







1000

1000  
1000  
1000  
1000

THE  
NAUTILUS

6197-73

A QUARTERLY JOURNAL  
DEVOTED TO THE INTERESTS  
OF CONCHOLOGISTS

---

VOL. 53  
JULY, 1939 to APRIL, 1940

---

EDITORS AND PUBLISHERS

HENRY A. PILSBRY

Curator of the Department of Mollusks and Marine Invertebrates,  
Academy of Natural Sciences

H. BURRINGTON BAKER

Professor of Zoology, University of Pennsylvania  
PHILADELPHIA, PA.

103

THE SCIENCE PRESS PRINTING COMPANY  
LANCASTER, PENNSYLVANIA

# CONTENTS

Names of new genera and species in *italics*

<i>Acanthochitona balesae</i> Pilsbry .....	pl. 12
<i>Actaeon candens</i> Rehder .....	21
<i>Adrana notabilis</i> Rehder .....	16
<i>Adrana scaphoides</i> Rehder .....	17
Aestivation .....	55, 134, 137, 138, 144
Alaska .....	61, 131
Alvania Risso, type <i>A. freminvillea</i> Risso .....	29
<i>Alvania (Willettia) keenae</i> Gordon .....	31
American Malacological Union .....	36, 68, 141
<i>Amnicola aldrichi aldrichi</i> Call & B. ....	118
<i>Amnicola aldrichi antroccetes</i> Hubricht .....	120
<i>Amnicola aldrichi insolita</i> Hubricht .....	119
<i>Amnicola proserpina</i> Hubricht .....	121
<i>Anachis chariessa</i> McGinty .....	83
<i>Anachis floridana</i> Rehder .....	20
Anodontites, aestivation .....	55, 138
Asia .....	67
<i>Aspella elizabethae</i> McGinty .....	pl. 10
Atlantic marines .....	1, 7, 16, 37, 40, 43, 53, 68, 79, 81, pls. 10, 12, 109, 110
<i>Bradybaena similaris honkongiensis</i> (Deshayes) .....	105
British Columbia .....	107, 108
<i>Busycon contrarium</i> (Conrad) .....	26
<i>Busycon perversum</i> (L.) .....	23
California .....	56
Canada .....	128
Cave deposit .....	45
<i>Cepolis caroli</i> McGinty .....	81
<i>Cepolis (Plagiptycha) boriquenae</i> H.B.B. ....	107
<i>Cepolis</i> (P.) <i>diaphana</i> (Lamarek) .....	107
<i>Cerithium auricoma</i> Schwengel .....	pl. 12, 109
Clappia .....	127
<i>Cochliopa rowelli</i> (Tryon) .....	67
<i>Coelocentrum bourgeoisae</i> Pilsbry .....	27

<i>Conus melvilli</i> Sowerby .....	40
<i>Crassispira tampaensis bartschi</i> Perry .....	81
<i>Cumingia tellinoides vanhyningi</i> Rehder .....	19
<i>Cyclostrema sanibelense</i> Pilsbry .....	53
<i>Cymatoica orientalis hendersoni</i> Rehder .....	19
<i>Cyphoma gibbosa</i> (L.) .....	1
<i>Cyphoma megintyi</i> Pilsbry .....	2
<i>Cyphoma signata</i> Pilsbry & McGinty .....	3
<i>Dignaxis</i> H.B.B., section of <i>Spiraxis</i> .....	11, 15
<i>Discus macclintocki</i> F.C.B. ....	123
<i>Discus patulus carinatus</i> MacMillan .....	143
Ecuador .....	111
Ekadanta Rao .....	67
<i>Euchemotrema</i> Archer, sections of <i>Stenotrema</i> .....	33
<i>Euglandina balesi</i> McGinty .....	pl. 2
<i>Eunaticina oldroydii</i> Dall .....	135
Florida .....	81, 122
<i>Fluminicola coloradoensis</i> Morrison .....	125
<i>Gemma fretensis</i> Rehder .....	18
<i>Gibbium</i> Gray .....	33
<i>Graptostracus</i> Pilsbry, subg. of <i>Leiostracus</i> .....	29
Haiti .....	42
<i>Holospira (Haplocion) kinonsis</i> Baily & Baily .....	94
<i>Humboldtiana fortis</i> Pilsbry .....	140
<i>Humboldtiana montezuma</i> Pilsbry .....	140
Illinois .....	120
Iowa .....	123
Jamaica .....	8
Kansas .....	77
<i>Lamellaria cochinnella</i> Perry .....	80
Latchford, Francis Robert .....	99
<i>Latirus cymatias</i> Schwengel .....	pl. 12, 110
<i>Latirus jucundus</i> McGinty .....	83
<i>Leiostracus webberi</i> Pilsbry .....	28
<i>Lepidochitona tropica</i> Pilsbry .....	pl. 12
<i>Littorina minima</i> (Wood) .....	68
Louisiana .....	105
<i>Lymnaea lanceata</i> (Gould) .....	134
<i>Lymnaeus sordidus</i> Kuester .....	139

Mansfield, Wendell Clay .....	64
<i>Marsenina globosa</i> Perry .....	41
<i>Mesodon (megasoma?) eritrichius</i> Berry .....	56
<i>Mesodon (megasoma?) euthales</i> Berry .....	60
Mexico .....	4, 8, 27, 49, 89, 94, 141
Micrelenechus Finlay .....	34
<i>Micromena</i> H.B.B., subg. of <i>Spiraxis</i> .....	11, 14
<i>Mirapex</i> H.B.B., sect. of <i>Spiraxis</i> .....	11, 13
<i>Miraradula</i> H.B.B., subg. of <i>Spiraxis</i> .....	10, 12
Missouri .....	118
<i>Monadenia fidelis</i> (Gray) .....	107
<i>Monadenia semialba</i> Henderson .....	108
<i>Muricidea mansfieldi</i> McGinty .....	83
Mutelidae, resistance to pollution .....	53
<i>Naesiotus quitensis ambatensis</i> Rehder .....	117
<i>Naesiotus quitensis jacksoni</i> Rehder .....	116
<i>Naesiotus quitensis orinus</i> Rehder .....	116
<i>Naesiotus quitensis quitensis</i> Pfr. ....	115
<i>Naesiotus quitensis vermiculatus</i> Rehder .....	117
Nevada .....	124
Obstructio Haas .....	106
Ohio .....	66, 106
Oregon .....	137
<i>Oxystyla melanocheilus mariae</i> McGinty .....	6
<i>Oxystyla ponderosa albata</i> McGinty .....	5
<i>Oxystyla ponderosa balesi</i> McGinty .....	5
<i>Oxystyla torrei</i> McGinty .....	7
<i>Oxystyla undata floridensis</i> Pils. ....	122
Pacific marines .....	22, 29, 34, 66, 108
Panama .....	67
Pennsylvania .....	47, 84
<i>Phlycticoncha</i> Bartsch & Rehder, subg. of <i>Lyonsia</i> .....	137
Pleistocene .....	22, 77, 81
Pleuroceridae, distribution .....	73
Pliocene .....	82
<i>Polydontes obliteratus</i> (Férussac) .....	42
<i>Polygyra appressa extrema</i> MacMillan .....	98
<i>Pomatiopsis praelonga</i> Brooks & MacMillan .....	96

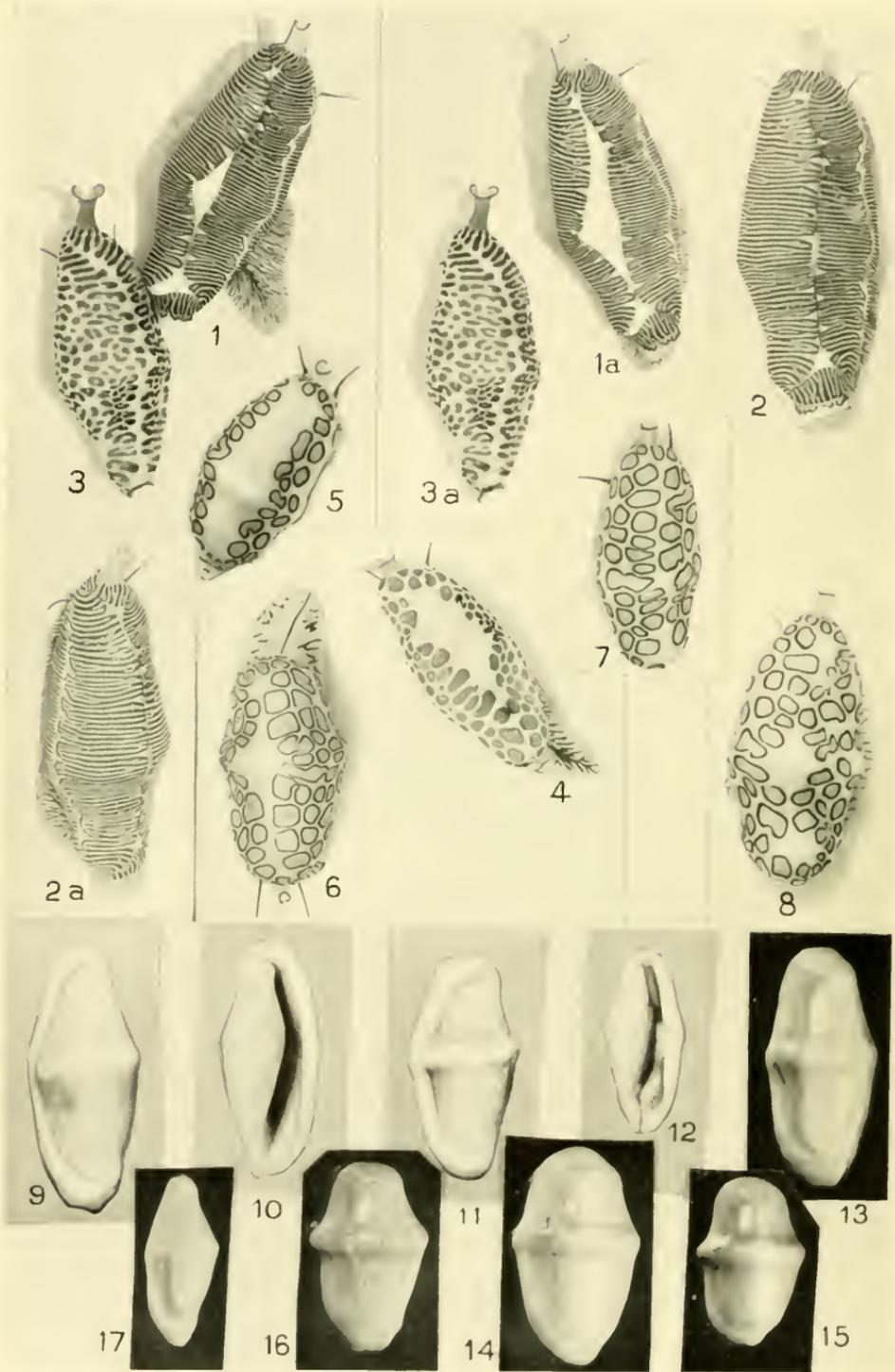
Puerto Rico .....	107
<i>Pyrgulopsis nevadensis</i> Stearns .....	137
<i>Repressaxis</i> H.B.B., sect. of <i>Spiraxis</i> .....	11, 16
Ritchie, John, Jr. ....	66
<i>Sayella chesapeakea</i> Morrison .....	44
<i>Sayella watlingsi</i> Morrison .....	45
Say's Conchology .....	34
<i>Schizopyle</i> Pilsbry, subg. of <i>Coelocentrum</i> .....	27
<i>Sigatica semisulcata holograpta</i> McGinty .....	pl. 12, 110
South America .....	28, 53, 106
<i>Spiraxinae</i> , revision .....	8, 9
<i>Spiraxis</i> ( <i>Micromena</i> ) <i>minusculus</i> H.B.B. ....	92
<i>Spiraxis</i> ( <i>Micromena</i> ) <i>minutus</i> H.B.B. ....	14
<i>Spiraxis</i> ( <i>Mirapex</i> ) <i>acus emigmaticus</i> H.B.B. ....	13
<i>Spiraxis</i> ( <i>Pseudosubulina</i> ) <i>arcuatus</i> H.B.B. ....	pl. 5
<i>Spiraxis</i> ( <i>Pseudosubulina</i> ) <i>caducus</i> H.B.B. ....	pl. 4
<i>Spiraxis</i> ( <i>Pseudosubulina</i> ) <i>costatus</i> H.B.B. ....	pl. 5
<i>Spiraxis</i> ( <i>P.</i> ) <i>irregularis negligens</i> H.B.B. ....	pl. 5
<i>Spiraxis</i> ( <i>Pseudosubulina</i> ) <i>parvus</i> H.B.B. ....	pl. 9
<i>Spiraxis</i> ( <i>Pseudosubulina</i> ) <i>ventrosus</i> H.B.B. ....	pl. 5
<i>Spiraxis</i> ( <i>Rectaxis</i> ) <i>granum</i> H.B.B. ....	49
<i>Spiraxis</i> ( <i>Rectaxis</i> ) <i>subnitidus</i> H.B.B. ....	51
<i>Spiraxis</i> ( <i>Rectaxis</i> ) <i>subtilis</i> H.B.B. ....	50
<i>Spiraxis</i> ( <i>R.</i> ) <i>subtilis vitreus</i> H.B.B. ....	50
<i>Spiraxis</i> ( <i>Versutaxis</i> ) <i>arctatus</i> H.B.B. ....	89
<i>Spiraxis</i> ( <i>Versutaxis</i> ) <i>futilis</i> H.B.B. ....	52
<i>Spiraxis</i> ( <i>Versutaxis</i> ) <i>opeas</i> H.B.B. ....	13
<i>Spiraxis</i> ( <i>Versutaxis</i> ) <i>subgranum</i> H.B.B. ....	51
<i>Spiraxis</i> ( <i>Versutaxis</i> ) <i>subopeas</i> H.B.B. ....	52
<i>Spiraxis</i> ( <i>Volutaxis</i> ) <i>fallax</i> H.B.B. ....	90
<i>Spiraxis</i> ( <i>V.</i> ) <i>nitidus persulcatus</i> H.B.B. ....	91
<i>Spiraxis</i> ( <i>Volutaxis</i> ) <i>subulinus</i> H.B.B. ....	90
<i>Spiraxis</i> ( <i>V.</i> ) <i>sulciferus atoyacensis</i> H.B.B. ....	89
<i>Spiraxis</i> ( <i>V.</i> ) <i>tenuecostatus obesus</i> H.B.B. ....	91
<i>Stagnicola bulimoides vancouverensis</i> F. C. Baker .....	pl. 7
<i>Stenotrema fraternum montanum</i> Archer .....	33
Subulinidae .....	92
<i>Synaptocochlea nigrita</i> Rehder .....	20

