

STATE OF FLORIDA
DEPARTMENT OF CONSERVATION

GEORGE W. DAVIS, *Commissioner*

GEOLOGICAL BULLETIN No. 12

NEW MIOCENE GASTROPODS AND SCAPHOPODS
FROM ALAQUA CREEK VALLEY, FLORIDA

BY
W. C. MANSFIELD
UNITED STATES GEOLOGICAL SURVEY

Tallahassee, Florida
1935

STATE OF FLORIDA
DEPARTMENT OF CONSERVATION

GEORGE W. DAVIS, *Commissioner*

GEOLOGICAL BULLETIN No. 12

NEW MIOCENE GASTROPODS AND SCAPHOPODS
FROM ALAQUA CREEK VALLEY, FLORIDA

BY
W. C. MANSFIELD
UNITED STATES GEOLOGICAL SURVEY

Published by
State Board of Conservation
Geological Department
Tallahassee, 1935

Published June 7, 1935

LETTER OF TRANSMITTAL

*Honorable George W. Davis,
Supervisor of Conservation.*

DEAR MR. DAVIS:

Two bulletins dealing with the invertebrate fossils of the Choctawhatchee formation which is so richly fossiliferous and well exposed in western Florida have been issued by the Geological Survey. One of these appeared in 1930 as Bulletin No. 3 and the other in 1932 as Bulletin No. 8. The field work incident to the preparation of the latter bulletin gave excellent opportunity to make additional collections and it was during this time that the new species described in the manuscript herewith transmitted were found. Dr. W. C. Mansfield, of the United States Geological Survey, is the author and the report comes as a contribution from the Federal Survey to the Florida Survey, the only expense being that of publication. These bulletins will form a most complete treatment of the larger invertebrate fossils of this formation which will prove helpful especially to students of invertebrate paleontology. It is with pleasure that acknowledgment is made of the generous co-operation of the Federal Survey and to Dr. Mansfield for his thorough and painstaking work. It is recommended that this supplementary report be printed as Geological Bulletin No. 12.

Very respectfully,

HERMAN GUNTER, *Assistant Supervisor,
State Board of Conservation,
Geological Department.*

Tallahassee, Florida,
February 11, 1935.

CONTENTS

	Page
Introduction	7
Description of Species.....	15

ILLUSTRATIONS

Plates 1-5. Miocene gastropods and scaphopods of the Choctawhatchee formation from the Alaqua Creek Valley.....	49
---	----

NEW MIOCENE GASTROPODS AND SCAPHOPODS FROM ALAQUA CREEK VALLEY, FLORIDA

By W. C. MANSFIELD¹

INTRODUCTION

This paper describes new species of gastropods and scaphopods that have been found in the valley of Alaquia Creek south of DeFuniak Springs, Fla., since the publication of my paper on "Miocene gastropods and scaphopods of the Choctawhatchee formation of Florida."² Descriptions of the pelecypods and foraminifers from the same beds were included in bulletins 8 and 9, respectively, of the Florida State Geological Survey.³ A sketch map showing the fossil localities in Alaquia Creek valley is given in Bulletin 8, fig. 1. The types of the new species are deposited in the U. S. National Museum. A nearly complete set of named specimens, including many topotypes, has been deposited with the Florida State Geological Survey. The plates were made from photographs by Nelson W. Shupe, retouched by Frances Wieser, both of the U. S. Geological Survey.

The beds containing these fossils represent the three lower zones (*Yoldia* zone, *Arca* zone, and *Ecphora* zone) of the Choctawhatchee formation, which are discussed in Bulletin 8. The correlation of these zones is shown in table 1.

The *Yoldia* zone is represented in the valley of Alaquia Creek by deposits on the Frazier farm (station 12060, the type locality) and on the Chester Spence farm (station 12718). These contain *Cymatosyrinx vaughanensis*, n. sp., *Turbonilla* sp., *Alabina* sp., *Crucibulum constrictum* (Conrad), and *Dentalium* (*Laevidentalium*) sp. aff. *D. callipeplum* Dall.

¹Published by permission of the Director of the U. S. Geological Survey.

²Mansfield, W. C., Florida Geol. Survey Bull. 3, 1930.

³Mansfield, W. C., Miocene pelecypods of the Choctawhatchee formation of Florida: Florida Geol. Survey Bull. 8, 1932.

Cushman, J. A., and Ponton, G. M., The Foraminifera of the upper, middle, and part of the lower Miocene of Florida: Florida Geol. Survey Bull. 9, 1932.

TABLE 1. CORRELATION OF SOME LATER TERTIARY AND PLEISTOCENE DEPOSITS OF THE ATLANTIC AND GULF COASTAL PLAIN

		EUROPEAN EQUIVALENT	NEW JERSEY	MARY- LAND	VIRGINIA	NORTH CAROLINA		SOUTH CAROLINA	GEORGIA	FLORIDA
PLEISTO- CENE				Deposits at Wailes Bluff <i>a</i>				Deposits on Yonges Island		Marls on North Creek
PLIOCENE	Upper	Sicilian (Arnian)				(?)		(?)		Deposits on Myakka River <i>b</i>
	Middle	Astian				(?)		(?)		(?)
	Lower	Plaisancian				Wacca- maw fm. to south	Croatan sand to north	Wacca- maw fm. <i>f</i>		Limestone of Tamiami Trail <i>c</i> Caloosahatchee marl

a The fossiliferous beds in the Pleistocene not necessarily correlated.

b The fauna included by Dall in the Myakka River fauna may include some Pleistocene.

c Position relative to Caloosahatchee marl not precisely known.

f Beds at the Grove plantation tentatively put in the Waccamaw formation by Cooke; may be older.

TABLE 1. CORRELATION OF SOME LATER TERTIARY AND PLEISTOCENE DEPOSITS OF THE ATLANTIC AND GULF COASTAL PLAIN—*Continued*

MIOCENE		EUROPEAN EQUIVALENT	NEW JERSEY	MARY- LAND	VIRGINIA		NORTH CAROLINA		SOUTH CAROLINA	GEORGIA	FLORIDA									
	Upper	Sahelian	Pontian			Yorktown formation Zone 2	Beds at Suffolk	Upper beds	Duplin marl to south	Duplin marl	Duplin marl (at Porters Landing)	Choctawhatchee formation	Cancellaria zone (upper part)							
							Beds at Yorktown								Cancellaria zone (lower part)					
							Chama-bearing bed	Chama-bearing bed		"Aluminous clay"										
		Middle	Tortonian or upper Vindobonian	Sarmatian			Zone 1		Zone 1	Zone 1 (at Raysor Bridge)				Ecphora zone						
	(?)													St. Marys fm.	St. Marys formation	Zone 2	(?) St. Marys fm. <i>d</i>		Arca zone (upper part)	
																Zone 1	(?)		Arca zone (lower part)	
														Choptank fm.	Choptank fm.					Yoldia zone
														Kirkwood fm.	Calvert fm.	Calvert fm.				Shoal River fm.
												Oak Grove sand <i>e</i>								

ALAGUA CREEK VALLEY GASTROPODS AND SCAPHOPODS

d Mainly concealed except at low-water stage.

^e Exact correlation with the Calvert formation not fully established; may be a little older and equivalent to the Helvetian.

The *Arca* zone, typically exposed at Red Bay, Walton County, is represented in the valley of Alaquia Creek by beds on the Bell farm (stations 12044 and 12045) and on Vaughan Creek (stations 12046 and 12047). These beds are believed to carry the earliest fauna of the zone, older than that of the lower of exposed fossiliferous bed at Red Bay, which contains the latest fauna of the *Arca* zone. They contain at least 72 species of gastropods, 16 of which lived also in the preceding Shoal River formation, and 2 species of scaphopods. The *Arca* zone at Red Bay carries *Cylichna* sp., *Conus alaquiaënsis* n. sp.?, *Turritella gatunensis blountensis* n. subsp., *Turritella alaquiaënsis vaughanensis* n. subsp.?, *Crucibulum constrictum* (Conrad)?, *Calliostoma* sp. and *Dentalium attenuatum* Say. Six species in the *Arca* zone are closely related to or are identical with species in the Gatun formation of the Canal Zone, the Bowden marl of Jamaica, or in the Gurabo formation of the Dominican Republic, as follows:

<i>Species in the Arca zone</i>	<i>Related foreign species</i>
<i>Terebra alaquiaënsis</i> laqua n. subsp.	<i>Terebra gausapata</i> Brown and Pilsbry, Gatun formation
<i>Pleurotoma</i> (Gemmula) <i>vaningeni</i> Brown and Pilsbry (rare)	<i>P. vaningeni</i> Brown and Pilsbry, Gatun formation
<i>Marginella vaughanensis</i> n. sp.	<i>Marginella coniformis</i> Sowerby, Bowden marl and Gurabo formation
<i>Epitonium alaquiaëns</i> n. sp.	<i>Epitonium aduncum</i> Woodring, Bowden marl
<i>Turritella gatunensis blountensis</i> n. subsp.	<i>Turritella gatunensis</i> Conrad, Gatun formation.
<i>Natica guppyana</i> Toulou (rare)	<i>Natica guppyana</i> Toulou, Gatun formation.

The *Ecphora* zone, whose type locality is Alum Bluff on the Apalachicola River, is represented in the valley of Alaquia Creek at only one known place—Permenter's farm (station 12048)—at which *Oliva* sp., *Epitonium* sp., *Turritella cookei permenteri* n. subsp., *Crucibulum auriculum* (Gmelin) var., and *Cadulus blountense* n. sp.? have been collected

The new species that are common to the Shoal River formation and to the Choctawhatchee formation have been described in a manuscript by Dr. Julia Gardner and are not included in

this report. They are marked by an asterisk in the following list.

The following list shows the geologic range of the gastropods and scaphopods that have been found in the valley of Alaquia Creek. Those species that are followed by the letter C, occur in the *Cancellaria* zone; by E, in the *Ecphora* zone; by A, in the *Arca* zone; by Y, in the *Yoldia* zone; by S, in the Shoal River formation; and by R, in the Recent fauna.

RANGE OF SPECIES

Gastropoda

1. *Acteon* species (immature), A.
2. *Acteon hamadryados* Maury, A (var.), S.
3. **Acteocina* species, A, S.
4. **Acteocina* species, A. S. Near *A. myremecoon* Dall (Duplin)
5. **Cylichna* species, A, S.
6. **Cylichnina* species, ?C, A, S.
7. *Volvula* species, A, ?S. Cf. *V. oxytata* Bush, Recent.
8. *Abderospira* species, A, ?S.
9. *Ringicula blountensis* n. sp., A.
10. *Terebra* (*Strioterebrum*) *alaquaënsis* n. sp., A.
11. *Terebra* (*Strioterebrum*) *alaquaënsis* laqua n. subsp., A.
12. *Terebra* (*Strioterebrum*) *alaquaënsis* ulaqua n. subsp., A.
13. *Terebra* (*Strioterebrum*) *vaughanensis* n. sp., A.
14. *Terebra* (*Strioterebrum*) *blountensis* n. sp., A.
15. *Conus alaquaënsis* n. sp., A.
16. *Conus laqua* n. sp., A.
17. *Conus vaughanensis* n. sp., A.
18. *Conus waltonensis blountensis* n. subsp., A.
19. *Conus* aff. *C. proteus* Hwass, A.
20. "*Pleurotoma* (*Gemmula*)" *vaningeni* Brown and Pilsbury, A (rare), S.
21. *Polystira alaquaënsis* n. sp., A.
22. *Crassispira blountensis* n. sp., A.
23. *Clathrodrillia*? *laqua* n. sp., A. Aff. Duplin marl (upper Miocene) form.
24. *Cymatosyrinx vaughanensis* n. sp., Y. A.
25. *Agladrillia uquala* n. sp., A.
26. **Ithythythara* species, A, S.

27. *Glyphostoma macneili* n. sp., A.
28. *Cancellaria* (*Cancellaria*) *laqua* n. sp., A.
29. *Cancellaria* (*Narona*) *blountiana* n. sp., A.
30. *Cancellaria* (*Narona*) *agria uaquala* n. subsp., A.
31. *Oliva* species (fragment), A. E.
32. *Olivella mutica* (Say) C, E, A, R.
33. *Marginella* (*Leptegouana*) *vaughanensis* n. sp., A.
34. *Marginella* (*Leptegouana*) *blountensis* n. sp., A.
35. **Marginella* (*Serrata*) species, A (var.?), S.
36. *Marginella* (*Serrata*) *aureocincta* Stearns, C. A. R.
37. *Cypraeolina lacrimula* Gould, C, A, ?S, R. Same form as at Petersburg, Va.
38. *Mitra* (*Tiara*) *blountensis* n. sp., A. Aff. upper Miocene species.
39. *Vexillum* (*Uromitra*) *alacquaense* n. sp., A.
40. *Fusus* *alacquaensis* n. sp., A. Aff. *burnsii* Dall (upper Miocene).
41. *Busycon propecoronatum* n. sp., A.
42. *Busycon blountense* n. sp., A.
43. *Busycon montforti* Aldrich, ?C, A, S, =?B. *maximum* rapum (Heilprin).
44. **Busycon* species, A. S. Close to B. *fusiforme*, St. Marys formation.
45. *Latirus waltonensis* n. sp., A.
46. *Neptunea*? *alacquaensis* n. sp., A.
47. *Phos blountanus* n. sp., A.
48. *Phos blountanus laquanus* n. subsp., A.
49. **Alectrion* species, A. S. Group of A. *peralta* Conrad, St. Marys formation.
50. **Alectrion* species, A. S.
51. *Alectrion blountensis* n. sp., A.
52. *Mitrella communis laqua* n. subsp., A.
53. *Anachis* (*Costoanachis*) *alacquaensis* n. sp., A.
54. *Anachis* (*Costoanachis*) *vaughanensis* n. sp., A.
55. **Typhis* species ?A (rare), S.
56. *Typhis harrisi waltonensis* n. subsp., A.
57. *Urosalpinx*? *vaughanensis* n. sp., A.
58. *Muricidea*? *alacquaensis* n. sp., A.
59. *Murex*, 2 species? indent., A.
60. *Epitonium alacquaense* n. sp., A. Aff. E. *aduncum* Woodring (Bowden marl)
61. *Epitonium* species (fragment), E.

