CONTRIBUTIONS FROM THE CUSHMAN LABORATORY FOR FORAMINIFERAL RESEARCH

246. FORAMINIFERA OF THE CORSICANA MARL*

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The Corsicana marl is one of the members of the Navarro group in northeastern Texas, overlying Nacatoch sand and underlying Kemp clay. In the present approved classification as set forth in the "Lexicon of Geologic Names of the United States" (Bull. 896, U. S. Geol. Survey, 1938), the pit of the Corsicana Brick Co. 2 miles S. of the court house at Corsicana, Navarro Co., Texas, is regarded as the type locality for the Corsicana marl (restricted). This locality is referred to in our paper as the Corsicana Clay Pit. We have available for study collections from five levels, representing 16 feet of section in the clay pit. We have included in the present study material collected by Cushman and Thomas from Mexia highway at forks of the Wortham road, 2.8 miles E.S.E. of Cooledge, Limestone Co., Texas, which carries a very rich fauna; and also the section on Onion Creek, collected by L. W. Stephenson, ¼ mile below Bastrop road crossing, 2½ miles W. of Old Garfield, Travis Co., Texas, with samples from eight levels including 38 feet of section in the bluff. As usual in localities at some distance from one another, ecologic factors probably enter into the problem and, while the faunas are consistent in most of their features, each locality has certain species not recorded in the others. For brevity in the explanations of plates the Corsicana Clay Pit is referred to as Loc. I; the locality 2.8 miles E.S.E. of Cooledge as Loc. II; and the section on Onion Creek as Loc. III.

By reference to an unpublished manuscript by the senior author on the Upper Cretaceous foraminifera of the Gulf Coastal region, we have added below a list of species from seven other localities definitely determined as Corsicana marl but not found in the three main localities dealt with in the present paper.

Additional Corsicana marl localities:

1. Base of marl. 2.6 miles N. by E. of Malta, Bowie Co., Texas.

2. Small branch below road, 2½ miles N. of Tona siding, about 5 miles S.W. of Quinlan, Hunt Co., Texas. Coll. by L. W. Stephenson.

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3. Gully in W-facing slope of Cottonwood Creek valley, ½ mile W. of Kimbro, 2 miles S. of Manda, Travis Co., Texas. Coll. by L. W. Stephenson.

4. Jones Crossing on Onion Creek, just E. of Austin-Bastrop highway, 9 miles in a straight line S.E. of capitol in Austin, Travis Co., Texas. Coll. by H. J. Plummer.

5. San Marcos River, left bank, 100 yards below ford, ½ mile below Martindale, Caldwell Co., Texas. Coll. by L. W. Stephenson.

6. W-facing bluff, Guadalupe River, 1.3 miles above McQueeney, Guadalupe Co., Texas. Coll. by L. W. Stephenson.

7. 3 feet below base of *Exogyra-Gryphaea* bed, San Antonio road, 6 miles E. of Castroville, Bexar Co., Texas. Coll. by L. W. Stephenson.

Additional Corsicana marl species:
(Numbers in parentheses refer to localities above)

Reophax texanus Cushman and Waters (5)
Ammodiscus pennyi Cushman and Jarvis (5)
Haplophragmoides calcula Cushman and Waters (2, 3, 5)
Haplophragmoides glabra Cushman and Waters (2, 5)
Haplophragmoides excavata Cushman and Waters (2, 5)
Ammobaculites coprolithiformis (Schwager) (3, 5)
Ammobaculites texanus Cushman (7)
Clavulinoides aspera (Cushman) (6)
Heterostomella americana Cushman (7)
Dorothia glabrata Cushman (3)
Trochammina gyroides Cushman and Waters (5)
Marginulina navarroana Cushman (7)
Dentalina confluens Reuss (3)
Frondicularia lanceola Reuss (1)
Globulina lacrima Reuss, var. *subsphaerica* (Berthelin) (1)
Buliminella cushmani Sandidge (6)
Valvulineria plummerae Loetterle (4)
Pullenia americana Cushman (7)
Globotruncana canaliculata (Reuss) (4)

The fauna is a rich one evidently deposited some distance from actual shore line as indicated by the fine material of the deposits and the fauna which is richest in foraminifera known to occur at medium depths.

A paper by Albritton and Phleger (Journ. Pal., vol. 11, 1937, pp. 347-354) lists numerous species from the Corsicana Clay Pit. We have examined their material and occasional changes in identification are recorded here.

Family AMMODISCIDAE

Genus AMMODISCUS Reuss, 1861

AMMODISCUS CRETACEUS (Reuss) (Pl. 9, fig. 1)

(For references see these Contributions, vol. 10, 1934, p. 45)

Typical specimens occur in material from the Corsicana Clay Pit and from 2.8 miles E.S.E. of Cooledge.

Family LITUOLIDAE

Genus HAPLOPHRAGMOIDES Cushman, 1910

HAPLOPHRAGMOIDES EGGERI Cushman (Pl. 9, fig. 2)

Haplophragmium fontinense Egger (not Terquem), Ber. Nat. Ver. Regensburg, vol. 12, 1907-1909 (1910), p. 10, pl. 3, figs. 16-18.

Haplophragmoides eggeri Cushman, Bull. Amer. Assoc. Petr. Geol., vol. 10, 1926, p. 583, pl. 15, fig. 1.—Cushman and Jarvis, Proc. U. S. Nat. Mus., vol. 80, Art. 14, 1932, p. 12, pl. 3, fig. 2.

Haplophragmoides cf. *subglobosum* Cushman and Jarvis, Contr. Cushman Lab. Foram. Res., vol. 4, 1928, p. 91, pl. 12, fig. 13.

Specimens are rare in the American Cretaceous and the few records are mostly from the Navarro. It occurs in our material from 2.8 miles E.S.E. of Cooledge.

Family TEXTULARIIDAE

Genus SPIROPLECTAMMINA Cushman, 1927

SPIROPLECTAMMINA SEMICOMPLANATA (Carsey) (Pl. 9, fig. 3)

(For references see these Contributions, vol. 17, 1941, p. 83)

The types of this species are from an exposure on Onion Creek. The species is characteristic of the Navarro but extends into the upper part of the Taylor group. As the wall is often thin, distortion may take place in fossilization. It seems to be absent in the Corsicana Clay Pit but occurs at the other two localities.

Family VERNEUILINIDAE

Genus GAUDRYINA d'Orbigny, 1839

GAUDRYINA RUDITA Sandidge (Pl. 9, fig. 4)

(For references see Special Publ. No. 7, Cushman Lab. Foram. Res., 1937, p. 46)

The only specimens in our Corsicana material are from 2.8 miles E.S.E. of Cooledge.

Genus GAUDRYINELLA Plummer, 1931

GAUDRYINELLA PSEUDOSERRATA Cushman (Pl. 9, fig. 5)

Gaudryinella pseudoserrata Cushman, Contr. Cushman Lab. Foram. Res., vol. 8, 1932, p. 99, pl. 11, figs. 20, 21; l. c., Special Publ. No. 7, 1937, p. 105, pl. 14, figs. 16-22.

This species seems to be an index fossil for that part of the Navarro above the Nacatoch sand. It is variable in the relative expansion of

the later chambers and also in the roughness of the surface. It occurs at all three of our localities.

Genus PSEUDOCLAVULINA Cushman, 1936

PSEUDOCLAVULINA CLAVATA (Cushman) (Pl. 9, fig. 6)

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

This is a wide ranging species in the American Upper Cretaceous. Our only Corsicana specimens are from 2.8 miles E.S.E. of Cooledge.

Genus CLAVULINOIDES Cushman, 1936

CLAVULINOIDES TRILATERA (Cushman) (Pl. 9, fig. 7)

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

The typical form of this species occurs in the Velasco and Midway shales of Mexico, the Upper Cretaceous of Trinidad, the Saratoga chalk of Arkansas, and the Corsicana marl of Texas. The var. *concava* has a wider range including both the Navarro and Taylor groups.

The typical form occurs at all three of our Corsicana marl localities.

CLAVULINOIDES INSIGNIS (Plummer) (Pl. 9, fig. 9)

(For references see Special Publ. No. 7, 1937, p. 124)

This species is a characteristic one in the upper beds of Navarro age. It occurs at all three of our localities.

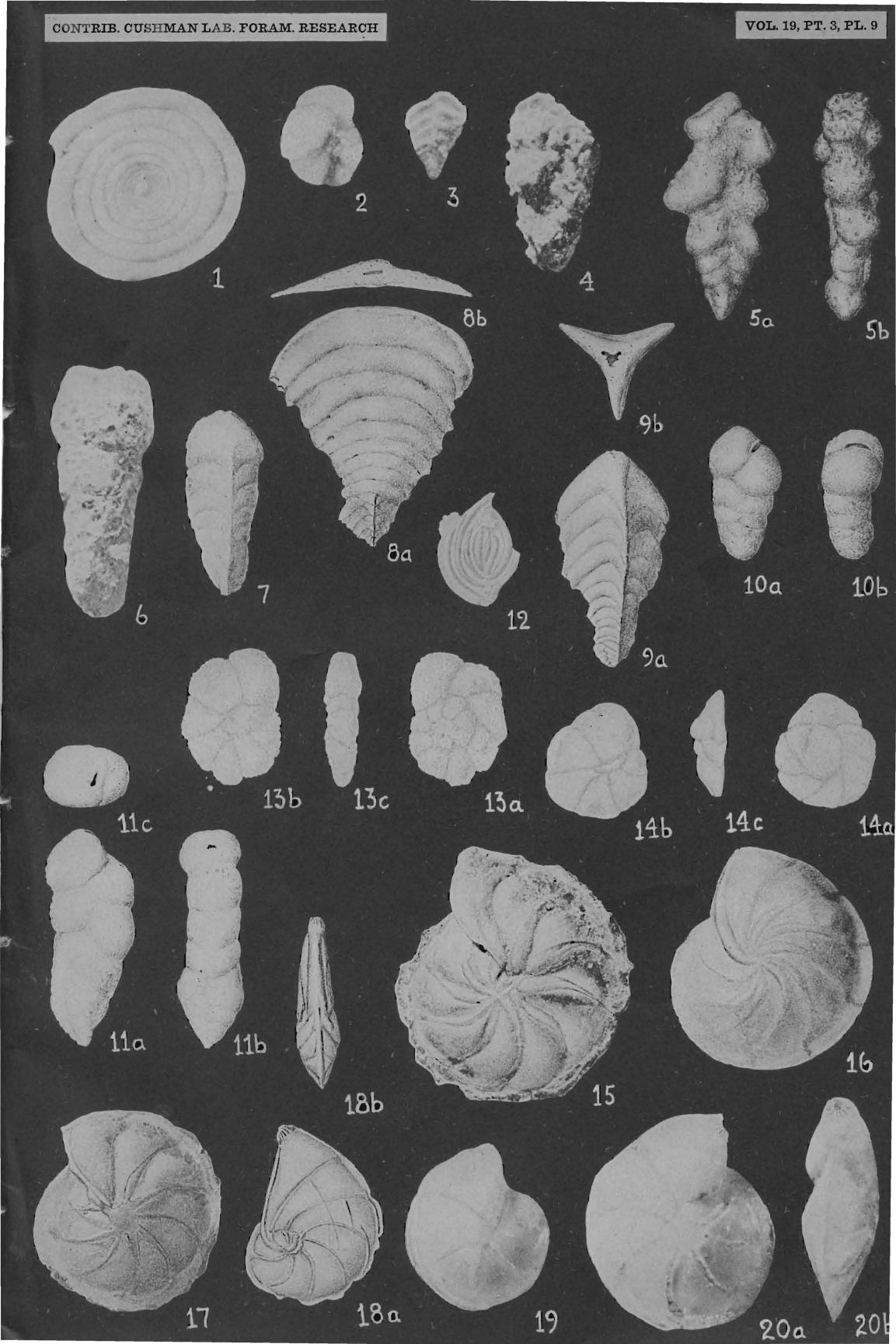
CLAVULINOIDES COMPRESSA (Cushman) (Pl. 9, fig. 8)

(For references see Special Publ. No. 7, 1937, p. 123)

This species is an excellent index fossil for the upper part of the Navarro group above the Nacatoch sand. Although not found in the Corsicana Clay Pit, it is abundant at the other localities, especially 2.8 miles E.S.E. of Cooledge.