<i>Tellina rubricata</i> Perry .....	79
Tennessee .....	73, 98
<i>Tethys californicus</i> Cooper .....	34
<i>Terebra flammea</i> Lamarek .....	7
<i>Terebra glossema</i> Schwengel .....	pl. 12
<i>Terebra texana</i> Dall .....	8
<i>Tivela floridana</i> Rehder .....	18
<i>Triodopsis tridentata rugosa</i> Brooks & MacMillan .....	96
<i>Tritonalia graccæ</i> McGinty .....	84
<i>Tropieorbis</i> Pilsbry & Brown .....	106
<i>Typhis lowei</i> Pilsbry, banded variety .....	66
Utah .....	126
Valvata, subgenera of .....	140
<i>Varicella (Laevaricella) playa</i> H.B.B. ....	107
<i>Vasum floridanum</i> McGinty .....	82
<i>Versutaxis</i> H.B.B., sect. of <i>Spiraxis</i> .....	11, 13
Virginia .....	45
West Virginia .....	95
<i>Willettia</i> Gordon, subg. of <i>Alvania</i> .....	31
Wyoming .....	126

## INDEX OF AUTHORS

Archer, A. F. ....	33
Baker, Frank C. ....	106, 140
Baker, H. Burrington .....	8, 33, 49, 89, 107, 138
Baily, Joshua L., Jr. ....	94
Baily, Ruth Ingersoll .....	94
Bartsch, Paul .....	137
Berry, S. Stillman .....	56
Brooks, Stanley T. ....	95
Clench, William J. ....	7, 122, 137
Cockerell, T. D. A. ....	22
Eyderdam, Walter J. ....	61, 107, 108(2), 131, 144
Gardner, Julia .....	64
Gordon, Mackenzie, Jr. ....	29
Goodrich, Calvin .....	66, 73, 77, 105, 106
Haas, Fritz .....	53
Hanna, G. Dallas .....	34(2)
Hubricht, Leslie .....	118
Ingram, William Marcus .....	136
La Rocque, A. ....	99
MacMillan, Gordon K. ....	47, 95, 98, 143
McGinty, Tom L. ....	1, 4, 37, 68, 81, 110
Morrison, J. P. E. ....	43, 45, 67(2), 123, 124, 140
Oughton, J. ....	99, 127
Perry, Louise M. ....	40, 79
Pilsbry, H. A. ....	1, 27, 28, 42, 53, 66, 141
Rehder, Harald A. ....	16, 33, 111, 137
Robertson, Imogene C. ....	68
Schwengel, Jeanne .....	109
Smith, Burnett .....	23
Van der Schalie, Henry .....	134, 138
Wurtz, Charles B. ....	84





1, 1a, 2, 2a, 9, 10, *Cyphoma signata*. 3, 3a, 4, 11, 12, *Cyphoma megrintyi*. 5, 6, 7, 8, 13-16, *Cyphoma gibbosa* (16 a paratype of "Ultimus precursor" Dall). 17, *Cyphoma intermedia*. Photos by Jack Selden and Helen Winchester.



# THE NAUTILUS

Vol. 53

July, 1939

No. 1

## THE GENUS *CYPHOMA* IN FLORIDA

BY H. A. PILSBRY AND TOM L. MCGINTY

*Cyphoma* is a group of few species confined to tropical America, comprising *C. emarginata* (Sowb.) of the Panamic region, *C. intermedia* (Sowb.) from the West Indies and northern South America,<sup>1</sup> and the following species occurring in southern Florida.

*Cyphoma* means a hump; not a nice name, but it sounds better in Greek, and is appropriate for these hunchbacked snails. De Montfort's name, *Ultimus*, formerly in use, was given because it was the last genus in his book. They are pretty shells, but the living animals are really lovely. They are not especially shy, and can be kept in captivity several days if fresh sea water is supplied.

*CYPHOMA GIBBOSA* (L.). Pl. 1, Figs. 5-8, 13-16.

This is a common species from the Lake Worth region to the Keys and in the West Indies, living on gorgonians from about four or five feet to the lower limit of the gorgonians they inhabit.

The special character of the shell is that the callus of the sides extends up high on the back, and thins out at the edge, so that its limit is scarcely visible except by the color, the callus being from cream buff to apricot buff, pinkish vinaceous or orange vinaceous in color, the uncovered middle of the back from pure white to cream buff. The interior varies from pure white to pink, nearly uniform or with white clouds in the middle and towards the ends.

The living animal is pale flesh tinted with crowded black rings over the mantle, the rings often more or less deformed; there is some ochraceous-orange tint within the rings and on the outer foot edges. The tail has a black median line and quite irregular

<sup>1</sup> Dall (Bull. 37, U. S. Nat. Mus., p. 134) cited *Simnia intermedia* Sowb. from Hatteras to Brazil, but we have not seen Florida or East Coast specimens.

radiating lines towards the edges, also along lateral margins of the foot. The breathing siphon is narrow, not expanding at the end, which is edged with a black line. Tentacles dark.

The margins of the mantle may meet on the back, but often it is carried less extended, irregular areas of the shell remaining uncovered. Ordinarily the head is not extended in front of the shell.

The largest shells are about 35 mm. long 18 wide, but it is more commonly from 25 to 30 mm. long. The smallest seen, from Boynton, measures  $15.3 \times 7$  mm. About equally small, from Pompano, collected by Marguerite Robinson, measures  $15.5 \times 8.7$  mm. In some years most shells seem to run small. There is noticeable variation in the prominence of the transverse ridge. "*Ultimus*" *precursor* Dall, from the Costa Rican Pliocene, is merely a strong-ridged extreme of *C. gibbosa*, not differing from some recent specimens.

CYPHOMA MCGINTYI Pilsbry. Pl. 1, Figs. 3, 3a, 4, 11, 12.

This species was defined briefly in NAUTILUS 52: 108 from a somewhat discolored specimen of minimum size.

The shell is relatively longer than *C. gibbosa*, and the lateral callus, especially that of the right side, is thick and narrow relative to that of *gibbosa*, indistinctly crenulated, with a strong impression along the junction of callus with the back. The callus on the left side is more extended and diffused. The transverse dorsal ridge is very strong. The base and the callus all around are warm white, the transverse ridge of the back snow white. The back is elsewhere cameo pink to persian lilac, more or less invaded by white, which in old shells leaves only small areas of pink on the right side. Aperture cameo pink to daphne pink within, with a white spot in the position of the external ridge and more or less white eluded anteriorly.

Length 39.5 mm., width 16 mm.	Length 23.7 mm., width 10.6 mm.
Length 31 mm., width 15.5 mm.	Length 23.7 mm., width 11.4 mm.

This species has been found on gorgonians of the Atlantic beach below the lower inlet of Lake Worth to the Dry Tortugas, occurring with *C. gibbosa*, but always rare in comparison with that.

The living animal, Pl. 1, Figs. 3, 3a, 4, is nearly white, closely dappled with dresden brown, or towards the mantle edge sepia spots, or in other individuals nearly black spots. These are round

to shortly oval, some oblong. It differs from *C. gibbosa* by having solid spots, not rings, on the mantle. In some individuals a few of the spots have light centers, in others some spots may coalesce, forming short bars. The respiratory siphon is unlike that of *gibbosa* by being dark colored, trumpet shaped, much wider at the end than in *gibbosa* or *signata*, in which the siphon is white with a black border at the end, which is not expanded. The foot is profusely marked with oblique lines.

In large numbers examined alive, collected by the junior author and by Elizabeth Pilsbry, the characters separating this from *C. gibbosa* are conspicuous and constant.

CYPHOMA SIGNATA new species. Pl. 1, Figs. 1, 1a, 2, 2a, 9, 10.

The shell is relatively longer than *C. gibbosa*, resembling *C. mcgintyi* in shape. Like that species the ends are blunt, the lateral callus is thick, relatively narrow, and on the right side there is a strong impression along its upper edge. There is a very weak crenulation of the outer lip and its callus, as in *mcgintyi* and exceptional specimens of *gibbosa*. The transverse ridge of the back is very much lower than in *C. mcgintyi*. The aperture is slightly more dilated near the anterior end than in *gibbosa* or *mcgintyi*. Color cartridge buff with some faint pale pinkish-cinnamon suffusion above and below the nearly white dorsal ridge, and a cream buff tint deep in the aperture.

Length 35 mm., width 15 mm.

The living animal is like *C. gibbosa* in having the breathing siphon rather narrow, not expanding at the end, which is edged with black. The mantle is pale yellow, very closely marked with black transverse lines which in places diverge a little at the edges leaving little white triangles, and they are interrupted on the two sides by irregular white longitudinal lines. The foot is densely covered with fine, divaricating black lines radiating obliquely from the central line (fig. 1) on a pale yellow ground, deeper yellow towards the edges; sole white.

This is the rarest of the Cyphomas, but apparently has about the same distribution as the others, from the sea outside the South Inlet of Lake Worth to Key West, where one was taken by Miss Adele Koto. The type is 174045 ANSP.; paratypes in McGinty collection.

Our name for it in the field was "fingerprint cyphoma," from

the markings of the mantle. Unfortunately, the Roman police did not practice fingerprinting, so there seems to be no short word for that in Latin; "*digitisignatus*" would perhaps be a little too mouth-filling for busy malacologists.

A fossil specimen of this species was found by Mrs. Edith Marble Taylor in the bank between highway and canal near Loxahatchee, Florida. Unfortunately there are both Pleistocene and Pliocene shells in this bank, so that the age of this fossil is uncertain (fig. 10).

The shell differs from strongly angular examples of *C. intermedia* (Sowb.) by the heavily calloused, blunt ends, and many other peculiarities of form. *C. intermedia* is referred to *Simnia* by some authors, to *Ultimus* (= *Cyphoma*) by Tryon, with some doubt. It may belong to the former genus, but probably this will not be fully clarified until the animal is examined.

---

## OXYSTYLA FROM WESTERN MEXICO

BY THOMAS L. MCGINTY  
(Continued from January, 1939)

OXYSTYLA PONDEROSA (Strebel). The Heavy Oxystyla. Plate 2,  
fig. 1.

A fine series of this large handsome species was taken in the vicinity of Acapulco. A previous record for this species is listed in the Manual of Conchology, 25 miles N.E. of Acapulco, State of Guerrero, at an elevation of 1000 feet above the sea, collected by H. S. Smith.

Shell thick, large specimens rather dull, cuticle usually present giving some specimens a decided yellow-brown appearance, embryonic whorls slightly tipped with dark chestnut-brown, some very faintly, but totally lacking on only one specimen. Early whorls shading into brown or greenish-brown on the last whorl; often there is a violaceous tinge on the penult whorl and occasionally on the last whorl. There are traces of a single band generally broken on the fifth and penult whorls, with three bands quite continuous on the last whorl. There are numerous streaks more distinct on the penult whorl and dark growth-rest varices, generally two or more on the last whorl with one on the penult whorl. Peristome broadly bordered inside with black-brown

fading into the white of the interior. Columella very strong, white and vertical. Height 68 mm.; diam. 35 mm.; whorls 7. Height 67 mm.; diam. 36 mm.; whorls 7.

Specimens in the Academy of Natural Sciences of Philadelphia, Bales and McGinty collections.

There are a number of *Oxystyla ponderosa* showing considerable variation in color on the early whorls. Figure 3 represents a specimen with intensified black coloration of the apical region. There were also a number of specimens taken in which pink coloration is greatly intensified on the early whorls. A few specimens have retained this pink color to the penult whorl.

*OXYSTYLA PONDEROSA BALESI*, new subspecies. Plate 2, figs. 2 and 5.

Bales's *Oxystyla*. Habitat: Puerto Marquez, near Acapulco.

Shell rather elongate-conic, with lightly convex whorls; ground color yellow brown, flammulations and growth-rest varices light reddish-brown. Varices, where long rest periods are indicated, dark brown. Peristome broadly bordered inside with dark reddish-brown fading into pink, giving a pinkish cast to the interior. There are three bands on the final whorl. Cuticle, light brown. Columella very strong, white, and vertical.

Holotype: Height 60 mm., diam. 33 mm., whorls 7. Fig. 5. A.N.S.P. No. 174046.

Paratype: Height 62.8 mm., diam. 33.6 mm., whorls 7. Fig. 2. A.N.S.P. No. 174047.

This *Oxystyla* is named for its discoverer, Dr. Blenn R. Bales of Cireleville, Ohio, whose splendid work in the field made this article possible. About 12 specimens of this subspecies were taken showing all growth stages. Judging from the limited number taken, this beautiful variety is a true rarity. Paratypes in the Bales and McGinty collections.

*OXYSTYLA PONDEROSA ALBATA*, new subspecies. Plate 2, fig. 4.

The White-clothed *Oxystyla*. In the large series of *O. ponderosa* from the vicinity of Acapulco brought together by Dr. Bales, there were three albino specimens. Albinism is rare in *Oxystyla*, but the finding of three specimens suggests that such a colony may exist at Acapulco.

The shell substance is white throughout with a yellow (between straw and Naples yellow) cuticle on the final whorls. There are visible flammulations on the fifth and penult whorls. Interior white. Columella white, and vertical.

Holotype: Height 63 mm., diam. 32.2 mm., whorls 7. No. 174049, A.N.S.P.

Paratype: Height 58 mm., diam. 32.2 mm., whorls 6. Paratypes in the Bales and McGinty collections.

*OXYSTYLA MELANOCEILUS* (Valenciennes).

Habitat: Puerto Marquez, about 17 miles S.W. by S. from Acapulco. Acapulco is some 600 miles or more south of the records given for this species in the Manual of Conchology. *O. melanocheilus* is rare at Acapulco, but a few specimens were taken which agree very well with Fig. 1, Plate 18, in the Manual. The Acapulco specimens are three-banded on the last whorl and have a black-brown apex. There is a strong cuticle which gives the shell a tawny yellow appearance. Measurement of an Acapulco specimen: Height 57 mm., diam. 32 mm., whorls  $6\frac{1}{2}$  (*melanocheilus*, black-lipped).

