulina.

**Dentalina Megalopolitana** Reuss (Pl. 1, fig. 27)

(For references see these Contributions, vol. 16, 1940, p. 80)

In the American Cretaceous, specimens referable to this species occur mostly in the Taylor marl or its equivalents, but there are a few records from the Navarro group. It is rare at station 32.

**Dentalina Catenua** Reuss (Pl. 1, fig. 27)


This species seems to be largely confined to the upper and middle parts of the Taylor group with a few records from the lower part of the Navarro group. It occurs in some numbers at station 31.

**Dentalina Solvata** Cushman (Pl. 1, fig. 29)


Typical specimens occur at station 31. Most of the occurrences of this species are in the Taylor group with rare ones in the Austin and lower part of the Navarro group.

Genus Nodosaria Lamarck, 1812

**Nodosaria Affinis** Reuss (Pl. 2, fig. 1)

(For references see these Contributions, vol. 18, 1942, p. 58)

This widely ranging species occurs at both stations.

**Nodosaria cf. Aspera** Reuss (Pl. 1, fig. 19)

(For references see these Contributions, vol. 16, 1940, p. 88)

The American Cretaceous records for this species are almost entirely from beds of Taylor age. It is very rare at station 31.

**Nodosaria Obscura** Reuss (Pl. 2, fig. 2)

(For references see these Contributions, vol. 16, 1940, p. 90, and additions below)


The species in the American Upper Cretaceous occurs mainly in the upper beds of Taylor age and lower beds of Navarro age. The above additional records are from the Lower Cretaceous. It occurs rarely at station 31.
Nodosaria proboscidea Reuss (Pl. 2, fig. 3)


The few American Cretaceous records for this species are from the upper part of the Taylor marl. It is rare at station 31.

Genus PSEUDOGLANDULINA Cushman, 1929

Pseudoglandulina lagenoides (Olszewski) (Pl. 2, fig. 4)

For references see these Contributions, vol. 17, 1941, p. 89

The American records for this species are from the beds of Navarro age and the upper beds of Taylor age. Specimens occur at station 31.

Genus SARACENARIA Defrance, 1824

Saracenaria triangularis (d'Orbigny) (Pl. 2, fig. 5)


There are numerous Cretaceous records for this species, many of them not typical. In the American Cretaceous it ranges from the Austin group into the lower beds of Navarro age, but is most common in the Taylor group. It occurs at both stations.

Genus PALMULA Lea, 1833

Palmula rugosa (d'Orbigny) (Pl. 2, fig. 6)


In the American Cretaceous this species is most frequent in beds of Taylor age, although the records include a few in the Navarro group and one in the upper part of the Austin group. It occurs at both stations.

Genus FRONDICULARIA Defrance, 1826

Frondicularia goldfussi Reuss

(For references see these Contributions, vol. 17, 1941, p. 91)

The American Cretaceous records are mostly from the beds of Taylor age with a few from the upper part of the Austin group. It is rare at station 31.

Frondicularia linearis Franke (Pl. 2, fig. 7)

(For references see these Contributions, vol. 12, 1936, p. 21)

In the American Cretaceous the range of this species seems to be from the upper beds of Austin age through most of the beds of Taylor age. It is rare at station 31.
FOR FORAMINIFERAL RESEARCH

FRONDICULARIA INTERMITTENS Reuss (Pl. 2, fig. 10)
(For references see these Contributions, vol. 18, 1942, p. 61)

This species is a characteristic one of beds of Taylor age, especially of the upper part. It is rare at station 31.

FRONDICULARIA FRANKEI Cushman (Pl. 2, fig. 9)
(For references see these Contributions, vol. 12, 1936, p. 18)

This species is characteristic of the upper and middle beds of Taylor age, although there are a few records from the lower beds of Navarro age. Typical specimens occur at station 31.

FRONDICULARIA ARCHIACIANA d'Orbigny (Pl. 2, fig. 8)
(For references see these Contributions, vol. 12, 1936, p. 19)

This species, in the American Cretaceous, is characteristic of beds of Taylor age with a few records from the lower beds of Navarro age. It occurs rarely at both stations.

Genus LAGENA Walker and Jacob, 1798

LAGENA cf. ACUTICOSTA Reuss (Pl. 2, fig. 12)

Specimens referred to this species occur commonly at station 32 but very rarely at station 31.

LAGENA cf. APICULATA Reuss (Pl. 2, fig. 13)

A single specimen from station 31 may be referred to this species.

LAGENA cf. SUBSTRIATA Williamson (Pl. 2, fig. 14)

A single specimen from station 31 resembles this species.

Family POLYMORPHINIDAE

Genus GLOBULINA d'Orbigny, 1826

GLOBULINA cf. LACRIMA Reuss (Pl. 2, fig. 15)

A single specimen from station 32 may be referred questionably to this species.

Genus PYRULINA d'Orbigny, 1839

PYRULINA cf. CYLINDROIDES (Roemer) (Pl. 2, fig. 16)

Rare specimens from station 31 seem related to this species.

