LOWER MIOCENE FORAMINIFERA OF FLORIDA.

By JOSEPH AUGUSTINE CUSHMAN.

The collections from which the species of Foraminifera described in this paper were obtained represent the three members of the lower Miocene Alum Bluff formation in Florida, none of which is at all rich in species. The Shoal River marl is the poorest of all, the Chipola marl has few species, and the Oak Grove marl a fair number. A number of the species are represented by single specimens only.

A comparison of the faunas shows that those of the Oak Grove and Chipola marls are very similar, having several species in common. The relation of most of the species is very clearly Miocene, and most of them have already been recorded in my papers on the Miocene species of the Atlantic and Gulf Coastal Plain of the United States, the Panama Canal Zone, and the West Indies. The general character of the faunas confirms the placing of these deposits in the lower Miocene as it is now generally accepted.

The faunas are characterized by species which show the influence of fairly cool waters, as they include no species which are typically either tropical or subtropical.

The following table shows the occurrence of the species obtained from the three members. The text gives something of the geographic and geologic distribution and enough references to permit consultation of original figures. The figures on the accompanying plate are all original and were made from photographs.

Distribution of lower Miocene Foraminifera of Florida.

	Shoal River marl.	Oak Grove marl.	Chipola marl.
Virgulina floridana D'Orbigny		×	
Cristellaria americana var. grandis Cushman, n. var	×		
Polymorphina lactea (Walker and Jacob)		×	×
Polymorphina communis D'Orbigny			×
Globigerina bulloides D'Orbigny		×	
Discorbis vilardeboana (D'Orbigny)		×	
Discorbis bertheloti (D'Orbigny)		×	
Truncatulina americana Cushman		×	
Truncatulina wuellerstorfi (Schwager)		×	
Truncatulina sp. ?		×	
Rotalia beccarii (Linnaeus)		×	×
Polystomella striato-punctata (Fichtel and Moll)		×	
Polystomella subnodosa (Münster)		×	
Polystomella crispa (Linnaeus)			×
Polystomella sagra D'Orbigny		×	×
Polystomella lanieri D'Orbigny		×	
Polystomella chipolensis Cushman			×
Amphistegina lessoni D'Orbigny		×	×

Family TEXTULARIIDAE.

Genus VIRGULINA D'Orbigny, 1826.

Virgulina floridana Cushman, n. sp.

Plate XI, figure 1.

Test elongate, tapering, the initial end smallest, thence gradually enlarging, the greatest diameter being near the apertural end; chambers several, elongate, sutures distinct and depressed; aperture comma-shaped at the outer end of the ventral face of the chamber; surface smooth. Length 0.6 millimeter.

Type specimen: U. S. National Museum, from U. S. G. S. station 5632, Oak Grove marl, Yellow River, Santa Rosa County, Fla.

This seems to differ from any of the described species of *Virgulina*, being easily distinguished by the general form alone.

Family LAGENIDAE.

Genus CRISTELLARIA Lamarck, 1812.

Cristellaria americana Cushman var. grandis Cushman, n. var.

Plate XI, figure 2.

Test differing from the typical form in the larger number of the chambers, of which there are nine to eleven in the last-formed coil instead of the six or seven in the typical form of the species. Diameter 2 millimeters, or slightly more.

Type specimen: U. S. National Museum, from U. S. G. S. station 5618, Shoal River marl, in marl pit on Langley's farm, 3½ miles southwest of De Funiak Springs, Fla.; G. C. Matson, collector.

This variety has the same closely coiled form, with raised costae and raised umbonal portion, as the typical form, but is larger and has more chambers in each coil.

The typical form was described from specimens collected in the Miocene Duplin marl of Muldrows Mills, S. C., and in the Miocene Choctawhatchee marl 1 mile south of Red Bay, Fla.

Genus POLYMORPHINA D'Orbigny, 1826.

Polymorphina lactea (Walker and Jacob) Macgillivray.

Plate XI, figures 3, 4.