EXPLANATION OF PLATE 9

FIG. 1. *Ammodiscus cretaceus* (Reuss). Loc. I. × 40. 2. *Haplophragmoides eggeri* Cushman. Loc. II. × 40. 3. *Spiroplectammina jemezcompacta* (Cushman). Loc. III. × 40. 4. *Gaudryina rudita* Sandidge. Loc. II. × 40. 5. *Gaudryinella pseudoserrata* Cushman. Loc. II. *a*, front view; *b*, side view. × 36. (After Cushman). 6. *Pseudoclavulina clavata* (Cushman). Loc. II. × 40. 7. *Clavulinoides trilatera* (Cushman). Loc. III. × 25. (After Cushman). 8. *C. compressa* (Cushman). Loc. II. *a*, side view; *b*, apertural view. × 25. (After Cushman). 9. *C. insignis* (Plummer). Loc. I. *a*, side view; *b*, apertural view. × 18. (After Cushman). 10. *Dorothia bulletta* (Carsey). Loc. I. *a*, front view; *b*, side view. × 20. (After Cushman). 11. *Plectina watersi* Cushman. Loc. I. *a*, front view; *b*, side view; *c*, apertural view. × 38. Holotype. (After Cushman). 12. *Textularilina* sp. Loc. III. × 50. 13. *Trochammina diagonis* (Carsey). Loc. I. *a*, dorsal view; *b*, ventral view; *c*, peripheral view. × 30. 14. *T. texana* Cushman and Waters. Loc. I. *a*, dorsal view; *b*, ventral view; *c*, peripheral view. × 40. 15. *Robulus navarroensis* (Plummer), var. *extruatus* Cushman. Loc. II. × 18. Holotype. (After Cushman). 16. *R. spisso-costatus* Cushman. Loc. II. × 18. Holotype. (After Cushman). 17. *R. navarroensis* (Plummer). Loc. III. × 25. (After Cushman). 18. *Planularia dissona* (Plummer). Loc. II. *a*, side view; *b*, apertural view. × 30. (After Cushman). 19, 20. *Lenticulina jonesi* Sandidge. × 36. 19, Loc. I. 20, Loc. II. *a*, side view; *b*, apertural view.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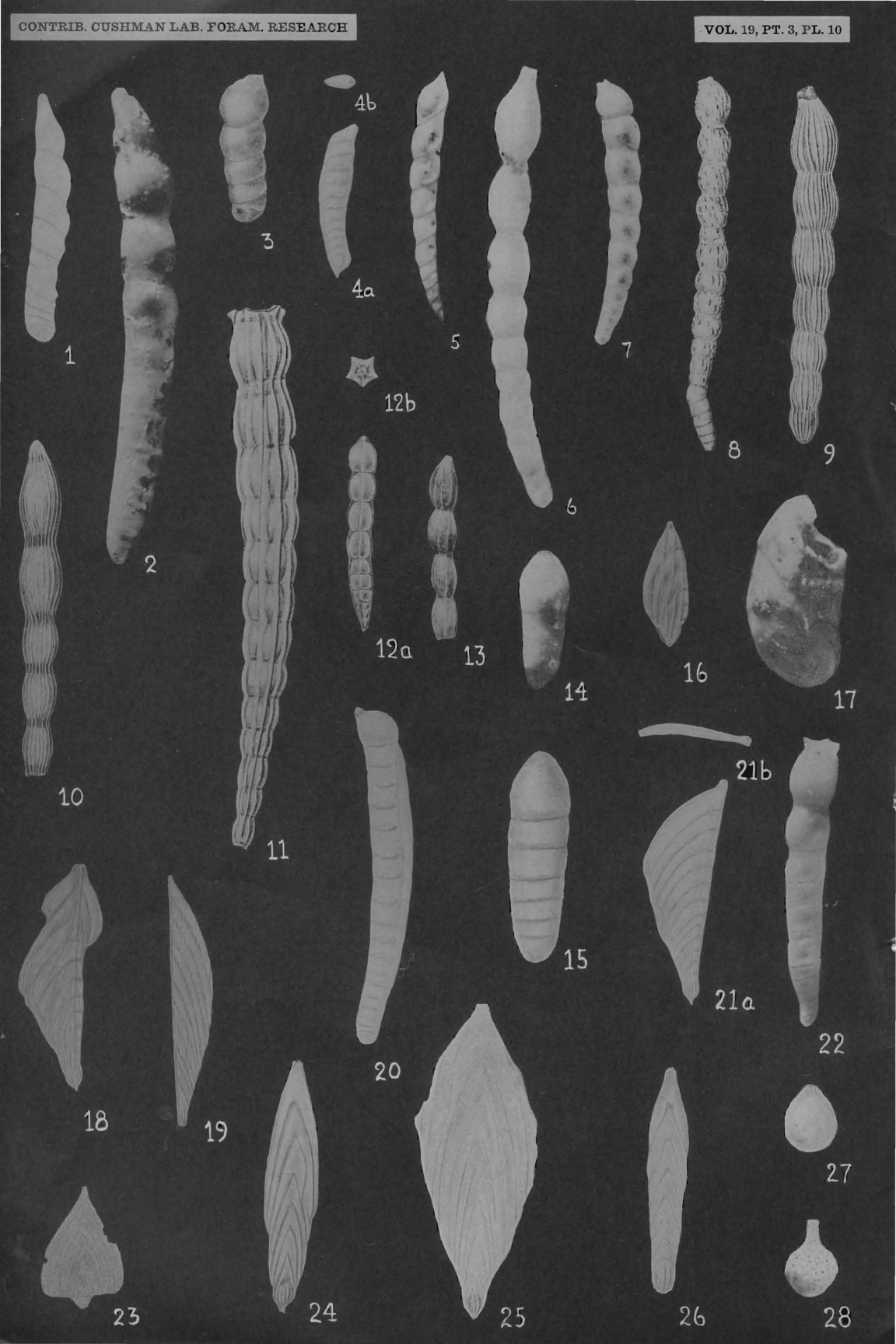
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Family VALVULINIDAE

Genus DOROTHIA Plummer, 1931

DOROTHIA BULLETTA (Carsey) (Pl. 9, fig. 10)

(For references see these Contributions, vol. 17, 1941, p. 85)

This is a widely distributed species but is especially abundant in typical form in the Navarro group. It occurs at all three of our localities.

Genus PLECTINA Marsson, 1878

PLECTINA WATERSI Cushman (Pl. 9, fig. 11)

(For references see Special Publ. No. 8, 1937, p. 107)

This species is apparently an index fossil for those portions of the Navarro group above the Nacatoch sand. It occurs in the Corsicana Clay Pit and in the section on Onion Creek.

Family MILIOLIDAE

Genus QUINQUELOCULINA d'Orbigny, 1826

QUINQUELOCULINA ANTIQUA Franke, var. ANGUSTA Franke

Miliolina (Quinqueloculina) antiqua FRANKE, var. *augusta* FRANKE, Abhandl. Preuss. Geol. Landes., n. ser., vol. 111, 1928, p. 127, pl. 11, fig. 25.

Quinqueloculina antiqua FRANKE, var. *angusta* CUSHMAN, Tenn. Div. Geol., Bull. 41, 1931, p. 23, pl. 2, fig. 6.

Quinqueloculina coonensis W. BERRY, in Berry and Kelley, Proc. U. S. Nat. Mus., vol. 76, Art. 19, 1929, p. 17, pl. 2, figs. 8, 9 [by error for 11, 12].

Rare specimens occur in the Corsicana marl from the section on Onion Creek.

EXPLANATION OF PLATE 10

FIG. 1. *Marginulina* sp. Loc. III. × 18. 2. *M. plummerae* Cushman. Loc. I. × 25. 3. *M. curvatura* Cushman. Loc. III. × 75. Holotype. (After Cushman). 4. *M. silicula* (Plummer). Loc. II. × 8. 5. *Dentalina legumen* Reuss. Loc. I. × 40. 6. *D. gracilis* d'Orbigny. Loc. II. × 40. 7. *D. basiplanata* Cushman. Loc. I. × 25. Paratype. (After Cushman). 8. *D. crinita* Plummer. Loc. II. × 25. (After Cushman). 9. *D. delicatula* Cushman. Loc. III. × 25. Holotype. (After Cushman). 10. *D. angusticostata* Cushman. Loc. II. × 38. Holotype. (After Cushman). 11. *Nodosaria affinis* Reuss. Loc. II. × 18. (After Cushman). 12. *N. navarroana* Cushman. Loc. I. *a*, side view; *b*, apertural view. × 60. Holotype. (After Cushman). 13. *N. corsicanana* Cushman. Loc. II. × 18. Paratype. (After Cushman). 14. *Pseudoglandulina lagenoides* (Olszewski). Loc. II. × 40. 15. *P. manifesta* (Reuss). Loc. I. × 45. 16. *Vaginulina navarroana* Cushman. Loc. I. × 36. 17. *Saracenaria* cf. *italica* Defrance. Loc. II. × 40. 18. *Vaginulina simondsi* Carsey. Loc. I. × 14. 19. *V. multicostata* Cushman. Loc. III. × 18. 20. *V. cretacea* Plummer. Loc. II. × 13. 21. *V. webbervillensis* Carsey. Loc. II. × 9. (After Cushman). 22. *V. subgracilis* Cushman. Loc. I. × 25. 23. *Palmula reticulata* (Reuss). Loc. II. × 9. 24. *Frondicularia verneuiliana* d'Orbigny. Loc. II. × 15. 25. *F. clarki* Bagg. Loc. II. × 25. (After Cushman). 26. *F. archiaciana* d'Orbigny. Loc. II. × 14. 27. *Lagena* cf. *globosa* Montagu. Loc. III. × 40. 28. *L. hispida* Reuss. Loc. III. × 40.

Genus MASSILINA Schlumberger, 1893

MASSILINA sp. (Pl. 8, fig. 12)

Single specimens, poorly preserved, occur at several levels in the Onion Creek section.

Family TROCHAMMINIDAE

Genus TROCHAMMINA Parker and Jones, 1859

TROCHAMMINA DIAGONIS (Carsey) (Pl. 9, fig. 13)

(For references see these Contributions, vol. 18, 1942, p. 55)

This is a widely distributed species occurring especially in the Navarro and Taylor groups. It is often much distorted in fossilization.