*OXYSTYLA MELANOCEILUS MARIAE*, new subspecies. Plate 2, fig. 6.

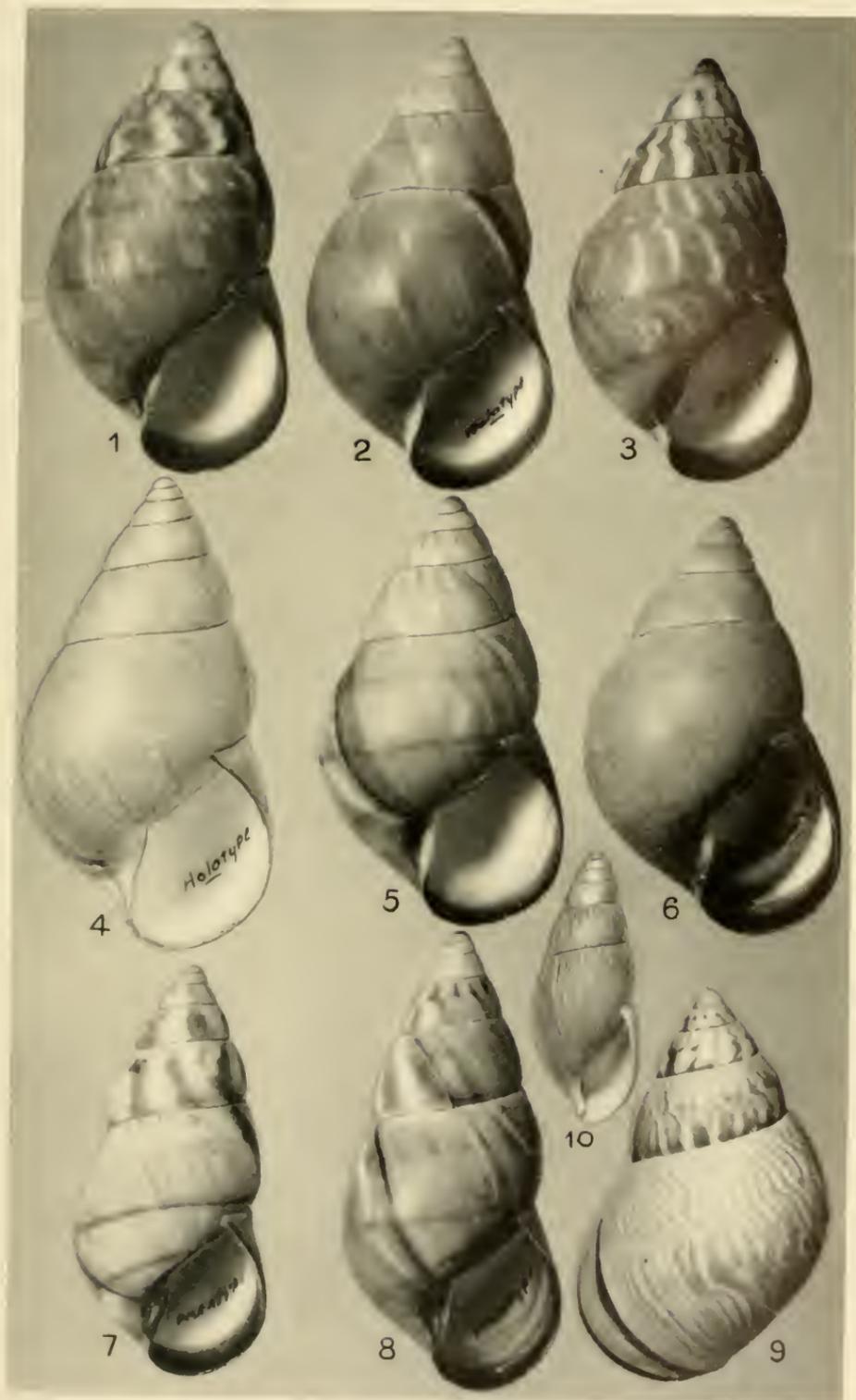
Mary E. Bales's *Oxystyla*. Habitat: Puerto Marquez, near Acapulco.

Shell similar in shape to the species. Apex dark brown, early whorls pink becoming reddish-brown, the color of the cuticle on the penult and final whorl. There are no flammulations on the entire shell. The growth-rest varices on the last whorl are black-brown. Peristome broadly bordered inside with black brown fading into the pinkish white of the interior. Other growth-rest varices within are somewhat lighter with the outer sides bordered with a light blue-gray. There are three faint bands on the last whorl. Columella very strong, white, and vertical.

Holotype: Height 57.8 mm., diam. 34 mm., whorls 6. A.N.S.P. No. 174048.

Paratype: Height 60 mm., diam. 34 mm., whorls probably  $6\frac{1}{2}$ , apex decollate. Paratypes in the Bales and McGinty collections.

The writer takes pleasure in naming this variety in honor of the doctor's wife, Mrs. Mary E. Bales, who was a co-worker and companion on the expedition.



1, 3, *Oxystyla ponderosa*. 2, 5, *O. p. balesi*. 4, *O. p. albata*. 6, *O. melanocheilus mariae*. 7, 8, *O. torrei*. 9, *O. pulchella*. 10, *Euglandina balesi* (Vol. 52, p. 16).



OXYSTYLA TORREI, new species. Plate 2, figs. 7 and 8.

See January, 1939, page 93. It seems well to note that there were no typical specimens of *Oxystyla zonifera* (Strebel) in the Acapulco series of *Oxystyla*. This *Oxystyla* has been reported from several localities in the State of Guerrero, but either some distance north or northwest of Acapulco, where *O. ponderosa* is firmly entrenched.

OXYSTYLA PULCHELLA (Spix). Plate 2, fig. 9.

A specimen of this beautiful tree snail from Barbados is figured. It has not been reported from this island before, so far as I know.

---

### ADDITIONAL NOTES ON *TEREBRA FLAMMEA* LAMARCK

BY WILLIAM J. CLENCH

Additional data have been obtained both regarding the published record of this species and from correspondence. A summary of this study is as follows:

Hedley (Proc. Linn. Soc. New South Wales 38, p. 306) considers Reeve's record of this species as occurring in Moreton Bay, Australia, an error, and further states that "material in the British Museum indicates that this species and its variety, *T. incomparabilis* Deshayes, inhabit the West Indies. . . . It does not appear to have been remarked that *Epitonium feldmanni* Bolten, 1798, is an earlier name for Lamarck's species."

The "variety *incomparabilis*," however, is not even closely related to *flammea*, but is a synonym of, or very near to, *robusta* Hinds, of the Panamanian province (Pacific).

Bolten's (Röding) *feldmanni* is also the same as *robusta* or very close to that species. The proportions are very different between this west coast species and *flammea*. Bolten's reference was made to the excellent figure by Chemnitz, 1780, Conchy.-Cab. (1), 4, p. 296, pl. 154, fig. 1446.

Dr. Rehder suggested that *T. texana* Dall might be the same, and upon an examination of the type specimens in Washington, this was found to be true. This species was originally described from Matagorda Island, Texas, and later (1919) Henderson fig-

ured a specimen collected in Barbados and mentioned a specimen which also existed in the National Museum that had been collected in a kitchen midden in Brazil.

Dr. Jutting has kindly checked specimens in certain of the European museums and her notes are as follows: The Amsterdam Museum has two specimens labeled "China" from Cuming. These are apparently part of the same set that is possessed by the Acad. Nat. Sci., Philadelphia, and by the Mus. Comp. Zoöl. The Leyden Museum has two specimens, one marked "Indian Ocean" and the other "Haiti." Dr. Bayer, however, did not consider the latter locality as at all trustworthy. There are three examples in the British Museum, all from St. Lucia, two from Cuming and one from Ponsonby.

Recently (NAUTILUS 52, p. 109) McGinty has reported this species from Lake Worth, Boynton, Florida.

The known range then for this species extends from southern Florida to Texas and south as far as Brazil. A brief synonymy follows:

#### TEREBRA FLAMMEA Lamarck

*Terebra flammea* Lam. 1822, An. s. Vert. p. 284; Kiener 1839, Icon. Coquilles Viv. 10, p. 12, pl. 5, fig. 10 (specimen probably from Lamarck's collection); Clench 1938, NAUTILUS 51, p. 114, pl. 9, figs. 1-2; McGinty 1939, NAUTILUS 52, p. 109.

*Terebra texana* Dall 1898, NAUTILUS 12, p. 44; Henderson, J. B. 1919, Univ. of Iowa Studies 8, p. 89, pl. 40, fig. 5.

---

## A REVISION OF *SPIRAXIS* C. B. ADAMS

### II. BURRINGTON BAKER

This is part 4 of a series on Mexican mollusks collected for Dr. Bryant Walker in 1926. The first part appeared (1928) as Occasional Papers Mus. Zool. Univ. Michigan, no. 193, in which the symbols for localities are explained on pp. 2-25. In plates 3 to 5, the scales for shells, genitalia and pallial complexes indicate lengths of 1 mm.; those for lines of right half of radular rows (T) 0.05 mm.; those for radular teeth 0.01 mm. (10 microns). In each new form, the figured shell is the type.

On account of the traditional importance ascribed to columellar

differences, the union of *Pseudosubulina* and *Spiraxis* into a single genus may seem rather iconoelastic. But, the generic retention of the former would necessitate four other genera (my subgenera) and I doubt if anyone could definitely place many of the species that are anatomically unknown. While I now feel that I could arrange shells with some accuracy, the name *Versutaxis* expresses the bewilderment one feels during their examination; senescent examples of *Rectaxis* and *Miraradula* may closely imitate the sigmoid columella of true *Volutaxis* and *S. (P.) orizabensis* and an undescribed species approach the columella of *Versutaxis*.

The following anatomical definition and subdivision of *Spiraxis* (new subfamily **SPIRAXINÆ**) are founded on drawings of dissections of 24 Mexican (+ 2 radulae) and 5 Jamaican species and on the radulae of one Cuban and one Venezuelan species.

Foot long and slender, pointed posteriad; lower pedal groove distinct; mantle-collar (MC; pl. 3, f. 10, pl. 5, f. 3) quite deep but thin; right (MR) and anterior (MA) and posterior (MP) left mantle-lappets small. Lung wall elongate; minor venation indistinct; principal vein (HV) often bordered by bands of muscle. Kidney (K) with a triangular pericardial ( $\bar{H}$ ) limb and a vestigial (in large forms) to conspicuous (in small species; pl. 3, f. 3) extension between ureter (KD) and hindgutff varying around 1.5 times as long as its base or length of pericardium. Anal mantle gland extending posteriad between hindgut and ureter; relatively large in small species.

Ovotestis (G; pl. 3, f. 7) about one whorl in length and imbedded in liver about a half-whorl above stomach; duct (GD) markedly swollen when filled with sperm; talon (GT) very short; carrefour (X) slender. Albumen gland (GG) large, elongate. Oviduct consisting of short slender duct (UX) below carrefour, uterus (UT) and postuterine or free oviduct (UV). Spermatheca (S) of long type; sac imbedded in base of albumen gland above aorta. Vagina (V) various. Prostate (DG) completely separate from uterus (at least in large species). Free vas deferens (D) fairly heavy and muscular but without epiphalloid enlargement (except in *Micromena*; E, pl. 3, f. 6); caught into penioviducal angle by right eye-muscle; opening (EP) into penial apex without definite verge (except in *Micromena*; PV). Penis (P) without appendages; retractor (PR) arising high on diaphragm and inserting on or near penial apex. Atrium (Y) opening below base of right ommatophore.

Columellar system with left free and buccal retractors joined for short distance.

Labial lobes quite prominent (at least in larger forms), triangular (like in *Streptostyla*). Jaw absent (despite statements to contrary), although fleshy fold, which usually supports it, is present and may have weakly cornified edge (as in most Systrophiiidae). Buccal mass quite to very small and radula minute and very flimsy (except in *Miraradula*). Radula with V-shaped rows (T, pl. 5, f. 1); central small, with 1 to 3 conical or triangular cusps; outer teeth all bicuspid; 0-4 laterals with 2 short subequal cusps and 9-31 marginals with inner or both (in *Micromena*; pl. 3, f. 5) cusps developed into a long slender needle (except in *Miraradula*; pl. 4, f. 7); 24-50 rows counted but usually about 35. Salivary glands broad but short (small as compared to carnivorous but large for herbivorous species), forming a lanceolate plate over oesophagus. Stomach fusiform, about 2 whorls in length, imbedded along side of albumen gland but extending anteriorly beyond it. Hindgut with S-loops reduced; running parallel with stomach to posterior end of pericardium, then across posterior end of kidney and forward as usual (I, pl. 3, f. 10).

The following key defines the subgenera and sections:

- A(AA) Radula with over 100 short-cusped laterals or marginals either side of tricuspid central; penis with small apical chamber and a peculiar pilaster (pl. 4, f. 6); shell with subvertical, although spirally twisted columella; type *S. similaris* (S. & P.) from Necaxa (station 54): ..... subg. *Miraradula*, new.
- AA(A) Radula with 0-4 short-cusped laterals and 6-31 marginals with one or both cusps long and needle-like. (B) Radula with tricuspid central, 2 laterals and 10-13 marginals; penis much as in *Miraradula*; shell usually with fairly straight columella; type *S. decussatus* (H.B.B.) from Venezuela (but genitalia from Mexico):  
..... subg. *Rectaxis* H.B.B. (1926).
- B(AA) Radula with unicuspid central; penis not as in *Miraradula*. (G) Apparently oviparous; uterus about as long as prostate and smaller than free oviduct + vagina; radula with 2 laterals (1 in *S. parvus*) or none; mainland and Cuba (+ *S. problematicus* from Jamaica). (F) Radula with laterals and with 9-18 marginals developing one needle-like and one shorter cusp; penis without marked verge or epiphallus. (E) Penis usually elongate, without heavy pilasters and with at least its apical end surrounded by a sheath; shell usually with columella not markedly truncate; Central American: ..... subg. *Volutaxis* S. & P. (1882).