Serpula lactea Walker and Jacob, in Adam's Essays on the microscope, 2d ed., p. 634, pl. 24, fig. 4, 1798.

Polymorphina lactea (Walker and Jacob) Macgillivray, A history of the molluscous animals of the counties of Aberdeen [etc.] p. 320, 1843.

Brady, *Challenger* Rept., Zoology, vol. 9, p. 559, pl. 71, fig. 11, 1884. Bagg, Maryland Geol. Survey, Miocene, p. 477, pl. 133, figs. 5, 6, 1904.

Cushman, U. S. Geol. Survey Bull. 676, p. 53, pl. 11, fig. 6, 1918.

Test rotund, circular or elliptical in front view, end view broadly oval, visible chambers few; sutures distinct but slightly if at all excavated; wall smooth; aperture radiate, often slightly extended. Length 0.70–0.75 millimeter.

Specimens were obtained from the Chipola marl of Chipola, Fla., and from the Oak Grove marl at U. S. G. S. station 5630, Yellow River, Santa Rosa County, Fla. The species has been collected from the upper Miocene Choctawhatchee marl 1 mile south of Red Bay, Fla.; from the Choptank formation of Jones Wharf and the Calvert formation of Plum Point, Md.; from the Kirkwood formation near Mullica Hill, N. J. It is also known from the Eocene of Maryland, thus giving the species a fairly wide range in the American Tertiary formations.

Polymorphina communis D'Orbigny.

Plate XI, figure 5.

Polymorphina (*Guttulina*) *communis* D'Orbigny, Annales sci. nat., vol. 7, p. 266, pl. 12, figs. 1–4; Modèles, No. 62, 1826.

Polymorphina communis H. B. Brady, *Challenger* Rept., Zoology, vol. 9, p. 568, pl. 72, fig. 19, 1884.

Cushman, U. S. Nat. Mus. Bull. 71, pt. 3, p. 87, pl. 37, fig. 7, 1913.

Test ovate, somewhat elongate or slightly fusiform, initial end broadly rounded, apertural end oblique and bluntly pointed; chambers few, inflated, sutures distinct; aperture radiate; wall smooth. Diameter slightly more than 1 millimeter.

This species occurs in the Chipola marl at Chipola, Fla. In some ways, especially in the general shape, it resembles the figures of *Polymorphina vitrea* (*Guttulina vitrea*) of D'Orbigny, in the Cuban monograph, 1839, Plate II, figures 1–3. Bagg has listed *P. communis* from the Calvert formation at Plum Point, Md.

Family GLOBIGERINIDAE.

Genus GLOBIGERINA D'Orbigny, 1826.

Globigerina bulloides D'Orbigny.

Plate XI, figure 6.

Globigerina bulloides D'Orbigny, Annales sci. nat., vol. 7, p. 277, No. 1, 1826; Modèles, Nos. 17, 76; in Barker, Webb, and Berthelot, Histoire naturelle des îles Canaries, pt. 2, p. 132, pl. 2, figs. 1–3, 28, 1839.

Brady, *Challenger* Rept., Zoology, vol. 9, p. 593, pl. 77; pl. 79, figs. 3–7, 1884.

Flint, U. S. Nat. Mus. Ann. Rept. for 1897, p. 321, pl. 69, fig. 2, 1899.

Cushman, U. S. Nat. Mus. Bull. 71, pt. 4, p. 5, pl. 2, figs. 7–9; pl. 9, 1914; U. S. Geol. Survey Bull. 676, p. 12, pl. 3, fig. 2; p. 56, pl. 12, figs. 4, 6, 1918.

Test subglobose, spiral, made up of a few inflated chambers, all visible from the dorsal side, three or four visible from the ventral side; sutures deep, surface coarsely reticulate.

The only Florida specimens referable to this species are from the Oak Grove marl at U. S. G. S. station 5632, on Yellow River, Santa Rosa County, Fla. It is also recorded from the Pliocene and Miocene of the Coastal Plain.