In a list of Corsicana marl species, Albritton and Phleger (Journ. Pal., vol. 11, 1937, p. 350) include "*Haplophragmoides coronata* (H. B. Brady)" which, on examination of the original specimen, is considered to be *Trochammina diagonis* (Carsey).

TROCHAMMINA TEXANA Cushman and Waters (Pl. 9, fig. 14)

Trochammina texana CUSHMAN and WATERS, Contr. Cushman Lab. Foram. Res., vol. 2, pt. 4, 1927, p. 85, pl. 11, fig. 8.

This species seems to be confined to the Navarro group. It occurs at all three of our localities. It has fewer chambers than *Trochammina diagonis* (Carsey) and the periphery is less lobulated.

Family LAGENIDAE

Genus ROBULUS Montfort, 1808

ROBULUS NAVARROENSIS (Plummer) (Pl. 9, fig. 17)

Cristellaria navarroensis PLUMMER, Univ. Texas Bull. 2644, 1926 (1927), p. 37, fig. 4.

Lenticulina navarroensis PLUMMER, l. c., Bull. 3101, 1931, p. 141.

Robulus navarroensis CUSHMAN, Tenn. Div. Geol., Bull. 41, 1931, p. 25, pl. 2, fig. 2; Journ. Pal., vol. 5, 1931, p. 303, pl. 34, fig. 14.—JENNINGS, Bull. Amer. Pal., vol. 23, No. 78, 1936, p. 15, pl. 1, fig. 14.—LOETTERLE, Nebraska Geol. Survey, 2d ser., Bull. 12, 1937, p. 20, pl. 1, fig. 4.—CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 17, 1941, p. 55, pl. 15, fig. 1.

Cristellaria cultrata CARSEY (not MONTFORT), Univ. Texas Bull. 2612, 1926, p. 70, pl. 6, fig. 3.

This is an excellent index fossil especially for that part of the Navarro group above the Nacatoch sand. It occurs at all three of our localities. The following variety is usually distinct but there are intermediate forms, especially in the Corsicana marl where both forms are abundant.

ROBULUS NAVARROENSIS (Plummer), var. EXTRUATUS Cushman (Pl. 9, fig. 16)

Robulus navarroensis (PLUMMER), var. *extruatus* CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 14, 1938, p. 31, pl. 5, fig. 1; vol. 17, 1941, p. 56, pl. 15, fig. 2.

This variety is also an index fossil for that part of the Navarro

group above the Nacatoch sand. The types are from the locality 2.8 miles E.S.E. of Cooledge and it also occurs at the Corsicana Clay Pit. It appears to be absent in the section on Onion Creek.

ROBULUS SPISSO-COSTATUS Cushman (Pl. 9, fig. 16)

Robulus spisso-costatus CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 14, 1938, p. 32, pl. 5, fig. 2; vol. 17, 1941, p. 57, pl. 15, fig. 3.

The types of this species are from the locality 2.8 miles E.S.E. of Cooledge where it is common. It occurs at the Corsicana Clay Pit but is absent in the section on Onion Creek. The species is characteristic of the Navarro group above the Nacatoch sand.

Very rare specimens of this species assume a *Darbyella* form.

In their list of Corsicana marl species, Albritton and Phleger (Journ. Pal., vol. 11, 1937, p. 351) give "*Cristellaria pseudomamilligerus* Plummer" which, on examination of their original specimens, appears to be *Robulus spisso-costatus* Cushman.

Genus LENTICULINA Lamarck, 1804

LENTICULINA JONESI Sandidge (Pl. 9, figs. 19, 20)

Lenticulina jonesi SANDIDGE, Journ. Pal., vol. 6, 1932, p. 273, pl. 42, figs. 1, 2.—CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 17, 1941, p. 64, pl. 16, fig. 9.

Specimens, seemingly referable to this species described from the Ripley formation of Alabama, occur at all three of our stations. There is some variation in the shape of the apertural face and in the curvature of the sutures as well as in the amount of involution of the test.

Genus PLANULARIA Defrance, 1824

PLANULARIA DISSONA (Plummer) (Pl. 9, fig. 18)

Cristellaria dissonus PLUMMER, Univ. Texas Bull. 3101, 1931, p. 145, pl. 11, figs. 17, 18; pl. 15, figs. 2-7.

Planularia dissona CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 17, 1941, p. 68, pl. 16, figs. 15-19.

Cristellaria reniformis CARSEY (not D'ORBIGNY), Univ. Texas Bull. 2612, 1926, p. 37, pl. 3, fig. 2.

This species is variable in its form, particularly in the relative amount of uncoiling. It is an excellent index fossil for the beds of Navarro age above the Nacatoch sand, often especially abundant in the Corsicana marl. It occurs at all three of our localities.

Genus MARGINULINA d'Orbigny, 1826

MARGINULINA SILICULA (Plummer) (Pl. 10, fig. 4)

(For references see these Contributions, vol. 17, 1941, p. 88)

This is an index fossil for the upper part of the Navarro group and formations of similar age in South America and Europe. Specimens

occur in two of the localities: the Corsicana Clay Pit and 2.8 miles E.S.E. of Cooledge.

MARGINULINA PLUMMERAE Cushman (Pl. 10, fig. 2)

Marginulina plummerae CUSHMAN, Contr. Cushman. Lab. Foram. Res., vol. 13, 1937, p. 97, pl. 13, figs. 21-23.

Hemicristellaria ensis PLUMMER (not REUSS), Univ. Texas Bull. 3101, 1931, p. 146, pl. 10, figs. 1-4.

Cristellaria lineara CARSEY (not *C. linearis* D'ORBIGNY), Univ. Texas Bull. 2612, 1926, p. 36, pl. 2, fig. 3.

This should be a good index fossil for the upper beds of Navarro age. It is present in material from the three localities.

MARGINULINA CURVATURA Cushman (Pl. 10, fig. 3)

Marginulina curvatura CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 14, 1938, p. 34, pl. 5, figs. 13, 14.

The types of this species are from the Corsicana marl of the section on Onion Creek. It also occurs at both of the other localities used here. It would be a good index fossil for the upper part of the Navarro group. Microspheric specimens closely resemble *M. bullata* Reuss but may be distinguished by the lack of a cylindrical neck.

MARGINULINA sp. (Pl. 10, fig. 1)

A single specimen from Onion Creek is here figured. The early portion is coiled with raised sutures while the later portion has depressed sutures and elongate, inflated chambers. In its early stages it somewhat resembles *M. plummerae* Cushman but the later chambers are much more elongate.

Genus DENTALINA d'Orbigny, 1826

DENTALINA BASIPLANATA Cushman (Pl. 10, fig. 7)

Dentalina annulata CUSHMAN (not REUSS), Tenn. Div. Geol., Bull. 41, 1931, p. 28, pl. 3, fig. 3.

Dentalina reussi PLUMMER (not NEUGEBOREN), Univ. Texas Bull. 3101, 1931, p. 135, pl. 11, fig. 5.—SANDIDGE, Journ. Pal., vol. 6, 1932, p. 274, pl. 42, fig. 10.

Dentalina basiplanata CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 14, 1938, p. 38, pl. 6, figs. 6-8; vol. 16, 1940, p. 82, pl. 14, figs. 1-6.—CUSHMAN and HEDBERG, l. c., vol. 17, 1941, p. 88, pl. 21, fig. 23.

This species often occurs in considerable numbers in the Corsicana marl. It occurs at all three of our localities. It has a wide range but is less common in the lower part of the Navarro group and in the Taylor group.

Some of the specimens which have been referred to *Dentalina megapolitana* Reuss probably belong here as do the specimens from the Corsicana Clay Pit referred to "*Dentalina gracilis* d'Orbigny" by Albritton and Phleger (Journ. Pal., vol. 11, 1937, p. 350).

DENTALINA LEGUMEN Reuss (Pl. 10, fig. 5)

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

This is a variable and wide ranging species, both in Europe and America. Specimens occur in material from the three localities used here.

DENTALINA GRACILIS d'Orbigny (Pl. 10, fig. 6)

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

This is a somewhat variable species with a wide range. It occurs in the Corsicana material only at the locality 2.8 miles E.S.E. of Cooledge.

DENTALINA CRINITA Plummer (Pl. 10, fig. 8)

Dentalina crinita PLUMMER, Univ. Texas Bull. 3101, 1931, p. 154, pl. 11, figs. 12, 13.—SANDIDGE, Journ. Pal., vol. 6, 1932, p. 274, pl. 42, fig. 5.—CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 16, 1940, p. 83, pl. 14, figs. 28, 29.

This species occurs at all three of our localities. It has a wide range in the Navarro and Taylor groups.

DENTALINA cf. CONSOBRINA d'Orbigny

The only specimens referable to this species are from the section on Onion Creek.

DENTALINA DELICATULA Cushman (Pl. 10, fig. 9)

Dentalina delicatula CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 14, 1938, p. 90, pl. 6, figs. 19, 20; vol. 16, 1940, p. 85, pl. 15, figs. 1-6.

The types of this species are from the Corsicana marl of the Onion Creek section. It also occurs in material from the Corsicana Clay Pit and from 2.8 miles E.S.E. of Cooledge. It seems to be characteristic of the Corsicana marl and occurs rarely in the Kemp clay.

DENTALINA ANGUSTICOSTATA Cushman (Pl. 10, fig. 10)

Dentalina angusticostata CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 14, 1938, p. 90, pl. 6, figs. 21, 22; vol. 16, 1940, p. 85, pl. 14, figs. 7, 8.

The types of this species are from the Corsicana marl, 2.8 miles E.S.E. of Cooledge, and it occurs also in the Onion Creek section but was not found in the material from the Corsicana Clay Pit. It is not recorded elsewhere than in the Corsicana marl.

Genus NODOSARIA Lamarck, 1812

NODOSARIA AFFINIS Reuss (Pl. 10, fig. 11)

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

Specimens of this large, wide ranging species occur at all three of our localities but are not common.

NODOSARIA NAVARROANA Cushman (Pl. 10, fig. 12)

Nodosaria navarroana CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 13, 1937, p. 101, pl. 15, fig. 11; vol. 16, 1940, p. 91, pl. 16, figs. 16, 17.

The types are from the Corsicana Clay Pit. It occurs at all three of our localities and elsewhere in the Corsicana marl. The only other

record is from the Prairie Bluff chalk of Mississippi. It should be a good index fossil for this part of the Upper Cretaceous.

NODOSARIA CORSICANANA Cushman (Pl. 10, fig. 12)

Nodosaria corsicanana CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 14, 1938, p. 42, pl. 7, figs. 1-4; vol. 16, 1940, p. 91, pl. 16, figs. 13-15.

This seems to be a good index fossil for the Corsicana marl as it is not recorded elsewhere. It occurs in the material from 2.8 miles E.S.E. of Cooledge and from the Corsicana Clay Pit.

Genus PSEUDOGLANDULINA Cushman, 1929

PSEUDOGLANDULINA MANIFESTA (Reuss) (Pl. 10, fig. 16)

Glandulina manifesta REUSS, Haidinger's Nat. Abhandl., vol. 4, pt. 1, 1851, p. 22, pl. 1, fig. 4.—FRANKE, Abhandl. Preuss. Geol. Landes., n. ser., vol. 111, 1928, p. 52, pl. 4, fig. 28—CUSHMAN and CHURCH, Proc. Calif. Acad. Sci., ser. 4, vol. 18, 1929, p. 511, pl. 39, fig. 10.