- (D) Vagina practically obsolete. (C) Free oviduct less than twice as long as uterus; shell usually smaller with weakly twisted columella and with last embryonic whorl assuming neanic sculpture; type *S. opeas*, n. sp. from Mexico: ..... sect. *Versutaxis*, new.
- C(B) Free oviduct about 4 times as long as uterus; shell larger, with heavy sigmoid columella; last embryonic whorl with widely spaced ribs but later ones with close threads; type *S. acus enigmaticus*, n. ssp. from Mexico: ..... sect. *Mirapex*, new.
- D(B) Vagina longer; shell with heavy sigmoid columella, with closely spaced threads on last embryonic whorl, mainly larger; type *S. sulciferus* (Mo.) from Mexico: ..... sect. *Volutaxis* s.s.
- E(B) Penis usually shorter, with two internal pilasters; vagina almost obsolete; shell usually with definitely truncate columella; type *S. berendti* (Pfr.) from Mexico: ..... subg. *Pseudosubulina* S. & P. (1882).
- F(B) Radula without laterals and with subequal needle-like cusps on 29-31 marginals; penis with vergic papilla and vas with epiphalloid swelling; shell minute, spirally striate and with straight, very weakly truncate columella; type *S. minutus*, n. sp. from Mexico (1 sp. from Jamaica): ..... subg. *Micromena*, new
- G(B) Viviparous; uterus longer than prostate and much larger and longer than free oviduct + short vagina; radula with 1 or with 4 laterals; Jamaica and (?) Los Roques: ..... subg. *Spiraxis* C.B.A. (1850).
- (H) Radula with 4 laterals and 6 marginals; shell like sect. *Spiraxis* but with only one columellar lamella and with later whorls markedly inflated below suture; type *S. mirabilis* (C.B.A.) from Jamaica: ..... sect. *Dignaxis*, new.
- H(C) Radula with only one lateral; shell not markedly inflated below suture. (K) Shell with palatal tooth or with columellar fold strongly projecting into aperture. (I) Columellar fold weaker; anatomy unknown; type *S. blandi* (Crosse) from Los Roques: ..... sect. *Ravenia* Crosse (1873).
- I(H) Columellar fold strong. (J) Shell with internal parietal lamella; radula with 13 marginals; type *S. inusitatus* (C.B.A.) from Jamaica: ..... sect. *Spiraxis* s.s.
- J(I) Shell without internal parietal lamella; radula with 26 marginals; type *S. costulosus* C.B.A. from Jamaica: ..... sect. *Euspiraxis* Pfr. (1855).
- K(H) Shell without palatal tooth and with columella moderately sigmoid; radula with 28 marginals; type *S. terebella* (C.B.A.) from Jamaica: ..... sect. *Repressaxis*, new.

SPIRAXIS (MIRARADULA) SIMILARIS (Strebel & Pfeffer), new subgenus.

Because no authentic material of this species has been seen by me, the subgenus *Miraradula* is founded on *Neeaxa* (station 54) specimens, one of which is described below. It also occurs around Córdoba.

Shell (pl. 4, f. 6) turrite, silvery-white, translucent, finely ribbed. Whorls 8 (fig.) to 8.5, quite convex, often weakly shouldered, with deep, slightly crenulate suture. Embryonic whorls 2.5, quite rapidly widening; first almost smooth, second gradually assuming low, very closely spaced threads and last with widening interspaces. Later whorls quite short, gradually increasing, with thin riblets crested below suture, weakening basally and much narrower than interspaces, which are granulate-striate but without distinct spirals; first two (neanic) with about 31 riblets; third to fifth with 34-35 and last with 38. Aperture elliptic-trapezoidal; peristome simple, almost vertical and very obscurely and obliquely truncate. Alt. 5.06 mm., diam. 33 (1.65 mm.), alt. last whorl 40 (2.03 mm.); aperture alt. 24 (1.22 mm.), diam. 68 (0.83 mm.); 8 whorls.

Lung about 5 times as long as base or kidney length, which is as long as its base and  $1\frac{1}{4}$  times pericardial length. Ototestis (pl. 4, f. 8) complexly lobed. Penis large; internally (f. 7) with a pyramidal apical chamber with longitudinal, beaded folds on its walls; large basal chamber with a very heavy pilaster, which extends about 0.7 distance down one side and terminates in a large, apparently almost cartilaginous, partially free, subspherical enlargement, and with two minor longitudinal folds. Columellar retractor comparatively broad. Buccal mass big and ovoid (larger than in *S. acus enigmaticus*). Radula very large for a *Spiraxis* with formula (f. 9): 114-1-114, with 61 rows; central elongate, tricuspid; all other teeth bicuspid and similar in form, evenly spaced, with both cusps subequal and conical, until outermost teeth, with shorter and rarely subdivided outer cusp. Salivary glands broadly lanceolate, subequal, with combined volume smaller than buccal mass.

*Miraradula* appears to have the most primitive radula in the genus, which suggests that the form of columella in *Pseudosubulina* is derived from a fairly straight axis with a spiral twist, while the twist is simply accentuated in *Volutaxis*. *S. miradorensis* (S. & P.) is probably related but no living specimens were obtained.

*S. (RECTAXIS) INTERMEDIUS* (S. & P.).

Penis of animals from near Córdoba relatively smaller but otherwise similar to that in *S. similaris*. Radular formula: 13-1-(2+11), with 38 rows; central trienspid.

Radulae of three additional Mexican species have been examined.

*S. (VERSUTAXIS) OPEAS*, new subgenus and species.

Shell (pl. 3, f. 1) cylindric-turrite, whitish corneous, slightly translucent, with lightly incised growth-lines and polished interspaces. Whorls 7.5, moderately flattened with somewhat impressed suture. Apex relatively large; embryonic whorls  $2\frac{3}{4}$ , rapidly widening; first 1.7 almost smooth but last assuming sculpture of incised growth-lines that separate flattened threads. Later whorls gradually increasing, with sharp but shallow growth-lines that become weaker on base of last whorl; first (neanic) with 48; second with 50; third with 57; fourth with 55 and last with 33. Aperture ovate-trapezoidal with greatest dimensions  $30^\circ$  to shell-axis; peristome almost vertical, weakly arcuate; columella narrow but definitely twisted. Alt. 4.89, diam. 33 (1.63), alt. last whorl 45 (2.22); aperture alt. 28 (1.36), diam. 63 (0.86 mm.).

Above Necaxa (BD, I, a, 34), 5000 ft.; infrequent. *S. opeas* appears closest to *S. odiosus* (Pilsbry), but is smaller with more closely spaced growth-lines and more twisted, although nearly vertical columella. Four other Mexican species of *Versutaxis* have been dissected.

*S. (MIRAPEX) ACUS* (?) *ENIGMATICUS*, new subgenus and subspecies.

Shell (pl. 4, f. 1) subulate-turrite, greenish white, somewhat translucent, closely thread-costulate. Whorls 9.5, convex to flattened (last 2) with quite deep, weakly crenulate suture. Apex nipple-shaped; embryonic whorls 2.7 to 3, quite rapidly widening; first almost smooth with very weak spiral striae; last with 18 riblets. Later whorls gradually increasing, with low angular threads and progressively narrower, concave interspaces; spiral striae becoming obsolete; first (neanic) with 36 threads; second with 35; third with 38; fourth with 52; fifth with 61 and last with 58. Aperture truncate reniform, with long axis about  $40^\circ$  to shell-axis; peristome slightly thickened,  $20^\circ$  to shell-axis and very little arcuate; columella sigmoid, strongly thickened. Alt. 9.92, diam. 25 (2.57), alt. last whorl 34 (3.47); aperture alt. 19 (1.88), diam. 79 (1.49 mm.).

Ovotestis (f. 2) with few alveoli, which are often bifurcate. Free oviduct very long and slender, swollen apically. Radular formula: 16-1-(2+14), rows not counted.

Las Tortolas, Córdoba (D, I, a, 4), 2650 ft.; infrequent. Shuttleworth's description of *S. acus* is almost unrecognizable; *S. acus* (?) *enigmaticus* is considerably stouter than the dimensions given by him but he states that he was not sure of the size or the number of whorls. My form must have a much more arcuate columella than *S. tenuis* Pfr. Certainly, "var. *minor*" of Fischer et Crosse has little in common with any of these. The section *Mirapex*, with its change from widely spaced ribs on the last embryonic to close threads on the later whorls, reverses the usual tendency in *Spiraxis*.

S. (VOLUTAXIS) SULCIFERUS (Morelet).

Talon (pl. 4, f. 5) minute. One animal with large, white-shelled egg in free oviduct, which is equalled by vagina. Penis folded (in fig.) inside of a fusiform sheath. Radular formula (H.B.B., 1926): 17-1-(2+15).

My animals, found with typical shells near Córdoba, belong to the paedogenetoid form, which is apparently what Pfr. named *S. berendti* (not the type of *Pseudosubulina*). In addition, *S. tenuicostatus* (S. & P.), *S. nitidus* (S. & P.) and two new species have been dissected; also, *S. melanielloides* (Pfr.) from Cuba has the radular formula: 20-1-(2+18).

S. (PSEUDOSUBULINA) BERENDTI BERENDTI (Pfeiffer).

Lung (pl. 3, f. 10) of animals from Necaxa almost 6 times as long as base or kidney length, which is 1.5 times its base or pericardial length. Talon (f. 7) cylindrical. Penis internally (f. 8) with one very heavy and two smaller convoluted pilasters. Cerebral ganglia (f. 9) large, each longer than their commissure; labels same as in H.B.B., 1938, Zonitid snails from Pacific Islands, part 1, p. 92.

Besides the type of *Pseudosubulina*, 7 Mexican species have been dissected.

S. (MICROMENA) MINUTUS, new subgenus and species.

Shell (pl. 3, f. 2) turritid, silvery white, translucent, finely thread-costulate. Whorls about 6.5, flattened convex with deep, quite simple suture. Apex obtuse; embryonic whorls  $2\frac{1}{4}$ , rapidly

widening, almost smooth (weakly punctate) except on last half-whorl, which becomes closely striate. Later whorls quite short, gradually increasing, with fine thread-riblets, much narrower than interspaces and attenuate at both ends, and with prominent, continuous, spiral striae; first (neanic) with about 41 threads; second with 33; third with 35 and last with 39. Aperture about  $20^\circ$  to shell-axis, broadly ovate-trapezoidal; peristome almost vertical, slightly but distinctly arcuate; columella almost straight, tapering and scarcely truncate. Alt. 2.23 mm., diam. 39 (0.87). alt. last whorl 52 (1.16); aperture alt. 31 (0.69), diam. 64 (0.44 mm.).

Kidney (f. 3) U-shaped (*i.e.*, approaching that of *Punctum*); ureter along inside of curvature. Anal mantle-glands conspicuous. Ototestis (f. 4) weakly lobate. Vas deferens swollen to form a fusiform epiphalloid sac. Penis (f. 6) almost filled by an acuminate verge. Radular formula (f. 5): 31+1+31, with 33 rows; central relatively large; other teeth with two subequal, needle-shaped cusps.

Below *Necaxa* (D, III, a, 53), 3000 ft.; very common. *S. minutus* somewhat resembles *S. decussatus* (H.B.B.) from Venezuela, but has less shouldered whorls, is much smaller and has less prominent growth-threads, which do not crenulate the suture. In the subgenus *Micromena*, *S. problematicus* (Pils.) from Jamaica and a new Mexican species have also been dissected.

\*SPIRAXIS (DIGNAXIS) MIRABILIS (C. B. Adams), new subgenus.

Lung of animals from Somerset, Jamaica, similar to that of *S. anomalus*. Ototestis weakly lobed. Uterus with eggs or embryos. Penis simple; sheath easily separated. Radular formula (pl. 5, f. 5): 10-1-(4+6), with 39 rows; lateral field almost as wide as marginal.

*Dignaxis* is the most aberrant Jamaican section of *Spiraxis*.

\*S. (SPIRAXIS) INUSITATUS (C. B. Adams).

Lung of animals from Somerset similar to that of *S. anomalus*. Ototestis (pl. 5, f. 2) clavate; talon not distinct. Uterus with 4 embryos. Vas deferens swollen near entrance into penis, which internally shows longitudinal folds. Radular formula (f. 1): 14-1-(1+13), with 41 rows; needle cusps of marginals mediocre.

*Spiraxis* s.s. becomes monotypic, but the next group is very closely related.

\*S. (*EUSPIRAXIS*) *ANOMALUS* (C. B. Adams).

Lung (pl. 5, f. 3) over 6 times as long as its base or length of U-shaped kidney. Ototestis consisting of several clavate lobules. Uterus with large, white-shelled eggs in some animals but with embryos surrounded by decalcified membranes in others. Apical half of penis internally with spiral ridges; basal half with transverse folds. Radula formula (f. 4): 27-1-(1+26), with 37 rows; needle-cusps of marginals fairly short.

Typical specimens from near Catadupa have been dissected but the figures represent the race *hollandi* (Henderson) from Ipswich, Jamaica. The animal of the type of *Euspiraxis* is still unknown.

\*S. (*REPRESSAXIS*) *TEREBELLA* (C. B. Adams), new subgenus.

Animals from behind Kingston, Jamaica (KF) similar to those of *S. inusitatus*. Ototestis with 2 lobes. Prostate much more reduced. Uterus containing 4 much larger embryos. Penis smaller and vas not enlarged. Radular formula (pl. 5, f. 6): 29-1-(1+28), with 50 rows.

Although the shell of the section *Repressaxis* resembles that of *Versutaxis*, *S. terebella* is evidently most closely related to *S. anomalus*.