Genus BULLOPORA Quenstedt, 1856

BULLOPORA LAEVIS (Sollas) (Pl. 2, fig. 33)
(For references see these Contributions, vol. 19, 1943, p. 63)

This species seems to have a wide vertical range from the upper part of the Austin group to the Navarro. The specimen from station 31 shows several connected chambers attached to a small pebble.
Family HETEROHELICIDAE

Genus BOLIVINOPSIS Yakovlev, 1891

BOLIVINOPSIS ROSULA (Ehrenberg) (Pl. 2, fig. 17)

(For references see these Contributions, vol. 19, 1943, p. 64)

This species has a wide range in the American Upper Cretaceous. It occurs at both stations.

Genus GÜMBELINA Egger, 1899

GÜMBELINA PLUMMERAe Loetterle (Pl. 2, fig. 18)

(For references see these Contributions, vol. 18, 1942, p. 62)

The range of this species is from the upper beds of Austin age through the Taylor group and into the Neylandville marl of the lower part of the Navarro group. It occurs at both stations.

GÜMBELINA STRIATA (Ehrenberg) (Pl. 2, fig. 19)

(For references see these Contributions, vol. 18, 1942, p. 63)

While the range of this species in the American Cretaceous is from beds of Austin age through the Taylor group into the Neylandville marl of the lower part of the Navarro group, it is found most frequently in the upper beds of Taylor age. It occurs at station 31.

GÜMBELINA PLANATA Cushman (Pl. 2, fig. 20)


This species is known only from the upper portion of the Taylor marl. It occurs rarely at station 31.

GÜMBELINA PSEUDOTESSERA Cushman

Gümbelina tessera Cushman (not Grammostomum tessera Ehrenberg), Journ. Pal., vol. 6, 1932, p. 338, pl. 51, figs. 4, 5.—Loetterle, Nebraska Geol. Survey, 2d ser., Bull. 12, 1937, p. 34, pl. 5, fig. 4.


This species apparently ranges through the Austin and Taylor groups. It occurs at station 32.

GÜMBELINA GLOBOCARINATA Cushman (Pl. 2, fig. 21)


From available records the vertical range of this species seems to be from the Austin group, through the Taylor, and into horizons equivalent to the Neylandville marl of the Navarro group, but not above. It occurs at station 32.

Genus BOLIVINOIDES Cushman, 1927

BOLIVINOIDES DECORATA (Jones) (Pl. 2, fig. 23)

Bolivina decorata Jones (in Wright), Proc. Belfast Nat. Field Club, 1884-85 (1886),
FOR FORAMINIFERAL RESEARCH

Appendix 9, p. 330, pl. 27, figs. 7, 8.—Wright (in Welch), Irish Naturalist, 1902, p. 179 (list).—Heron-Allen and Earland, Journ. Roy. Micr. Soc., 1909, p. 336; 1910, p. 409, pl. 7, figs. 1, 2.—Macfadyen, Geol. Mag., vol. 69, 1932, p. 487 (list), pl. 35, fig. 20.


The typical form of the species occurs most commonly in the upper and middle beds of Taylor age with rare occurrences in the Navarro group. It is common at both stations.

**Bolivinoides decorata (Jones), var. Delicatula Cushman** (Pl. 2, fig. 22)


The variety has nearly the same range as the typical form, but is usually less common and frequently does not occur with it. It is present at station 31.

**Genus Eouvigerina Cushman, 1926**

_Eouvigerina gracilis_ Cushman (Pl. 2, fig. 20)


This species seems to be an index fossil for Cretaceous beds of Taylor age. It is rare at station 31.

**Genus Pseudouvigerina Cushman, 1927**

_Pseudouvigerina cretacea_ Cushman (Pl. 2, fig. 31)


_Pseudouvigerina plummerae_ Cushman (not Cushman, 1927), Journ. Pal., vol. 5, 1931, p. 309, pl. 35, fig. 18.

The few records for this species give it a wide range from Austin to Navarro. It occurs at station 31.
A single incomplete specimen from station 31 is the only one referable to this species.

Family BULIMINIDAE

Genus BULIMINELLA Cushman, 1911

BULIMINELLA CARSEYAE Plummer (Pl. 2. fig. 24)

Bulimina compressa Carsey (as n. sp.), Univ. Texas Bull. 2612, 1926, p. 29, pl. 4, fig. 14.


The range of this species is from the Austin group to the lower part of the Navarro group. It occurs commonly at both stations.

Genus BULIMINA d'Orbigny, 1826

BULIMINA REUSSI Morrow (Pl. 2. fig. 25)

(For references see these Contributions, vol. 17, 1941, p. 95)

The range of this species is from the Austin group through the Taylor to beds of early Navarro age. It occurs at both stations.

Genus NEOBULIMINA Cushman and Wickenden, 1928

NEOBULIMINA cf. SPINOSA Cushman and Parker

A few specimens from station 31 may be referred to this species. The known range is through beds of Taylor age into the lower beds of Navarro age.

Genus VIRGULINA d'Orbigny, 1826

VIRGULINA TEGULATA Reuss (Pl. 2. fig. 26)


This species extends throughout the American Cretaceous except the upper beds of Navarro age. It occurs at both stations.

Genus BOLIVINA d'Orbigny, 1839

BOLIVINA CRETOSA Cushman (Pl. 2. fig. 27)

(For references see Special Publ. No. 9, 1937, p. 43)

The range of this species is mostly in beds of Taylor age with a few records from the Navarro group. It occurs at both stations.