Nodosaria manifesta CUSHMAN, Bull. Amer. Assoc. Petr. Geol., vol. 10, 1926, p. 594, pl. 18, fig. 8.—SANDIDGE, Journ. Pal., vol. 6, 1932, p. 278, pl. 42, fig. 8.

Nodosaria larva CARSEY, Univ. Texas Bull. 2612, 1926, p. 31, pl. 2, fig. 2.

Nodosaria humilis CUSHMAN (not ROEMER), Tenn. Div. Geol., Bull. 41, 1931, p. 32, pl. 4, fig. 5.

This is a variable form with a wide range. There is considerable difference in the shape of the microspheric and megalospheric forms. It occurs rather rarely at all three of our localities.

PSEUDOGLANDULINA LAGENOIDES (Olszewski) (Pl. 10, fig. 14)

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

Specimens are rare in the material from 2.8 miles E.S.E. of Cooledge and in the Onion Creek section.

Genus SARACENARIA Defrance, 1824

SARACENARIA cf. ITALICA Defrance (Pl. 10, fig. 17)

Rare specimens may be referred to this species with some question. They are from 2.8 miles E.S.E. of Cooledge.

Genus VAGINULINA d'Orbigny, 1826

VAGINULINA MULTICOSTATA Cushman (Pl. 10, fig. 19)

Vaginulina multicostata CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 6, 1930, p. 28, pl. 4, fig. 4.

Vaginulina simondsi CUSHMAN (part) (not CARSEY), Tenn. Div. Geol., Bull. 41, 1931, p. 33, pl. 4, fig. 7 (not fig. 8); Journ. Pal., vol. 5, 1931, p. 306, pl. 35, fig. 7.

Most of the records for this species are from the Navarro or its equivalents although it ranges into the Taylor. It occurs at all three of our localities.

VAGINULINA SIMONDSI Carsey (Pl. 10, fig. 18)

Vaginulina simondsi CARSEY, Univ. Texas Bull. 2612, 1926, p. 40, pl. 2, fig. 4.—PLUMMER, l. c., Bull. 3101, 1931, p. 161, pl. 10, figs. 13-15.

This species has been much confused with other somewhat similar ones. It is close to *V. webbervillensis* Carsey, but is smaller, less expanded toward the outer end and has costae over the entire surface. Its range seems to be confined to the Navarro group. Of our three localities it occurs only at the Corsicana Clay Pit.

VAGINULINA CRETACEA Plummer (Pl. 10, fig. 20)

Vaginulina gracilis Plummer, var. *cretacea* Plummer, Univ. Texas Bull. 2644, 1926 (1927), p. 172, pl. 2, fig. 8.

Vaginulina cretacea Cushman, Bull. Geol. Soc. Amer., vol. 47, 1936, p. 417, pl. 1, fig. 5.

This seems to be a good index fossil for that part of the Navarro group above the Nacatoch sand, occurring in the Kemp clay and Corsicana marl of Texas, Arkadelphia marl and Saratoga chalk of Arkansas, Prairie Bluff chalk of Mississippi and Alabama, and Ripley formation of Mississippi. It also occurs in the Upper Cretaceous of Navarro age in the canyons of Georges Bank. It occurs at all three of our localities.

VAGINULINA NAVARROANA Cushman (Pl. 10, fig. 16)

Vaginulina navarroana Cushman, Bull. Geol. Soc. Amer., vol. 47, 1936, p. 416, pl. 1, fig. 3.—Cushman and Hedberg, Contr. Cushman Lab. Foram. Res., vol. 17, 1941, p. 90, pl. 22, fig. 1.

The types of this species are from Cretaceous greensand of Navarro age from the canyons of Georges Bank. It has also been recorded from the Mito Juan and upper part of the Colon formation in Colombia. It is common in the Corsicana marl and occurs in the Kemp Clay of Texas, Prairie Bluff chalk of Mississippi and Alabama, and in the Nacatoch sand of Arkansas. There are specimens in all three of our localities. It should make a good index fossil for the upper part of the Navarro group.

VAGINULINA WEBBERVILLENSIS Carsey (Pl. 10, fig. 21)

Vaginulina webbervillensis Carsey, Univ. Texas Bull. 2612, 1926, p. 39, pl. 2, fig. 7.—Plummer, l. c., Bull. 2644, 1926 (1927), p. 39, pl. 2, fig. 7.—Cushman, Contr. Cushman Lab. Foram. Res., vol. 6, 1930, p. 27, pl. 4, fig. 14.—Plummer, Univ. Texas Bull. 3101, 1931, p. 160.

This is a fine, large species and an index fossil for the Corsicana marl and other beds of Navarro age above the Nacatoch sand. It occurs at all three of our localities.

VAGINULINA SUBGRACILIS Cushman (Pl. 10, fig. 22)

Vaginulina subgracilis Cushman, Contr. Cushman Lab. Foram. Res., vol. 13, 1937, p. 103, pl. 15, fig. 13.

Vaginulina gracilis Cushman (not Plummer), Tenn. Div. Geol., Bull. 41, 1931, p. 34, pl. 4, fig. 11.

The description of *Vaginulina subgracilis* [illegible] holotype is from the Corsicana marl. The figured type [illegible] from the Ripley formation, 1½ miles W. of Sardis on Sandy [illegible] road, Henderson Co., Tennessee. In our material *Vaginulina subgracilis* occurs only in the Corsicana Clay Pit.

Genus PALMULA Lea, 1833

PALMULA RETICULATA (Reuss) (Pl. 10, fig. 24)

Flabellina reticulata Reuss, Haidinger's Nat. Abhandl., vol. 4, pt. 1, 1851, p. 30, pl. 1, fig. 22; Sitz. Akad. Wiss. Wien, vol. 44, 1861 (1862), p. 326—[illegible] Sprawozd. Kom. Fizyj. Akad. Umiej., Krakowie, vol. 9, 1875, p. 110—[illegible] Mitth. Nat. Ver. Neu-Vorpommern u. Rügen, Jahrg. 10, 1878, p. 130—[illegible] Abhandl. kön. bay. Akad. Wiss. München, Cl. II, vol. 21, 1899, p. 107, pl. 13, fig. 5-7.—Franke, Abhandl. geol.-pal. Inst. Univ. Greifswald, vol. 6, 1925, p. 64, pl. 6, fig. 14; Abhandl. Preuss. Geol. Landes., n. ser., vol. 111, 1928, p. 93, pl. 8, fig. 12.—White, Journ. Pal., vol. 2, 1928, p. 204, pl. 28, fig. 15.—Cushman, Contr. Cushman Lab. Foram. Res., vol. 6, 1930, p. 32, pl. 4, figs. 18, 19.—Cushman and [illegible] Proc. U. S. Nat. Mus., vol. 80, Art. 14, 1932, p. 37, pl. 11, fig. 15.—[illegible] Zeitschr. Deutschen Palästina-Vereins, Jahrg. 1934, p. 46.—Cushman, Contr. Cushman Lab. Foram. Res., vol. 11, 1935, p. 87, pl. 13, fig. 19.—Jennings, Bull. Amer. Pal., vol. 23, No. 78, 1936, p. 22, pl. 2, fig. 17.

Frondicularia reticulata Bagg, Bull. 88, U. S. Geol. Survey, 1898, p. 50, pl. 3, fig. 6—Weller, New Jersey Geol. Survey, Paleontology, vol. 4, 1907, p. 230, pl. 2, fig. 30.—Plummer, Univ. Texas Bull. 2644, 1926 (1927), pp. 39, 172, pl. 2, fig. 4.

Palmula reticulata Cushman, Foraminifera, their classification and economic use, 3rd. Ed., 1940, pl. 20, fig. 9.

Flabellina favosa Beissel, Abhandl. Preuss. Geol. Landes., n. ser., vol. 1, 1913, pl. 9, figs. 25-28; pl. 16, fig. 28.

Frondicularia cf. *interpunctata* Cushman (not von der Marck), Bull. Amer. Assoc. Petr. Geol., vol. 10, 1926, p. 598, pl. 20, fig. 3.

This species is found in the uppermost Cretaceous of Europe and is characteristic of the American Cretaceous above the Nacatoch sand, although there are rare records below in the upper part of the Taylor marl. In our material it occurs in the Corsicana Clay Pit and 2.8 miles E.S.E. of Cooledge.

Genus FRONDICULARIA Defrance, 1826

FRONDICULARIA VERNEUILIANA d'Orbigny (Pl. 10, fig. 25)

(For references see these Contributions, vol. 18, 1942, p. 61)

This species has a wide distribution in the Upper Cretaceous in the Navarro, Taylor, and Austin groups. The only specimens in our material from the Corsicana marl are from 2.8 miles E.S.E. of Cooledge.

FRONDICULARIA ARCHIACIANA d'Orbigny (Pl. 10, fig. 26)

(For references see these Contributions, vol. 12, 1936, p. 19)

This species is most characteristic of the Taylor group but occurs

sites in the Navarro group, in the Corsicana marl of Texas and the Ripley formation of Tennessee. Our only specimens are from 2.8 miles S.S.E. of Cooledge.

FRONDICULARIA CLARKI Bagg (Pl. 10, fig. 25)

Frondicularia clarki BAGG, Bull. 88, U. S. Geol. Survey, 1898, p. 48, pl. 3, fig. 4.—WELLER, New Jersey Geol. Survey, Paleontology, vol. 4, 1907, p. 227, pl. 2, fig. 23.—CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 6, 1930, p. 34, pl. 5, figs. 1, 2.—PLUMMER (part), Univ. Texas Bull. 3101, 1931, p. 171, pl. 9, fig. 17 (not fig. 16).—CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 12, 1936, p. 12, pl. 3, figs. 4-6.—JENNINGS, Bull. Amer. Pal., vol. 23, No. 78, 1936, p. 22, pl. 2, fig. 21.—COLE, Florida Dept. Conservation, Geol. Bull. 16, 1938, p. 34 (list), pl. 2, fig. 11.

This species is found in the upper part of the Navarro group and its equivalents. It occurs at all three of our localities in the Corsicana marl.

Genus LAGENA Walker and Jacob, 1798

LAGENA HISPIDA Reuss (Pl. 10, fig. 28)

Many forms have been included under this name. Our only specimens are from the Onion Creek section where it is rare.

LAGENA cf. GLOBOSA Montagu (Pl. 10, fig. 27)

The only specimens referable to this species in our present material are from the Onion Creek section.

Family POLYMORPHINIDAE

Genus GUTTULINA d'Orbigny, 1839

GUTTULINA ADHAERENS (Olszewski) (Pl. 11, fig. 1)

Polymorphina adhaerens OLSZEWSKI, Sprawozd. Kom. Fizyj. Akad. Umiej., Krakowie, vol. 9, 1875, p. 119, pl. 1, fig. 11.

Guttulina adhaerens CUSHMAN and OZAWA, Proc. U. S. Nat. Mus., vol. 77, Art. 6, 1930, p. 36, pl. 1, fig. 9; pl. 6, fig. 7.—CUSHMAN, Tenn. Div. Geol., Bull. 41, 1931, p. 39, pl. 6, figs. 5, 6.—CUSHMAN and JARVIS, Proc. U. S. Nat. Mus., vol. 80, Art. 14, 1932, p. 40, pl. 12, fig. 8.