Family ROTALIIDAE.

Genus DISCORBIS Lamarck, 1804.

Discorbis vilardeboana (D'Orbigny) Cushman.

Plate XI, figures 7, 8.

Rosalina vilardeboana D'Orbigny, Voyage dans l'Amérique méridionale, Foraminifères, p. 44, pl. 6, figs. 13–15, 1839.

Discorbis vilardeboana (D'Orbigny) Cushman, U. S. Nat. Mus. Bull. 71, pt. 5, p. 14, pl. 9, fig. 2; fig. 14 in text, 1915; U. S. Geol. Survey Bull. 676, p. 14, pl. 3, fig. 1; p. 58, pl. 14, figs. 3, 5; pl. 15, fig. 4, 1918.

Discorbina vilardeboana (D'Orbigny) Parker and Jones, London Geol. Soc. Quart. Jour., vol. 28, p. 115, 1872.

Brady, *Challenger* Rept., Zoology, vol. 9, p. 645, pl. 86, figs. 9–12; pl. 88, fig. 2, 1884.

Test plano-convex, rounded dorsally, flattened or slightly concave ventrally, peripheral margin rounded; chambers about seven in the last-formed whorl, on the ventral border the last-formed chamber large, slightly inflated, forming one-fourth to one-third of the surface of the ventral side; sutures distinct, depressed, especially on the ventral side, somewhat umbilicate. Diameter 0.70–0.85 millimeter.

Specimens referred provisionally to this species came from the Oak Grove marl at U. S. G. S. station 5630, on Yellow River, Santa Rosa County, Fla. The species has been recorded from the Pliocene and Miocene of the Coastal Plain and from the Tertiary of Europe.

From a study of the various figures of this species it will be seen that many forms have been put under this name. That is undoubtedly due in large part to Brady's figures in the *Challenger* report, which show probably three species, and it is to be doubted whether any of them is really equivalent to D'Orbigny's original. The original figures show a test with basal asterigerine portions to the chambers and a rather well-developed spire to the test, five chambers in the last-formed whorl, not like any of the *Challenger* figures except in a very general way. It may be likely that the Tertiary species of the Coastal Plain of the United States represent other distinct species.

Discorbis bertheloti (D'Orbigny) Cushman.

Plate XI, figure 9.

Rosalina bertheloti D'Orbigny, in Barker, Webb, and Berthelot, Histoire naturelle des îles Canaries, vol. 2, pt. 2, p. 135, pl. 1, figs. 28–30, 1839.

Discorbis bertheloti (D'Orbigny) Cushman, U. S. Nat. Mus. Bull. 71, pt. 5, p. 20, pl. 7, fig. 3; fig. 23 in text, 1915; U. S. Geol. Survey Bull. 676, p. 58, pl. 15, figs. 1–3, 1918.

Discorbina bertheloti (D'Orbigny) Brady, Linnaean Soc. London Trans., vol. 24, p. 469, pl. 48, fig. 10, 1864; *Challenger* Rept., Zoology, vol. 9, p. 650, pl. 89, figs. 10–12, 1884.

Test unequally biconvex, usually six to seven chambers in the last-formed coil, dorsal side usually flattened; ventral side more convex; sutures curved, fairly distinct on both sides, occasionally slightly limbate; aperture usually extending into the dorsal side so that a portion of the aperture is peripheral. Diameter 0.80 millimeter or less.

I have recorded this species from the Miocene of Florida, South Carolina, and Virginia. A rather poorly preserved specimen figured here may belong to this species. It is from the Oak Grove marl at U. S. G. S. station 5630, on Yellow River, Santa Rosa County, Fla.

Genus TRUNCATULINA D'Orbigny, 1826.

Truncatulina americana Cushman.

Plate XI, figures 10, 11.