Genus LOXOSTOMA Ehrenberg, 1854

LOXOSTOMA CUSHMANI Wickenden (Pl. 2. fig. 28)

(For references see these Contributions, vol. 18, 1942, p. 63)

The range of this species is mostly confined to beds of Austin and
Taylor age. It is fairly common at station 31, but the crenulations are not strongly developed, and are only near the apertural end.

Family ELLIPSOIDINIDAE
Genus PLEUROSTOMELLA Reuss, 1860
PLEUROSTOMELLA SUBNODOSA Reuss (Pl. 2, fig. 29)
(For references see Journ. Pal., vol. 6, 1932, p. 341)
This seems to be an index fossil for beds of Taylor age. It occurs at both stations. Cole records it from Selma chalk well samples from Florida (Florida Dept. Conservation, Geol. Bull. 16, 1938, p. 35 (list), pl. 4, fig. 7).

Genus NODOSARELLA Rzehak, 1895
NODOSARELLA GRACILLIMA Cushman (Pl. 2, fig. 32)
Nodosarella sp. Morrow, Journ. Pal., vol. 8, 1934, p. 197, pl. 29, figs. 2, 3.
This species is found mostly in beds of Austin age and in the lower beds of the Taylor group. It is rare at station 31.

Family ROTALIIDAE
Genus VALVULINERIA Cushman, 1926
VALVULINERIA PLUMMERAE Loetterle (Pl. 3, fig. 1)
Gyroidina nitida PLUMMER (not REUSS), Univ. Texas Bull. 3101, 1931, p. 191, pl. 14, fig. 5.
Valvulineria plummerae LOETTERLE, Nebraska Geol. Survey, 2d ser., Bull. 12, 1937, p. 41, pl. 6, figs. 5, 6.
This species occurs in beds of Austin and Taylor age. It occurs at station 31.

Genus GYROIDINA d'Orbigny, 1826
GYROIDINA DEPRESSA (Alth) (Pl. 3, fig. 2)
(For references see these Contributions, vol. 17, 1941, p. 97)
This is a wide ranging species in the American and European Cretaceous. It is very rare at station 31.

GYROIDINA GLOBOSA (Hazenov) (Pl. 3, fig. 3)
(For references see these Contributions, vol. 17, 1941, p. 97)
This species is particularly characteristic of beds of Taylor age, but it extends also into the upper beds of Austin age and lower beds of Navarro age. It occurs at both stations.

GYROIDINA cf. GIRARDANA (Reuss)
A few specimens from station 31 have an angled periphery, and may be placed under this species. It is variable in this character, however.
Genus STENSIÖINA Brotzen, 1936

STENSIÖINA AMERICANA Cushman and Dorsey (Pl. 3, fig. 4)

Cibicides exocolata Cushman (not Truncatulinia exocolata Cushman, 1926), Journ. Pal., vol. 5, 1931, p. 315, pl. 36, fig. 8; l. c., vol. 6, 1932, p. 345.

Stenisiöina exocolata Cole (not Cushman), Florida Dept. Conservation, Geol. Bull. 16, 1938, p. 35 (list), pl. 3, figs. 2, 3.


This species ranges throughout beds of Taylor age, and occurs less commonly in the lower beds of Navarro age. It is common at station 32, but was not found at all at station 31.

Family CASSIDULINIDAE

Genus PULVINULINELLA Cushman, 1926

PULVINULINELLA TEXANA Cushman (Pl. 3, fig. 5)


This is a characteristic species of beds of Taylor age with rare occurrences in the Neylandville marl and Saratoga chalk of the lower part of the Navarro group. It is common at both localities.

Family CHILOSTOMELLIDAE

Genus ALLOMORPHINA Reuss, 1850

ALLOMORPHINA MINUTA Cushman (Pl. 3, fig. 7)


Previous records are from the upper part of the Austin chalk. This is the first record from beds of Taylor age. It occurs rarely at station 31.

Genus PULLENIA Parker and Jones, 1862

PULLENIA AMERICANA Cushman (Pl. 3, fig. 6)

(For references see these Contributions, vol. 19, 1943, p. 7)

This species is most common in beds of Taylor age, but also occurs in those of Navarro age, especially the lower part. It occurs at both stations.

Family GLOBIGERINIDAE

Specimens belonging to the genera Globigerina and Globigerinella occur at both stations. Specific names cannot be given until more work is done on the types of the various species.

Family GLOBOROTALIIDAE

Genus GLOBOTRUNCANA Cushman, 1927

GLOBOTRUNCANA CANALICULATA (Reuss) (Pl. 3, fig. 8)


This species has a wide range in the American Cretaceous. It occurs at both stations.

Globotruncana marginata (Reuss) (Pl. 3, fig. 9)
Rosalina marginata Reuss, Verstein. böhm. Kreide., pt. 1, 1845, p. 36, pl. 8, figs. 54, 74; pl. 13, fig. 68.


Typical specimens of this species are most common in beds of Austin age and lower beds of Taylor age, although it occurs also in beds referred to the Neylandville marl of Navarro age. It occurs only at station 31.

Globotruncana arca Cushman (Pl. 3, fig. 10)
(For references see these Contributions, vol. 19, 1943, p. 71)

Nearly all the records for this species are from beds of Taylor age with a very few from the Navarro group. It occurs at both stations, more abundantly at station 31.