62. **Melanella* species ?A, S.
63. *Strombiformis* species, not determined, A.
64. *Pyramidella* species, not determined, A.
65. *Turbonilla*, 2 or more species, A, Y.
66. *Semicassis* (*Tylocassis*) *inflata waltonensis* n. subsp., A.
67. *Sconsia* aff. *S. striata* Lamarck, A.
68. *Triphora* species, A.
69. *Alabina*, one or more species, E, A, Y.
70. *Serpulorbis granifera* Say?, E.
71. *Turritella gatunensis blountensis* n. subsp., A, ?S.
72. *Turritella alaquaeensis* n. sp., A.
73. *Turritella alaquaeensis vaughanensis* n. subsp., A.
74. *Turritella cookei permenteri* n. subsp., E.
75. **Architectonica* species, A. S. Aff. *A. granulata* Lamarck.
76. *Fossarus* aff. *F. dalli* Whitfield, A.
77. *Crepidula plana* Say, A, S.
78. *Crepidula fornicata* (Linnaeus), A, S.
79. *Crucibulum auriculum* (Gmelin) var.?, E.
80. *Crucibulum auriculum* (Gmelin), A.
81. *Crucibulum constrictum* (Conrad), A, Y, ?S.
82. *Crucibulum* cf. *C. multilatum* (Conrad), A.
83. *Natica guppyana* Toulou, A (one specimen), S.
84. *Natica canrena* (Linnaeus), C, A.
85. *Natica canrena* (Linnaeus)?, A.
86. *Polinices coënsis* Dall, C, A. Smaller in A than C.
87. *Polinices* (*Euspira*) *waltonensis* n. sp., A.
88. *Polinices* (*Euspira*) *propeinternus* n. sp., A.
89. *Polinices duplicatus* (Say), C, A, R.
90. *Tectonatica pusilla* (Say), C, A, R. Reported middle Miocene to Recent.
91. *Sinum* aff. *S. fragilum* Conrad, A. The type of *S. fragilum* came from St. Marys formation, Md.
92. *Calliostoma* species (young), A.
93. *Molleria* cf. *M. duplinensis parva* Mansfield, A.
94. *Solariella laqua* n. sp., A.
95. *Vitrinella blountana* n. sp., A.
96. *Teinostoma* cf. *T. nanum umbilicatum* (H. C. Lea), A.
97. *Circulus trillex* (Bush), A, R.

Scaphopoda:

98. *Dentalium attenuatum* Say, C, E, A.
99. *Dentalium* aff. *D. callipeplum* Dall, Y, A.
100. *Cadulus blountense* n. sp., A. ?E.

The fossil shells described in this report were collected at the places listed below. The numbers in the list are the station numbers used by the U. S. Geological Survey for collections deposited by it in the Division of Mollusks of the U. S. National Museum.

12718. Chester Spence farm (N.E. $\frac{1}{4}$ of N.E. $\frac{1}{4}$, sec. 17, T.2N., R.19 W.). Fossils collected directly above a horizontal oxidized line, which is about 5 feet above the base of the bluff, and in a layer 2 or 3 feet higher up. W. C. Mansfield and G. M. Ponton, collectors, 1932 (*Yoldia* zone).
12060. Frazier's old farm (formerly Spencer farm), one-fourth mile southeast of center of sec. 18, T.2N., R.19 W. Fossils obtained at a dripping spring which heads a small branch flowing into Alaqua Creek. W. C. Mansfield and G. M. Ponton, collectors, 1930-31 (type locality of *Yoldia* zone).
12044. On the Steel Chuch road at head of a small branch flowing into Sconier's Mill Creek, on the rear of the G. H. Bell farm (formerly the G. R. Spencer farm) 7.1 miles south-southwest of DeFuniak Springs (N.E. $\frac{1}{4}$, sec. 29, T.2N., R.19W) W. C. Mansfield and G. M. Ponton, collectors, 1930 (*Arca* zone, lower part).
12045. At head of small branch flowing into Sconier's Mill Creek on the G. H. Bell farm, about one-fourth mile south of Station 12044 (about center sec. 29, T.2N., R.19 W.). W. C. Mansfield and G. M. Ponton, collectors, 1930 (*Arca* zone, lower part).
12046. Vaughan Creek (locally called Blounts Creek), about 3 miles from its junction with Alaqua Creek on the old farm of Mrs. F. H. Davis, about $6\frac{1}{2}$ miles nearly south of DeFuniak Springs (sec. 27, T.2 N., R.19 W.). Fossils obtained a short distance below the head of a shallow gorge that cuts through the marl. Elevation of shell bed, 93 feet above sea level. W. C. Mansfield and G. M. Ponton, collectors, 1930-31 (*Arca* zone, lower part).
12047. Vaughan Creek (locally called Blounts Creek), from a few yards below an old mill to half a mile below it, and about $1\frac{1}{2}$ to 2 miles from the creek's junction with Alaqua Creek, in sec. 28, T.2 N., R.19 W (J. W. Fahrenholz's old farm). Elevation of shell bed at water's level at

- lower end of creek, 76 feet. W. C. Mansfield and G. M. Ponton, collectors, 1930 (*Arca* zone, lower part).
12048. In an old road cut in the east bank of Alaqu Creek on P. Permenter's old farm, about 10 miles nearly south of De Funiak Springs, in sec. 17, T.1 N., R.19 W. Shells collected at altitude of 53 feet above sea level. W. C. Mansfield and G. M. Ponton, collectors, 1930 (*Ecphora* zone).
12049. E. Gomillion's place, about half a mile east of Red Bay. W. C. Mansfield and G. M. Ponton, collectors, 1930 (*Arca* zone, upper part).
12050. Lower bed on Jim Kennedy Branch, about one mile east of Red Bay. W. C. Mansfield and G. M. Ponton, collectors, 1930-32 (*Arca* zone, upper part).

DESCRIPTIONS OF SPECIES

Class GASTROPODA
 Family RINGICULIDAE
 Genus RINGICULA Deshayes, 1838
Ringicula blountensis Mansfield, n. sp.
 Plate 1, Figure 13

Shell small, solid, ovate and consisting of about 2 nuclear and 2 post-nuclear whorls. Nuclear whorls smooth,—initial turn very small, following turn much larger. Post-nuclear whorls marked with spiral striae forming between these striae very narrow flat bands. Body whorl much larger than preceding and rounded in outline. Outer lip thick with upper third of margin depressed. Inner lip callus bearing three widely separate folds, the upper one situated at the posterior third and the anterior one forming the border of the anterior canal.

The holotype (U.S.N.M. Cat.No.373111) measures: Length, 2.4 mm.; diameter 1.6 mm.

Type locality: Station 12046, Vaughan Creek, upper locality, Walton County, Florida.

Occurrence: Upper middle Miocene, *Arca* zone. Common at the type locality.

Family TEREBRIDAE
 Genus TEREBRA Bruguière, 1789
 Subgenus STRIOTEREBRUM Sacco, 1891
Terebra (Strioterebrum) alaquensis Mansfield, n. sp.
 Plate 1, Figure 1

Shell rather slender, solid, posterior extremity moderately acute, axial and spiral sculpture about the same strength, 12

whorls remaining on holotype; tip lost. Subsutural band about one-fourth width of whorl, restricted in front by a moderately deep sulcus. Ribs about 20 in number, offset on adjoining whorls, weakly arcuate, continuous across the whorl and about the same width as intercostal spaces. Spiral sculpture on spire of narrow, equal sized, regularly spaced bands separated by interspaces of equal width; these number 4 below the sulcus on the holotype and 5 on some other specimens. The ribs and spirals on the body whorl extend to the siphonal fasciole. Siphonal fasciole bounded posteriorly by a sharp keel and in front by growth lines. Columella weakly biplicate.

The holotype (U.S.N.M.Cat.No.373112) measures: Length, 25 mm.; diameter, 5 mm.

Type locality: Station 12046, Vaughan Creek, upper locality, Walton County, Florida.

Occurrence: Upper middle Miocene, *Arca* zone; known only at the type locality.

Terebra (*Strioterebrum*) *alacquaënsis laqua* Mansfield, n. subsp.
Plate 1, Figure 2

Shell rather slender, solid, posterior extremity moderately acute and consisting of 2 nuclear and 9 post-nuclear whorls. Subsutural band wide and constricted in front by a rather deep and narrow sulcus. Sutural area depressed. Axials about 19 on each whorl, slightly offset on adjoining whorls, weakly arcuate, about as wide as interspaces, weakly nodulous at the intersection with the spirals. The spiral in front of the subsutural band is rather wide; the following four are narrow and extend forward to the suture. Spirals and axials on the body whorl extend to the base. Siphonal fasciole bounded on the upper margin by a sharp keel and anteriorly by coarse growth lines. Columella weakly biplicate.

The holotype (U. S. N. M. Cat. No. 373113) measures: Length 27 mm.; diameter, 7 mm.

Terebra alacquaënsis laqua is closely related to *Terebra gausapala* Brown and Pilsbry from Mt. Hope, Canal Zone, which differs from *T. alacquaënsis laqua* in having a stronger spiral below the subsutural band.

Type locality: Station 12046, Vaughan Creek, upper locality, Walton County, Florida.

Occurrence: Upper middle Miocene, *Arca* zone; known only at the type locality.

Terebra (*Strioterebrum*) *alaguaënsis* *ulagua* Mansfield, n. subsp.
Plate 1, Figure 3

Shell of medium size, moderately slender, somewhat acute at posterior extremity and consisting of 2 nuclear and 11 post-nuclear whorls. Subsutural band wide and constricted anteriorly by a moderately deep sulcus. Axials on contiguous whorls offset. Suture weakly depressed. Axials about 20, slightly narrower than interspaces, continuous across the whorl. Spiral sculpture of (2 on early whorls and 3 on later whorls between the sulcus and base) narrow, equally spaced bands. Very fine spiral threads overrun the whorls, being more distinct in the intercostal valleys. Siphonal fasciole bounded behind by a sharp keel. Columella weakly biplicate.

The holotype (U.S.N.M.Cat.No. 373114) measures: Length, 26½ mm.; diameter, 6 mm.

Terebra alaguaënsis ulagua differs from *Terebra alaguaënsis* and *Terebra alaguaënsis laqua* in having fewer spirals between the sulcus and the base of the whorl; however, the three forms are closely related.

Type locality: Station 12046, Vaughan Creek, upper locality, Walton County, Florida.

Occurrence: Upper middle Miocene, *Arca* zone; known only at the type locality.

Terebra (*Strioterebrum*) *vaughanensis* Mansfield, n. sp.
Plate 1, Figure 4

Shell small, very slender, axial sculpture much stronger than spiral. Nucleus on holotype lost but on a small paratype it consists of 3 small, smooth, rounded whorls. Suture weakly depressed. Subsutural band about one-third width of whorl and constricted anteriorly by a deep sulcus. Axials about 15, nearly vertical on contiguous whorls, retractive over posterior half of whorl and protractive below. Spiral sculpture of a very faint line adjacent to and below the sulcus and fine striae on the anterior half of the whorl forming between them very narrow flat bands. Axials and spirals on the body whorl extend to the base. Columella with 2 strong plications.

The holotype (U.S.N.M.Cat.No.373115) measures: Length, 16 mm.; diameter, 3½ mm.

Type locality: Station 12046, Vaughan Creek, upper locality, Walton County, Florida.

Occurrence: Upper middle Miocene, *Arca* zone; known only at the type locality.

Terebra (*Strioterebrum*) *blountensis* Mansfield, n. sp.

Plate 1, Figure 5

Shell rather small, moderately slender, with gradually enlarging whorls. Sutural band about one-third width of whorl, constricted in front by a deep sulcus. Axials 16, strong, narrower than interspaces, slightly offset on contiguous whorls, weakly retractive on upper half of whorl and protractive below. Spiral sculpture on spire whorls of 2 impressed lines below the sulcus, one being at the upper third and the other at the lower third. There are 8 impressed spiral lines on the anterior half of the body whorl. Columella with 2 strong plications.

The holotype (U.S.N.M.Cat.No.373116) measures: Length, 26.5 mm.; diameter, $5\frac{1}{2}$ mm.

Type locality: Station 12046, Vaughan Creek, upper locality, Walton County, Florida.

Occurrence: Upper middle Miocene, *Arca* zone; known only at the type locality.

Family CONIDAE

Genus *CONUS* Linnaeus 1758

Conus alaquænsis Mansfield, n. sp.

Plate 1, Figure 7

Shell rather small, thin, moderately slender, consisting of about 9 whorls in all. Spire turritid, weakly concave and constituting about one-third shell length. Protoconch small, rounded, apparently smooth and apically depressed. Following 5 post-nuclear whorls strongly carinated above the suture; later whorls less strongly carinated, the suture falling upon the periphery of the whorl. Spire whorls marked with obscure spirals and curved growth lines. Face of body whorl and siphonal fasciole sculptured with 19 moderately narrow, spiral bands separated by narrower interspaces. These bands extend upward nearly to the carinated shoulder. The interspaces on the back of the body whorl are either very narrow or carry a spiral thread. Some of the spiral bands are ornamented with a few granules. Columella with a weak depression at the lower border. Canal anteriorly deflected to the left and backward.

The holotype (U.S.N.M.Cat.No.373117) measures: Length 33.3 mm.; greatest diameter, 13.5 mm.; length of spire, 9.6 mm.

Conus harveyensis Mansfield, an upper Miocene species, is related to the new species, differing from the latter in having a stouter shell and wider spiral bands on the body whorl.

Type locality: Station 12046. Vaughan Creek, upper locality, Walton County, Florida.

Occurrence: Upper middle Miocene, *Arca* zone. Station 12046, Vaughan Creek, upper locality, Walton County (type locality). A poorly preserved mold at Station 12049, Red Bay, Walton County, may belong to the new species.

Conus laqua Mansfield, n. sp.
Plate 1, Figure 6

Shell small, subbiconic, rather stout and consisting of 10 whorls in all. Spire turrited, uniformly conic and constituting about one-third of shell length. Spire whorls medially depressed and marked with obscure spiral lines and strong curved growth lines. Front and back of body whorl similarly sculptured with 21 strong, nearly smooth, concentric bands with slightly narrower interspaces. The interspaces are crossed by fine axial threadlets.

The holotype (U. S. N. M. Cat. No. 373118) measures: Length, 24 mm.; greatest diameter, 10.8 mm. Length of spire, 9 mm.

Conus multiliratus gaza Johnson and Pilsbry from the middle Miocene of Dominican Republic, Panama and Colombia, S. A., shows some relationship to *C. laqua* n. sp. but differs from it in having a more tapering body whorl. *Conus harveyensis* Mansfield, an upper Miocene species, though closely related, has a relatively narrower shell and wider spiral bands.

The new species appears to be a precursor of *C. pygmaeus* Reeve, a living species, differing mainly in having wider-spaced concentric bands.

Occurrence: Upper middle Miocene, *Arca* zone. Station 12046, Vaughan Creek, upper locality, Walton County (type locality). Station 12044, Bell place, upper locality, Walton County; Station 12045, Bell place, lower locality. Rare at all localities.

Conus waltonensis blountensis Mansfield, n. subsp.
Plate 1, Figure 9

Shell small, rather stout with 7 or 8 whorls in all. Spire turrited, evenly and broadly conic and constitutes about one-fourth of shell length. Spire whorls carinated at the lower shoulder and depressed medially. Body whorl broad above and narrow below and sculptured, from the upper third to the siphonal fasciole, with about 10 rather wide spiral bands, which are ornamented with a few granules. Siphonal fasciole

weakly elevated and marked with 5 or 6 closely spaced and narrow spiral bands.

The holotype (U.S.N.M.Cat.No.373119) measures: Length, 17.2 mm.; greatest diameter, 9.2 mm.; Length of spire, 5 mm.

Conus wallonensis blountensis, n. subsp. differs from *Conus waltonensis* Aldrich, a species from the Shoal River formation in having a relatively higher and more evenly conic spire; broader body whorl above and more constricted below; a stronger carina at the shoulder of the body whorl; and in the absence of granules on the upper third of the body whorl.