Truncatulina americana Cushman, U. S. Geol. Survey Bull. 676, p. 63, pl. 20, figs. 2, 3; pl. 21, fig. 1, 1918; U. S. Nat. Mus. Bull. 103, p. 68, pl. 23, figs. 2*a-c*, 1918.

Test planoconvex, dorsal side nearly flat, ventral side slightly convex, chambers numerous, eight to ten in the last-formed coil, rather rapidly increasing in size, peripheral margin subangular, dorsal side with the last few chambers failing to meet the umbilicus, ventral side similar in this respect in most specimens; sutures distinct, slightly limbate on the dorsal side, depressed on the ventral side; wall smooth, punctate; aperture peripheral with a slight lip. Diameter 0.75 millimeter or less.

This seems to be a very characteristic Miocene species, being known from the Miocene of North and South Carolina and Florida, as well as from Panama.

The specimens from the lower Miocene were found in the Oak Grove marl at U. S. G. S. stations 5630 and 5631, on Yellow River, Santa Rosa County, Fla.

Truncatulina wuellerstorfi (Schwager) H. B. Brady.

Plate XI, figure 12.

Anomalina wüllerstorfi Schwager, *Novara*-Exped., Geol. Theil, vol. 2, p. 258, pl. 7, figs. 105, 107, 1866.

Truncatulina wuellerstorfi (Schwager) Brady, *Challenger* Rept., Zoology, vol. 9, p. 662, pl. 93, figs. 8, 9, 1884. Cushman, U. S. Geol. Survey Bull. 676, p. 63, pl. 19, fig. 3; pl. 20, fig. 1, 1918.

Test planoconvex, compressed, ventral sides slightly convex, dorsal side flattened or nearly so, peripheral edge usually acute, occasionally slightly rounded, chambers narrow, much curved, nine or ten in the last-formed whorl; sutures distinct, much curved; peripheral margin slightly keeled, inner margin of the chambers, especially on the dorsal side, slightly overlapping; surface coarsely punctate; aperture peripheral. Diameter 0.75 to 1 millimeter.

Specimens have already been recorded from the Miocene Choctawhatchee marl at Jackson Bluff, Fla., and Duplin marl at Mayesville, S. C. The specimen figured here was found in the Oak Grove marl at U. S. G. S. station 5631, on Yellow River, Santa Rosa County, Fla.

Truncatulina sp. (?).

Plate XI, figure 13.

Test biconvex, peripheral margin with a thin, rather broad carina, chambers eight to ten in each coil, sutures distinct but not depressed, strongly curved; wall rather coarsely punctate. Diameter 0.65 millimeter.

A specimen from U. S. G. S. station 5631, Oak Grove marl on Yellow River, Santa Rosa County, Fla., is here figured, but it is not assigned to any described species, as the specimens are too poorly preserved for recognizing it as new.

Genus ROTALIA Lamarck, 1804.

Rotalia beccarii (Linnaeus) D'Orbigny.

Plate XI, figures 14–16.

Nautilus beccarii Linnaeus, Systema naturae, 12th ed., p. 1162, 1767; Gmelin's 13th ed., p. 3370, No. 4, 1788.

Rotalia (*Turbinulina*) *beccarii* (Linnaeus) D'Orbigny, Annales sci. nat., vol. 7, p. 275, No. 40, 1826; Modèles, No. 74, 1826.

Rotalia beccarii (Linnaeus) Parker and Jones, Philos. Trans., vol. 155, p. 388, pl. 16, figs. 29, 30, 1865.
Brady, *Challenger* Rept., Zoology, vol. 9, p. 704, pl. 107, figs. 2, 3, 1884.
Flint, U. S. Nat. Mus. Ann. Rept. for 1897, p. 331, pl. 75, fig. 2, 1899.
Cushman, U. S. Geol. Survey Bull. 676, p. 18, pl. 5, fig. 1; pl. 6, fig. 1; p. 66, pl. 23, fig. 3; pl. 24, figs. 1, 2; pl. 25, fig. 1, 1918.