Globotruncana fornicata Plummer (Pl. 3, fig. 11)
(For references see these Contributions, vol. 17, 1941, p. 99)

The range of this species is through the Taylor group up to the Neylandville marl of the Navarro. It occurs very rarely in the Corsicana marl member of the Navarro group (Cushman and Todd, Contr. Cushman Lab. Foram. Res., vol. 19, 1943, p. 71). Specimens referred to this species occur at both stations.

Genus GLOBOROTALIA Cushman, 1927

Globorotalia micheliniana (d'Orbigny) (Pl. 3, fig. 13)

Globorotalia micheliniana Cushman, Contr. Cushman Lab. Foram. Res., vol. 7, 1931, p. 45, pl. 6, fig. 8; Special Publ. No. 5, 1933, pl. 35, fig. 13; Foraminifera, their Classification and Economic Use, 3rd Ed., 1940, Key, pl. 35, fig. 13.

Gyroidina micheliniana Cushman, Journ. Pal., vol. 6, 1932, p. 342, pl. 51, fig. 12.
Eponides micheliniana Plummer, Univ. Texas Bull. 3101, 1931, p. 192, pl. 14, fig. 11.
Truncatulina refugens (Montfort), var. conica Carsey, l. c., Bull. 2612, 1926, p. 46, pl. 4, fig. 15.

Although from a few localities in beds of Austin age, the largest number of records is from beds of Taylor age. The species is especially abundant in the more chalky phases of the middle and upper beds. It is common at both stations.

**GLOBOROTALIA MEMBRANACEA** (Ehrenberg) (Pl. 3, fig. 12)
(For references see these Contributions, vol. 19, 1943, p. 71)

The American Cretaceous records are mostly from the Velasco shale of Mexico. It occurs also in the Corsicana marl member of the upper part of the Navarro. A very few specimens apparently of this species occur at station 32.

**Family ANOMALINIDAE**

**Genus ANOMALINA** d'Orbigny, 1826

**ANOMALINA AMMONOIDES** (Reuss) (Pl. 3, fig. 14)


The range of this species in the American Cretaceous is apparently limited to beds of Austin and Taylor age. It is common at both stations.

**ANOMALINA PINGUIS** Jennings (Pl. 3, fig. 15)

*Anomalina pinguis* Jennings, Bull. Amer. Pal., vol. 23, No. 78, 1936, p. 37, pl. 5, fig. 1.

*Anomalina grosserugosa* PLUMMER (not GÜMBEL), Univ. Texas Bull. 3101, 1931, p. 201, pl. 14, fig. 9.

Specimens from both stations seem to be identical with this species.

**Genus PLANULINA** d'Orbigny, 1826

**PLANULINA TAYLORENSIS** (Carsey) (Pl. 3, fig. 17)
(For references see these Contributions, vol. 18, 1942, p. 15)

This species is particularly characteristic of beds of Taylor age with a few records from the lower beds of Navarro age. It is common at both stations.

**Genus CIBICIDES** Montfort, 1808

**CIBICIDES STEPHENSONI** Cushman (Pl. 3, fig. 16)

*Cibicides stephensoni* CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 14, 1938, p. 70, pl. 12, fig. 5; vol. 16, 1940, p. 37, pl. 7, fig. 2.

This species is most common in the upper beds of Taylor age, but extends upward into the lower beds of Navarro age. It occurs at both stations.

**CIBICIDES BEAUMONTIANUS** (d'Orbigny) (Pl. 3, fig. 18)
(For references see these Contributions, vol. 16, 1940, p. 39)
In the American Cretaceous the range of this species is from the Annona chalk member of the Taylor to the Saratoga chalk member of the Navarro. It is common at both stations.

**Cimicides cf. Constrictus** (Hagenow) (Pl. 3, fig. 19)

(For references see these Contributions, vol. 16, 1940, p. 40)

A few specimens from station 32 resemble this species. It has been previously recorded from the Saratoga chalk.

**FORAMINIFERA FROM THE AQUIA FORMATION OF VIRGINIA**

*By Joseph A. Cushman*

Although the mega-fossils of the Eocene of the Atlantic Coastal Plain region of the United States are fairly well known, very little is recorded in regard to micro-fossils, especially the Foraminifera. Recent well drillings in eastern Virginia have produced samples which it is important to have placed correctly as to their geologic age. The samples are often fairly rich in foraminifera, but faunas recorded in the literature with which they may be compared are mostly from rather remote areas. To make available data from the immediate areas, field samples were collected by Mr. D. J. Cederstrom of the U. S. Geological Survey. This work was done as part of the cooperative investigation of Coastal Plain geology and ground water resources by the State and Federal Surveys. The samples have been prepared and the faunas mounted for study. The results are given in the following pages.

There are a few species represented by single specimens or immature or broken ones that are not included here. The relationships of the fauna are very interesting, and definitely place the age of the beds as Wilcox Eocene. The fauna as a whole indicates that it lived in waters of considerable depth.

Undoubtedly some of the species recorded by Bagg in the Eocene volume of the Maryland Geological Survey (1901) are of equivalent age with these from Virginia. No attempt has been made to place these in the synonymy as the figures are somewhat conventionalized, and the actual specimens should be studied.