Globulina problema PLUMMER (not D'ORBIGNY), Univ. Texas Bull. 3101, 1931, p. 173, pl. 11, fig. 1.—SANDIDGE, Amer. Midland Nat., vol. 13, 1932, p. 358, pl. 31, figs. 23, 24.

In the American Cretaceous this species seems to be limited to that part of the Navarro group above the Nacatoch sand. In our material it occurs at all three of the localities, but is rare.

Genus GLOBULINA d'Orbigny, 1826

GLOBULINA LACRIMA Reuss (Pl. 11, fig. 3)

Polymorphina (Globulina) lacrima REUSS, Verstein. böhm. Kreide., pt. 1, 1845, p. 40, pl. 12, fig. 6; pl. 13, fig. 83.—EGGER, Abhandl. kön. bay. Akad. Wiss. München, Cl. II, vol. 21, 1899, p. 125, pl. 17, figs. 39, 40.

Globulina lacrima REUSS, Haidinger's Nat. Abhandl., vol. 4, pt. 1, 1851, p. 43, pl. 4,

fig. 9.—Cushman and Ozawa, Proc. U. S. Nat. Mus., vol. 77, Art. 6, 1930, p. 77, pl. 19, figs. 1, 2.—Cushman, Tenn. Div. Geol., Bull. 41, 1931, p. 80, pl. 6, fig. 9; Journ. Pal., vol. 6, 1932, p. 337, pl. 51, fig. 2; Bull. Geol. Soc. Amer., vol. 47, 1936, p. 418.—Loetterle, Nebraska Geol. Survey, 2d ser., Bull. 12, 1937, p. 21, pl. 3, fig. 4.—Frizzell, Journ. Pal., vol. 17, 1943, p. 348, pl. 56, fig. 27.

Polymorphina gibba Cushman (not d'Orbigny) Bull. Amer. Assoc. Petr. Geol., vol. 10, 1926, p. 604, pl. 20, figs. 8, 15.

This species is widely distributed, but in America is confined mostly to the beds of Navarro and Taylor ages with rare occurrences in the upper beds of Austin age. It occurrs at all three of our localities.

GLOBULINA LACRIMA Reuss, var. HORRIDA Reuss (Pl. 11, fig. 4)

Globulina horrida Reuss, Verstein. böhm. Kreide., pt. 2, 1846, p. 110, pl. 43, fig. 14.

Globulina lacrima Reuss, var. *horrida* Cushman and Ozawa, Proc. U. S. Nat. Mus., vol. 77, Art. 6, 1930, p. 79, pl. 19, fig. 3.—Cushman, Journ. Pal., vol. 6, 1932, p. 337, pl. 51, fig. 3

This variety differs from the typical form in having a finely spinose surface and the apertural end usually fistulose. It occurs in our material at only one station in the Onion Creek section.

Genus PYRULINA d'Orbigny, 1839

PYRULINA CYLINDROIDES (Roemer) (Pl. 11, fig. 2)

Polymorphina cylindroides Roemer, Neues Jahrb. für. Min., 1838, p. 385, pl. 3, fig. 26.—H. B. Brady, Parker and Jones, Trans. Linn. Soc., vol. 27, 1870, p. 221, pl. 39, fig. 6.

Pyrulina cylindroides Cushman and Ozawa, Proc. U. S. Nat. Mus., vol. 77, Art. 6, 1930, p. 56, pl. 14, figs. 1-5.—Cushman, Tenn. Div. Geol., Bull. 41, 1931, p. 80, pl. 6, figs. 7, 8.—Tappan, Journ. Pal., vol. 14, 1940, p. 114, pl. 18, fig. 1.

Polymorphina fusiformis Cushman (not Roemer), Bull. Amer. Assoc. Petr. Geol., vol. 10, 1926, p. 604, pl. 20, fig. 14.

Polymorphina gutta W. Berry (not d'Orbigny), in Berry and Kelley, Proc. U. S. Nat. Mus., vol. 76, Art. 19, 1929, p. 10, pl. 1, fig. 11.

This is a rather variable species and usually not found in any considerable numbers. It is mostly found in the Navarro group and upper part of the Taylor group. Our specimens are from the Corsicana Clay Pit and from 2.8 miles E.S.E. of Cooledge.

Genus PSEUDOPOLYMORPHINA Cushman and Ozawa, 1928

PSEUDOPOLYMORPHINA CUYLERI Plummer (Pl. 11, fig. 6)

Pseudopolymorphina cuyleri Plummer, Univ. Texas Bull. 3101, 1931, p. 173, pl. 9, figs. 18-21.

Pseudopolymorphina mendezensis Cushman and Ozawa (part), Proc. U. S. Nat. Mus., vol. 77, Art. 6, 1930, p. 109, pl. 28, figs. 7-9.

This is an excellent index fossil for the upper portion of the Navarro group, being particularly well developed in the Corsicana marl. It is several times as large as *P. mendezensis* and, in the young stages, dif-

fers in being broader and more compressed. It occurs in the material from the Corsicana Clay Pit and from 2.8 miles E.S.E. of Cooledge. It also occurs in the Arkadelphia marl of Arkansas and in the Prairie Bluff chalk of Alabama and Mississippi.

PSEUDOPOLYMORPHINA MENDEZENSIS (White) (Pl. 11, fig. 6)

Polymorphina mendezensis WHITE, Journ. Pal., vol. 2, 1928, p. 213, pl. 29, fig. 14.

Pseudopolymorphina mendezensis CUSHMAN and OZAWA (part), Proc. U. S. Nat. Mus., vol. 77, Art. 6, 1930, p. 109.—BROTZEN, Sver. Geol. Under., Ser. C, No. 396, 1936, p. 115, pl. 7, fig. 10.

The types are from the Mendez shale of Mexico. A few specimens from the Corsicana marl seem to be identical. They are from the Corsicana Clay Pit and from 2.8 miles E.S.E. of Cooledge.

Genus RAMULINA Rupert Jones, 1875

RAMULINA NAVARROANA Cushman (Pl. 11, fig. 7)

Ramulina navarroana CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 14, 1938, p. 43, pl. 7, figs. 10, 11.

This species is known only from the Corsicana marl, occurring in material from 2.8 miles E.S.E. of Cooledge and from the section on Onion Creek.

Genus BULLOPORA Quenstedt, 1856

BULLOPORA LAEVIS (Sollas) (Pl. 11, fig. 8)

Webbina laevis SOLLAS, Geol. Mag., dec. 2, vol. 4, 1877, p. 103, pl. 6, figs. 1-3.

Vitrewebbina laevis CHAPMAN, l. c., dec. 3, vol. 9, 1892, p. 54, pl. 2, fig. 4; Ann. and Mag. Nat. Hist., 6th ser., vol. 18, 1896, p. 332, text fig. 3; Journ. Roy. Micr. Soc., 1896, p. 585, pl. 12, fig. 12.—BAGG, Bull. 88, U. S. Geol. Survey, 1898, p. 36, pl. 2, fig. 4.—CHAPMAN, Ann. and Mag. Nat. Hist., 7th. ser., vol. 3, 1899, p. 314.—WEEKS, New Jersey Geol. Survey, Paleontology, vol. 4, 1907, p. 205, pl. 1, figs. 40, 41.—CHAPMAN, Bull. 72, W. Australia Geol. Survey, 1917, p. 37, pl. 11, fig. 101.

Bulloporа laevis WICKENDEN, Journ. Pal., vol. 6, 1932, p. 206, pl. 29, figs. 6-8.—CUSHMAN, Special Publ. No. 5, Cushman Lab. Foram. Res., 1933, pl. 22, fig. 24.—TAPPAN, Journ. Pal., vol. 14, 1940, p. 115, pl. 18, fig. 6.

Forms referred to this species are widely distributed in the Cretaceous. In the Corsicana marl it occurs in the material from 2.8 miles E.S.E. of Cooledge and at one station in the section on Onion Creek.

Family NONIONIDAE

Genus NONIONELLA Cushman, 1926

NONIONELLA ROBUSTA Plummer (Pl. 11, fig. 9)

Nonionella robusta PLUMMER, Univ. Texas Bull. 3101, 1931, p. 175, pl. 14, fig. 12.—CUSHMAN, U. S. Geol. Survey Prof. Paper 191, 1939, p. 27, pl. 7, fig. 3.

Nonionina scapha CARSEY (not FITCHEL and MOLL), Univ. Texas Bull. 2612, 1926, p. 49, pl. 1, fig. 2.

This is an excellent index fossil for the Navarro group and is espec-

ially abundant in the Corsicana marl. It occurs in [illegible] three of our localities.

Family HETEROHELICIDAE

Genus BOLIVINOPSIS Yakovlev, 1891

BOLIVINOPSIS ROSULA (Ehrenberg) (Pl. 11, fig. 10)

Spiroplecta rosula EHRENBERG, Mikrogeologie, 1854, pl. 32, pt. 2, fig. 26.

Spiroplectoides rosula CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 3, 1927, p. 62, pl. 13, fig. 9; p. 114, pl. 23, figs. 6, 7; Tenn. Div. Geol., Bull. 41, 1931, p. 44, pl. 7, fig. 9; Special Publ. No. 4, Cushman Lab. Foram. Res., 1933, pl. 21, fig. 1; Special Publ. No. 5, 1933, pl. 26, fig. 4; Contr., vol. 10, 1934, p. 38, pl. 6, fig. 10; CUSHMAN, Foraminifera, their classification and economic use, 3rd. Ed., 1940, p. 81, fig. 12; Key, pl. 26, fig. 4.

Bolivinopsis rosula MACFADYEN, Journ. Roy. Micr. Soc., vol. 53, 1933, p. 150, pl. 6, fig. 10.

This species is widely distributed in the Cretaceous. It occurs in material from all of our localities in the Corsicana marl.

Genus GÜMBELINA Egger, 1899

GÜMBELINA STRIATA (Ehrenberg) (Pl. 11, fig. 11)

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

This species is rare in the Navarro group. It occurs in our material from the Corsicana Clay Pit and from 2.8 miles E.S.E. of Cooledge.

GÜMBELINA GLOBULOSA (Ehrenberg) (Pl. 11, fig. 12)

(For references see these Contributions, vol. 14, 1938, p. 6)

This is a widely distributed species ranging through both the Navarro and Taylor groups. It occurs at all three of our Corsicana marl localities.

GÜMBELINA COSTULATA Cushman (Pl. 11, fig. 13)

Gümbelina costulata CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 14, 1938, p. 16, pl. 3, figs. 7-9.

This species also ranges throughout the Navarro and Taylor groups and occurs at all of our localities.

GÜMBELINA EXCOLATA Cushman (Pl. 11, fig. 16)

(For references see these Contributions, vol. 17, 1941, p. 92)

Most of the records for this species are from the Corsicana marl, Kemp clay, and Arkadelphia marl of Navarro age but there are some records for it in the upper part of the Taylor marl. It also occurs in the Selma chalk of wells in Florida, and is recorded from the Upper Cretaceous of Mexico and Colombia.