Test biconvex; chambers numerous, the last-formed whorl containing eight to twelve; periphery rounded; sutures limbate above, much depressed ventrally, umbilical region often filled with a rounded mass of material surrounded by a depressed area running to the sutures; wall smooth.

The species is known from the Pliocene of North and South Carolina and Florida and from the Miocene of Maryland, Virginia, North and South Carolina, Florida, and Alabama. In the lower Miocene it was collected in the Oak Grove marl at U. S. G. S. station 5630, on Yellow River, Santa Rosa County, Fla., and in the Chipola marl at Chipola, Fla.

Family NUMMULITIDAE.

Genus POLYSTOMELLA Lamarck, 1822.

Polystomella striatopunctata (Fichtel and Moll) Parker and Jones.

Plate XI, figure 17.

Nautilus striatopunctata Fichtel and Moll, Testacea microscopica, p. 61, pl. 9, figs. *a–c*, 1803.
Polystomella striatopunctata (Fichtel and Moll) Parker and Jones, Annals and Mag. Nat. Hist., 3d ser., vol. 5, p. 103, No. 6, 1860.
Brady, *Challenger* Rept., Zoology, vol. 9, p. 733, pl. 109, figs. 22, 23, 1884.
Flint, U. S. Nat. Mus. Ann. Rept. for 1897, p. 337, pl. 80, fig. 2, 1899.
Bagg, U. S. Geol. Survey Bull. 513, p. 92, pl. 27, figs. 10–12, 1912.
Cushman, U. S. Nat. Mus. Bull. 71, pt. 4, p. 31, pl. 18, fig. 2, 1914; U. S. Geol. Survey Bull. 676, p. 1, pl. 8, fig. 4; p. 69, pl. 26, fig. 4; pl. 27, fig. 2, 1918.

Test nautiloid, composed of several coils, the last-formed one with about ten chambers, periphery broadly rounded, depressed at the umbilicus; chambers inflated, sutures depressed, septal lines with regular bridging; aperture a nearly semicircular, narrow opening.

Forms referred to this species are common in the Tertiary. I have recorded it from the Pliocene Waccamaw marl of North and South Carolina and Caloosahatchee marl of Florida, and in the Miocene it occurs in Maryland, South Carolina, and Florida. It is also known from Panama and from the Miocene of Santo Domingo. The specimen figured here came from the Oak Grove marl at U. S. G. S. station 5630, on Yellow River, Santa Rosa County, Fla.

Polystomella subnodosa (Münster) Reuss.

Plate XI, figure 18.

Robulina subnodosa Münster, Neues Jahrb., 1838, p. 391, pl. 3, fig. 61.
Polystomella subnodosa Reuss, Akad. Wiss. Wien Sitzungsber., vol. 18, p. 240, pl. 4, fig. 51*a*, *b*, 1855.
Brady, *Challenger* Rept., Zoology, vol. 9, p. 734, pl. 110, fig. 1*a*, *b*, 1884.
Cushman, U. S. Nat. Mus. Bull. 71, pt. 4, p. 32, pl. 14, fig. 8, 1914; U. S. Geol. Survey Bull. 676, p. 7, pl. 27, fig. 6, 1918.

Test composed of about twelve chambers in the last-formed volution, in face view about 2½ times as long as wide, the periphery angled with a blunt keel, periphery very slightly if at all lobulated, umbilical region umbonate, septal lines depressed and evenly bridged; aperture an arched narrow opening at the base of the apertural face. Diameter about 0.60 millimeter.

This species has been recorded from the Miocene Duplin marl at Mayesville, S. C. It also occurs in the Oak Grove marl at U. S. G. S. station 5630, on Yellow River, Santa Rosa County, Fla.

Polystomella crispa (Linnaeus) Lamarck.

Plate XI, figure 19.