---

## NEW MARINE MOLLUSKS FROM THE WEST ATLANTIC

BY HARALD A. REHDER\*

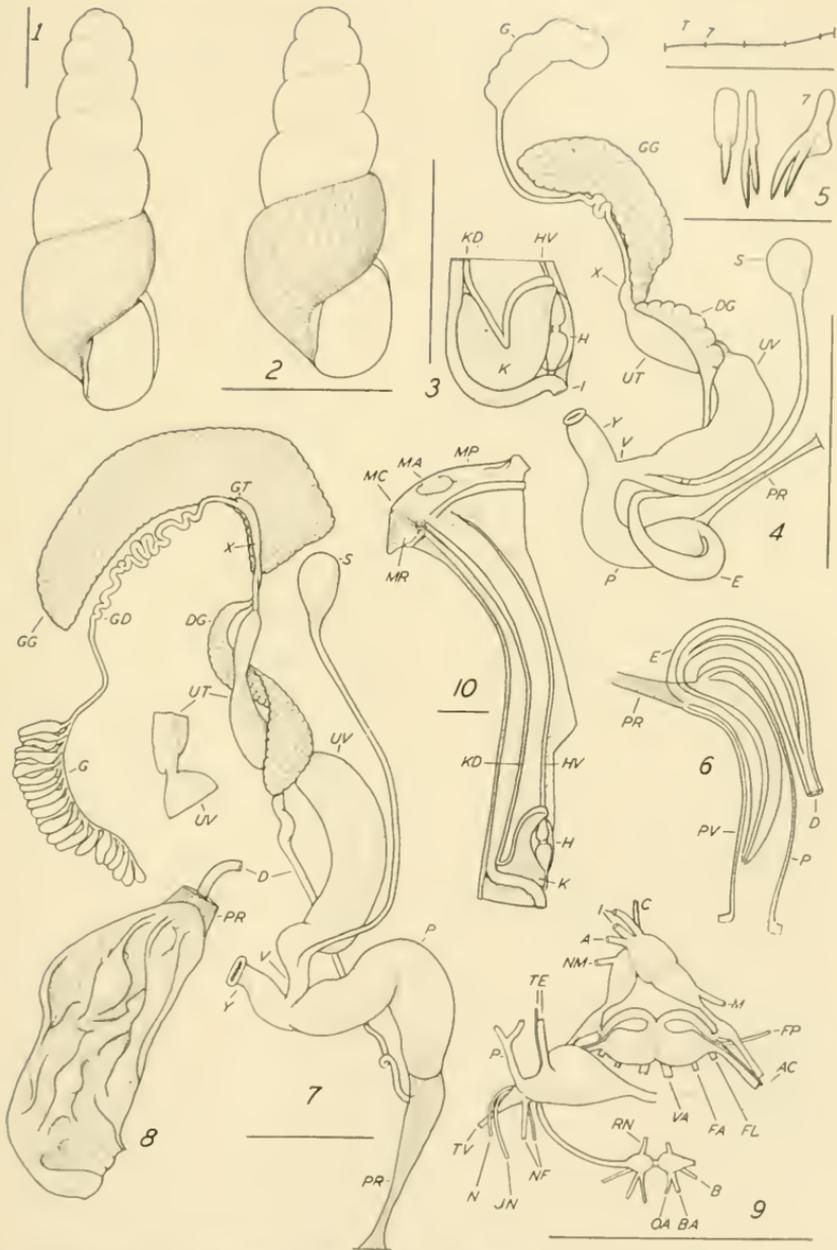
Assistant Curator, Division of Mollusks  
United States National Museum

The identification of specimens sent to the United States National Museum for that purpose by correspondents makes it necessary to give a status to some undescribed forms which is here done.

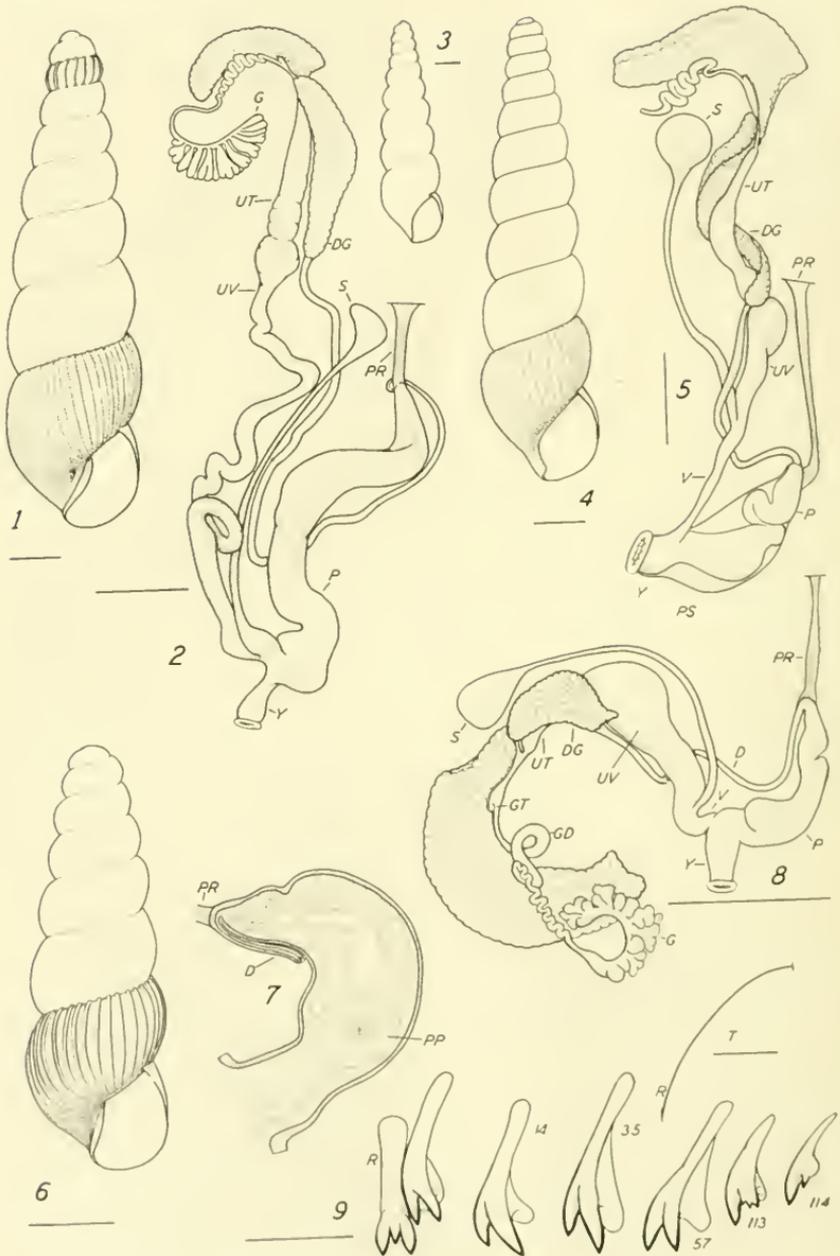
*ADRANA NOTABILIS*, new species. Plate 6, figs. 4, 12.

Shell large, whitish (dead shells), compressed lanceolate, the beaks anterior to the middle slightly prominent, weakly arching the dorsal margin. The posterior part of the shell is attenuated and subrostrate, while the anterior portion of the shell is broader. A gradually broadening, weakly bipartite, shallow groove runs from the beaks to the anterior ventral angle, forming there a small

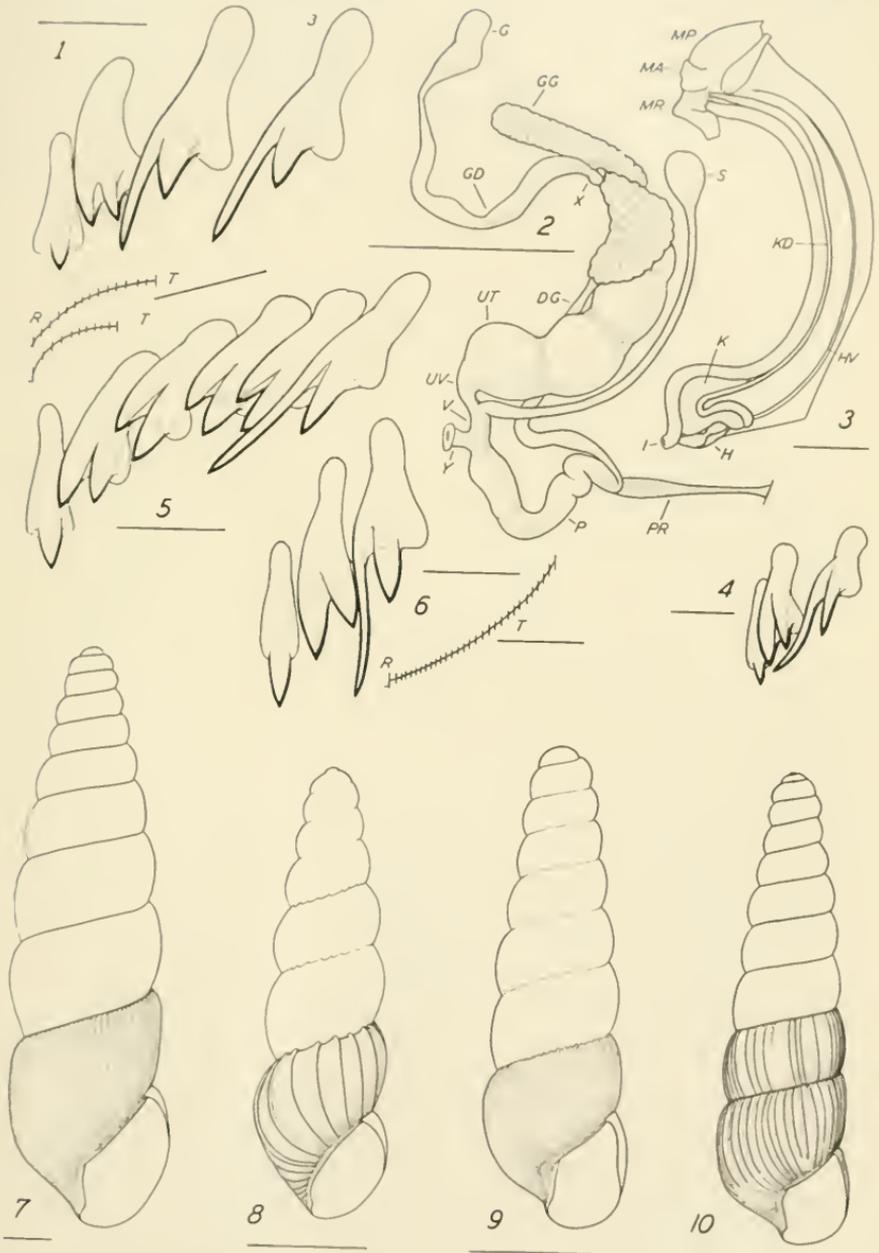
\* Published by permission of the Secretary of the Smithsonian Institution.



1, *Spiraxis (Versutaxis) opas*. 2-6, *S. (Micromena) minutus*. 7-9, *S. (Pseudosubulina) bicincti* (Pfr.).



1-2, *Spiraxis (Mirapex) aeneus enigmaticus*. 3, *S. caducus*, stout form. 4, *S. caducus*, type. 5, *S. (Volutaris) sulcifera* (Mor.). 6-9, *S. (Miraradula) similis* (S. & P.)



1-2, *Spiraxis* (s.s.) *inutilatus* (C. B. Adams). 3-4, *S.* (*Euspiraxis*) *anomulus hollandi* (Hend.). 5, *S.* (*Dignaxis*) *mirabilis* (C. B. Adams). 6, *S.* (*Repressaris*) *terebella* (C. B. Adams). 7, *S.* *ventrosus*, type. 8, *S.* *costatus*, type. 9, *S.* *arcuatus*, type. 10, *S.* *irregularis nealigens*, type.



shallow sinus. The sculpture of the median part consists of fine, rather crowded, concentric grooves which are absent posteriorly beyond a faint groove running from the beaks to the postero-ventral area. Anterior to the anterior furrow, the grooves become fewer in number and stronger. The dorsal areas are lanceolate and smooth, the posterior lunule limited by a sharp carina. The chondrophore is broadly triangular, separating the two series of practically rectilinear hinge teeth, the anterior series bearing 48-51 teeth, the posterior one 58-60 teeth. The pallial sinus is rather short, oblong, truncate.

The type, U.S.N.M. no. 499337, was collected by Dr. J. A. Tong on the Paraguana Peninsula, Venezuela. It measures: Length, 61.4 mm.; height, 20.0 mm.; breadth, 4.9 mm. Nine other single valves, U.S.N.M. no. 456516, are from the same lot.

This species, kindly forwarded to me by Mr. Charles T. Berry of the Johns Hopkins University, resembles *Nuculana gloriosa* A. Adams from Singapore, but is larger, with a less concave postero-dorsal margin and a less pronounced posterior groove. From *Nuculana tellinoides* Sowerby, from Cumana, Venezuela, it differs in being more broadly rounded anteriorly, longer and more narrowly rostrate posteriorly. *Nuculana electa* A. Adams from Santos, Brazil, and *egregia* Guppy from the Gulf of Paria, Venezuela, are both smaller, with stronger sculpture and with a more narrowly rostrate, subtruncate end.

ADRANA SCAPHOIDES, new species. Plate 6, fig. 5.

Shell rather large, thin, translucent, slender, lanceolate, sub-equilateral, narrowed and rounded at both ends, the posterior dorsal margin straight, anterior dorsal margin slightly convex; the ventral margin evenly arcuate except near the anterior end where a shallow sinus forms a rostrate rounded end. Umbones inconspicuous. Shell white, covered by a very thin, deciduous, yellowish-green periostracum, which remains only on the ventral half of the valves. The sculpture consists of fine concentric grooves which cut slightly diagonally across the growth lines. Posteriorly there is a narrow triangular smooth area; anteriorly beyond the shallow ventral sinus the grooves are fewer in number and more strongly marked. The lunule and escutcheon are undefined. The ligament lies in a broadly triangular, spoon-shaped, chondrophore below the umbones. Hinge line rather straight; the teeth on both sides of the chondrophore number 75+, the posterior series being slightly longer. Interior white, pallial line with a rather broad rectangular sinus.

The type, U.S.N.M. no. 364223, was collected by Mr. T. A. Link near Cartagena, Colombia. It measures: Length, 51.1 mm.; height, 11.1 mm. A second, somewhat smaller specimen, U.S.N.M. no. 473201, was collected by Mr. Link at the same place.

No other east coast species is very similar in shape. Our shell resembles *Nuculana elongata* Sowerby from the West Coast of Colombia, but that is a broader, heavier shell.

*TIVELA FLORIDANA*, new species. Plate 6, figs. 2, 3.