The collections included here from Marlboro Point are from prac-


*Published by permission of the Acting Director, United States Geological Survey.*
tically the type locality of the Aquia formation. This section is proba-
bly identical with Gildersleeve's Section 2. The sample from the
Turritella beds at Fairview Beach may be compared with Gildersleeve's
Section 6, and may possibly be classed as belonging to the Nan-
jemoy formation. The third locality contains Eocene mega-fossils. The
three localities have many species in common, as will be shown.

List of Stations
From Marlboro Point, between the mouths of Potomac and Aquia
1. 0-2 feet.
2. 2-8 feet.
3. 8-14 feet, to bottom of first ledge.
4. In first rock layers at 15 feet.
5. 16-19 feet, above first rock layer.
6. 19-22 feet, below second rock layer.
7. 22-28 feet.
8. 28-34 feet.
9. 40-46 feet.
10. 52-58 feet.

From Fairview Beach, south shore of Potomac River, south of Mary-
land Point, King George Co., Va.

From 0.5 mi. SE. Stafford Court House, Stafford Co., Va., elev. 180 ft.
12. Eocene rocky fossil ledge.

Family SACCAMMINIDAE
Genus SACCAMMINA M. Sars, 1869

SACCAMMINA SPHAERICA M. Sars (Pl. 3, fig. 20)

Rare specimens resembling this species occur at station 10. The
only previous American Tertiary record for this species is that of Cole
from the Eocene, Chapapote formation, of Mexico. (Bull. Amer. Pal.,
vol. 14, No. 53, 1928, p. 204 (4), pl. 3, fig. 15).

Family REOPHACIDAE
Genus REOPHAX Montfort, 1808

REOPHAX CURTUS Cushman (Pl. 3, fig. 21)

3 L. c., p. 21.
Univ., ser. 4, Biol., vol. 6, 1931, p. 57, text fig. 8.—EARLAND, Discovery Rep'ts,
This species has not previously been recorded as a fossil. Specimens are typical, having three chambers in the adult, rapidly increasing in size, and composed of coarse grains. The species is fairly common at station 11, and rare at stations 6, 9, and 12.

A single specimen, apparently the later chambers of a species of *Reophax*, also occurred and is figured for reference (Pl. 3, fig. 22).

**Family LITUOLIDAE**

*Genus HAPLOPHRAGMOIDES* Cushman, 1910

**HAPLOPHRAGMOIDES** (Pl. 3, fig. 23)

The figured specimen from station 5 is the only representative of this species. It is a much compressed form with very indistinct sutures.

**HAPLOPHRAGMOIDES** sp. *SPHAEERILOCULUM* Cushman (Pl. 3, fig. 24)

There are no fossil records for this species, but these specimens from Virginia are very similar to Recent ones. They are rare at stations 11 and 12.

*Genus AMMOBACULITES* Cushman, 1910

**AMMOBACULITES** sp. (Pl. 3, fig. 25)

Although represented by but a single specimen from station 12, it seems definite enough in its characters to be placed on record until more specimens may be found.

**Family TEXTULARIIDAE**

*Genus SPIROPLECTAMMINA* Cushman, 1927

**SPIROPLECTAMMINA WILCOXENSIS** Cushman and Ponton (Pl. 3, figs. 26, 27)


This is a characteristic and common species of the Wilcox Eocene. It was described from the Tuscahoma sand, RR. cut, 1 mi. N. of Ozark, Ala., and has been recorded from the Bashi formation of Woods Bluff and near Yellow Bluff, Alabama. Toulmin recorded it from the Wilcox, Salt Mountain limestone, of Clark Co., Ala. It is abundant in the Virginia material, occurring at stations 3, 4, 6, 7, 9, 10, 11, and 12.

**Family VERNEUILINIDAE**

*Genus GAUDRYINA* d'Orbigny, 1839

**GAUDRYINA** sp.

A few very small specimens probably belong to *Gaudryina*, but it
seems best to await more material before trying to specifically identify them. They are rare at stations 5, 11, and 12.

Family TROCHAMMINIDAE
Genus TROCHAMMINA Parker and Jones, 1859

TROCHAMMINA HOWEI Cushman, n. sp. (Pl. 3, fig. 28)
Test small, dorsal side slightly convex, ventral side less convex, somewhat umbilicate, periphery broadly rounded, composed of about three whorls; chambers four to the whorl, gradually increasing in size, those of the adult whorl increasing only slightly, somewhat inflated, especially on the ventral side; sutures nearly straight, slightly depressed on the dorsal side, nearly radial and strongly depressed on the ventral side; wall distinctly arenaceous but smoothly finished; aperture on the ventral side of the last-formed chamber, elongate, slightly arched, with a slightly developed, overhanging lip. Length 0.30-0.38 mm.; breadth 0.24-0.30 mm.; thickness 0.07-0.09 mm.

Holotype (Cushman Coll. No. 39685) from the Eocene, Aquia formation, Turritella beds, Fairview Beach, King George Co., Va.

The species differs from Trochammina teasi Cushman and Ellisor of the Eocene of Texas in the less compressed test, rounded periphery, and umbilicate ventral side, and from T. claibornensis Howe from the Claiborne Eocene of Louisiana in the much broader chambers, straight sutures, and umbilicate ventral side. The new species is named in honor of Dr. H. V. Howe.