Nautilus crispus Linnaeus, Systema naturae, 12th ed., p. 1162, 1767.
Polystomella crispa Lamarck, Animaux sans vertèbres, vol. 7, p. 625, No. 1, 1822.
Brady, *Challenger* Rept., Zoology, vol. 9, p. 736, pl. 110, figs. 6, 7, 1884.
Cushman, U. S. Nat. Mus. Bull. 71, pt. 4, p. 32, pl. 18, fig. 1, 1914; U. S. Geol. Survey Bull. 676, p. 69, pl. 27, figs. 1, 4, 5, 1918.

Test composed of 20 or more chambers in the last-formed volution, in face view about twice as long as wide, lenticular, widest at the middle, keeled with sharp-angled periphery, not at all lobulated; surface with the reticulated portion larger than the septal lines; umbilical region umbonate, filled with clear shell material, usually with a few pores; aperture an angled narrow opening, V-shaped, divided into several secondary openings. Diameter 1 millimeter or less.

I have recorded this species from the Miocene Choctawhatchee marl of Florida, the Duplin marl of the Carolinas, and the Gatun formation of Panama. It is also known from the Miocene of Europe.

The specimen described was obtained in the Chipola marl at Chipola, Fla.

Polystomella sagra D'Orbigny.

Plate XI, figures 20, 21.

Polystomella sagra D'Orbigny, in De la Sagra, Histoire physique, politique et naturelle de l'île de Cuba, Foraminifères, p. 55, pl. 6, figs. 19, 20, 1839.
Cushman, U. S. Nat. Mus. Bull. 103, p. 75, pl. 26, figs. 5*a*, *b*, 1918.

Test bilaterally symmetrical, subcircular in side view; peripheral margin rounded, ten or more chambers in the last-formed coil; sutures distinct, curved, slightly depressed in the last-formed portion, not at all depressed in the early part of the coil; early half of the coil with definite raised, longitudinal ribs, corre-

sponding to the bridging over the sutures, persisting longest on the peripheral portion of the test, later portion smooth; bridging of earliest portion of coil regular, short, in the last-formed sutures increasing considerably in length; apertural face smooth, punctate; roughly triangular in outline, the angles rounded; aperture a very narrow slit at the base of the apertural face of the chamber. Diameter 0.65 millimeter.

I have already recorded this species from the Pleistocene of the Panama Canal Zone; from the Miocene marl in the gorge of Yumuri River, Matanzas, Cuba; and from the Miocene of Santo Domingo. Specimens seemingly identical occur in the lower Miocene Oak Grove marl at U. S. G. S. station 5630, on Yellow River, Santa Rosa County, Fla. The species also occurs in the Chipola marl at Chipola, Fla.

Polystomella lanieri D'Orbigny.

Plate XI, figure 22.

Polystomella lanieri D'Orbigny, in De la Sagra, Histoire physique, politique et naturelle de l'île de Cuba, Foraminifères, p. 54, pl. 7, figs. 12, 13, 1839.

This species differs from *Polystomella sagra*, described above, in the shape of the test, which is distinctly angled at the periphery, the sides in front view making a regular rhomboid form.

The only Florida specimens referable to this species are from the Oak Grove marl at U. S. G. S. station 5630, on Yellow River, Santa Rosa County, Fla. I have recorded this species from the Miocene marl in the gorge of Yumuri River, Matanzas, Cuba and from the Miocene of Santo Domingo.

Polystomella chipolensis Cushman, n. sp.

Plate XI, figure 23.

Test rounded, composed of 10 to 12 chambers in the last-formed coil; periphery broadly rounded, sutures nearly obsolete, longitudinal markings occupying nearly the whole area between the sutures, in the earlier portion becoming fused and continuous. Diameter 1.25 millimeters.

Type specimen: U. S. National Museum, from the Chipola marl of Chipola, Fla.

This is distinguished from the other species of *Polystomella* by its very long retral processes and broadly rounded form.

Genus AMPHISTEGINA D'Orbigny, 1826.

Amphistegina lessonii D'Orbigny.

Plate XI, figures 24–26.