Occurrence: Upper middle Miocene, *Arca* zone. Station 12046, Vaughan Creek, upper locality, Walton County, Fla. (type locality). Known only from the type locality.

Conus vaughanensis Mansfield, n. sp.

Plate 1, Figure 8

Shell of moderate size, rather stout and solid, with about 9 whorls in all. Spire turritid, weakly acuminate in the earlier whorls and constituting about one-third shell length. Whorls medially depressed and marked with weak concentric threads and curved growth lines. Anterior canal broken off. Body whorl sculptured only at anterior end with 5 or more undulating raised concentric lines.

The holotype (U.S.N.M.Cat.No.373120) measures: Length, 50 mm.; greatest diameter, 27.5 mm.

Conus imitator Brown and Pilsbry, a middle Miocene species from the Gatun formation, Panama Canal Zone, is related to *C. vaughanensis*, n. sp. but differs from it in having a more slender shell, more acuminate early spire and stronger sculpture on the body whorl.

Conus diluvianus Green, a species confined to the St. Marys formation of Maryland and Virginia, shows close relationship to the new species but differs from the latter in having a shallower depression in the anal fasciole and fewer whorls.

Conus delessertii Recluz, a living species ranging from Cape Hatteras to the Florida Keys is also closely related to the new species but differs from it in having a slimmer shell and a shallower anal fasciole.

Occurrence: Upper middle Miocene, *Arca* zone. Station 12046, Vaughan Creek, upper locality, Walton County, Florida (type locality); Station 12044, Bell Place, upper locality, Walton County (one fragment.)

Conus aff. *C. proteus* Hwass
Plate 1, Figure 12

A large shell with only the spire preserved was collected at Station 12046, Vaughan Creek, upper locality, Walton County. This shell is related to *Conus proteus* Hwass. The specific determination of this shell must await the collection of better specimens. The spire when compared with that of *C. proteus* has less depressed whorls medially. The spire of *C. apium* Woodring, a species from the Bowden marl of Jamaica, is somewhat similar to the unnamed Florida species.

The figured specimen (U.S.N.M.Cat.No.373121) measures: Diameter of spire, 37.5 mm.

Family TURRIDAE
Genus POLYSTIRA Woodring, 1928
Polystira alaquænsis Mansfield, n. sp.
Plate 1, Figure 14

Shell large, fusiform, moderately slender, prominently spirally sculptured and consisting of about 15 whorls in all. Spire high, weakly turritid with uniformly enlarging whorls. Suture appressed against preceding spiral. Nuclear whorls 4; apical turn very small; following two whorls larger, rounded and smooth; fourth whorl sculptured with fine axials. The sculpture of the first post-nuclear whorl consists of 2 spirals, the second or medial one is the stronger and on the later whorls forms the periphery; on the fourth whorl another spiral appears at base of the whorl and in ascending the spire becomes equal in strength to the subsutural spiral. The sculpture of the penultimate whorl is composed of three raised nearly equally-spaced, primary spirals or keels; the medial one is a little stronger and is situated at the periphery of the whorl; two secondary spirals or threads lie above the posterior primary and 3 below the anterior primary. Fine axials connect the primary spirals; those above the peripheral keel are retractive and those below protractive. The sculpture on the body whorl, from the suture forward to the base, consists of 8 similar primary, concentric keels intercalated with 3 or 4 secondary threads. Canal long, straight above and reflected at the extremity and sculptured with primary and secondary spirals. Aperture wide above and narrow and linear below.

The holotype (U.S.N.M.Cat.No.373122) measures: Length, 49 mm.; greatest diameter, 14 mm.

Polystira barretti (Guppy) from the Bowden marl of Jamaica, has a much stronger peripheral keel and a larger nucleus than the new species.

Polystira haitensis (Sowerby), a species reported from the Cercado and Gurabo formations of the Dominican Republic, also has a larger nucleus.

A species described in manuscript by Gardner and occurring in the Shoal River formation of Florida appears to be the ancestor of the new species described in this paper. Both have similar nuclei but the Shoal River species has a much stronger peripheral keel and fewer primary concentric spirals on the body whorl.

Occurrence: Upper middle Miocene, *Arca* zone. Station 12046, Vaughan Creek, upper locality (type and only locality).

Genus CRASSISPIRA Swainson, 1840
Crassispira blountensis Mansfield, n. sp.
Plate 1, Figure 11

Shell of moderate size, fusiform, turritid, with 6 remaining whorls, early whorls decollate. Whorls weakly inflated, anterior ones more so than posterior, constricted at the suture. Axial sculpture stronger than spiral. Suture rather closely appressed, wavy in conformity with the contour of the axials and marginally bordered by a weak thread. Anal fasciole wide, situated at upper fourth, marked by 3 or 4 spiral threads, bounded behind by a spiral cord and in front by a ribbed shoulder. Axials (17 on the penultimate whorl) moderately strong and sharp, weakly protractive and extending from the shoulder of the anal fasciole forward to the suture. Sculpture on the spire whorls below the anal fasciole consisting of 4 to 5 faintly spirally striate bands, weakly nodulous with the axials and separated by narrower spaces. Spiral bands on the periphery of the body whorl are intercalated with 1 or 2 spiral threads and those on the base and canal with 3 or 4. Siphonal fasciole strong; a small chink is located between the inner lip and lower end of the columella.

The holotype (U. S. N. M. Cat. No. 373123) measures: Length, 28 mm.; greatest diameter, 8.5 mm.

Occurrence: Upper middle Miocene, *Arca* zone. Station 12046, Vaughan Creek, upper locality, Walton County (type and only locality).

Genus CLATHRODRILLIA Dall, 1918

Clathrodrillia? laqua Mansfield, n. sp.

Plate 2, Figure 6

Shell small, solid, high-spined, moderately slender; axial sculpture stronger than spiral; body whorl and spire about the same length and composed of about 8 whorls in all. Suture closely appressed and undulating. Anal fasciole wide and slightly depressed. First nuclear whorl small, rounded, smooth; following whorl larger, rounded and sculptured with about 8 spiral threadlets and faint axials forming a faint reticulate ornamentation; following whorls sculptured with stronger, wider-spaced axials and incised spirals on the lower half of the whorl. The penultimate whorl has 8 moderately strong, rounded and widely-spaced axials, which are strongly developed on the lower half of the whorl and very weakly developed on the upper half. Whole surface of shell sculptured with incised spirals forming narrow, flat bands, which are stronger on the periphery. These bands are very narrow and alternate with spiral threadlets on the basal slope of the body whorl. Anal notch wide, very deep, the upper margin being a short distance below the suture. Pillar short; anterior siphonal canal wide and dorsally reflected.

The holotype (U. S. N. M. Cat. No. 373124) measures: Length, 10.5 mm.; greatest diameter, 3 mm.

Clathrodrillia? laqua is related to an undescribed species from the Duplin marl at the Natural Well, North Carolina. The new species is a descendent of a species from the Shoal River formation described in manuscript by Gardner. It differs from the Shoal River form in having fewer and weaker axials.

Occurrence: Upper middle Miocene, *Arca* zone. Station 12044, Bell place, upper locality, Walton County (type locality); Station 12046, Vaughan Creek, upper locality, Walton County.

Genus CYMATOSYRINX Dall, 1889

Cymatosyrinx vaughanensis Mansfield, n. sp.

Plate 2, Figures 1, 2

Shell of moderate size, rather stout, mainly axially sculptured, with about 11 whorls. Suture appressed and wavy. Whorls turritid and inflated. Anal fasciole rather wide, occupying the upper third and gradually ascending anteriorly. First nuclear whorl globular, smooth and small; second nu-

clear whorl less rounded and faintly marked by axials. Following whorls weakly depressed in the upper half and axially sculptured in the lower half, weak at first but becoming stronger in ascending the whorl. Penultimate whorl with 10 axials, which are very weak in the anal fasciole but do not quite reach the posterior suture. On the basal whorl the axials terminate at the base except 2 or 3 in front that extend nearly to the siphonal fasciole. The surface of the shell is marked with faint, curved growth lines, which are retractive over the anal fasciole and protractive below. Siphonal fasciole well developed. Anal sinus deep; upper margin one millimeter below the suture. Margin of outer lip thin and weakly arched. Inner lip smooth and calloused. Anterior canal short, wide and terminally turned to the right and backward.

The holotype (U. S. N. M. Cat. No. 373125) measures: Length, 22 mm.; greatest diameter, 7 mm.

The new species is a descendant of a species from the Shoal River formation of Florida described in manuscript by Gardner, but is a slimmer shell, with one more rib and with weaker axials on the early whorl than the Shoal River form. It is also closely related to *Cymatosyrinx limatula* (Conrad), a species reported throughout the Miocene Chesapeake group of Maryland. It appears to be more closely related to the form in the St. Marys formation than to those in the Calvert or the Choptank formation.

Occurrence: Upper middle Miocene: *Arca* zone,—Station 12046, Vaughan Creek, upper locality, Walton County (type locality); Station 12044 Bell place, upper locality, Walton County (one specimen). *Yoldia* zone,—Station 12718, upper bed at Chester Spence farm, Walton County (one poor specimen).

Genus AGLADRILLIA Woodring, 1928

Agladrillia uquala Mansfield, n. sp.

Plate 1, Figure 10

Shell small, moderately slender, with a high spire, short canal, and with 8 remaining whorls. Nucleus decollate. Whorls weakly inflated. Suture shallow. Axial sculpture consisting of about 14 offset, strong ribs, extending from suture to suture. Anal fasciole scarcely distinguishable on the spire whorls but better defined by a narrow band on the body whorl. Axials not strongly developed below the base on the body whorl. Spiral sculpture on the spire whorls consisting of 5 or 6 raised,

smooth, narrow bands, separated by narrower spaces. Margin of outer lip broken. Inner lip with a smooth and heavy callus. Anterior canal short.

The holotype (U.S.N.M.Cat.No.373126) measures: Length, 14 mm.; greatest diameter, 4.5 mm.

Agladrillia callothyra Woodring a species from the Bowden marl of Jamaica, is much more constricted at the suture than *Agladrillia uquala*. "*Drillia*" *foveolata* Pilsbry and Johnson, Miocene, Dominican Republic, judging from the illustration, is closely related to *A. uquala* but appears to have fewer axials on the penultimate whorl than the new species.

Occurrence: Upper middle Miocene, *Arca* zone. Station 12046, Vaughan Creek, upper locality, Walton County (type locality).

Genus GLYPHOSTOMA Gabb, 1873
 Glyphostoma macneili Mansfield, n. sp.
 Plate 2, Figure 3

Shell rather large, moderately slender, both axially and spirally sculptured, with a long spire and canal; nuclear whorls decollate. Suture appressed and wavy. Anal fasciole wide, ascending forward from the suture. Whorls turritid and uniformly expanding. Penultimate whorl with 10 strong, rounded protractive axials, extending from the lower margin of the anal fasciole forward to the suture and intercalated by round-bottomed valleys about the same width as the ribs. Body whorl with about 20 axials, which extend nearly to the siphonal fasciole. Spiral sculpture of the early whorls consisting of 2 primary threads situated near the upper and lower extremity of each rib. Penultimate whorl with a fine secondary thread between the primaries and one at the upper shoulder and another at the base of the whorl. Anal fasciole marked with 2 or 3 obscure spiral threads and by curved axials on the upper half. Body whorl and canal with 20 moderately coarse spiral threads which are weakly nodulous at the intersections with the axials. A wider interspiral space is present on the body whorl slightly below the periphery. Whole surface of the shell reveals under strong magnification a granulose ornamentation. Anal sinus rather deep and wide and separated from the parietal wall by a callus. Outer lip with a thin undulating margin and provided behind with a strong varix and within with transverse lirae, which overrun an elevated cord that extends parallel with the lip margin. Columella with

about 30 denticles. Anterior canal long and terminally turned to the left and backward.

The holotype (U. S. N. M. Cat. No. 373127) measures: Length, 24 mm.; greatest diameter, 7 mm.

Occurrence: Upper middle Miocene, *Arca* zone. Station 12046, Vaughan Creek, upper locality, Walton County (type and only known locality).

The species is named in honor of F. Stearns MacNeil of the U. S. Geological Survey.

Family CANCELLARIDAE

Genus CANCELLARIA Lamarck, 1799

Subgenus *Cancellaria* s.s.

Cancellaria (*Cancellaria*) *laqua* Mansfield, n. sp.

Plate 2, Figure 5

Shell small, solid, ovate, axially and spirally sculptured and consisting of 2 nuclear and $3\frac{1}{2}$ post-nuclear whorls. Suture shallow and grooved. Nuclear whorls rounded, smooth, initial turn minute. Umbilicus rather large, roughed by growth lines. Post-nuclear whorls turritid, inflated, rapidly enlarging. Axial and spiral sculpture about the same strength and form a reticulate ornamentation. Both axial and spiral sculpture begin at the same place on the first post-nuclear whorl. On the second post-nuclear whorl, there are 4 spiral threads, the posterior thread being doubled. Body whorl with 14 spirals, 3 of which overrun the siphonal fasciole, and about 30 retractive axials. Outer lip within with 7 sharp lirae, which are strongest posteriorly and marginally. Columella triplicate, the upper plication much stronger than the lower two. A small denticle lies midway between the posterior and the second plication.

The holotype (U. S. N. M. Cat. No. 373128) measures: Length, 13.3 mm.; diameter, 9 mm.

Cancellaria reticulata leonensis Mansfield, an upper Miocene Florida species, has a less expanding early whorl than the new species.

Occurrence: Upper middle Miocene, *Arca* zone, station 12,046, Vaughan Creek, upper locality, Walton County, Fla. Type and only locality.

Subgenus *NARONA* H. and A. Adams, 1853
Cancellaria (*Narona*) *blountiana* Mansfield, n. sp.
Plate 2, Figure 4

Shell small, turritid, slender, axial sculpture stronger than spiral, with 2 nuclear and 4 post-nuclear whorls. Nuclear whorls smooth, naticoid, initial turn very small, succeeding turn much larger. Post-nuclear whorls constricted at the suture, nearly flat below and gently sloping anteriorly from the prominent upper shoulder. First post-nuclear whorl sculptured with fine spirals and stronger axials. Penultimate whorl sculptured with 5 spirals on the posterior slope of the shoulder and 6 similar narrow bands at and below the shoulder. Base of body whorl with an occasional intercalating thread between the bands. Penultimate whorl with 12 axials which are weaker and more strongly retractive on the posterior slope of the shoulder than below the shoulder. Aperture ovate. Anterior canal short and rather narrow. Outer lip within marked with 12 short and small denticles. Columella provided with 2 plications of about equal strength.

The holotype (U.S.N.M.Cat.No.373129) measures: Length, 15 mm.; diameter, 9 mm.

Occurrence: Upper middle Miocene, *Arca* zone. Station 12046, Vaughan Creek, upper locality, (type and only locality).