Family LAGENIDAE
Genus ROBULUS Montfort, 1808

ROBULUS WILCOXENSIS Cushman and Ponton (Pl. 3, figs. 29, 30)

This characteristic species was described from material of Wilcox Eocene age, Tuscaloosa sand, RR. cut, 1 mi. N. of Ozark, Ala. Toulmin recorded it from the Wilcox Eocene, Salt Mountain limestone, of Clark Co., Ala., and from the upper Midway limestone of Fort Gaines, Ala. Cushman and Todd recorded it from the Paleocene, Naheola formation, of Alabama. In the Virginia material it is common, and occurs at stations 7, 8, 9, 10, and 11.

ROBULUS cf. KNIGHTI Toulmin (Pl. 4, fig. 1)
A single specimen from station 10 resembles this species described
FOR FORAMINIFERAL RESEARCH

from the Wilcox Eocene, Salt Mountain limestone, of Alabama, but it is not entirely typical.

**ROBULUS sp.** (Pl. 4, fig. 2)

The figured specimen is very similar to that figured by Howe from the Cook Mountain Eocene as "Lenticulina guayabalensis Cole" (Geol. Bull. 14, Louisiana Geol. Survey, 1939, p. 42, pl. 5, fig. 7). A comparison with paratypes of Cole's species shows it not to be the same. His Mexican form has straighter sutures, more strongly developed keel, and higher umbo.

**Genus DARBYELLA Howe and Wallace, 1933**

**DARBYELLA WILCOXENSIS Cushman and Garrett** (Pl. 4, fig. 3)


The types of this species are from the Wilcox Eocene, Bashi formation, of Woods Bluff, Ala. It has been recorded from the Eocene "Tejon" of the Chico Martinez Creek area, Kern Co., Calif. The only specimen found in the Virginia material is that figured. It is from station 11 and is typical.

**Genus MARGINULINA d'Orbigny, 1826**

**MARGINULINA cf. EXQUISITA (Toulmin)** (Pl. 4, fig. 6)

The specimen figured resembles the species described by Toulmin from the Salt Mountain limestone of Alabama (Journ. Pal., vol. 15, 1941, p. 583, pl. 79, fig. 7). It is a megalospheric specimen from station 6.

**MARGINULINA sp.** (Pl. 4, fig. 4)

A very few specimens of the form figured occur at stations 6 and 7. They are very close to the form figured by Toulmin from the Salt Mountain limestone of Alabama as "Vaginulinopsis brantleyi (Garrett)" (Journ. Pal., vol. 15, 1941, p. 583, pl. 79, figs. 8-10). This is not the same as *Hemicristellaria brantleyi* Garrett (Journ. Pal., vol. 15, 1941, p. 154, pl. 26, figs. 1-4) as shown by comparison with specimens kindly furnished by Messrs. Garrett and Toulmin. Our species is smaller, more compressed, and much less highly ornamented.

**Genus DENTALINA d'Orbigny, 1826**

**DENTALINA cf. COMMUNIS d'Orbigny** (Pl. 4, fig. 7)

Specimens of the form illustrated here have been figured in the literature under many names. They occur rarely at stations 1, 3, 4, and 8, and are fairly common at stations 6 and 7.
DENTALINA of HEXACOSTATA Howe (Pl. 4, fig. 11)
The single two-chambered specimen figured from station 7 seems probably to be the young stage of the species described by Howe from the Eocene, Cook Mountain formation, of Louisiana (Geol. Bull. 14, Louisiana Geol. Survey, 1939, p. 44, pl. 5, fig. 13).

DENTALINA VIRGINIANA Cushman, n. sp. (Pl. 4, figs. 8, 9)
Test small, consisting of 4 or 5 chambers, initial end with a short spine, apertural end slightly projecting; chambers nearly uniform in size, somewhat inflated; sutures slightly depressed, usually more so on one side than the other; wall ornamented with longitudinal costae, 7 or 8 in number, continuous over the sutures, typically somewhat spiral in position, the last chamber often smooth; aperture, terminal, radiate, slightly projecting. Length 0.75–0.85 mm.; diameter 0.18 mm.

Holotype (Cushman Coll. No. 39705) from the Eocene, Aquia formation, 22'–28' sample, section at Marlboro Point, Stafford Co., Va.

This species is close to Nodosaria milamensis Howe from the Eocene, Cook Mountain formation, of Louisiana, but differs in the dentaline form, smaller size, fewer costae, and their inclination to be spiral. The species also occurs at station 6. It is very constant in its size and other characters.

DENTALINA WILCOXENSIS Cushman (Pl. 4, fig. 10)

The types of this species are from the Wilcox Eocene, Bashi formation, from near Yellow Bluff, Ala. It occurs very rarely at station 6.

There are a few other forms in the Virginia material that may be assigned to Dentalina, but they are represented by single or broken specimens.

Genus VAGINULINA d'Orbigny, 1826

VAGINULINA PLUMOIDES Plummer, var. VIRGINIANA Cushman, n. var. (Pl. 4, fig. 5)

Variety differing from the typical in the more strongly curved sutures, more strongly developed costae, especially on the dorsal side, which is decidedly thickened, and the fewer chambers.