GÜMBELINA GLABRANS Cushman (Pl. 11, fig. 14)

(For references see these Contributions, vol. 17, 1941, p. 92)

This seems to be an index fossil for that portion of the Navarro group above the Nacatoch sand. It also occurs in Colombia and in the walls of the canyons in Georges Bank. It was found at all three of our localities in the Corsicana marl.

Genus GÜMBELITRIA Cushman, 1933

GÜMBELITRIA CRETACEA Cushman (Pl. 11, fig. 16)

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

This is an index fossil for that part of the Navarro group above the Nacatoch sand. It occurs in the material from 2.8 miles E.S.E. of Cooledge and from the section on Onion Creek.

Genus PSEUDOTEXTULARIA Rzehak, 1886

PSEUDOTEXTULARIA VARIANS Rzehak (Pl. 11, fig. 17)

(For references see these Contributions, vol 14, 1938, p. 21)

This species in the American Cretaceous occurs in Mexico, particularly in the Mendez shale. It occurs in the Kemp clay of Texas and was found at all three of our localities in the Corsicana marl.

Genus VENTILABRELLA Cushman, 1928

VENTILABRELLA CARSEYAE Plummer (Pl. 11, fig. 18)

(For references see these Contributions, vol. 17, 1941, p. 93)

This is an index fossil for that part of the Navarro group above the Nacatoch sand. It occurs at all three of our Corsicana marl localities.

Genus PSEUDOUVIGERINA Cushman, 1927

PSEUDOUVIGERINA SELIGI (Cushman) (Pl. 11, fig. 19)

Uvigerina seligi CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 1, pt. 1, 1925, p. 1, pl. 4, fig. 1.—PLUMMER, Univ. Texas Bull. 3101, 1931, p. 186, pl. 14, fig. 10.

Uvigerina tenuistriata CARSEY (not REUSS), Univ. Texas. Bull. 2612, 1926, p. 42, pl. 1, fig. 1.

This species seems to be characteristic of the Navarro group above the Nacatoch sand. It is found at all three of our Corsicana marl localities. It is recorded by Albritton and Phleger as *"Eouvigerina americana* Cushman" (Journ. Pal., vol. 11, 1937, p. 351), as shown by examination of their original material.

Family BULIMINIDAE

Genus BULIMINELLA Cushman, 1911

BULIMINELLA CARSEYAE Plummer, var. PLANA Cushman and Parker (Pl. 11, fig. 20)

Buliminella carseyae PLUMMER, var. *plana* CUSHMAN and PARKER, Contr. Cushman Lab. Foram. Res., vol. 12, 1936, p. 8, pl. 2, fig. 7.—CUSHMAN and HEDBERG, l. c., vol. 17, 1941, p. 94, pl. 22, fig. 26.

This variety is characteristic of the Navarro group above the Nacatoch sand and occurs in the Colon shale of Colombia. It occurs in our material from the Corsicana Clay Pit and from the section on Onion Creek.

Genus BULIMINA d'Orbigny, 1826

BULIMINA REUSSI Morrow, var. NAVARROENSIS Cushman and Parker (Pl. 11, fig. 21)

Bulimina reussi MORROW, var. *navarroensis* CUSHMAN and PARKER, Contr. Cushman Lab. Foram. Res., vol. 11, 1935, p. 100, pl. 15, fig. 11.

This variety seems to be limited to beds of Navarro age and is particularly common in the Corsicana marl. It occurs at all three of our localities.

BULIMINA PROLIXA Cushman and Parker (Pl. 11, fig. 25)

Bulimina puschi CUSHMAN (not REUSS), Tenn. Div. Geol., Bull. 41, 1931, p. 47, pl. 7, fig. 19.

Bulimina prolixa CUSHMAN and PARKER, Contr. Cushman Lab. Foram. Res., vol. 11, 1935, p. 98, pl. 15, fig. 5.

This species occurs in beds of Navarro age and in the upper beds of Taylor age. It occurs in the Corsicana marl only at the locality 2.8 miles E.S.E. of Cooledge.

BULIMINA KICKAPOOENSIS Cole, var. PINGUA Cushman and Parker (Pl. 11, fig. 24)

Bulimina kickapooensis COLE, var. *pingua* CUSHMAN and PARKER, Contr. Cushman Lab. Foram. Res., vol. 16, 1940, p. 44, pl. 8, figs. 13, 14.

The types are from the locality 2.8 miles E.S.E. of Cooledge and it occurs at both of our other localities. The variety often occurs abundantly and is an excellent marker for this part of the Navarro group, occurring in, besides the Corsicana marl, the Kemp clay of Texas and the Prairie Bluff chalk of Mississippi.

BULIMINA ASPERA Cushman and Parker (Pl. 11, fig. 27)

(For references see these Contributions, vol. 16, 1940, p. 44)

Specimens referable to this species occur in our Corsicana material from the Corsicana Clay Pit and from 2.8 miles E.S.E. of Cooledge. It is widely distributed in the Navarro and Taylor groups.

Genus NEOBULIMINA Cushman and Wickenden, 1928

NEOBULIMINA CANADENSIS Cushman and Wickenden

Neobulimina canadensis CUSHMAN and WICKENDEN, Contr. Cushman Lab. Foram. Res., vol. 4, 1928, p. 13, pl. 1, figs. 1, 2.—CUSHMAN, Tenn. Div. Geol., Bull. 41, 1931, p. 48, pl. 8, fig. 1; Special Publ. No. 4, Cushman Lab. Foram. Res., 1933, pl. 22, fig. 24; Special Publ. No. 5, 1933, pl. 27, fig. 15.—CUSHMAN and PARKER, Contr., vol. 12, 1936, p. 9, pl. 2, figs. 9, 10.—JENNINGS, Bull. Amer. Pal., vol. 24, No. 78, 1936, p. 31, pl. 3, fig. 22.

This widely distributed species occurs in our material from 2.8 miles E.S.E. of Cooledge.

Genus VIRGULINA d'Orbigny, 1826

VIRGULINA NAVARROANA Cushman (Pl. 11, fig. 23)

(For references see Special Publ. No. 9, 1937, p. 6)

This seems to be a good index fossil for the Kemp clay and Corsicana

marl of the upper part of the Navarro group. It occurs at all three of our localities.

Genus LOXOSTOMUM Ehrenberg, 1854

LOXOSTOMUM PLAITUM (Carsey) (Pl. 11, fig. 26)

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

Specimens of this species occur at all three of our Corsicana localities.

LOXOSTOMUM PLAITUM (Carsey) var. LIMBOSUM Cushman (Pl. 11, fig. 27)

(For references see Special Publ. No. 9, 1937, p. 170)

This variety is confined to beds of Navarro age. In our material it occurs at the locality 2.8 miles E.S.E. of Cooledge.

Family ELLIPSOIDINIDAE

Genus ELLIPSONODOSARIA A. Silvestri, 1900

ELLIPSONODOSARIA STEPHENSONI Cushman (Pl. 11, fig. 28)

Ellipsonodosaria stephensoni CUSHMAN, Contr. Cushman Lab. Foram. Res., vol 12, 1936, p. 52, pl. 9, figs. 10-15.

This species ranges through the Navarro and Taylor groups. In our Corsicana material it occurs at the Corsicana Clay Pit and from 2.8 miles E.S.E. of Cooledge.

ELLIPSONODOSARIA ALEXANDERI Cushman, var. IMPENSIA Cushman (Pl. 11, fig. 29)

Ellipsonodosaria alexanderi CUSHMAN, var. *impensia* CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 14, 1938, p. 48, pl. 8, figs. 4, 5.—FRIZZELL, Journ. Pal., vol. 17, 1943, p. 350, pl. 57, fig. 4.

This form is a good index fossil for the upper part of the Navarro group and is especially abundant in the Corsicana marl. It occurs at all three of our localities.

ELLIPSONODOSARIA (?) GRANTI (Plummer) (Pl. 11, fig. 30)

Nodosaria granti PLUMMER, Univ. Texas Bull. 2644, 1926 (1927), p. 83, pl. 5, fig. 9.
Ellipsonodosaria (?) granti CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 12, 1936, p. 51, pl. 9, figs. 3-5.

In the Cretaceous this species is largely confined to beds of Navarro age but there are a few specimens from the upper part of the Taylor marl. It occurs in our material from the Corsicana Clay Pit and from 2.8 miles E.S.E. of Cooledge.

Family ROTALIIDAE

Genus VALVULINERIA Cushman, 1926

VALVULINERIA CRETACEA (Carsey) (Pl. 12, fig. 1)

Rotalia cretacea CARSEY, Univ. Texas Bull. 2612, 1926, p. 48, pl. 5, fig. 1.—SANDIDGE, Amer. Midland Nat., vol. 13, 1932, p. 364, pl. 33, figs. 7, 8.

This species apparently belongs in the genus *Valvulineria*. It is often abundant and characteristic of beds of Navarro age with a few

occurrences in the Taylor group. It occurs at all three of our Corsicana localities.

VALVULINERIA cf. UMBILICATULA (d'Orbigny) (Pl. 12, fig. 2)

Valvulineria cf. *umbilicatula* CUSHMAN, Tenn. Div. Geol., Bull. 41, 1931, p. 53, pl. 9, figs. 2-5.

Gyroidina umbilicata CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 7, 1931, p. 43, pl. 6, fig. 3.

This is a variable form possibly identical with d'Orbigny's species. It occurs in the Navarro group particularly above the Nacatoch sand. In the Corsicana marl it occurs at our locality 2.8 miles E.S.E. of Cooledge and in the section on Onion Creek.

Genus GYROIDINA d'Orbigny, 1826

GYROIDINA DEPRESSA (Alth) (Pl. 12, fig. 4)

(For references see these Contributions, vol. 17, 1941, p. 97)

This species has a wide range nearly throughout the Upper Cretaceous. The only material from the Corsicana marl is from the Corsicana Clay Pit where it is rare.