Cancellaria (*Narona*) *agria uaquala*, n. subsp.
Plate 2, Figures 7, 8

Shell small, slender, turritid; axial sculpture stronger than spiral; with 2 nuclear and 4 post-nuclear whorls. Nuclear whorls, smooth, naticoid; initial turn very small, succeeding whorl much larger. The sculpture on the first post-nuclear whorl is initiated with both axials and spirals. First and second post-nuclear whorls with 3 spirals situated at the periphery; later whorls with about 6 spirals, 2 weaker spirals on the posterior slope of the shoulder and 4 stronger on the shoulder and anterior part. Body whorl with about 17 spirals,—6 of these being on the siphonal fasciole. Penultimate whorl axially sculptured with 9 strong, weakly retractive ribs extending from suture to suture. Outer lip margin broken; sculptured within with 8 sharp lirae situated far within the aperture. Columella with 2 oblique plications, the upper one being the stronger.

The holotype (U. S. N. M. Cat. No. 373130) measures: Length, 14 mm.; diameter, 9.3 mm.

Cancellaria agria Mansfield, a species occurring in upper Miocene of Florida (*Ecphora* and *Cancellaria* zones) is closely related to *Cancellaria agria uaquala*, n. subsp., but differs from it in having stronger axials and spirals.

Occurrence: Upper middle Miocene, *Arca* zone; Station 12046, Vaughan Creek, upper locality, Walton County, (type and only locality).

Olivella ochlockoneënsis Mansfield, new name

1930. *Olivella jacksonensis* Mansfield, Florida Geol. Survey Bull. 3, p. 53, pl. 4, fig. 6.

Not *Olivella jacksonensis* Cooke, Washington Acad. Sci. Jour., vol. 16, p. 134, fig. 5.

Type locality: Station 3423, lower upper Miocene bed at Jackson Bluff, Leon County, Florida.

I take this opportunity to give a new name to this species although the species is not known from the valley of Alaquia Creek.

Family MARGINELLIDAE

Genus MARGINELLA Lamarck, 1799

Section LEPTEGOUANA Woodring, 1928

Marginella (*Leptegouana*) *vaughanensis* Mansfield, n. sp.

Plate 2, Figure 13

Shell small and subcylindrical. Spire very low—only slightly higher than margin of outer lip. Suture appressed and obscure. Posterior shoulder rounded; body whorl very weakly depressed medially, slightly more depressed behind outer lip. Outer lip nearly straight; margin incurved and weakly denticulated between curved extremities. Aperture linear and nearly as long as shell. Columella provided with 4 oblique plications all of which are of nearly the same strength; lower 2 more oblique, more closely spaced than the posterior 2, and situated on the weakly curved columella. The anterior plication forms the inner border of the short and moderately wide anterior canal.

The holotype (U.S.N.M.Cat.No.373131) measures: Altitude, 11 mm.; diameter, 6.5 mm.

The description is based upon a single specimen. Perhaps the closest related living species is *Marginella guttata* Dillwyn, but the latter species has a relatively narrower posterior extremity than *M. vaughanensis*, n. sp.

Marginella coniformis Sowerby, a species occurring in the Miocene Bowden marl of Jamaica and the Gurabo formation, Dominican Republic, is closely allied to *M. vauhanensis*, n. sp. which perhaps should be regarded as a subspecies of the West Indian fossil. However, the new species has a much smaller shell and lacks the callus on the face of the shell.

Occurrence: Upper middle Miocene, *Arca* zone. Station 12046, Vaughan Creek, upper locality, Walton County (type and only locality).

Marginella (*Leptegouana*) *blountensis* Mansfield, n. sp.
Plate 2, Figure 14

Shell small, solid and subovate. Spire short, extending only about one millimeter above outer lip margin. Spire whorls very weakly inflated. Sutural area shallowly depressed. Body whorl with a rounded shoulder, inflated on the upper third behind the outer lip margin and very weakly depressed in front of this swollen area. Aperture narrow, slightly wider below. Outer lip nearly straight between curved extremities and marginally bearing rather strong denticles. Columella bearing 4 folds of nearly the same strength, 2 lower plications more oblique and more closely spaced; the anterior one continuous with the margin of the anterior canal.

The holotype (U.S.N.M.Cat.No.373132) measures: Altitude, 11.5 mm.; diameter, 6.7 mm.

The new species is closely related to *Marginella limatula* Conrad, a species described from the upper Miocene at Suffolk, Virginia, and reported as occurring in later deposits and in the Recent fauna; but differs from the latter in having a smaller and more slender shell and in lacking the swollen area behind the outer lip on the upper third of the last whorl.

Marginella (*Leptegouana*) *maoensis* Maury from the Cercado formation, middle Miocene, Dominican Republic, is closely related to the new species, differing from the latter in having a more curved outer lip and a more expanded aperture anteriorly.

Occurrence: Upper middle Miocene, *Arca* zone. Station 12046, Vaughan Creek, upper locality, Walton County (type locality); Station 12044, Bell place, upper locality, Walton County (one specimen).

Family MITRIDAE
Genus MITRA Martyn, 1784
Subgenus TIARA Swainson, 1831
Mitra (Tiara) blountensis Mansfield, n. sp.
Plate 2, Figure 10

Shell of moderate size, rather slender, strongly spirally sculptured; nucleus decollate; 8 whorls remaining on holotype. Whorls weakly convex and weakly tabulated at the suture. Suture indistinct, closely adhering to spiral. Spiral sculpture (3 on spire whorls and 10 to 12 on body whorl to siphonal fasciole) of strong, erect, thin, subacute, equidistant primary lirations intercalated with a spiral thread. This intermedial thread is more strongly developed on the later spire whorls and on the upper part of the body whorl and is either very faint or absent elsewhere. Axial sculpture of regularly placed, flat, weakly striate, narrow bands—a little wider than interspaces—lying in the valleys of the primary spirals and overrunning the secondary spirals. Siphonal fasciole with about 5 oblique spirals. Outer lip thin and marginally weakly crenulate. Columella on holotype bearing 4 oblique folds, the posterior 2 being the stronger. A larger specimen than the holotype has 5 folds.

The holotype (U. S. N. M. Cat. No. 373133) measures: Length, 25 mm.; diameter, 7.5 mm.

Mitra blountensis n. sp. is related to *Mitra stephensoni* Mansfield, a species from the upper Miocene of Florida, but differs from the latter in having a slimmer shell, a relatively longer spire and one less primary spiral on the spire whorl and in the absence of tertiary spiral threads.

Mitra henekeni Sowerby, middle Miocene, West Indies, has a stouter shell and stronger spiral sculpture.

Occurrence: Upper middle Miocene, *Arca* zone. Station 12046, Vaughan Creek, upper locality, Walton County (type and only locality).

Genus VEXILLUM ("Bolten") Roeding, 1798
Subgenus UROMITRA Bellardi, 1887
Vexillum (Uromitra) alaquañense Mansfield, n. sp.
Plate 2, Figures 11, 12

Shell small, moderately stout with a high spire and short canal, axial sculpture stronger than spiral and consisting of 1½ nuclear and 6 post-nuclear whorls. Nuclear whorls smooth and naticoid. Post-nuclear whorls weakly inflated and weak-

ly constricted at the suture. Axially sculptured with slightly offset, nearly vertical axials (17 on the penultimate whorl)—a little narrower than interspaces—and extending from suture to suture. Intercostal valleys are crossed by flat bands (about 6 on the spire whorls) separated by narrower incised lines. Ribs on the body whorl extend to the base. Stronger spirals are present on the base of the body whorl and continue over the siphonal fasciole. Outer lip thin, marked far within by 6 weak lirations. Columella provided with 4 oblique plications; the posterior being the strongest and the anterior one being more oblique, weak and continuous with the border of the anterior canal.

The holotype (U. S. N. M. Cat. No. 373134) measures: Altitude, 8.6 mm.; diameter 3.2 mm.

The new species is a descendant and therefore closely related to a species from the Shoal River formation of Florida described in manuscript by Gardner but differs from the Shoal River form in having a much stouter shell.

Occurrence: Upper middle Miocene, *Arca* zone. Station 12046, Vaughan Creek, upper locality, Walton County (type locality): Station 12044, Bell place, upper locality, Walton County (one young specimen and relationship not definitely determined).

Family FASCIOLARIIDAE

Genus FUSINUS Rafinesque, 1815

Fusinus alaquænsis Mansfield, n. sp.

Plate 2, Figures 9, 17

Shell of moderate size, rather slender with a high spire and long canal. Whorls weakly inflated. First nuclear whorl smooth, succeeding whorl rounded and axially crossed by fine threads, obscure at first and more distinct later. Early post-nuclear whorls ornamented with 5 primary spirals, the anterior third at the periphery, the posterior two on the upper slope, and the fourth and fifth below the periphery. A secondary thread usually intercalates the primaries. On the penultimate whorl there are 6 primary spirals, intercalated with one secondary thread. Body whorl and canal with spiral sculpture similar to that on the spire whorls. Axials on later whorls fade out. Pillar thick.

Larger cotype (U. S. N. M. Cat. No. 373135) measures: Diameter, 31 mm.

Fusinus burnsii Dall, an upper Miocene species from Petersburg, Va., is closely allied to the new species, differing from the latter in having a more slender shell and weaker secondary spirals.

Occurrence: Upper middle Miocene, *Arca* zone. Station 12046, Vaughan Creek, upper locality, Walton County (type locality); Station 12044, Bell farm, upper locality, Walton County.

Genus BUSYCON Bolten, 1798

Busycon propecoronatum Mansfield, n. sp.

Plate 3, Figures 1, 2

Shell moderately large, rather fragile, turritid, and consisting of about 8 whorls in all. First turn smooth, following turn carinated at the lower part, and sculptured on the first third with fine axial threads, which are situated mainly on the lower half; these are followed by fine denticles on the shouldered margin and later on by tubercles. Post-nuclear whorls tabulated in front of the suture, sharply angled at the shoulder and precipitous below. On the first three post-nuclear whorls, the area in front of the suture declines anteriorly toward the shoulder but on the following whorls this area declines toward the upper suture. The excavation at the suture is shallow on the early whorls but becomes deeper in ascending the whorl. The tubercles at the shoulder on the later whorls are rather strong and are connected by a ridge. Spiral sculpture on the spire whorls consists of very fine threads, which are stronger on the raised area behind the shoulder. Upper part of body whorl without spirals, lower part and canal with moderately strong spirals. Outer lip and canal on holotype missing, but better preserved young specimens show a thin outer lip and a long canal.

The holotype (U. S. N. M. Cat. No. 373136) measures: Altitude, 65 mm.; diameter, 40 mm.

B. propecoronatum n. sp. is closely related to *B. coronatum* (Conrad) from the St. Marys formation of Maryland, differing from the latter species in having a shallower channel in front of the suture and a more tabulated and more posteriorly sloping area in front of the suture.

Occurrence: Upper middle Miocene, *Arca* zone. Station 12046, Vaughan Creek, upper locality (type and only locality).

Busycon blountense Mansfield, n. sp.

Plate 3, Figures 3, 4

Shell small, broad, thin, low-spired and consists of about $4\frac{1}{2}$ remaining whorls; nucleus decollate. Spire rises about 7 millimeters above carina of the body whorl. Spire whorls gently slope anteriorly. Suture shallowly depressed. Whorls with a low, undulating border, weakly nodulous on the early whorls but only undulating on the later whorls. Spirals on spire whorls consisting of fine threads on the early whorls and coarser threads on the later whorls, being stronger on the anterior half of the whorl. Body whorl slightly inflated above and constricted at the base and sculptured with rather widely spaced spiral threads and occasional finer intermedial threads.

The holotype (U. S. N. M. Cat. No. 373137) measures: Altitude, 33.5 mm.; diameter, 24.5 mm.

Occurrence: Upper middle Miocene, *Arca* zone. Station 12046, Vaughan Creek, upper locality, Walton County (type and only locality).

Genus *LATIRUS* Montfort, 1810

Latirus waltonensis Mansfield, n. sp.

Plate 3, Figure 10

Shell rather small, solid, with a high spire and long canal. Earliest whorls missing. Suture deep and appressed. Spire whorls sculptured with 7 rounded, subnodulous axials, strongly developed on lower two-thirds of the whorl and absent in upper third. These axials fade out on the last half of body whorl. Spire whorls sculptured with closely-spaced primary spiral cords alternating with secondary threads. A small chink is near the lower end of the columella. Columella provided with 3 plications, the upper one weaker than the lower.

The holotype (U. S. N. M. Cat. No. 373138) measures: Altitude, 47 mm.; diameter, 18 mm.

Occurrence: Upper middle Miocene, *Arca* zone. Vaughan Creek, Walton County (type locality); not collected elsewhere. Collected by the Florida Geological Survey.

Family NEPTUNEIDAE

Genus *NEPTUNEA* "Bolten", Roeding, 1798

Neptunea? alaquaeensis Mansfield, n. sp.

Plate 3, Figure 13

Shell rather small, thin, fragile, turritid; with a moderately long spire and canal and with 5 remaining whorls; tip decol-

late. Earliest whorls smooth and rounded. Post-nuclear whorls tabulated above the angled shoulder and weakly inflated below. Suture depressed and closely adhering. Sculpture on spire whorls consists of a narrow rounded spiral band in front of and adjacent to the suture, a stronger band at the shoulder and 3 below, the suture adhering to the basal one. Sculpture of body whorl below shoulder and on canal consisting of strong spiral bands usually intercalated with weaker bands. Lower end of canal on holotype missing but other immature specimens have a rather long canal without any observed plications on the columella.

The holotype (U. S. N. M. Cat. No. 373139) measures: Altitude, 35 mm. (canal broken off); diameter, 24 mm.

Neptunea? alaquænsis n. sp. has some characters apparently showing a relationship to "*Chrysodomus*" *patuxentensis* Martin, a small form occurring in the Calvert and Choptank formations of the Chesapeake group of Maryland but may represent another genus. The canal of *C. patuxentensis* is straighter than that of the Florida form and has a callus along the inner margin.

Neptunea? alaquænsis may be related to "*Halia*" *americana* Olsson,⁴ a species described from the Gatun formation, Canal Zone, but my species does not appear to belong to the genus *Halia*. I have seen only the illustration of Olsson's species.

Occurrence: Upper middle Miocene, *Arca* zone. Station 12046, Vaughan Creek, upper locality, Walton County (type and only locality).

Family COLUBRARIIDAE
Genus PHOS Montfort, 1810
Phos blountanus Mansfield, n. sp.
Plate 3, Figure 5

Shell rather solid, moderately slender, and consisting of 3 nuclear and 5 post-nuclear whorls. Apical turn small and depressed; following 2 turns smooth, inflated and much larger. Protractive axials begin on the fourth whorl and are followed shortly by faint spirals. Post-nuclear whorls moderately inflated and gradually enlarging. Axials stronger than spirals. Axial sculpture consisting of about 12 nearly vertical, rather strong ribs, which extend from suture to suture and are separated by rounded valleys a little wider than ribs. The ribs on

⁴Olsson, A. A., Bull. Amer. Paleont., vol. 9, p. 251, pl. 7, fig. 7, 1922.

the body whorl continue to the siphonal fasciole. Spiral sculpture consisting of closely spaced bands, which alternate in strength and overrun both axials and valleys. Outer lip submarginally marked within with about 11 spiral ridges. Inner lip provided with a thin callus. Anterior canal short. Siphonal fasciole diagonally marked with about 8 threads.