Holotype of variety (Cushman Coll. No. 39718) from the Eocene, Aquia formation, 8'–14' sample, to bottom of first ledge, Marlboro Point, Stafford Co., Va.

The few specimens found are distinctive, and may represent a new species. It is evidently related to and possibly derived from V. plumoides Plummer of the Paleocene of Texas.
Family POLYMORPHINIDAE

Genus GUTTULINA d'Orbigny, 1839

GUTTULINA cf. PROBLEMA d'Orbigny (Pl. 4, fig. 14)

Specimens, mostly representing immature individuals, from stations 1, 2, 4, 6, and 10 may be referred to this species, although few of them have reached their full development.

GUTTULINA cf. WILCOXENSIS Cushman and Ponton

A few immature specimens from stations 5 and 7 probably represent the young stages of this species.

Genus GLOBULINA d'Orbigny, 1839

GLOBULINA GIBBA d'Orbigny (Pl. 4, figs. 17, 18)

Specimens which seem identical with this species were found at stations 1, 2, 3, 6, 7, 9, 10, and 11.

Genus PYRULINA d'Orbigny, 1839

PYRULINA sp. (Pl. 4, fig. 16)

The single specimen figured from station 1 is the only representative of this genus in the collection.

Genus GLANDULINA d'Orbigny, 1826

GLANDULINA LAEVI GATA d'Orbigny, var. (Pl. 4, fig. 20)

Two specimens from station 6 belong to this genus, as the arrangement of the early chambers shows. They resemble var. ovata (Cushman and Applin), but are not exactly the same when compared with the types.

Genus PSEUDOPOLYMORPHINA Cushman and Ozawa, 1928

PSEUDOPOLYMORPHINA WILCOXENSIS Cushman and Ponton (Pl. 4, fig. 19)

Pseudopolymorpha wilcoxensis CUSHMAN and PONTON, Contr. Cushman Lab. Foram. Res., vol. 8, 1932, p. 61, pl. 8, figs. 5, 6.—CUSHMAN and GARRETT, l. c., vol. 15, 1939, p. 81, pl. 14, fig. 11.

The types of this species are from the Wilcox Eocene, Tuscahoma sand, RR. cut, 1 mi. N. of Ozark, Ala., and it has also been recorded from the Wilcox, Bashi formation, of Woods Bluff, Ala. It is common in the Virginia material at stations 1, 2, 3, 4, 6, 7, 8, 10, and 11.
Genus SIGMOMORPHINA Cushman and Ozawa, 1928

SIGMOMORPHINA SEMITECTA (Reuss) var. TERQUEMIANA (Forasini) (Pl. 4, fig. 15)

(For references see these Contributions, vol. 19, 1943, p. 37)

There are numerous records for this variety from the American Eocene, including the Claiborne and Jackson, and from the Paleocene Midway. It is fairly common in the Virginia material, occurring at stations 1, 2, 3, 6, 7, 8, 9, and 11.

Family BULIMINIDAE

Genus BULIMINA d'Orbigny, 1826

BULIMINA OVATA d'Orbigny (Pl. 4, figs. 21, 22)

This species has been recorded from much of the Tertiary of America, including some Wilcox Eocene records. Specimens occur commonly at stations 7, 8, 9, and 11.

Genus VIRGULINA d'Orbigny, 1826

VIRGULINA WILCOXENSIS Cushman and Ponton (Pl. 4, fig. 24)


The types of this species are from the Wilcox Eocene, Tuscahoma sand, RR. cut, 1 mi. N. of Ozark, Ala. It is also recorded from the Wilcox, Bashi formation, of Woods Bluff and near Yellow Bluff, Ala.; and from the upper beds of the Midway of Alabama. In the Virginia material it is very rare at station 5.

EXPLANATION OF PLATE 3

(All figures X 50)

Figures 1-19 from Pecan Gap chalk; figures 20-30 from Aquia formation.

Genus ANGULOGERINA Cushman, 1927

ANGULOGERINA VIRGINIANA Cushman, n. sp. (Pl. 4, fig. 23)

Test minute, elongate, tapering, triangular in section, the sides concave and the angles slightly rounded, triserial except for the last 2 or 3 chambers in the adult which are irregularly uniserial; chambers of the early portion indistinct, in the adult somewhat separated and more inflated; sutures indistinct except in the very last portion in the adult where they are somewhat depressed; wall ornamented with fine longitudinal costae continuous over most of the test; aperture in the adult terminal, with a short neck and slight lip. Length 0.30-0.40 mm.; diameter 0.10-0.12 mm.

Holotype (Cushman Coll. No. 39773) from the Eocene, Aquia formation, 19'-22' sample, below second rock layer, Marlboro Point, Stafford Co., Va.

This species in some respects resembles A. gallowayi Cole from the Guayabal formation of Mexico, but has more concave sides and a more tapering and ornamented test. It is also somewhat like the form recorded from Trinidad as Angulogerina cf. parvula (Cushman and Thomas) (Cushman and Renz, Contr. Cushman Lab. Foram. Res., vol. 18, 1942, p. 9, pl. 2, fig. 10), but is not the same. The species is not common in the Virginia material, but occurs at stations 6, 7, and 11.

Family ROTALIIDAE

Genus DISCORBIS Lamarck, 1804

DISCORBIS sp.