Amphistegina lessonii D'Orbigny, Annales sci. nat., vol. 7, p. 304, No. 3, pl. 17, figs. 1–4, 1826; Modèles, No. 98, 1826.

Brady, *Challenger* Rept., Zoology, vol. 9, p. 740, pl. 111, figs. 1–7, 1884.

Flint, U. S. Nat. Mus. Ann. Rept. for 1897, p. 338, pl. 82, fig. 4, 1899.

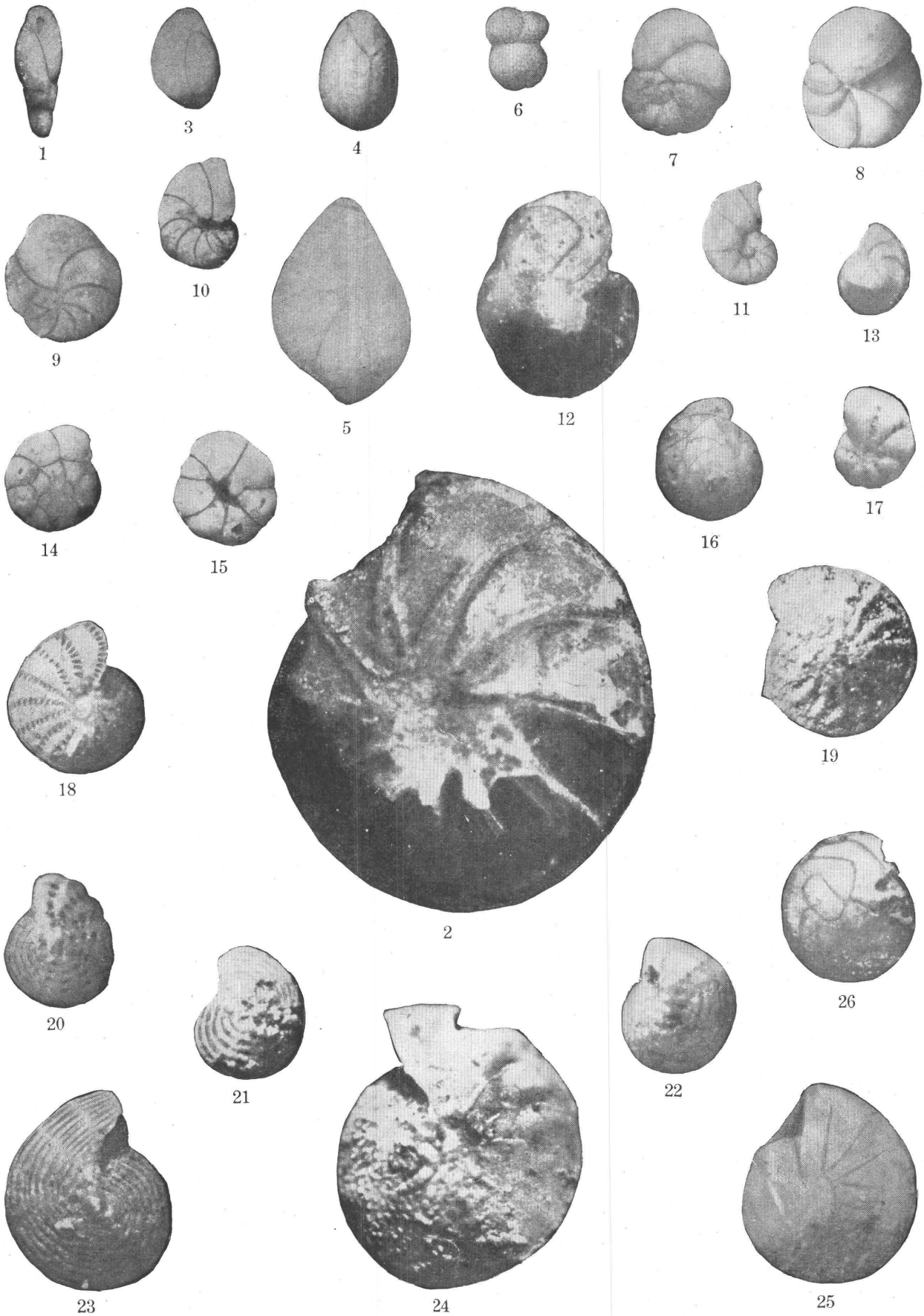
Cushman, U. S. Nat. Mus. Bull. 71, pt. 4, p. 35, pl. 19, fig. 2, 1914; U. S. Geol. Survey Bull. 676, p. 20, pl. 4, fig. 3, 1918; U. S. Nat. Mus. Bull. 103, p. 77, 1918.