The holotype (U. S. N. M. Cat. No. 373140) measures: Length, 14 mm.; diameter, 5 mm.

Phos blountanus n. sp. has a stouter shell and closer-set spirals than *Phos vaughani* Mansfield from the upper Miocene of Florida.

Type locality: Station 12046, Vaughan Creek, upper locality, Walton County, Florida.

Occurrence: Upper middle Miocene, *Arca* zone. Known only from the type locality.

Phos blountanus laquanus Mansfield, n. subsp.

Plate 3, Figure 6

Shell similar in character to *Phos blountanus* n. sp. except in the nature of the spiral sculpture. The spire whorls and the first half of the body whorl have no secondary spiral sculpture—the secondary spirals appearing on the last half of the body whorl. The spire whorls have 4 very narrow, widely spaced bands, the posterior one being weaker than the others. There are 14 ribs on the penultimate whorl.

The holotype (U. S. N. M. Cat. No. 373141) measure: Length, 14 mm.; diameter, 5.3 mm.

Type locality: Station 12046, Vaughan Creek, upper locality Walton County, Florida.

Occurrence: Upper middle Miocene. Known only from the type locality.

Family ALECTRIONIDAE

Genus ALECTRION Montfort, 1810

Alectrion blountensis Mansfield, n. sp.

Plate 2, Figure 16

Shell rather stout, solid; axial sculpture stronger than spiral; with 3 nuclear and 4 post-nuclear whorls. Nuclear whorls smooth, rounded and rapidly enlarging. Post-nuclear whorls moderately inflated and constricted at the sutures. Axially sculptured on penultimate whorl with 9 strong, slightly retractive ribs extending across the whorl and separated by wider valleys. Spiral sculpture consisting of 2 to 3 threadlets below the suture; 4 to 5 very narrow bands extending forward over

the periphery, and usually 2 threadlets behind the suture. The axials continue on the body whorl to the base but the spirals continue over the siphonal fasciole. Outer lip with a thin margin, strengthened behind with a strong varix and marked within with 7 to 9 spiral ridges. Parietal wall and lower columella with 1 to 2 denticles. Anterior canal short and recurved.

The holotype (U. S. N. M. Cat. No. 373142) measures: Length, 6.5 mm.; diameter, 3.5 mm.

Type locality: Station 12046, Vaughan Creek, upper locality, Walton County, Florida.

Occurrence: Upper middle Miocene, *Arca* zone. Known only from the type locality.

Family COLUMBELLIDAE

Genus MITRELLA Risso, 1826

Mitrella communis laqua Mansfield, n. subsp.

Plate 2, Figure 15

Shell small, solid, rather acute; spire and body whorl about the same length and consisting of 9 whorls in all. Apical turn minute, following turns gradually enlarging. Whorls weakly inflated. Suture closely appressed and shallowly depressed. Body whorl broadly angled at the lower shoulder. Canal sculptured with about 12 narrow spiral bands. Outer lip provided with a varix behind and with 7 elongate denticles within. A small patch of callus is on the parietal wall below the commissure and a thin callus overruns the lower part of the columella. Anterior canal short, terminally emarginate and dorsally reflected.

The holotype (U. S. N. M. Cat. No. 373143) measures: Length, 9.3 mm.; diameter, 3.8 mm.

Mitrella communis laqua n. subsp. is closely related to *Mitrella communis mediocris* Pilsbry and Harbison from the Shiloh marl member of the Kirkwood sand of New Jersey and *Mitrella communis* (Conrad) from the St. Marys formation of Maryland. It is about the same size of *Mitrella communis mediocris* but it has more inflated whorls than that subspecies and the lower shoulder of the body whorl is more angled. The St. Marys species is larger, otherwise it is very similar.

Type locality: Station 12046, Vaughan Creek, upper locality, Walton County, Florida.

Occurrence: Upper middle Miocene, *Arca* zone. Type locality; Station 12044, Bell place, upper locality, Walton County.

Genus ANACHIS H. and A. Adams, 1853

Subgenus COSTOANACHIS Sacco, 1890

Anachis (*Costoanachis*) *alaucaensis* Mansfield, n. sp.

Plate 3, Figure 11

Shell small, rather acute, weakly turritid, spire and body whorl about the same length, and consisting of 3 rounded, smooth nuclear whorls and $4\frac{1}{2}$ post-nuclear whorls. Spire whorls gradually enlarging. Suture appressed and undulating. Sculpture of spire whorls consisting of moderately strong, weakly arcuate axials (15 on penultimate whorl), a little narrower than interspaces and extending across the whorls. Last half of body whorl without axials and marked only by a varix behind the outer lip border. Base of body whorl and canal sculptured with about 10 very narrow bands. Outer lip within marked on the lower two-thirds with 7 elongate denticles, the posterior one being the strongest. Callus on columella bearing 5 small rounded denticles. Anterior canal moderately short, wide and terminally emarginate.

The holotype (U. S. N. M. Cat. No. 373144) measures: Length, 7.2 mm.; diameter, 3 mm.

Type locality: Station 12046, Vaughan Creek, upper locality, Walton County.

Occurrence: Upper middle Miocene, *Arca* zone. Known only at the type locality.

Anachis (*Costoanachis*) *vaughanensis* Mansfield, n. sp.

Plate 3, Figure 8

Shell small, solid, moderately slender, axial sculpture stronger than spiral, and consisting of 3 nuclear and 3 post-nuclear whorls. Nuclear whorls smooth, rapidly enlarging. Post-nuclear whorls sculptured with weakly protractive axials extending across the whorls and with spiral striae lying mainly in the valleys. Ribs on the body whorl terminate at the base. Base of body whorl and canal marked with closely spaced spirals. Outer lip within with 7 denticles. Callus of columella provided with minute denticles. Anterior canal short, wide and terminally emarginate.

The holotype (U. S. N. M. Cat. No. 373145) measures: Length, 4.5 mm.; diameter, 2 mm.

Type locality: Station 12046, Vaughan Creek, upper locality, Walton County, Florida.

Anachis (Costoanachis) orthopleura Woodring, a species from the Bowden marl, Jamaica, is closely related to *A. (Costoanachis) Vaughanensis*, n. sp., differing from the latter in having stronger axials on the early post-nuclear whorls and stronger spirals on the base of the body whorl and on the pillar.

Occurrence: Upper middle Miocene, *Arca* zone. Known only from the type locality.

Family MURICIDAE

Genus TYPHIS Montfort, 1910

Typhis harrisi waltonensis Mansfield, n. subsp.

Plate 5, Figure 9

The new subspecies is very closely related to *Typhis harrisi* Olsson, a species occurring in the upper Miocene of Florida and in the Duplin marl at the Natural Well, North Carolina, differing from the latter in having weaker spirals on the faces of varices. Only microscopic spiral lines are visible on the varices of the new subspecies, whereas on *T. harrisi* they are much coarser. The new subspecies agrees with *T. harrisi* in all other characters.

The holotype (U. S. N. M. Cat. No. 373146) measures: Length, 17.5 mm. (nucleus lost); diameter, 11 mm.

Typhis harrisi waltonensis n. subsp. is also closely related to *T. acuticostata* Conrad from the St. Marys formation of Maryland.

Type locality: Station 12046, Vaughan Creek, upper locality, Walton County, Florida.

Occurrence: Upper middle Miocene, *Arca* zone. Known only at the type locality.

Genus UROSALPINX Stimpson, 1865

Urosalpinx? vaughanensis Mansfield, n. sp.

Plate 3, Figure 7

Shell small, spire shorter than last whorl, both axially and spirally sculptured and consisting of $1\frac{1}{2}$ nuclear and 4 post-nuclear whorls. Nuclear whorls small, erect and smooth. Post-nuclear whorls inflated and rounded, and bearing at the periphery a strong brownish colored band. Sculpture on the spire whorls consists of 3 low, flat, narrow bands above the periphery and 2 below it and 9 broad axials which are strongly developed at and behind the periphery. Lower half of body whorl and canal sculptured mainly with spiral bands, which

are more closely spaced on the canal. Whole shell transversely sculptured with fine growth lines, which are fibrous on the sutural margin. Outer lip weakly crenulated marginally and bearing at a short distance within 6 elongate denticles. Columella weakly bulged near the entrance to the anterior canal. Anterior canal rather narrow and reflected dorsally.

The holotype (U. S. N. M. Cat. No. 373147) measures: Altitude 13.3 mm.; diameter, 6 mm.

Urosalpinx? vaughanensis n. sp., though much smaller, shows close relationship to *U. rusticus* (Conrad), a species confined to the St. Marys formation of Maryland.

Occurrence: Upper middle Miocene, *Arca* zone. Station 12046, Vaughan Creek, upper locality, Walton County. Type and only locality.

Genus MURICIDEA (Swainson) Mörch, 1852

Muricidea? alaquaeensis Mansfield, n. sp.

Plate 3, Figure 9; Plate 4, Figure 10

Shell small, spire about one-third length of body whorl, axial sculpture stronger than spiral, about $1\frac{1}{2}$ nuclear and 5 post-nuclear whorls. Whorls tabulated in front of the suture. Axial sculpture consists of 6 strong ribs extending from suture to suture on the spire whorls and across the canal on the body whorl. These axials are retractive over the tabulated area and nearly vertical below the periphery and when unbroken bear reflected hollow spines at the periphery on the later whorls. The earliest post-nuclear whorls do not bear spines. Spiral sculpture (on spire 3 and on body 12) of primary cords overrunning axials and interspaces. A medial secondary spiral is present on the body whorl. In addition to the primary and secondary ornamentation, tertiary threadlets are visible on most of the shell. Aperture ovate, widest above. Anterior canal rather long, nearly closed and curved backward and to the right. Outer lip within marked with 9 rather short raised spiral lirations, the posterior liration being larger, more widely spaced, and situated near the center of the posterior area of the aperture. Inner lip with a thin callus, bearing 3 lirations at the anterior third. Anterior canal moderately long and nearly closed. Siphonal fasciole strong and ornamented with lamellae.

Cotypes (U. S. N. M. Cat. No. 373148) measure: Larger cotype—length, 15 mm.; diameter, $8\frac{1}{2}$ mm. Smaller cotype, length, 13 mm.; diameter, $5\frac{1}{2}$ mm.

Type locality: Station 12046, Vaughan Creek, upper locality, Walton County, Florida.

Occurrence: Upper middle Miocene, *Arca* zone. Known only at the type locality.

Family EPITONIIDAE

Genus EPITONIUM ("Bolten") Roeding, 1798

Epitonium alaquaeense Mansfield, n. sp.

Plate 3, Figure 12

Shell small, moderately acute, only axially sculptured, and consisting of 2 nuclear and 6 post-nuclear whorls. Nucleus slender, whorls rounded and smooth. Post-nuclear whorls rapidly enlarging. Axials nearly vertical along the spire, contiguous at the sutures, 12 on the body whorl and 9 on the preceding whorl, upright, thin on the earlier whorls and thicker on later whorls. Aperture broadly elliptical, the longitudinal axis being a little greater.

The holotype (U. S. N. M. Cat. No. 373149) measures: Length. $7\frac{1}{2}$ mm.; diameter 3 mm.

Epitonium (Nitidiscala) aduncum Woodring, from the Bowden formation, Jamaica, is closely allied to *E. alaquaeense* n. sp., differing mainly from the latter in having a slimmer shell and fewer axials.

Type locality: Station 12046, Vaughan Creek, upper locality, Walton County, Florida.

Occurrence: Upper middle Miocene, *Arca* zone. Known only at the type locality.

Family CASSIDIDAE

Genus SEMICASSIS Mörch, 1852

Subgenus TYLOCASSIS Woodring, 1928

Semicassis (Tylocassis) inflata waltonensis, Mansfield, n. subsp.

Plate 4, Figures 5, 9

Shell of moderate size, strongly inflated, spire low. Nucleus naticoid, consisting of $2\frac{1}{2}$ smooth whorls. Sculpture of post-nuclear whorls consisting of spiral bands intercalated with a spiral thread or narrow band and retractive axials forming a reticulate ornamentation, especially on the earlier whorls. Axials weaker than bands and more strongly developed at the intersection with them, forming on the wider bands low and elongate elevations. There are four spiral bands on the penultimate whorl. The secondary spirals are a little stronger over the periphery of the whorl. Outer lip provided with a

strong varix and with 20 elevated, entering lirations on the inner margin. Parietal wall marked with spiral cords. Lower half of callus of inner lip bearing rounded and elongate denticles; marked with ridges within. Siphonal fasciole strongly developed, marked off behind by a deep groove and sculptured with spiral bands alternating with spiral threads.

The holotype (U. S. N. M. Cat. No. 373150) measures: Length, 43.3 mm.; diameter, 31 mm.

Smaller paratype: Length, 35 mm.; diameter, 20 mm.

Semicassis inflata waltonensis, n. subsp., is closely related to and probably is an ancestral form of *Semicassis inflata* Shaw, a living east coast species, differing from the latter in having a relatively shorter and more inflated shell and showing a tendency to a more persistent interpolation of secondary spiral threads or narrow bands.

Type locality: Station 12046, Vaughan Creek, upper locality, Walton County, Florida.

Occurrence: Upper middle Miocene, *Arca* zone.

Family TURRITELLIDAE

Genus TURRITELLA Lamarck, 1799

Turritella gatunensis blountensis Mansfield, n. subsp.

Plate 4, Figures 1, 2

Shell of medium size, moderately slender and constricted at the excavated sutures. Earliest whorls rounded and weakly medially carinated. On the following whorls a basal spiral appears, weak at first but soon becoming as strong as the medial one, forming between them a shallow depression. Another spiral comes in on the later whorls on the posterior slope, which becomes anteriorly nearly as strong as the one in front of it. In addition to the primary spirals, secondary and tertiary spirals overrun the whorls. The suture winds against the base of the preceding whorl.

The cotypes (U. S. N. M. Cat. No. 373151) measure: Specimen with preserved earlier whorls. Length 41 mm.; diameter, 8 mm. Specimen with lost earlier whorls: Length, 40. mm.: diameter 12 mm.

Turritella gatunensis Conrad is closely related to the new subspecies but differs from the latter in having more medially carinate early whorls and an earlier development of the basal spiral. It also has a less slender shell than the new subspecies.

Type locality: Station 12046, Vaughan Creek, upper locality, Walton County, Florida.

Occurrence: Upper middle Miocene, *Arca* zone. Common at type locality; Station 12044, Bell Place, upper locality, Walton County; Station 12049, 12050, Red Bay, lower bed, Walton County. Four small specimens at Station 5618, $3\frac{1}{2}$ miles southwest of DeFuniak Springs, Florida, uppermost bed of the Shoal River formation, appear to belong to the new subspecies.

Turritella alaquænsis Mansfield, n. sp.