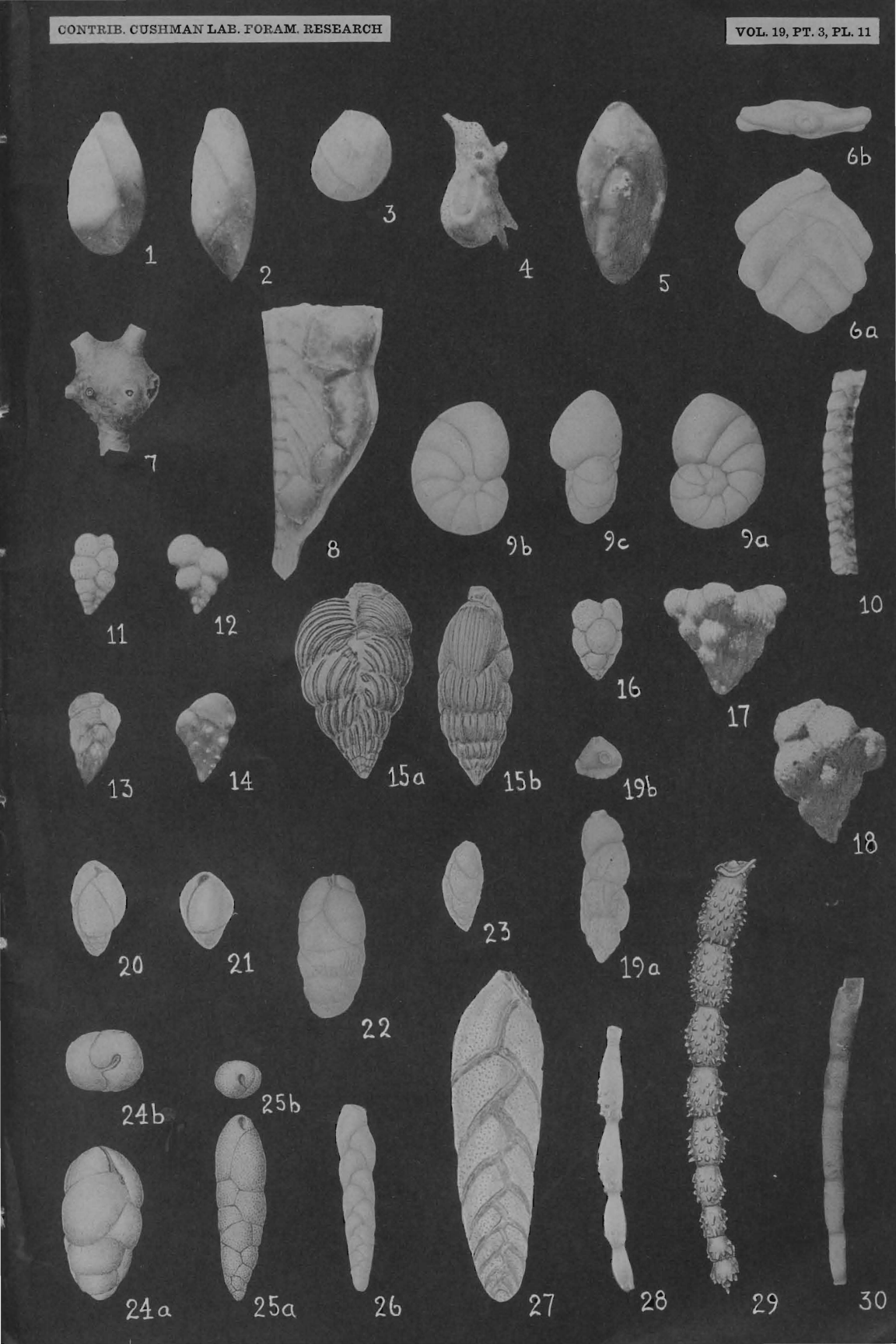
GYROIDINA GIRARDANA (Reuss) (Pl. 12, fig. 3)

Rotalina girardana REUSS, Zeitschr. deutsch. geol. Ges., vol. 3, 1851, p. 73, pl. 5, fig. 34.

Gyroidina girardana CUSHMAN, Journ. Pal., vol. 5, 1931, p. 311, pl. 36, fig. 1; Special Publ. No. 5, Cushman Lab. Foram. Res., 1933, pl. 30, fig. 3.—COLE, Florida Dept. Conservation, Geol. Bull. 16, 1938, p. 35 (list), pl. 2, fig. 13.

EXPLANATION OF PLATE 11

FIG. 1. *Guttulina adhaerens* (Olszewski). Loc. I. × 40. 2. *Pyrulina cylindroides* (Roemer). Loc. II. × 40. 3. *Globulina lacrima* Reuss. Loc. I. × 40. 4. *G. lacrima* Reuss, var. *horrida* Reuss. Loc. III. × 40. 5. *Pseudopolymorphina mendezensis* (White). Loc. I. × 40. 6. *P. cuyleri* Plummer. Loc. II. × 14. 7. *Ramulina navarroana* Cushman. Loc. II. × 30. Holotype. (After Cushman). 8. *Bullopora laevis* (Sollas). Loc. II. × 15. 9. *Nonionella robusta* Plummer. Loc. I. × 65. 10. *Bolivinopsis rosula* (Ehrenberg). Loc. I. × 40. 11. *Gümbelina striata* (Ehrenberg). Loc. I. × 40. 12. *G. globulosa* (Ehrenberg). Loc. I. × 40. 13. *G. costulata* Cushman. Loc. I. × 40. 14. *G. glabrans* Cushman. Loc. I. × 40. 15. *G. excolata* Cushman. Loc. II. *a*, front view; *b*, side view. × 75. (After Cushman). 16. *Gümbelitria cretacea* Cushman. Loc. III. × 75. 17. *Pseudotextularia varians* Rzehak. Loc. I. × 40. 18. *Ventilabrella carseyae* Plummer. Loc. I. × 40. 19. *Pseudouvigerina seligi* (Cushman). Loc. I. *a*, side view; *b*, apertural view. × 80. 20. *Buliminella carseyae* Plummer, var. *plana* Cushman and Parker. Loc. III. × 75. 21. *Bulimina reussi* Morrow, var. *navarroensis* Cushman and Parker. Loc. II. × 75. 22. *B. aspera* Cushman and Parker. Loc. I. × 30. 23. *B. prolixa* Cushman and Parker. Loc. II. × 75. 24. *B. kickapooensis* Cole, var. *pingua* Cushman and Parker. Loc. II. *a*, side view; *b*, apertural view. × 36. Holotype. (After Cushman and Parker). 25. *Virgulina navarroana* Cushman. Loc. I. *a*, side view; *b*, apertural view. × 85. Holotype. (After Cushman). 26. *Loxostomum plaitum* (Carsey). Loc. III. × 60. (After Cushman). 27. *L. plaitum* (Carsey), var. *limbosum* Cushman. Loc. II. × 75. 28. *Ellipsonodosaria stephensoni* Cushman. Loc. 1. × 40. 29. *E. alexanderi* Cushman, var. *impensia* Cushman. Loc. II. × 30. Holotype. (After Cushman). 30. *E. (?) grantii* (Plummer). Loc. I. × 25. (After Cushman).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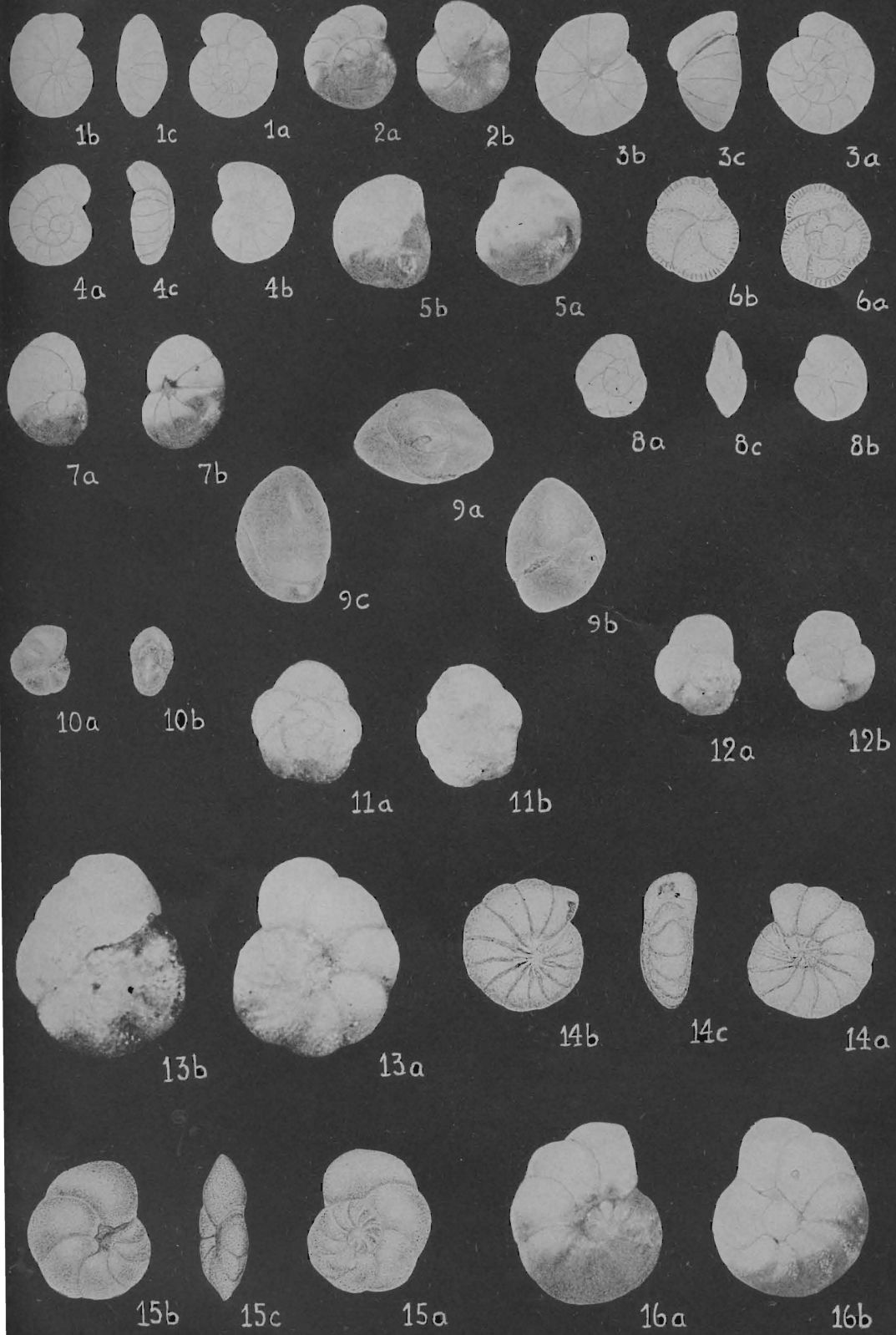
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This species has a wide range in the Upper Cretaceous. It occurs at all three of our localities. An examination of the specimens shows that Albritton and Phleger's "*Gyroidina micheliniana* (d'Orbigny)" (Journ. Pal., vol. 11, 1937, p. 352) should belong here.

Genus EPISTOMINA Terquem, 1883

EPISTOMINA CARACOLLA (Roemer) (Pl. 12, fig. 5)

Gyroidina caracolla ROEMER, Verstein. norddeutsch. Kreide., 1840-41, p. 97, pl. 15, fig. 22.

Pulvinulina caracolla CHAPMAN, Journ. Roy. Micr. Soc., 1898, p. 7, pl. 1, fig. 9.

Epistomina caracolla FRANKE, Abhandl. geol.-pal. Inst. Univ. Greifswald, vol. 6, 1925, p. 88, pl. 8, fig. 10.—CUSHMAN and CHURCH, Proc. Calif. Acad. Sci., ser. 4, vol. 18, 1929, p. 517, pl. 40, figs. 10(?), 11-13.—CUSHMAN, Tenn. Div. Geol., Bull. 41, 1931, p. 55, pl. 10, fig. 1.—LOETTERLE, Nebraska Geol. Survey, 2d ser., Bull. 12, 1937, p. 62, pl. 11, fig. 2.—CUSHMAN and HEDBERG, Contr. Cushman Lab. Foram. Res., vol. 17, 1941, p. 98, pl. 23, fig. 19.

Discorbis ripleyensis W. BERRY, in Berry and Kelley, Proc. U. S. Nat. Mus., vol. 76, Art. 19, 1929, p. 11, pl. 3, figs. 16-18.

This species is widely distributed in beds of Navarro and Taylor age. In the Corsicana marl it occurs only at the locality 2.8 miles E.S.E. of Cooledge.