Rare specimens of this genus occur in the Virginia material, but

EXPLANATION OF PLATE 4

(All figures × 50)

usually as single specimens and not well enough characterized to identify specifically.

Genus LAMARCKINA Berthelin, 1881

**LAMARCKINA WILCOXENSISS Cushman** (Pl. 4, fig. 25)


This is a characteristic species of the Wilcox Eocene, recorded from the Bashi formation and Tuscahoma sand in Alabama. Glaessner recorded it from the Eocene of the Caucasus region. It is very common at station 7 in the Virginia material, and less so at station 6.

Genus VALVULINERIA Cushman, 1926

**VALVULINERIA WILCOXENSISS Cushman and Ponton** (Pl. 4, fig. 26)


This is a characteristic species of the Wilcox Eocene. The types were from the Tuscahoma sand, RR. cut, 1 mi. N. of Ozark, Ala., and it has also been recorded from the Bashi formation at Woods Bluff and from near Yellow Bluff, Ala. It is by far the most abundant species in the Virginia material, occurring commonly at stations 1, 2, 3, 4, 5, 6, 7, 8, and 11.

**VALVULINERIA SCROBICULATAS (Schwager)** (Pl. 4, fig. 27)

*Anomalina scrobiculata* Schwager, Palaeographica, vol. 30, 1883, Pal. Theil, p. 129, pl. 29 (6), fig. 18.


The types of this species are from the middle Eocene of northern Africa. It has been recorded from the Wilcox Eocene, Tuscahoma sand, RR. cut, 1 mi. N. of Ozark, Ala., and from the Bashi formation at Woods Bluff and near Yellow Bluff, Ala. While not as common as the preceding species, it occurs at stations 1, 2, 3, and 7 in considerable numbers.

Genus EPONIDES Montfort, 1808

**EPONIDES LOTUS (Schwager)**

(For references see these Contributions, vol. 18, 1942, p. 40)

This species is recorded from the Eocene of widely separated re-
regions. In America it occurs in the Wilcox Eocene, Tuscahoma sand and Bashi formation, of Alabama as well as in the Naheola formation of the Paleocene, Midway group of Alabama. It is rare in the Virginia material at stations 7 and 11.

**Genus SIPHONINA Reuss, 1850**


This species is a good index fossil for the Wilcox Eocene. There are numerous records for it in Alabama from the Tuscahoma sand, the Bashi formation, and the Salt Mountain formation. It is very rare in the Virginia material, occurring only at station 11.

**Family CASSIDULINIDAE**

**Genus PULVINULINELLA Cushman, 1926**

*Pulvinulinella obtusa* (Burrows and Holland) (Pl. 4, fig. 32)

(For references see these Contributions, vol. 18, 1942, p. 42)

This species has a wide range in the Paleocene and Eocene, occurring in the Midway, Wilcox, and Claiborne. It is fairly common in the Virginia material, occurring at stations 1, 3, 6, 7, 8, 9, and 11.

**Family GLOBIGERINIDAE**

A very few specimens, mostly not well preserved as to details, occur in the Virginia material.

**Family GLOBOROTALIIDAE**

**Genus GLOBOROTALIA Cushman, 1927**

*Globorotalia wilcoxensis* Cushman and Ponton

This species is recorded from the Wilcox Eocene, Tuscahoma sand and Bashi formation, of Alabama. In the Virginia material it is very rare at station 7.

**Family ANOMALINIDAE**

**Genus ANOMALINA d’Orbigny, 1826**

*Discorbina umbonifera* (Schwager) (Pl. 4, fig. 30)
CONTRIBUTIONS FROM THE CUSHMAN LABORATORY


This species was described from the middle Eocene of northern Africa. It is recorded from the Wilcox Eocene of Alabama, from the Tuscahoma sand, RR. cut, 1 mi. N. of Ozark, and from the Bashi formation near Yellow Bluff. In the Virginia material it is fairly common, occurring at stations 1, 5, 6, 7, 9, and 11.

Genus CIBICIDES Montfort, 1808

CIBICIDES PRAECURSORIUS (Schwager) (Pl. 4. fig. 28)

(For references see these Contributions, vol. 18, 1942, p. 45)

This species, described from the middle Eocene of northern Africa, is a characteristic one of the Midway Paleocene and Wilcox Eocene, particularly of Alabama. It also occurs in the Eocene of Trinidad, and has recently been recorded from the Bashi formation near Yellow Bluff, Alabama. (Cushman, Amer. Journ. Sci., vol. 242, 1944, p. 18, pl. 2, figs. 23, 24). Like many species of the genus which were probably attached, specimens vary considerably in the regularity of the last-formed chambers. Specimens are common in the Virginia material at station 11, and less so at stations 7, 9, and 10.

CIBICIDES HOWELLI Toulmin (Pl. 4. fig. 29)


Like the above species, this one shows a considerable range of variation. It is recorded from the Wilcox Eocene of Alabama and the Paleocene of Trinidad. In the Virginia material it is fairly common at station 8, but was not found elsewhere.

Genus STICHOCIBICIDES Cushman and Bermudez, 1936

STICHOCIBICIDES sp. (Pl. 4. fig. 31)

A single specimen from station 10 very evidently belongs to this genus, the type species of which was described from the Eocene of Cuba. More specimens are needed to give the full characters.