Plate 4, Figures 3, 7

Shell of medium size and moderately slender. Earliest 3 or 4 whorls carinated below middle of the whorl. On the third or fourth whorl, another spiral appears on the posterior part of the whorl, low at first but becoming stronger in ascending the spire and forming a low medial concavity between it and the anterior crenulated spiral. The sculpture on the later whorls consists of 5 spirals; the first and second are situated at the upper third of the whorl, the posterior being a little weaker and situated slightly below the suture. These spirals are closely spaced, and somewhat doubled. The third spiral is situated in a low depression near the middle of the whorl and a little nearer to the fourth than the second spiral. The fourth spiral is posterior to the basal one; and the basal one is in contact with the suture. The crenulations on the first and second spirals are retractive and those on the third and fourth protractive. The second and fourth spirals are about the same strength; the third is a little weaker. The basal spiral is marked only by spiral threads. The whole shell is overrun with fine spirals, which alternate in size.

The cotypes (U. S. N. M. Cat. No. 373152) measure: Larger specimen with lost nucleus, length 52 mm.; diameter, 13.5 mm. Specimen with preserved tip, length, 33.5 mm.; diameter, 8.5 mm.

Type locality: Station 12046, Vaughan Creek, upper locality, Walton County, Florida.

Occurrence: Upper middle Miocene, *Arca* zone. Common at type locality; Station 12044, Bell place, upper locality, Walton County.

Turritella alaquænsis vaughanensis Mansfield, n. subsp.

Plate 4, Figure 8

Fragments of *Turritella* from the Alaqu Creek valley show a slightly different type of sculpture than other specimens described and are referred to a new subspecies. These specimens

differ from *Turritella alaquænsis* in having the spiral in the middle of the whorl stronger and more centrally placed in the concavity. The whorls have 5 spirals, counting the basal one, all of which are nearly the same strength. The posterior 2 are closely spaced, the third medially and the fourth posterior to the basal spiral. All spirals bear crenulations except the basal one.

The holotype, a broken specimen (U. S. N. M. Cat. No. 373-153) measures: Length, 29 mm.; diameter, 12.5 mm.

Type locality: Station 12047, Vaughan Creek, lower locality, Walton County, Florida.

Occurrence: Upper middle Miocene, *Arca* zone. Type locality, rare? Poorly preserved specimens collected from the lower bed at Red Bay, Walton County, appear to belong to the new subspecies.

Turritella cookei permenteri Mansfield, n. subsp.
Plate 4, Figures 4, 6

The new subspecies is closely related to *T. cookei harveyensis* Mansfield from the upper Miocene of Florida, differing only slightly from the latter. The new subspecies differs from *T. cookei harveyensis* in having a less slender shell, stronger sculpture, and especially on the earlier whorls, a stronger central spiral.

The cotypes (U. S. N. M. Cat. No. 373154) measure: Larger specimen, length 44 mm.; diameter, 17.3 mm. Smaller specimen, length 41.5 mm.; diameter, 12.5 mm.

Type locality: Station 12048, near Permenter's old place, Alaquia Creek, Walton County, Florida.

Occurrence: Upper Miocene, *Ecphora* zone. Known only from the type locality.

Turritella subannulata leonensis Mansfield, new name

1930. *Turritella subannulata jacksonensis* Mansfield, Florida Geol. Survey Bull. 3, p. 109, pl. 16, fig. 3

Not *Turritella jacksonensis* Cooke, Washington Acad. Sci. Jour., vol. 16, p. 136, fig. 8, 1926

Type locality: Station 3423, lower upper Miocene bed at Jackson Bluff, Leon County, Florida.

I take this opportunity to give a new name to this species although the species is not known from the valley of Alaquia Creek.

Family NATICIDAE

Genus POLINICES Montfort, 1910

Subgenus EUSPIRA Agassiz, 1839

Polinices (Euspira) waltonensis Mansfield, n. sp.

Plate 5, Figure 13

Shell small, thin, glossy, low spired, consisting of 5 whorls in all. Whorls inflated. Suture weakly appressed and marginally very weakly shouldered. Area below suture weakly depressed, sculptured with weak retractive growth lines and, on some specimens, by obscure spirals. Umbilicus large, sculptured on the thin callus of the inner lip by spiral growth lines and ascending threadlets. Inner lip with a thin callus adhering to the parietal wall and the lower part of the body whorl; the border opposite the umbilicus is curved inward and below is continuous with the border of the aperture.

The holotype (U. S. N. M. Cat. No. 373155) measures: Length, 20 mm.; diameter, 20.5 mm.

Type locality: Station 12044, Bell place, upper locality, Walton County, Florida.

Occurrence: Upper middle Miocene, *Arca* zone. Type locality, quite common; Station 12046, Vaughan Creek, upper locality, abundant.

Polinices (Euspira) propeinternus Mansfield, n. sp.

Plate 5, Figure 14

Shell small, rather thin, glossy, moderately low spired and consisting of $4\frac{1}{2}$ whorls in all. Apical turn loosely coiled; following whorls inflated and tabulated below the suture. Suture on early whorls very lowly depressed and on later whorls weakly appressed. Sculpture of weak retractive growth structures and obscure spirals. Aperture subovate, outer margin more rounded than inner margin; upper part of inner lip provided with a thin callus which closely adheres to the lower part of the body whorl; margin opposite umbilicus nearly straight and continuous below with the anterior margin of the aperture. Umbilicus large, open, provided, on the left side, with an entering ascending sulcus.

The holotype (U. S. N. M. Cat. No. 373156) measures: Length, 11.4 mm.; diameter, 10 mm.

Polinices propeinternus n. sp. is closely related to and probably is a precursor of *P. internus* (Say) a species ranging in time from the upper Miocene into the Pliocene, but it has a much smaller shell than the latter species.

Polinices tuomeyi (Whitfield) a species described from the Miocene marls at Jerico, New Jersey, is related to *P. propeinternus* but differs from the latter in having a heavier shell with less tabulated whorls.

Type locality: Vaughan Creek, upper locality, Walton County, Florida.

Occurrence: Upper middle Miocene, *Arca* zone. Type locality (common) known only from the type locality.

Family TROCHIDAE

Genus SOLARIELLA S. Wood, 1842

Solariella laqua Mansfield, n. sp.

Plate 5, Figures 1, 2, 3, 4, 5

Shell small, turritid, moderately high spired for the genus and consisting in all of $5\frac{1}{2}$ whorls. Earliest turn smooth and rounded with an immersed tip; following whorls nearly flat below the suture, very sharply angled at the posterior shoulder and sculptured with one weakly beaded spiral in front of the suture, a nearly smooth cord at the posterior shoulder, and 2 smooth cords below, the medial one being a little weaker and situated nearer the basal cord. Another weaker spiral is present above the medial one on some specimens. Base of body whorl with 5 to 7 rather weak and nearly smooth spiral cords. Umbilical cords weakly nodulated, coarser than the basal cords, and separated by rather wide intervals. Aside from the stronger spirals, the whole shell is overrun with microscopic spirals. Retractive axial growth structures ornament most of the shell being more prominent on the tabulated area in front of the suture. Umbilicus large and scalariform. Aperture nearly round; inner lip thin and closely adhering to the body whorl.

The larger cotype (U. S. N. M. Cat. No. 373157) measures: Length, 5.5 mm.; diameter, 7 mm.

The following species, when compared with *S. laqua*, show the following differences: *S. vauhani* Mansfield, an upper Miocene species, has a larger shell and coarser ornamentation; *S. altiusulca* Guppy, a species from the Bowden marl of Jamaica, has a less tabulated area below the suture, more rounded whorls and more spirals on the base; *S. major* (Gardner and Aldrich), an upper Miocene species, though closely related, has more strongly nodulated spirals and weaker umbilical cords; *S. lacunella depressa* Dall, a living subspecies from Florida and the Antilles, has a lower spire and closer spaced spirals.

Type locality: Station 12046, Vaughan Creek, upper locality, Walton County, Florida.

Occurrence: Upper middle Miocene, *Arca* zone. Type locality (quite common); Station 12044, Bell farm, upper locality, Walton County (rare).

Family VITRINELLIDAE

Genus VITRINELLA C. B. Adams, 1850

Vitrinella blountana Mansfield n. sp.

Plate 5, Figures 6, 7, 8

Shell small, rather thin, low-spired, consisting in all of 3 whorls, the body whorl comprising most of the shell. Whorls weakly flattened in front of the suture, rounded below and marked only by growth lines. Umbilicus large and smooth. Aperture large and rounded; inner lip adhering to the body whorl.

The holotype (U. S. N. M. Cat. No. 373158) measures: Altitude, 1 mm.; diameter, 2.2 mm.

V. blountana n. sp. appears to be most closely related to *V. diaphana* (d'Orb.) Bush, a species occurring off Cape Hatteras, North Carolina, differing in having a flatter spire than the living species.

Type locality: Station 12046, Vaughan Creek, upper locality, Walton County, Florida.

Occurrence: Upper middle Miocene, *Arca* zone. Known only at the type locality.

Class SCAPHOPODA

Family SIPHONDENTALIIDAE

Genus CADULUS, Philippi, 1844

Cadulus blountense, Mansfield, n. sp.

Plate 5, Figure 10

Shell small, very slender, smooth, polished, gently curved—the posterior extremity slightly more curved than the anterior. Anterior end weakly constricted. Aperture nearly round.

The holotype (U. S. N. M. Cat. No. 373159) measures: Length, 7 mm.; greatest diameter 0.7 mm.

Perhaps the most closely related living species is *Cadulus acus* Dall from Samana Bay, Dominican Republic; however, the living species when compared with the fossil has a more slender shell and possesses extremely fine circular grooves or lines not observed on the fossil form.

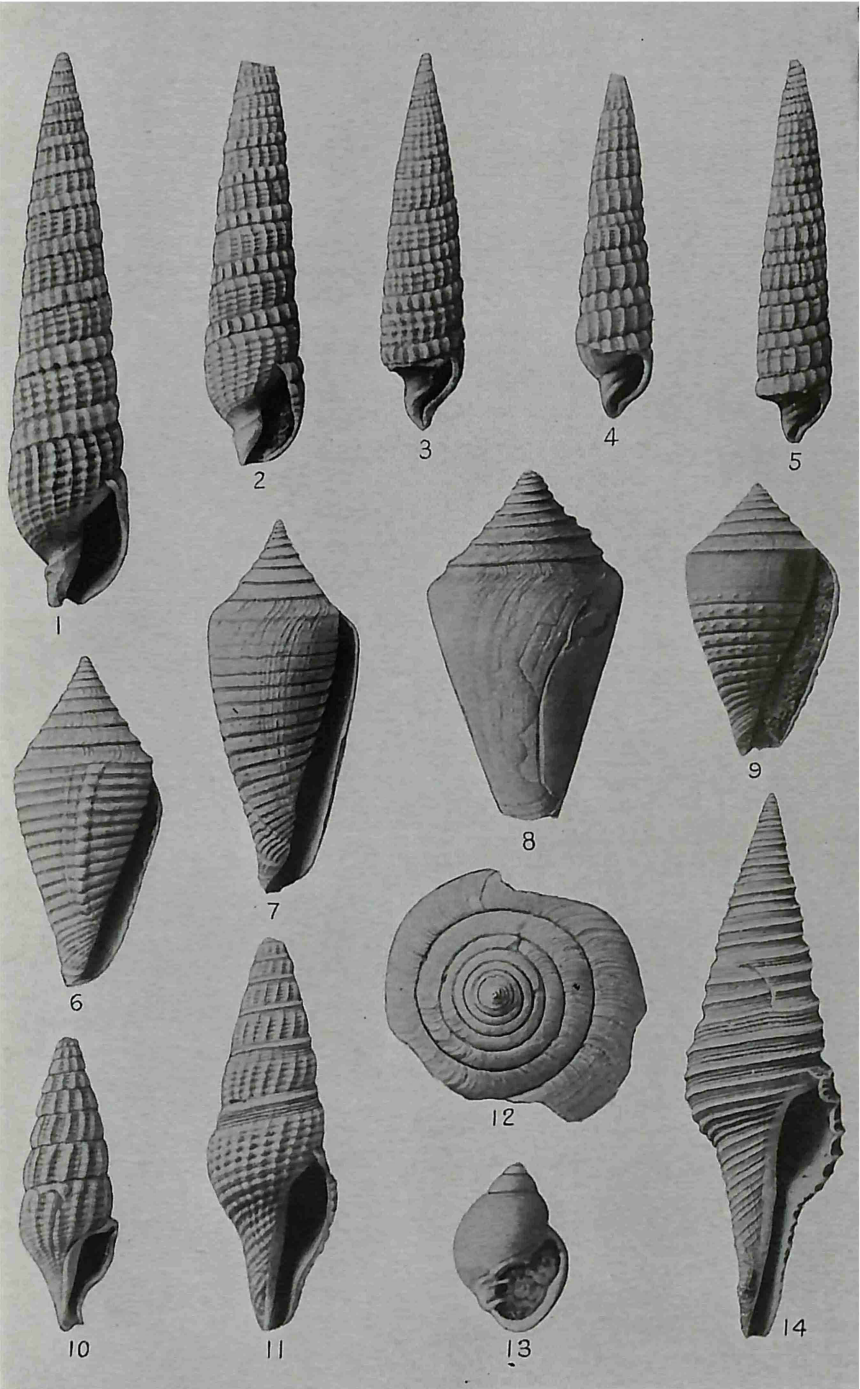
Type locality: Station 12046, Vaughan Creek, upper locality, Walton County, Florida.

Occurrence: Upper middle Miocene. Type locality (common); Station 12044, Bell farm, upper locality, Walton County (rare).

PLATES 1-5

PLATE 1

- Figure 1. *Terebra (Strioterebrum) alaquañensis* Mansfield, n. sp. Holotype, x3. Page 15.
2. *Terebra (Strioterebrum) alaquañensis laqua* Mansfield, n. subsp. Holotype, x3. Page 16.
3. *Terebra (Strioterebrum) alaquañensis ulaqua* Mansfield, n. subsp. Holotype, x2. Page 17.
4. *Terebra (Strioterebrum) vaughanensis* Mansfield, n. sp. Holotype, x3. Page 17.
5. *Terebra (Strioterebrum) blountensis* Mansfield, n. sp. Holotype, x2. Page 18.
6. *Conus laqua* Mansfield, n. sp. Holotype, x2. Page 19.
7. *Conus alaquañensis* Mansfield, n. sp. Holotype, x1½. Page 18.
8. *Conus vaughanensis* Mansfield, n. sp. Holotype, x1. Page 20.
9. *Conus waltonensis blountensis* Mansfield, n. subsp. Holotype, x2½. Page 19.
10. *Agladrillia uquala* Mansfield, n. sp. Holotype, x3. Page 24.
11. *Crassispira blountensis* Mansfield, n. sp. Holotype, x2. Page 22.
12. *Conus* aff. *C. proteus* Hwass. Figured specimen, x1, view of apical end of spire. Page 21.
13. *Ringicula blountensis* Mansfield, n. sp. Holotype, x10. Page 15.
14. *Polystira alaquañensis* Mansfield, n. sp. Holotype, x1½. Page 21.