Shell small, moderately thin, inflated, ovate-triangular, the anterior end slightly more pointed than the posterior end, umbones central, white or straw-colored, often with irregular reddish brown maculations near the beaks, or more or less suffused with bluish or brownish purple. Internally the color may be white or more or less tinted with brown under the hinge line, or the whole interior may be purplish. The exterior is smooth, rather glossy. The ligament is external, short, posterior. The hinge is typical except that the posterior cardinals are not strongly grooved and the anterior laterals are more slender and drawn out. The pallial sinus is rather broad, rounded, and as deep as it is broad.

The type, U.S.N.M. no. 473118, was collected by Mr. Ted Dranga at Jensen Beach, near Miami, Florida, and measures: Length, 11.5 mm.; height, 9.2 mm.; breadth, 6.4 mm.

U.S.N.M. no. 471501, contains paratypes from the same locality. We also have specimens from the south end of Lake Worth, and from 45 feet in the northeast part of Lake Worth, Palm Beach County, Florida.

From its closest relative, *Tivela abaconis* Dall from the Bahamas, it differs in having the posterior end more bluntly rounded, and in being more ovate in shape and less triangular. The types of the latter are moreover generally roseate in color, though some others are white.

*GEMMA FRETENSIS*, new species. Plate 6, figs. 8, 9.

Shell small, subtrigonal, rather stout, the exterior polished, with fine, irregular concentric furrows, similar to those of *Gemma gemma*. The exterior is whitish with a more or less extended purplish splotch in the postero-dorsal area, which is visible in the interior. The interior is otherwise white, crenulated at the ventral margin and with a rather shallow rounded pallial sinus. The

hinge teeth are typical, except that they are slightly nearer and more crowded than in *gemma*.

The type, U.S.N.M. no. 508650, was collected by H. K. Townes in Long Island Sound at the Crab Meadow State Park, Long Island, New York, in July 1938. It measures: Length, 3.7 mm.; height, 3.6 mm.

U.S.N.M. no. 472862 contains further specimens from the same lot.

This species differs from *Gemma gemma* Totten in being more subtrigonal, with narrower, more acute umbones. From *Gemma manhattensis* Prime it differs in lacking the strong concentric furrows, the sculpture being more like that of *gemma*; it is also slightly narrower. From both species it differs in having a shallower pallial sinus.

CYMATOICA ORIENTALIS HENDERSONI, new subspecies. Plate 6, figs. 10, 11.

This subspecies differs from typical *orientalis* Dall from Samaná Bay, Dominican Republic, in having the strong concentric ribs not angled along a line passing from the beaks to the ventral margin, but gradually rising as they pass backward. The posterior end also tends to be less rostrate.

The type, U.S.N.M. no. 493384, was dredged by J. B. Henderson, Jr., at Eolis Station 8, in 25 fathoms, 1 mile S.E. of Fowey Light, near Miami, Florida. It measures: Length, 8.7 mm.; height, 5.6 mm.; breadth, 2.8 mm.

This form is not rare from Miami, Florida, south through the Keys to the Tortugas and on the north coast of Cuba from Bahia Honda to Cardenas Bay. We likewise have one specimen from Lake Worth, and two valves from 28 fathoms, 75 miles off Charlotte Harbor, Florida.

CUMINGIA TELLINOIDES VANHYNINGI, new subspecies. Plate 6, figs. 13, 14.

Shell similar to *tellinoides*, but with a slightly lower, more elongate shell, more attenuate posteriorly. The concentric sculpture is generally weaker and less obvious.

The type, U.S.N.M. no. 473123, was collected on the west side of

Lower Matecumbe Key, Florida, by F. B. Lyman. It measures: Height, 10.8 mm.; length, 16.3 mm.; breadth, 5.8 mm.

This southern subspecies is represented in our collection by specimens from Biscayne Bay to Key West, and thence to the west coast of Florida. It apparently is found also along the Gulf Coast, as we have several lots from Texas. There is one specimen from northern Cuba in our collection. The typical *Cumingia tellinoides* in our collection ranges southward only as far as St. Augustine, Florida.

This and the following two species were generously donated by Dr. T. Van Hyning of the Florida State Museum.

SYNAPTOCOCHLEA NIGRITA, new species. Plate 6, fig. 1.

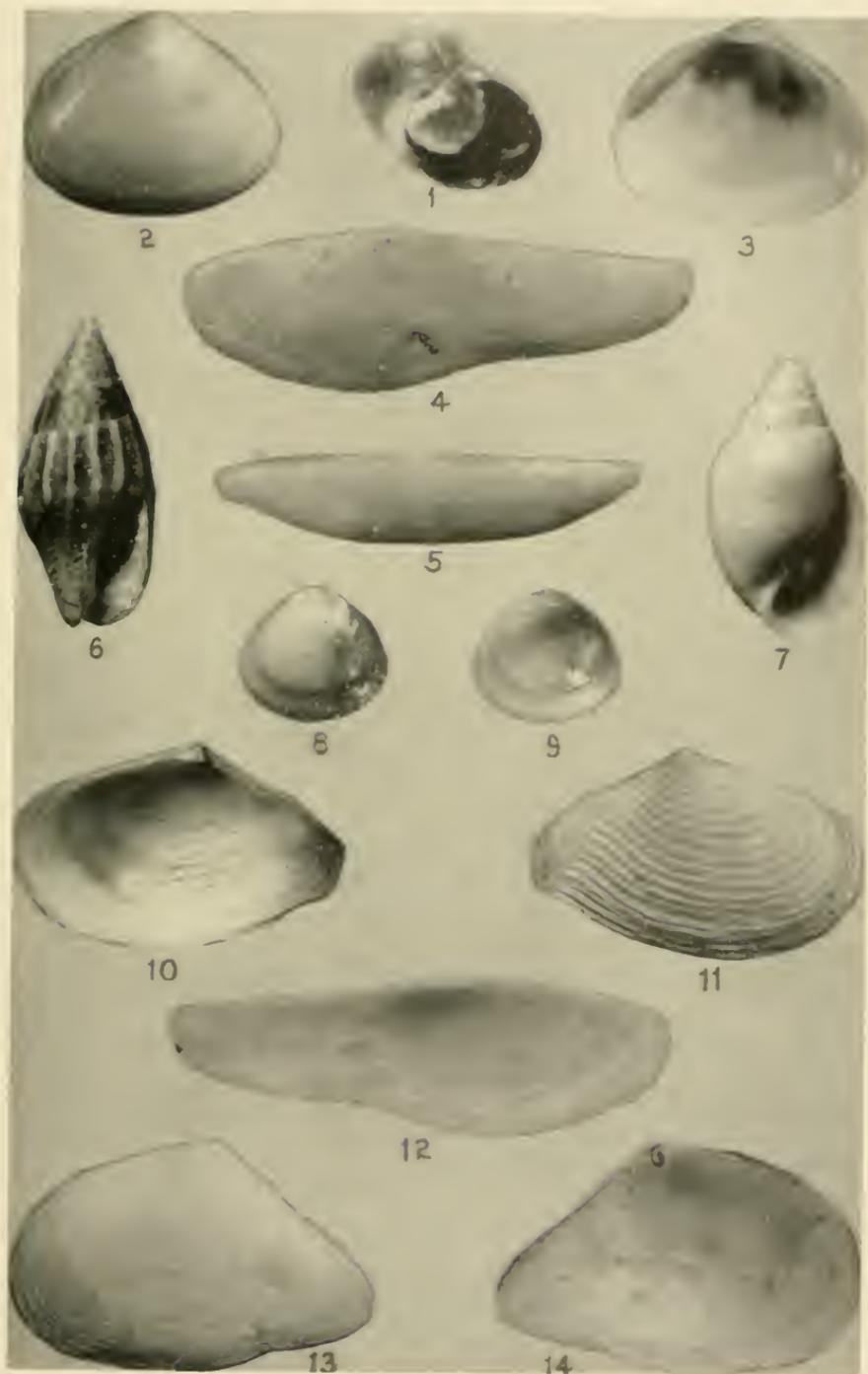
Shell very small, obliquely ovate-oblong, black, composed of 3 whorls; the first 1.5 whorls glassy white, gradually becoming grayish and finally black with 2 irregular radial white streaks about one-eighth of a whorl apart near the end of the second whorl. The first  $1\frac{1}{4}$  whorls are smooth, then rather close spiral cords appear, which at the end of  $2\frac{1}{4}$  whorls begin to be crossed by rather irregular, radial riblets, so that on the body whorl the spiral cords appear nodulose and slightly wavy. The aperture is large, obliquely oval, measuring two-thirds of the length of the shell. The interior is bluish gray with the columellar margin and umbilical region white. The umbilicus is almost closed by a slight callus leaving only a very narrow chink.

The type, U.S.N.M. no. 473205, was collected on rocks on Loggerhead Key, Dry Tortugas Keys, Florida, by G. W. Van Hyning. It measures: Height, 1.6 mm.; breadth, 1.6 mm.; oblique length, 1.8 mm.

This species differs from *S. picta* d'Orbigny, the only other Antillean species, by being smaller, black in color and by the spiral sculpture being more crowded and slightly coarser.

ANACHIS FLORIDANA, new species. Pl. 6, fig. 6.

Shell of medium size, rather broadly ovate, yellowish, unicolorated or with more or less extensive splotches of dark chestnut brown below the suture, and with zig-zag vertical lines of the same color over the remainder of the whorls. Axial ribs may or may not be present on the last two whorls; when present they are low, rather separated, and disappearing below the periphery. Above the last two whorls the shells are usually smooth, the nuclear whorls being



1, *Synaptocochlea nigrita*,  $\times 15$ . 2, 3, *Tivela floridana*, left valve,  $\times 3$ . 4, *Adrana notabilis*. 5, A, *scaphoides*. 6, *Anachis floridana*,  $\times 5$ . 7, *Acteon can dens*,  $\times 5$ . 8, 9, *Gemma fretensis*,  $\times 5$ . 10, 11, *Cymatoeica orientalis hendersoni*,  $\times 3$ . 12, *Adrana notabilis*. 13, 14, *Cumingia tellinoides vanhyningi*,  $\times 3$ .



smooth, glassy and white; occasionally the first one or two post-nuclear whorls are sculptured with narrow vertical ribs. In no case, however, are there any spiral grooves or striae, as in *A. avara* Say. The aperture and outer and inner lip are as in *Anachis avara*.

The type, U.S.N.M. no. 473202, was found on an old rope in 30 feet of water near Cape Canaveral, Brevard County, Florida, by F. B. Lyman. It measures: Height, 8.3 mm.; breadth, 3.7 mm.; height of aperture, 4.0 mm.

U.S.N.M. no. 473203, contains two more specimens of the same lot.

The National collection also possesses this species from Waveland, Dade County, Florida, and from the mouth of the Hillsborough River in Tampa Bay, Hillsborough County, Florida.

This southern Florida form is closely related to *Anachis avara* Say, differing from it in being generally somewhat smaller, with narrower, more slender ribs, and in lacking the spiral grooves of that species, which is always sculptured, whereas this form is often smooth or lacking the axial riblets on the early postnuclear whorls. The great variability may signify that we are dealing with a mutating hybrid element. This species reaches a size of 11 mm.

*ACTEON CANDENS*, new species. Pl. 6, fig. 7.

Close to *Acteon punctostriatus* C. B. Adams, but generally somewhat larger, more solid, opaque, glossy white, with the spiral sculpture less conspicuous, the basal striation well marked but posteriorly becoming more obscure, generally not reaching the upper insertion of the lip. Two or three, more or less indistinct, pale, caramel colored bands may be present on the early whorl.

The type, U.S.N.M. no. 493407, was dredged in 1915 by J. B. Henderson, Jr., in 68 fathoms off Fowey Light, Florida. It measures: Height, 7.5 mm.; breadth, 4.2 mm. Other lots in the U. S. National Museum collection come from localities ranging from Cape Hatteras, North Carolina, to the Dry Tortugas, and up the west coast of Florida.

This species is also near *Acteon chipolanus* Dall, from the Miocene of Florida, but that shell is more slender, with the spiral striae even fewer in number.

PLEISTOCENE SHELLS FROM SAN CLEMENTE  
ISLAND, CALIFORNIA

BY T. D. A. COCKERELL

I visited San Clemente Island in May of this year, and was very fortunate in getting there in time to examine an extensive sandy deposit about the middle of the top of the island, which had been recently uncovered in the course of operations by the navy.

I was kindly taken to the place by Mr. J. A. Wahler, and was assisted in collecting the fossils by Dr. J. T. Scott and Mr. Logan Buehart. The deposit, which is full of marine shells, is about 800 feet above sea level, or rather more, the surface of the ground, where undisturbed, being 860 ft. above the sea.

I sent a series of the shells to Miss Myra Keen, of Stanford University, and she promptly transmitted the list given below, which I publish with her permission. She states that the "median of midpoints" is  $39.6^\circ$ , corresponding with the Timm's Point Bed on the mainland, as described by Alex Clark.

PELECYPODA

*Cardita ventricosa* Gould  
*Crenella divaricata* (d'Orbigny)  
*Epilucina californica* (Conrad)  
(N., M.)  
*Glycymeris septentrionalis*  
(Middendorff)  
*Luciniscia nuttallii* (Conrad)  
*Mytilus californianus* Conrad  
*Psephidia cf. lordi* (Baird)  
(M.)  
*Spissula planulata* (Conrad)  
*Transennella tantilla* (Gould)

GASTROPODA

*Acmaca incessa* (Hinds) (N.)  
*A. mitra* Eschscholtz  
*A. pelta* Eschscholtz (M.)  
*A. scabra* (Gould) (N., M.)  
*Amphissa versicolor* Dall  
*Bittium eschrichtii* (Middendorff)

*B. rugatum* Carpenter  
*Dentalium cf. rectius* Cpr.  
*Diala* sp.  
*Hipponix cranioides* Carpenter  
(N.)  
*Homalopoma carpenteri* (Pilsbry)  
*Lacuna* sp.  
*Littorina scutulata* Gould  
*Mitrella carinata* (Hinds)  
*M. gausapata* (Gould) (N., M.)  
*M. tuberosa* (Carpenter)  
*Nassarius fossatus* (Gould)  
*Odostomia cf. stearnsii* Dall & Bartsch  
*Ocnopota* sp.  
*Olivella biplicata* (Sowerby)  
(N., M.)  
*Opalia chacci* Strong  
*Polinices lewisii* (Gould)  
*Tegula funebralis* (A. Adams)  
(N.)  
*Tritonalia foveolata* (Hinds)

The letters N. and M. following the names, indicate that the species was also found by me in the Pleistocene on San Nicolas and San Miguel Islands, respectively. On these islands, also the deposit was on the top of the mesa. On San Nicolas, Pleistocene shells are found at various levels, but excepting those near the top, they are under suspicion of having come down the slopes with the talus. These finds of Pleistocene shells on the islands are of considerable importance as indicating that the islands were nearly submerged. But the land shells, on a deposit above the marine beds, appear to prove that there was always some emergent land. This is also indicated by the plants.