This species occurs in the Oak Grove marl at U. S. G. S. station 5632, on Yellow River, Santa Rosa County, Fla., and in the Chipola marl at Chipola, Fla.

PLATE XI.

PLATE XI.

FIGURE 1. *Virgulina floridana* Cushman, n. sp., × 40. Station 5632, Yellow River, Fla.
2. *Cristellaria americana* Cushman var. *grandis* Cushman, × 25. Station 5618, De Funiak Springs, Fla.
3. *Polymorphina lactea* (Walker and Jacob) Macgillivray, × 30. Chipola, Fla.
4. *Polymorphina lactea* (Walker and Jacob) Macgillivray, × 30. Station 5630, Yellow River, Fla.
5. *Polymorphina communis* D'Orbigny, × 30. Chipola, Fla.
6. *Globigerina bulloides* D'Orbigny, × 30. Station 5630, Yellow River, Fla.
7. *Discorbis vilardeboana* (D'Orbigny) Cushman, × 30, dorsal view. Station 5630, Yellow River. Fla.
8. *Discorbis vilardeboana* (D'Orbigny) Cushman, × 30, ventral view (another specimen). Station 5630, Yellow River, Fla.
9. *Discorbis bertheloti* (?) (D'Orbigny) Cushman, × 30. Station 5630, Yellow River, Fla.
10. *Truncatulina americana* Cushman, × 30. Station 5631, Yellow River, Fla.
11. *Truncatulina americana* Cushman, × 30. Station 5630, Yellow River, Fla.
12. *Truncatulina wuellerstorfi* (Schwager) H. B. Brady, × 30. Station 5631, Yellow River, Fla.
13. *Truncatulina* sp. (?), × 30. Station 5631, Yellow River, Fla.
14. *Rotalia beccarii* (Linnaeus) D'Orbigny, × 30, dorsal view. Station 5630, Yellow River, Fla.
15. *Rotalia beccarii* (Linnaeus) D'Orbigny, × 30, ventral view. Station 5630, Yellow River, Fla.
16. *Rotalia beccarii* (Linnaeus) D'Orbigny, × 30. Chipola, Fla.
17. *Polystomella striatopunctata* (Fichtel and Moll) Parker and Jones, × 30. Station 5630, Yellow River, Fla.
18. *Polystomella subnodosa* (Münster) Reuss, × 30. Station 5630, Yellow River, Fla.
19. *Polystomella crispa* (Linnaeus) Lamarck, × 30. Chipola, Fla.
20. *Polystomella sagra* D'Orbigny, × 30. Station 5630, Yellow River, Fla.
21. *Polystomella sagra* D'Orbigny, × 30. Chipola, Fla.
22. *Polystomella lanieri* D'Orbigny, × 30. Station 5630, Yellow River, Fla.
23. *Polystomella chipolensis* Cushman, n. sp., × 30. Chipola, Fla.
24. *Amphistegina lessonii* D'Orbigny, × 25. Chipola, Fla.
25. *Amphistegina lessonii* D'Orbigny, × 25. Station 5630, Yellow River, Fla.
26. *Amphistegina lessonii* D'Orbigny, × 30. Station 5632, Yellow River, Fla.



LOWER MIOCENE FORAMINIFERA OF FLORIDA