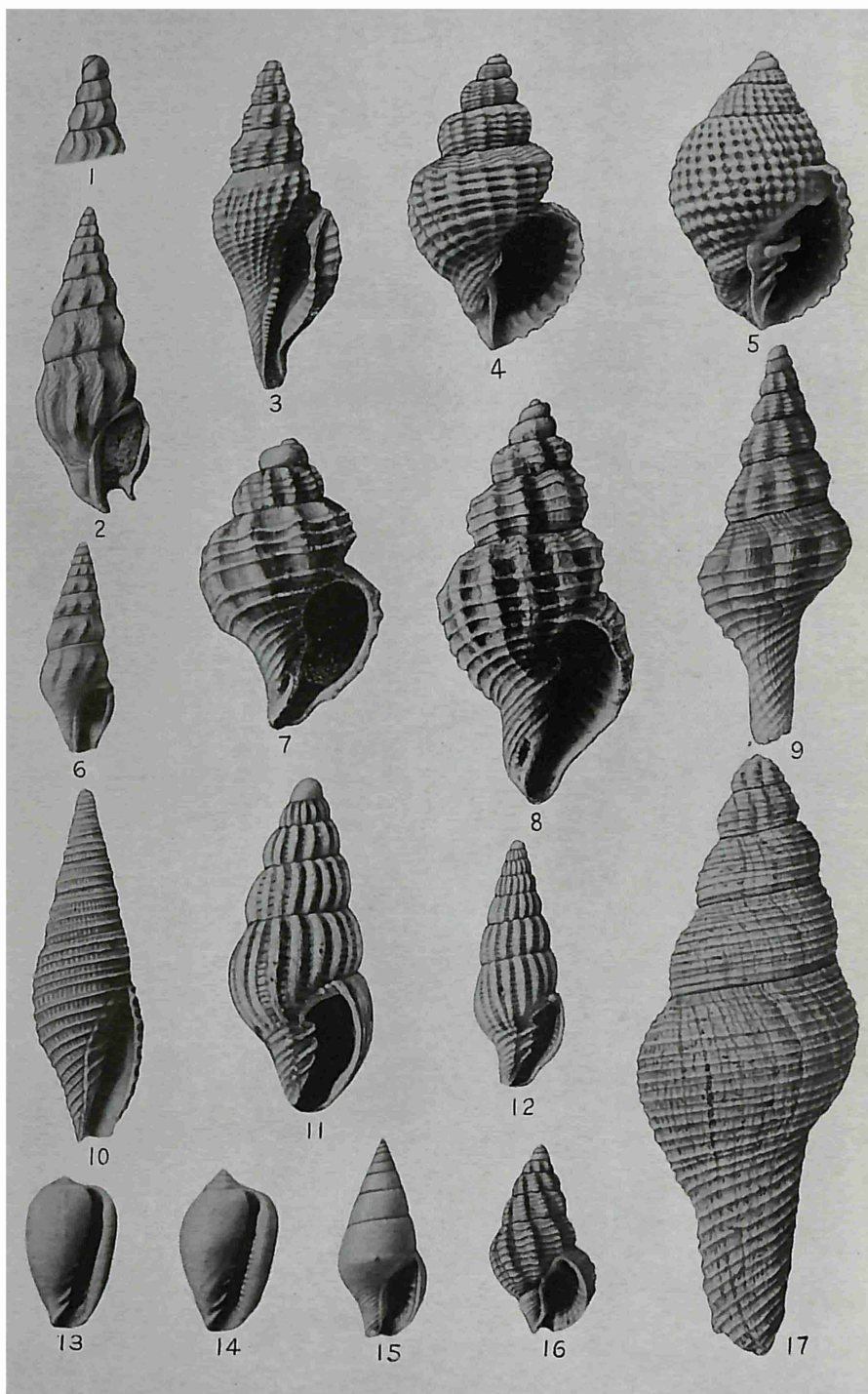
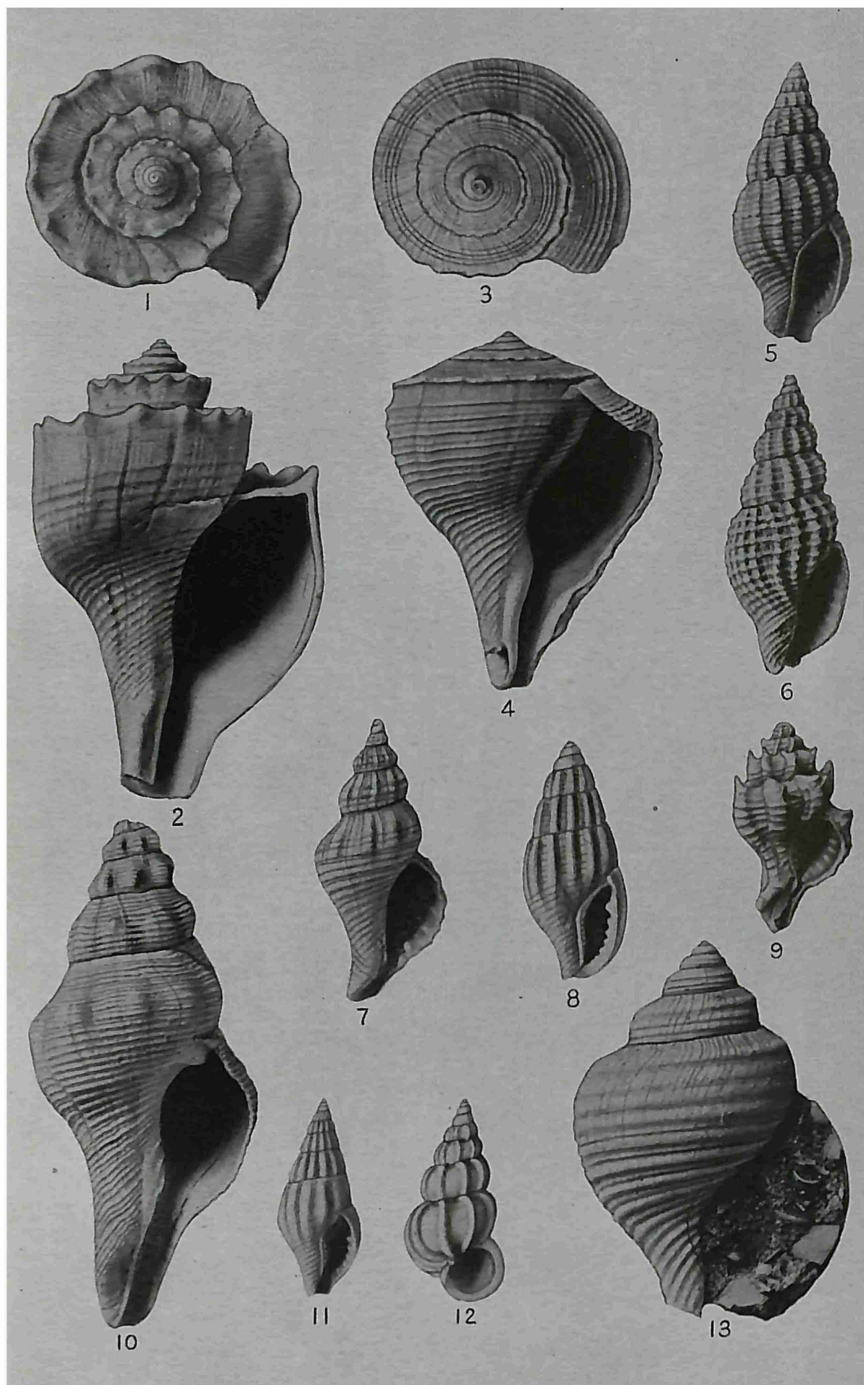


PLATE 2

- Figures 1, 2. *Cymatosyrinx vaughanensis* Mansfield, n. sp.
1. Paratype, showing character of early whorls, x5; 2, holotype, x2. Page 23.
3. *Glyphostoma macneili* Mansfield, n. sp. Holotype, x2. Page 25.
4. *Cancellaria (Narona) blountiana* Mansfield, n. sp. Holotype, x3. Page 27.
5. *Cancellaria (Cancellaria) laqua* Mansfield, n. sp. Holotype, x3. Page 26.
6. *Clathrodrillia? laqua* Mansfield, n. sp. Holotype, x3. Page 23.
- 7, 8. *Cancellaria (Narona) agria uaquala* Mansfield, n. subsp. 7, paratype, x8; 8, holotype, x4. Page 27.
- 9, 17. *Fusinus alaquænsis* Mansfield, n. sp. Cotypes: 9, x3; 17 x1. Page 31.
10. *Mitra (Tiara) blountensis* Mansfield, n. sp. Holotype, x2. Page 30.
- 11, 12. *Vexillum (Uromitra) alaquæense* Mansfield, n. sp. 11, paratype, x10; 12, holotype, x4. Page 30.
13. *Marginella (Leptegouana) vaughanensis* Mansfield, n. sp. Holotype, x2. Page 28.
14. *Marginella (Leptegouana) blountensis* Mansfield, n. sp. Holotype, x2. Page 29.
15. *Mitrella communis laqua* Mansfield, n. subsp. Holotype, x3. Page 36.
16. *Alectrion blountensis* Mansfield, n. sp. Holotype, x4. Page 35.

PLATE 3

- Figures 1, 2. *Busycon propecoronatum* Mansfield, n. sp. Holotype, x1. 1, view of apical end; 2, front view. Page 32.
- 3, 4. *Busycon blountense* Mansfield, n. sp. Holotype, x1½. 3, view of apical end; 4, front view. Page 33.
5. *Phos blountanus* Mansfield, n. sp. Holotype, x3. Page 34.
6. *Phos blountanus laquanus* Mansfield, n. subsp. Holotype, x3. Page 35.
7. *Urosalpinx? vaughanensis* Mansfield, n. sp. Holotype, x3. Page 38.
8. *Anachis (Costoanachis) vaughanensis* Mansfield, n. sp. Holotype, x8. Page 37. *
9. *Muricidea? alaquañensis* Mansfield, n. sp. Holotype, x2. Page 39.
10. *Latirus waltonensis* Mansfield, n. sp. Holotype, x1½. Page 33.
11. *Anachis (Costoanachis) alaquañensis* Mansfield n. sp. Holotype, x4. Page 37.
12. *Epitonium alaquañense* Mansfield, n. sp. Holotype, x4. Page 40.
13. *Neptunea? alaquañensis* Mansfield, n. sp. Holotype, x1½. Page 33.



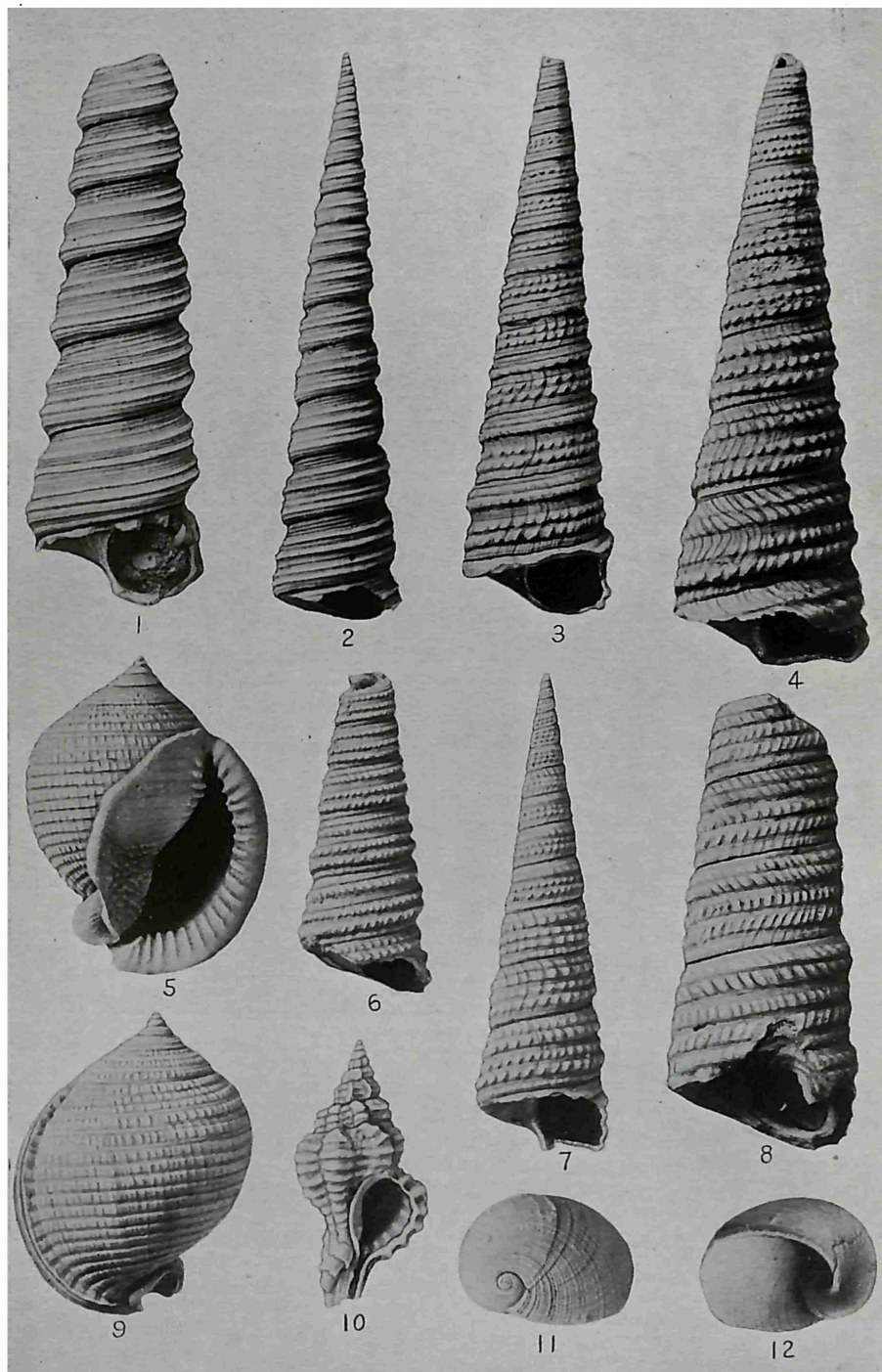


PLATE 4

- Figures 1, 2, *Turritella gatunensis blountensis* Mansfield, n. subsp. Cotypes, x2. Page 41.
- 3, 7. *Turritella alaquænsis* Mansfield, n. sp. Cotypes, 3, x1½; 7, x2. Page 42.
- 4, 6. *Turritella cookei permenteri* Mansfield, n. subsp. Cotypes, 4, x2; 6, x1. Page 43.
- 5, 9. *Semicassis (Tylocassis) inflata waltonensis* Mansfield, n. subsp. Holotype, x1. Page 40.
8. *Turritella alaquænsis vaughanensis* Mansfield, n. subsp. Holotype, x2. Page 42.
10. *Muricidea? alaquænsis* Mansfield, n. sp. Paratype, x3. Page 39.
- 11, 12. *Sinum* aff. *S. fragilum* Conrad, x3. From Station 12046, Vaughan Creek, upper locality, Walton County, Florida. U. S. Nat. Mus. No. 373160.