On San Nicolas, on the slopes, marine and land shells are sometimes found mixed, but careful examination shows that the latter are all from a superficial deposit later than that carrying the marine shells.

---

**TYPE SPECIMEN OF *BUSYCON PERVERSUM*  
(*MUREX PERVERSUS* LINNÉ)**

BY BURNETT SMITH

This note is made possible through the liberal policy of The Linnean Society of London in granting permission to publish photographs of the type of *Murex perversus* Linné. Mr. R. Winckworth of London has very kindly examined the specimen for the writer, and Dr. Henry A. Pilsbry of the Academy of Natural Sciences of Philadelphia has contributed many helpful suggestions. To the Linnean Society and to these gentlemen the writer wishes to express his thanks. Plate 7, figs. 1, 2 are reproductions of the type photographs.

The desirability of consulting the Linnean type was suggested by Hanley's discussion of *Murex perversus*.<sup>1</sup> He says: "The *Pyrrula perversa* of authors (Reeve, Conch. System, pl. 236, f. 5) is marked for this shell in the Linnean collection, and 'List. 907, 908' has been added in the revised copy of the 'Systema.' All the synonyms are usually accepted as correct, but Gualtieri's engraving (manifestly taken from a broken example), in the

---

<sup>1</sup> Hanley, *Sylvanus: Ipsa Linnaei Conchylia*. London 1855. See p. 302.

multiplicity of modern illustrations, is not worthy of being quoted.”

Hanley is presumably referring to one of two figures in Gualtieri<sup>2</sup> which, in spite of their shortcomings, depict the slender left-handed or sinistral *Busycon* long known as *B. perversum* (L.) The figures in Lister<sup>3</sup> given by Hanley likewise show the same phase of slender left-handed *Busycon*. If, however, one consults the Reeve<sup>4</sup> figure cited by Hanley it is found to show a young individual of the robust and long-spined sinistral *Busycon* variously known as *B. kieneri* (Philippi), *B. perversum* var. *kieneri*, and *B. perversum kieneri*.

The writer has examined rather extensive sets of recent sinistral *Busycons* and the evidence so far gathered points to the specific distinctness of the slender and robust phases just mentioned. Were the differences between them of lower than specific rank there should be many intergrades. The latter are not forthcoming in the recent fauna.

*Busycon kieneri* (Philippi)<sup>5</sup> is based on Kiener's figure of an immature individual clearly referable to the robust phase. Adult examples of this phase are heavy and far from slender, provided with a few long spines on the last whorl, and with the anterior canal showing a prominent swelling or swollen band crossing it diagonally. The entire aspect of this form is so like a "mirror image" of the usual adult dextral *Busycon eliceans* (Montfort)<sup>6</sup> that the view has been expressed that these sinistral shells are in reality merely teratological examples of this normally dextral

---

<sup>2</sup> Gualtieri, Nicolai: Index Testarum Conchyliorum. Florentiae 1742. See pl. 30, fig. B.

<sup>3</sup> Lister, Martin: Historia Sive Synopsis Methodica Conchyliorum. Editio Tertia. (Dillwyn, 1823.)

<sup>4</sup> Reeve, Lovell: Conchologia Systematica, etc. London 1842. See vol. II, pl. 236, fig. 5.

<sup>5</sup> Philippi, R. A.: Kurze Beschreibung einiger neuen Conchylien. Zeitschrift für Malakozoologie. Fünfter Jahrgang 1848. Cassel 1849. See p. 98 and reference to Kiener's figure.

Kiener, L. C.: Spécies Général et Iconographie des Coquilles Vivantes, etc. Vol. 6, Pyrula, 1840. See pl. 9, fig. 2.

<sup>6</sup> Montfort, Denys De: Conchyliologie Systématique. Tome Second. Paris 1810. See pp. 502-504 and figure.

species.<sup>7</sup> Kiener, on the other hand, and quite recently Johnson<sup>8</sup> make sinistrality the bond between the slender and robust left-handed *Busycons* and regard their differences as varietal or subspecific. As stated above, the present writer has obtained no evidence so far in favor of this latter view. Linking the robust left-handed shells with *Busycon clicans* would seem more logical but until overwhelming evidence supports such a practice its adoption is opposed. To make *Busycon kieneri* and *B. clicans* conspecific would involve a nomenclatorial tangle which will be noted beyond.

From the standpoint of its two original figure citations *Murex perversus* Linné<sup>9</sup> appears to include two distinct species. One of these is pictured by the figure in Gualtieri (pl. 30, fig. B), already considered, representing a slender sinistral shell. The other species, figured in Argenville,<sup>10</sup> shows the robust sinistral form later to be known as *Busycon kieneri* (Philippi).

Röding's<sup>11</sup> genus *Busycon* contains a *B. perversum* among its original species. No author is given but rather surely the *Murex perversus* of Linné is intended. The figure or figures cited by Röding are to be found in Chemnitz (Martini)<sup>12</sup> and they illustrate the slender phase of sinistral *Busycon* which, as already noted, is shown in Gualtieri's figure of the broken shell.

It is plain that the specific name *perversum* should be applied to but one of these two forms of *Busycon*. The revisions of Kiener and of Philippi, if so they may be termed, have resulted in the fastening of the name *perversum* to the slender shell while the robust one has done duty as variety or subspecies of *Busycon*

<sup>7</sup> Tryon, George W., Jr.: Manual of Conchology, etc. Vol. III. See p. 141 also pl. 57, fig. 390.

<sup>8</sup> Johnson, Charles W.: List of Marine Mollusea of the Atlantic Coast from Labrador to Texas. Boston Soc. Nat. Hist. Proc. Vol. 40, no. 1. 1934. See p. 126.

<sup>9</sup> Linnaeus, Carolus: Systema Naturae. Tomus I. Editio Decima, Reformata. 1758. See p. 753.

<sup>10</sup> Argenville: L'Histoire Naturelle, etc. Paris 1742. See pl. 18, fig. F.

<sup>11</sup> Röding, Peter Friedrich: Museum Boltenianum, etc. 1798. See p. 149.

<sup>12</sup> Chemnitz, Johann Hieronymus: Neues systematisches Conchylien-Cabinet. Neunten Bände, erste Abtheilung. Nürnberg 1786. See vol. IX, pl. 106, fig. 902.

*perversum*, as a distinct species (*B. kieneri*), or as a sinistral monstrosity of *B. eliceans*.

Apparently no one has so far considered the type specimen of *Murex perversus*. When photographs of this type are examined it becomes clear that the name *Busycon perversum* (Linné) should be applied henceforth to the robust form described as a distinct species by Philippi, and that *B. kieneri* (Philippi) must unfortunately be placed in the synonymy.

The elimination of *Busycon kieneri* involves the question of the validity of *B. eliceans* and perhaps also of *B. carica* (Gmelin).

The trouble does not end here for a name must be found for the slender sinistral *Busycon*.

For this purpose at least two names should be investigated. The older of these *Fulgur contrarius*, was used by Conrad<sup>13</sup> in describing the left-handed *Busycon* of the Duplin Miocene at the Natural Well in Duplin County, North Carolina. The later name, *Busycon adversarium*, also of Conrad,<sup>14</sup> was attached by him to a shell figured by Tuomey and Holmes.

*Busycon adversarium* appears to be founded upon a fairly mature example of *B. contrarium*, and the name is therefore a synonym for the latter species. The proper disposition of the recent slender sinistral *Busycons* is full of many difficulties. For the present, however, it seems best to regard them as a race of *Busycon contrarium* (Conrad).

#### EXPLANATION OF FIGURES, PLATE 7

Type Specimen of *Murex perversus* Linné. Long dimension about 74 mm. Photographs by the Linnean Society's photographer.

FIG. 1. Specimen with aperture turned toward observer.

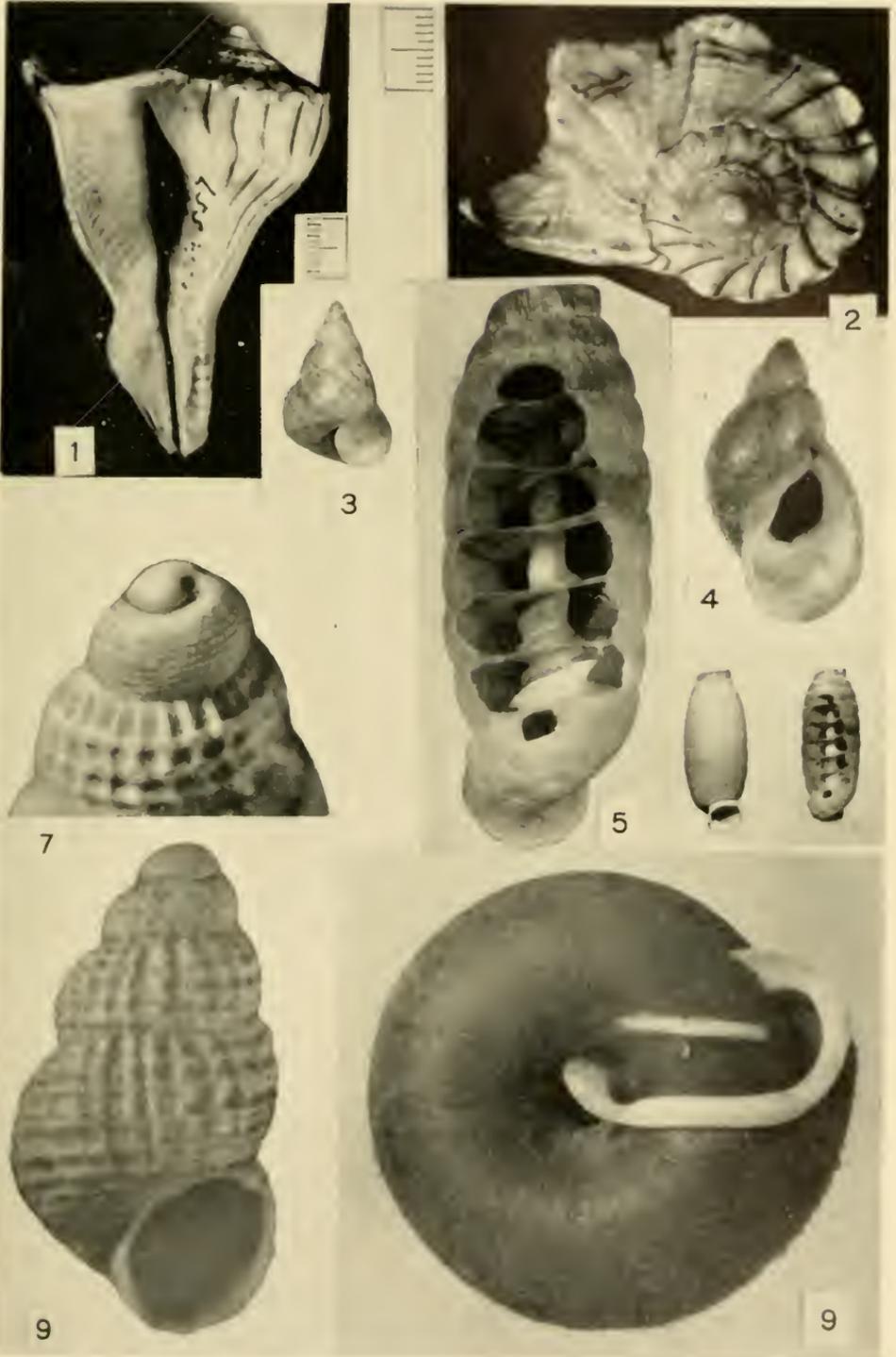
FIG. 2. Apical view.

<sup>13</sup> Conrad, T. A.: New fossil Shells from N. Carolina. Amer. Journ. Sci. 39. 1840. See p. 387.

Conrad, T. A.: Fossils of the Medial Tertiary or Miocene Formation of the United States, No. (4). 1861. (Republication of 1893 by William Healey Dall.) See p. 81 and pl. 45, fig. 11.

<sup>14</sup> Conrad, T. A.: Catalogue of the Miocene Shells of the Atlantic Slope. Acad. Nat. Sci. Philadelphia, Proc. XIV. 1862. See p. 560.

Tuomey, M. and F. S. Holmes: Pleiocene Fossils of South-Carolina. 1857. See p. 145 and pl. 29, fig. 3.



1, 2, Type of "Murex" perversus Linnaeus. 3, Leiostracus webberi. 4, Stagnicola bulimoides vancouverensis (Vol. 52, p. 114). 5, Coelocentrum bourgeoiseae,  $\times 3\frac{1}{2}$  and natural size. 7, 9 (left), "Alvania" keeneae. 9 (right), Stenotrema fraternum montanum (Vol. 52, p. 98).



A NEW MEXICAN *COELOCENTRUM*

BY H. A. PILSBRY

Among other Mexican land shells sent by Miss M. E. Bourgeois, of Mixcoac, D. F., Mexico, were specimens of a new *Coelocentrum*, which though externally much like various other species, has an internal armature quite unlike any yet described.

*COELOCENTRUM BOURGEOISAE*, new species. Pl. 7, Figs. 5.

The shell is imperforate, cylindroid, with somewhat convex sides; truncate, the breach closed by a steep plug, central hole small. About one turn below the truncation the diameter increases rapidly. The whorls are slightly convex, with sculpture of very fine thread-like striae about as wide as their intervals; the last whorl rounded, with only a weak trace of a spiral cord and slight impression defining the base. The small aperture is quite oblique, the lip a little expanded, shortly free from preceding whorl. The internal axis is rather small above but enlarges in the last four whorls. It is swollen around the upper part in the third whorl from the last, this swelling becoming a rather thick, rounded spiral cord in the penult whorl, where there is also a high spiral lamella flaring into the cavity from the junction of axis and anterior partition. Opposite the higher part of this lamella there is a much shorter spiral cord on the upper (posterior) partition, and a weak one in the outer wall, below the middle of the whorl (broken away in fig. 5). These lamellae diminish rapidly in the last whorl, and are not visible in the aperture.