Genus SIPHONINA Reuss, 1850

SIPHONINA PRIMA Plummer (Pl. 12, fig. 6)

Siphonina prima PLUMMER, Univ. Texas Bull. 2644, 1926 (1927), p. 148, pl. 12, fig. 4.—CUSHMAN, Proc. U. S. Nat. Mus., vol. 72, Art. 20, 1927, p. 2, pl. 2, fig. 4.—JENNINGS, Bull. Amer. Pal., vol. 23, No. 78, 1936, p. 33, pl. 4, fig. 3.

The types of this species are from the Midway (Paleocene) of Texas.

EXPLANATION OF PLATE 12

FIG. 1. *Valvulineria cretacea* (Carsey). Loc. I. *a*, dorsal view; *b*, ventral view; *c*, peripheral view. × 50. 2. *V.* cf. *umbilicatula* (d'Orbigny). Loc. II. *a*, dorsal view; *b*, ventral view. × 40. 3. *Gyroidina girardana* (Reuss). Loc. I. *a*, dorsal view; *b*, ventral view; *c*, peripheral view. × 75. 4. *G. depressa* (Alth). Loc. I. *a*, dorsal view; *b*, ventral view; *c*, peripheral view. × 75. 5. *Epistomina caracolla* (Roemer). Loc. II. *a*, dorsal view; *b*, ventral view. × 40. 6. *Siphonina prima* Plummer. Loc. II. *a*, dorsal view; *b*, ventral view. × 75. 7. *Ceratobulimina cretacea* Cushman and Harris. Loc. II. *a*, dorsal view; *b*, ventral view. × 40. 8. *Pulvinulinella glabrata* Cushman. Loc. III. *a*, dorsal view; *b*, ventral view; *c*, peripheral view. × 75. 9. *Allomorphina navarroana* Cushman. Loc. I. *a*, dorsal view; *b*, side view; *c*, ventral view. × 65. Holotype. (After Cushman). 10. *Pullenia minuta* Cushman. Loc. I. *a*, side view; *b*, apertural view. × 55. Holotype. (After Cushman). 11. *Globotruncana arca* (Cushman). Loc. I. *a*, dorsal view; *b*, ventral view. × 40. 12. *Globorotalia membranacea* (Ehrenberg). Loc. II. *a*, dorsal view; *b*, ventral view. × 40. 13. *Anomalina nelsoni* W. Berry. Loc. III. *a*, dorsal view; *b*, ventral view. × 40. 14. *A. pseudopapillosa* Carsey. Loc. I. *a*, dorsal view; *b*, ventral view; *c*, peripheral view. × 50. (After Cushman). 15. *Planulina correcta* (Carsey). Loc. III. *a*, dorsal view; *b*, ventral view; *c*, peripheral view. × 50. (After Cushman). 16. *Cibicides harperi* (Sandidge). Loc. II. *a*, dorsal view; *b*, ventral view. × 40.

Similar forms occur in the Navarro group above the Nacatoch sand in Texas, Arkansas, Mississippi, Alabama, Tennessee, and New Jersey. Our specimens from the Corsicana marl are from 2.8 miles E.S.E. of Cooledge and from the section on Onion Creek.

Family CASSIDULINIDAE

Genus CERATOBULIMINA Toula, 1920

CERATOBULIMINA CRETACEA Cushman and Harris (Pl. 12, fig. 7)

Ceratobulimina cretacea CUSHMAN and HARRIS, Contr. Cushman Lab. Foram. Res., vol. 3, 1927, p. 173, pl. 29, fig. 1; pl. 30, fig. 11.—CUSHMAN, Tenn. Div. Geol., Bull. 41, 1931, p. 56, pl. 10, fig. 2; Special Publ. No. 5, Cushman Lab. Foram. Res., 1933, pl. 33, fig. 1.—PLUMMER, Amer. Midland Nat., vol. 17, 1936, p. 460, fig. 5.

The types of this species are from the Corsicana marl of Texas. It is characteristic of the beds of Navarro age above the Nacatoch sand. In our material it occurs only at the locality 2.8 miles E.S.E. of Cooledge.

Genus PULVINULINELLA Cushman, 1926

PULVINULINELLA GLABRATA Cushman (Pl. 12, fig. 8)

Pulvinulinella glabrata CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 14, 1938, p. 66, pl. 11, fig. 4.

The types of this species are from the Corsicana marl. It is almost entirely confined to the upper beds of Navarro age. Specimens occur at the locality on Onion Creek.

Family CHILOSTOMELLIDAE

Genus ALLOMORPHINA Reuss, 1850

ALLOMORPHINA NAVARROANA Cushman (Pl. 12, fig. 9)

Allomorphina navarroana CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 12, 1936, p. 73, pl. 13, fig. 1.

The types are from the Corsicana Clay Pit and there are specimens also from the section on Onion Creek. The only other record is from the Kemp clay of Texas. It would seem, therefore, that this should be a good index fossil for this upper part of the Navarro group.

Genus PULLENIA Parker and Jones, 1862

PULLENIA MINUTA Cushman (Pl. 12, fig. 10)

Pullenia minuta CUSHMAN, Contr. Cushman. Lab. Foram. Res., vol. 12, 1936, p. 77, pl. 13, fig. 7.—CUSHMAN and TODD, l. c., vol. 19, 1943, p. 8, pl. 1, fig. 17.

The types of this species are from the Corsicana marl and it occurs at all three of our localities. It is an index fossil for the upper beds of Navarro age, occurring in the Kemp clay and Corsicana marl of Texas and in the Prairie Bluff chalk of Mississippi.

Family GLOBIGERINIDAE

Genus GLOBIGERINA d'Orbigny, 1826

GLOBIGERINA CRETACEA d'Orbigny

This group is under study at the present time and final determination of species has not been completed. At all three of our Corsicana marl localities there are specimens probably identical with those of d'Orbigny.

Family GLOBOROTALIIDAE

Genus GLOBOTRUNCANA Cushman, 1927

GLOBOTRUNCANA FORNICATA Plummer

(For references see these Contributions, vol. 17, 1941, p. 99)

A single specimen from the locality 2.8 miles E.S.E. of Cooledge seems to belong to this species. Its normal range is from the Neylandville marl member of the Navarro group down through the Taylor group.

GLOBOTRUNCANA ARCA (Cushman) (Pl. 12, fig. 11)

Pulvinulina arca Cushman, Contr. Cushman Lab. Foram. Res., vol. 2, pt. 1, 1926, p. 23, pl. 3, fig. 1.

Globotruncana arca Cushman, l. c., vol. 3, 1927, p. 91, pl. 19, fig. 11; Journ. Pal., vol. 1, 1927, p. 169, pl. 28, fig. 15.—Cushman and Church, Proc. Calif. Acad. Sci., ser. 4, vol. 18, 1929, p. 518, pl. 41, figs. 1-3.—Cushman, Journ. Pal., vol. 6, 1932, p. 343, pl. 51, fig. 13.—Glaessner, Studies in Micropaleontology, vol. 1, fasc. 1, 1937, p. 36, pl. 1, fig. 10.—Cole, Florida Dept. Conservation, Geol. Bull. 16, 1938, p. 36 (list), pl. 4, figs. 11, 12.

Globigerina rosetta Carsey, Univ. Texas Bull. 2612, 1926, p. 44, pl. 5, fig. 3.

Specimens referable to this species occur at all three of our localities.

Genus GLOBOROTALIA Cushman, 1927

GLOBOROTALIA MEMBRANACEA (Ehrenberg) (Pl. 12, fig. 12)

Planulina membranacea Ehrenberg (part), Mikrogeologie, 1854, pl. 26, fig. 43 (not pl. 25, 1A, fig. 41).

Pulvinulina membranacea Cushman, Bull. Amer. Assoc. Petr. Geol., vol. 10, 1926, p. 608, pl. 21, fig. 10.

Globorotalia membranacea White, Journ. Pal., vol. 2, 1928, p. 280, pl. 38, fig. 1.

The Cretaceous records for this species have been confined to the upper part. Rare specimens from the locality 2.8 miles E.S.E. of Cooledge seem identical with Mexican specimens.

Family ANOMALINIDAE

Genus ANOMALINA d'Orbigny, 1826

ANOMALINA NELSONI W. Berry (Pl. 12, fig. 13)

Anomalina nelsoni W. Berry, in Berry and Kelley, Proc. U. S. Nat. Mus., vol. 76, Art. 19, 1929, p. 14, pl. 2, figs. 19-21.—Cushman, Contr. Cushman Lab. Foram. Res., vol. 16, 1940, p. 27, pl. 5, figs. 1, 2.—Cushman and Hedberg, l. c., vol. 17, 1941, p. 99, pl. 23, fig. 20.

This species has a wide distribution in the Navarro group and the upper part of the Taylor group. In our Corsicana marl material it occurs in the material from 2.8 miles E.S.E. of Cooledge and in the section on Onion Creek.

ANOMALINA PSEUDOPAPILLOSA Carsey (Pl. 12, fig. 14)

Anomalina pseudopapillosa CARSEY, Univ. Texas. Bull. 2612, 1926, p. 47, pl. 1, fig. 6.—PLUMMER, l. c., Bull. 3101, 1931, p. 200, pl. 14, fig. 13.—CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 16, 1940, p. 29, pl. 5, fig. 6.

The range of this species is from the Midway (Paleocene) downward through beds of Navarro age to and including the Nacatoch sand. It occurs at all three of our Corsicana marl localities.

Genus **PLANULINA** d'Orbigny, 1826

PLANULINA CORRECTA (Carsey) (Pl. 12, fig. 15)

Discorbis correcta CARSEY, Univ. Texas Bull. 2612, 1926, p. 45, pl. 3, fig. 5.—PLUMMER, l. c., Bull. 3101, 1931, p. 188, pl. 14, figs. 1-4.

Planulina correcta CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 16, 1940, p. 36, pl. 6, fig. 11.—CUSHMAN and HEDBERG, l. c., vol. 17, 1941, p. 99, pl. 23, fig. 10.

This species is a characteristic one for the upper part of the Navarro group, occurring in the Kemp clay and Corsicana marl of Texas, Arkadelphia marl of Arkansas, and Prairie Bluff chalk of Mississippi and Alabama. The types are from the Corsicana marl and the species occurs in all of our localities.

Genus **CIBICIDES** Montfort, 1808

CIBICIDES HARPERI (Sandidge) (Pl. 12, fig. 16)

(For references see these Contributions, vol. 16, 1940, p. 38)

This species seems to be limited to the upper beds of Navarro age. In our material it occurs at 2.8 miles E.S.E. of Cooledge and in the section on Onion Creek.

RECENT LITERATURE ON THE FORAMINIFERA

Below are given some of the more recent works on the foraminifera that have come to hand:

Glaessner, M. F. Problems of Stratigraphic Correlation in the Indo-Pacific Region.—Proc. Roy. Soc. Victoria, vol. 55, pt. 1 (new series), May, 1943, pp. 41-80, chart.—Lists and notes on foraminifera are given.

Frizzell, Don L. Upper Cretaceous Foraminifera from northwestern Peru.—Journ. Pal., vol. 17, No. 4, July, 1943, pp. 331-353, pls. 55-57, text figs. 1, 2.—There are 52 species and varieties described from the Mal Paso shale, of which 15 are new.

Thalmann, Hans E. Bibliography and index to new genera, species, and varieties of Foraminifera for the year 1940.—L. c., pp. 388-408.

J. A. C.