PLATE 5

Figures 1, 2, 3, 4, 5. *Solariella laqua* Mansfield, n. sp. Cotypes, 1, 2, x4; 3, 4, 5, x3. Page 45.

6, 7, 8. *Vitrinella blountana* Mansfield, n. sp. Holotype, x10. Page 46.

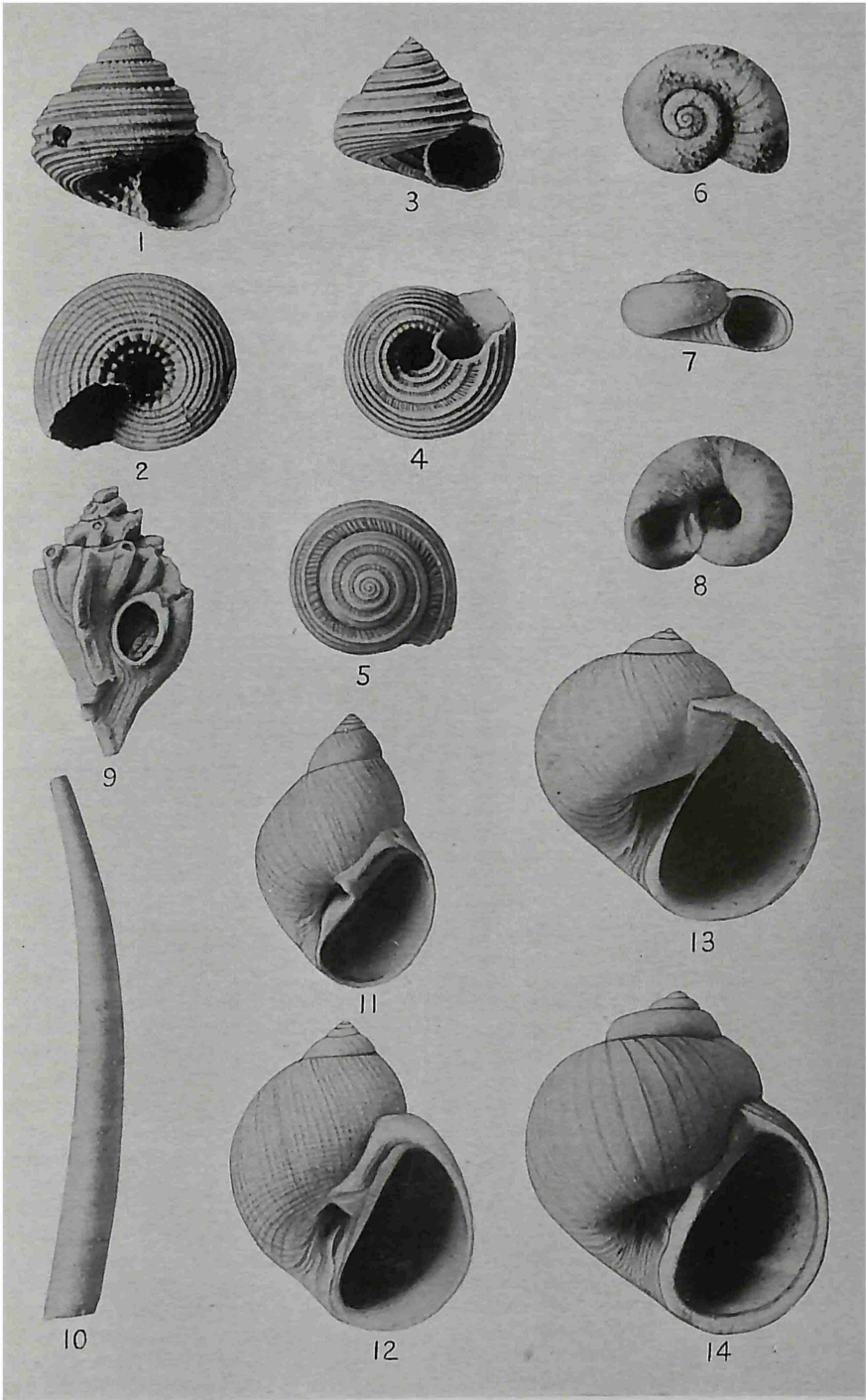
9. *Typhis harrisi waltonensis* Mansfield, n. subsp. Holotype, x2. Page 38.

10. *Cadulus blountense* Mansfield, n. sp. Holotype, x10. Page 46.

11, 12. *Polinices (Dallitesta) coënsis* Dall, x2. From Station 12046, Vaughan Creek, upper locality, Walton County, Florida. U. S. Nat. Mus. No. 373161.

13. *Polinices (Euspira) waltonensis* Mansfield, n. sp. Holotype, x2. Page 44.

14. *Polinices (Euspira) propeinternus* Mansfield, n. sp. Holotype, x4. Page 44.



INDEX

A

Abderospira species 11
 Acteocina species 11
 Acteocina species, near A.
 myremecoon 11
 Acteon hamadryados 11
 Acteon species 11
 acuticostata, Typhis 38
 aduncum, Epitonium (Nitidiscala)
 10, 40
 Agladrillia callothyra 25
 Agladrillia uquala 24
 agria, Cancellaria 28
 Alabina species 7, 13
 alaquænsæ, Epitonium 10, 40
 alaquænsæ, Vexillum (Uromitra) 30
 alaquænsis, Anachis
 (Costoanachis) 37
 alaquænsis, Conus 10, 18
 alaquænsis, Fusinus 31
 alaquænsis, Muricidea? 39
 alaquænsis, Neptunea 33
 alaquænsis, Polystira 21
 alaquænsis, Terebra
 (Strioterebrum) 15
 alaquænsis, Turritella 42
 Aletrion blountensis 35
 Aletrion species 12
 altiuscula, Solariella 45
 americana, "Halia" 34
 Anachis (Costoanachis)
 alaquænsis 37
 Anachis (Costoanachis)
 orthopleura 38
 Anachis (Costoanachis)
 vaughanensis 37
 apium, Conus 21
 Area zone 7
 Architectonica species 13
 attenuatum, Dentalium 10, 13
 aureocincta, Marginella (Serrata)
 12

B

barretti, Polystira 22
 blountana, Vitrinella 46
 blountanus, Phos 34
 blountense, Busycon 33
 blountense, Cadulus 10, 46
 blountensis, Aletrion 35
 blountensis, Conus waltonensis 19
 blountensis, Crassispira 22
 blountensis, Marginella
 (Leptegouana) 29

blountensis, Mitra (Tiara) 30
 blountensis, Ringicula 15
 blountensis, Terebra
 (Strioterebrum) 18
 blountensis, Turritella
 gatunensis 10, 41
 blountiana, Cancellaria
 (Narona) 27
 burnsii, Fusinus 32
 Busycon blountense 33
 Busycon coronatum 32
 Busycon montforti 12
 Busycon propecoronatum 32
 Busycon species 12

C

Cadulus blountense 10, 46
 Calliostoma species 10, 13
 callipeplum, Dentalium
 (Laevidentalium) 7
 callothyra, Agladrillia 25
 Cancellaria agria 28
 Cancellaria (Narona) agria
 uquala 27
 Cancellaria (Narona) blountiana 27
 Cancellaria (Cancellaria) laqua 26
 Cancellaria reticulata leonensis 26
 canrena, Natica 13
 "Chrysodomus" patuxentensis 34
 Circulus trilex 13
 Clathrodrillia? laqua 23
 coënsis, Polinices (Dallitesta) 58
 communis, Mitrella 36
 coniformis, Marginella 10, 29
 constrictum, Crucibulum 7
 Conus alaquænsis 10, 18
 Conus apium 21
 Conus delessertii 20
 Conus diluvionus 20
 Conus harveyensis 18
 Conus imitator 20
 Conus laqua 19
 Conus multiliratus gaza 19
 Conus proteus 21
 Conus pygmaeus 19
 Conus vaughanensis 20
 Conus waltonensis 20
 Conus waltonensis blountensis 19
 coronatum, Busycon 32
 Crassispira blountensis 22
 Crepidula fornicata 13
 Crepidula plana 13
 Crucibulum auriculum 13
 Crucibulum constrictum 7, 13

Crucibulum cf. *C. multineatum* 13
Cylichna species 10, 11
Cylichnina species 11
Cymatosyrinx limatula 24
Cymatosyrinx vauhanensis 7, 23
Cypracolina lacrimula 12

D

delessertii, *Conus* 20
Dentalium attenuatum 10, 13
Dentalium (Laevidentalium) sp.
 aff. *D. callipeplum* 7, 13
depressa, *Solariella lacunella* 45
diaphana, *Vitrinella* 46
diluvianus, *Conus* 20
 "Drillia" *foveolata* 25
duplicatus, *Polinices* 13

E

Ecphora zone 7
Epitonium (Nitidiscala)
aduncum 10, 40
Epitonium alaquacense 40
Epitonium species 10, 12

F

Fossarus aff. *F. dalli* 13
foveolata, "Drillia" 25
fragilum, *Sinum* 57
Fusinus burnsii 32
Fusinus alaquacensis 31

G

gatunensis, *Turritella* 10, 41
gausapata, *Terebra* 10, 16
gaza, *Conus multiliratus* 19
Glyphostoma macneili 25
guttata, *Marginella* 28
guppyana, *Natica* 10, 13

H

haitensis, *Polystira* 22
 "Halia" *americana* 34
hamadryados, *Acteon* 11
harrisi, *Typhis* 38
harveyensis, *Conus* 18
harveyensis, *Turritella cookei* 43
henekeni, *Mitra* 30

I

imitator, *Conus* 20
inflata, *Semicassis* 41
internus, *Polinices* 44
Ithythythara species 11

J

jacksonensis, *Olivella* 28
jacksonensis, *Turritella* 43

L

lacrimula, *Cypracolina* 12
laqua, *Cancellaria (Cancellaria)* 26
laqua, *Clathrodrillia*? 23
laqua, *Conus* 19
laqua, *Mitrella communis* 36
laqua, *Terebra (Strioterebrum)*
alaquacensis 10, 16
laqua, *Solariella* 45
laquanus, *Phos blountanus* 35
Latirus waltonensis 33
leonensis, *Cancellaria reticulata* 26
leonensis, *Turritella subannulata* 43
limatula, *Cymatosyrinx* 24
limatula, *Marginella* 29

M

macneili, *Glyphostoma* 25
major, *Solariella* 45
maoensis, *Marginella*
 (*Leptegouana*) 29
Marginella (Serrata) aureocincta 12
Marginella (Leptegouana)
blountensis 29
Marginella coniformis 10, 29
Marginella guttata 28
Marginella limatula 29
Marginella (Leptegouana)
maoensis 29
Marginella (Leptegouana)
vauhanensis 10, 28
Marginella (Serrata) species 12
mediocris, *Mitrella communis* 33
melanella species 13
Mitra (Tiara) blountensis 30
Mitra henekeni 30
Mitra stephensoni 30
Mitrella communis 36
Mitrella communis laqua 36
Mitrella communis mediocris 36
Molleria cf. *M. duplinensis parva* 13
montforti, *Busycon* 12
Muricea? *alaquacensis* 39
mutica, *Olivella* 12

N

Natica canrena 13
Natica guppyana 10, 13
Neptunea alaquacensis 33

O

ochlockoneënsis, *Olivella* 28
Oliva species 10, 12
Olivella jacksonensis 28
Olivella mutica 12
Olivella ochlockoneënsis
 (new name) 28
orthopleura, *Anachis*
 (*Costoanachis*) 38

P

patuxentensis, "Chrysodomus" 34
permenteri, *Turritella cookei* 10, 43
Phos blountanus 34
Phos blountanus laquanus 35
Phos vughani 35
Pleurotoma (*Gemmula*)
 vaningeni 10
Polinices (*Dallitesta*) *coënsis* 58
Polinices duplicatus 13
Polinices internus 44
Polinices (*Euspira*)
 propeinternus 44
Polinices tuomeyi 45
Polinices (*Euspira*) *waltonensis* 44
Polystira alaquaeënsis 21
Polystira barretti 22
Polystira haitensis 22
propecoronatum, *Busycon* 32
propeinternus, *Polinices*
 (*Euspira*) 44
proteus, *Conus* 21
pusilla, *Tectonatica* 13
pygmaeus, *Conus* 19
Pyramidella species 13

R

Ringicula blountensis 15

S

Sconsia aff. *S. striata* 13
Semicassis inflata 41
Semicassis (*Tylocassis*) *inflata*
waltonensis 40
Serpulorbis granifera? 13
Sinum aff. *S. fragilum* 57
Solariella altiusulca 45
Solariella lacunella depressa 45
Solariella laqua 45
Solariella major 45
Solariella vughani 45
stephensoni, *Mitra* 30
Strombiformis species 13

T

Tectonatica pusilla 13
Teinostoma cf. *T. nanum*
umbilicatum 13
Terebra (*Strioterebrum*)
alaquaënsis 15
Terebra (*Strioterebrum*)
alaquaënsis laqua 10, 16
Terebra (*Strioterebrum*)
alaquaënsis ulaqua 17
Terebra (*Strioterebrum*)
blountensis 18
Terebra gausapata 10, 16
Terebra (*Strioterebrum*)
vaughanensis 17
trilex, *Circulus* 13
Triphora species 13
tuomeyi, *Polinices* 45
Turbonilla species 7, 13
Turritella alaquaeënsis 42
Turritella alaquaeënsis
vaughanensis 10, 42
Turritella cookei harveyensis 43
Turritella cookei permenteri 10, 43
Turritella gatunensis 10, 41
Turritella gatunensis
blountensis 10, 41
Turritella jacksonensis 43
Turritella subannulata leonensis
 (new name) 43
Typhis acuticostata 38
Typhis harrisi 38
Typhis harrisi waltonensis 38
Tphis species 12

U

uaquala, *Cancellaria* (*Narona*)
agria 27
uquala, *Agladrillia* 24
ulaqua, *Terebra* (*Strioterebrum*)
alaquaënsis 17
Urosalpinx? *vaughanensis* 38

V

vaningeni, *Pleurotoma*
 (*Gemmula*) 10
vaughanensis, *Anachis*
 (*Costoanachis*) 37
vaughanensis, *Conus* 20
vaughanensis, *Cymatosyrinx* 7, 23

vaghanensis, *Marginella*
 (*Leptegouana*) 10, 28
 vaghanensis, *Terebra*
 (*Strioterebrum*) 17
 vaghanensis, *Turritella*
 alacquaensis 10, 42
 vaghanensis, *Urosalpinx*? 38
 vaghani, Phos 35
 vaghani, *Solariella* 45
Vexillum (*Uromitra*) *alacquaense* 30
Vitrinella blountana 46
Vitrinella diaphana 46
Volvula species 11

W

waltonensis, *Conus* 20
 waltonensis, *Latirus* 33
 waltonensis, *Polinices*
 (*Euspira*) 44
 waltonensis, *Semicassis*
 (*Tylocassis*) *inflata* 40
 waltonensis, *Typhis harrisi* 38

Y

Yoldia zone 7, 10