Length 21.3 mm., diam. 8.3 mm.;  $9\frac{1}{2}$  whorls remaining.

Length 22.8 mm., diam. 7.6 mm.; 10 whorls remaining.

Zihuatanejo, Guerrero, Mexico.

No other *Coelocentrum* yet known has a spiral lamella flaring from the front partition at its junction with the axis, together with other armature somewhat like that of the typical group of *Holospira*. For species having this structure the

Subgenus *Schizopyle*, new subgenus

is proposed. Type *Coelocentrum bourgeoisae*.

*LEIOSTRACUS WEBBERI*, A NEW BULIMULID  
SNAIL FROM ECUADOR

BY H. A. PILSBRY

Among other land shells received from Mr. Frederick S. Webber there was a single specimen of a snail having some resemblance to the Brazilian *Leiostracus perlucidus* (Spix), but differing in several important features. These shells were collected for Mr. Webber by a naturalist friend, in the foothills of the Andes not far from the town of Banos, Ecuador.

*LEIOSTRACUS WEBBERI*, new species. Pl. 7. Fig. 3.

The shell is very thin, pyramidal, narrowly umbilicate, glossy, translucent whitish, with, on the last two whorls, about six very narrow opaque white bands or wide lines, and narrow irregular interrupted retractive streaks of light brown, in places broken into scattered dots; the base without markings. The spire is straightly conic, the small apex somewhat obtuse. Whorls are moderately convex, the last one angular at periphery, slightly excavated below the angle, the base elsewhere weakly convex. Sculpture:—Very close to the tip fine spiral threads arise; they are well spaced, six on each whorl, and continue on following whorls, until finally, on the later whorls, they become the white lines described above. On the third whorl microscopic spirals appear in the spaces between the threads; they are most distinct on the penult whorl, becoming weak on the last whorl and almost vanishing at the base. The strongly oblique aperture is ovate, the lip thin and simple, triangularly dilated at the axial insertion.

Length 22 mm., diam. 14 mm.;  $6\frac{2}{3}$  whorls.

It is quite possible that the single specimen is not quite mature, and that the lip becomes expanded when full grown.

On account of the apical sculpture of the shell and dentition, it will probably be best to rank *Leiostracus* as a genus distinct from the huge *Drymaeus* assemblage. It is a small group of about ten species,<sup>1</sup> all published hitherto being from tropical Brazil to Guiana.

The species of the eastern parts of the continent have extremely fine, close spiral lines on the apical whorls, with more or less weak,

<sup>1</sup> See Man. Conch. 12: 90, and 14, Classification of Bulimulidae p. xlix. One species, *L. ruthveni* (H. B. Baker), from Guiana, has been added since the publication of the Manual of Conchology.

irregular corrugation. The western species now described differs by having only few (about 6), widely spaced spirals on early whorls and no trace of vertical or irregular sculpture. It forms a new subgenus of *Leiostracus*, to be called

*Graptostracus*, new subgenus.

---

## A NEW SUBGENUS AND SPECIES OF WEST COAST "ALVANIA"

BY MACKENZIE GORDON, JR.

H. E. Vokes<sup>1</sup> in his checklist of shell-bearing gastropods from the intertidal zone of Moss Beach, San Mateo County, California, mentioned among other microscopies two new species of "*Alvania*." These were not subsequently described. Recently Dr. A. Myra Keen of Stanford University collected at this locality and managed to secure some beach drift in which were numerous microscopic gastropods. Among these were two specimens of a hitherto undescribed species of "*Alvania*." She kindly turned them over to me for description.

For some time I have realized that the group of small West Coast shells assigned to *Alvania* is not congeneric with the true representatives of that genus from the Mediterranean region. The status of the genus *Alvania* is as follows: In April, 1884, Buequoy, Dautzenberg, and Dollfus<sup>2</sup> designated *Alvania cimex* (Linnaeus) (= *Turbo cimex* Linnaeus) as the genotype of *Alvania* Risso (1826). Although they and other authors regarded *A. cimex* as conspecific with *A. freminvillea* Risso, *A. europaea* Risso, and *A. mammillata* Risso, the Linnaean species did not appear in Risso's original list.<sup>3</sup> It is therefore not eligible for designation as the genotype, according to the International Rules of Zoological Nomenclature. In order to remedy this situation I hereby designate *Alvania freminvillea* Risso<sup>4</sup> (= *Turbo cimex* Linnaeus) as the genotype of *Alvania*. This will not affect the practical usage of

<sup>1</sup> Nautilus: vol. 50, no. 2 (Oct., 1936), pp. 46-50.

<sup>2</sup> Les Mollusques Marins du Roussillon: fasc. 7, p. 282. 1884.

<sup>3</sup> Hist. Nat. Eur. Mérid.: Tome IV, pp. 140-147. 1826.

<sup>4</sup> Ibid: p. 141, pl. IV, fig. 118.

*A. cimex* as the genotype but it will clearly define the status of the genus *Alvania* in accordance with the International Rules of Zoological Nomenclature.

Recently Thiele<sup>5</sup> cited *Alvania montagui* (Payraudeau) (= *Rissoa montagui* Payraudeau) as typical of the genus, evidently believing that earlier than April, 1884, Monterosato<sup>6</sup> had designated this species as the genotype. Monterosato made no such designation but merely listed *A. montagui* first among various species of *Alvania*. Moreover, *A. montagui* did not appear in Risso's original list and is thus not eligible for designation, although it is thought by some authors to be possibly conspecific with *A. sardea* Risso. However, both *A. cimex* and *A. montagui* are members of *Alvania* s. str.

The true *Alvanias* of the Mediterranean region differ from our West Coast forms in the following particulars:

(1) They have thick, heavy shells about 5 mm. in height while the latter have rather delicate shells generally less than 3 mm. in height.

(2) They possess five postnuclear whorls while our West Coast forms generally average three.

(3) The outer lip of the former is greatly thickened by a prominent buttress-like varix and its interior bears prominent denticles, while the West Coast forms have a thin to slightly thickened outer lip with the interior generally smooth but occasionally with shallow spiral lirations.

(4) The sculpture of the shells of true *Alvania* is also coarser and heavier than that of the West Coast species.

As already pointed out by Dr. Paul Bartsch<sup>7</sup> our West American "*Alvanias*" will have to be reassigned to some of the dozen or more allied genera and subgenera of this group which have been described principally from southern Europe. Lacking sufficient comparative genotype material I have not been able fully to accomplish this task, so a final solution must await a later paper. However, it appears that no subgenus has yet been erected which would satisfactorily include the species about to be described and its close West American relatives. This group is characterized by

<sup>5</sup> Handb. der Systemat. Weichtierkunde: pt. 1, p. 163. 1929.

<sup>6</sup> Conch. litt. Medit.: p. 19. 1884.

<sup>7</sup> Proc. U. S. Nat. Museum: vol. 52, no. 2193 (May 29, 1917), p. 678.

a spirally lirate nucleus. As far as could be determined, all subgenera into which our West Coast "Alvanias" could be placed are supposed to possess smooth mammillate nuclei. Thus I take the liberty of describing the following subgenus as new:

WILLETTIA, new subgenus

Subgenotype: *Alvania montereyensis* Bartsch, 1911.

This subgenus is characterized principally by a turbinate, well-rounded nucleus of approximately two whorls which is sculptured by spiral lirations. The shell is not thick and generally less than 3 mm. in height. The post-nuclear whorls are generally three in number and somewhat inflated or well rounded. The shell is sculptured by spiral cords on the whorls and base and axial ribs on the whorls. The intersection of the ribs and cords form nodes. The aperture is rissoid with the outer lip thin to slightly thickened and smooth within. The peritreme is complete.

To this subgenus may be assigned *A. montereyensis* Bartsch, *A. sanjuanensis* Bartsch, *A. keenae* Gordon, *A. aquisculpta* Keep, *A. cosmia* Bartsch, *A. kyskaënsis* Bartsch, *A. halia* Bartsch, and *A. nemo* Bartsch.

This subgenus is named in honor of the well known authority on West Coast shells, Mr. George Willett, Curator of the Department of Ornithology and Conchology at the Los Angeles Museum, Los Angeles, California.

"ALVANIA" (WILLETTIA) KEENAE, new species. Pl. 7. Figs. 7, 9 (left).

Shell small, elongate-ovate, yellowish-white. Nuclear whorls one and one-half, turbinate, with axis parallel to that of the post-nuclear turns; first nuclear half-turn smooth (eroded?); last turn sculptured by approximately ten rounded, hardly elevated, somewhat beaded spiral lirae, separated by very narrow spiral grooves. Post-nuclear whorls well-rounded, almost inflated, marked by narrow, rounded, elevated, slightly protractive axial ribs, about one-third to one-fourth as wide as the spaces that separate them. Of these, 18 occur on the first, 22 on the second, and 25 on the third (last) turn. The axial ribs are crossed by prominent, elevated, well-rounded spiral cords which are stronger than the axial ribs; separated by slightly wider, broadly-rounded spiral grooves. There are five spiral cords on the first two whorls and six on the last, the extra cord being added below the periphery by the coiling of the shell. The two posterior cords are narrower and more

closely spaced than the rest which are subequal in strength and spacing. This results in a slight angulation at the third cord in the second whorl, but not in the last whorl where the second cord becomes slightly stronger. The axial ribs are strongest where they cross the spiral cords, forming prominent elliptical nodes with the long axis parallel to the spiral cords. The axial ribs are not well developed on the last half-turn. The sutures are rather strongly constricted.

Periphery well-rounded, marked by a sulcus not quite as wide as that separating the heavier cords on the spire. Base rounded, narrowly umbilicated, with a slight angulation marking the boundary of the umbilical area. The base is sculptured by six (not counting the first sub-peripheral cord which is exposed on the last whorl) low, rounded, closely-spaced spiral cords, much weaker than those on the spire; the last one occupying the umbilical area. The base is also marked by faint lines and constrictions of growth. Aperture oval; posterior angle obtuse; outer lip very slightly thickened, well-rounded; inner lip rounded, slightly reflected and appressed to the base posteriorly; parietal wall covered with a moderately thick callus which renders the peritreme complete. The type possesses three and one-quarter whorls and measures: length, 1.9; diameter, 1.0 mm.

Holotype: No. 6516 (Stanford Univ. type coll.) from beach drift among boulders, Moss Beach, San Mateo County, California, collected by Dr. A. Myra Keen, October 23, 1938. A paratype figured in this paper, with two and one-quarter whorls and a height of 1.4 mm. and which shows more clearly the sculpture of the nuclear whorls, was collected with the type and is: No. 7229 (Calif. Acad. Sci. type coll.).

*Alvania keenae* appears to be most closely related to *A. montereyensis* Bartsch which possesses eight spiral threads on the nuclear whorls and has similar sculpture. The new species, however, differs from *A. montereyensis* in having more spiral cords on all the whorls, less axial ribs in the early whorls, and weaker spiral cords on the base, besides a more robust shape.

This species is named for the collector of the types, Dr. A. Myra Keen, Curator of the Paleontological collections, Stanford University, California.

#### REFERENCES

- BARTSCH, PAUL. 1911. The recent and fossil mollusks of the genus *Alvania* from the west coast of America: Proc. U. S. Nat. Museum, vol. 41, no. 1863, pp. 333-362, pls. 29-32.

- BARTSCH, PAUL. 1917. Descriptions of new west American marine mollusks and notes on previously described forms: Proc. U. S. Nat. Museum, vol. 52, no. 2193, pp. 677-679.
- BARTSCH, PAUL. 1927. New west American marine mollusks: Proc. U. S. Nat. Museum, vol. 70, no. 2660, pp. 29-31.
- BUCQUOY, E., DAUTZENBERG, PH., and DOLLFUS, G. 1884. Les mollusques marins du Roussillon: fasc. 7 (April, 1884), pp. 259-298, pls. 31-35.
- COSSMANN, M. 1921. Essais de Paléoconchologie Comparée: vol. 12, pp. 3-32.
- MONTEROSATO, A. 1884. Conch. litt. Medit., p. 19.
- RISSE, A. 1826. Hist. Nat. de L'Europe Méridionale: Tome IV, pp. 140-147.
- SUTER, HENRY. 1913. Manual of the New Zealand Mollusca: pp. 198-227.
- THIELE, JOHANNES. 1929. Handbuch der Systematischen Weichtierkunde: pt. 1, pp. 162-163.
- TRYON, G. W., JR. 1887. Manual of Conchology: vol. 9, pp. 314-437.
- VOKES, H. E. 1936. The gastropod fauna of the intertidal zone at Moss Beach, San Mateo County, California: NAUTILUS, vol. 50, no. 2 (Oct., 1936), pp. 46-50.

---

### NOTES AND NEWS

EXACT DATES OF THE NAUTILUS.—Volume 52 (1): pp. 1-36, pls. 1-2, was mailed July 22, 1938; (2): 37-72, pls. 3-4 + 2 portraits, Oct. 28, 1938 [N. B. error (51) in volume on outside and p. 37.]; (3): 73-108, pls. 5-7, Jan. 23, 1939; (4): 109-144 (+ viii), pls. 8-9, April 26, 1939.—H. B. B.

THE TYPE OF SECTION EUCHEMOTREMA ARCHER.—In THE NAUTILUS, 1939, Vol. 52, p. 98 a new section *Euchemotrema* was described for the genus *Stenotrema*. I neglected to assign a type species for this section, and I hereby designate *Stenotrema monodon* (Rackett) as its type.

The figure of *Stenotrema fraternum montanum* Archer was inadvertently omitted from the same paper, and is now represented on Plate 7, Fig. 9.—A. F. ARCHER.

MICRELENCHUS *versus* GIBBIUM.—In resurrecting the name *Gibbium* Gray, 1843 (see the Proceedings of the Biological Society of Washington, vol. 50, 1937, p. 115), I overlooked the fact that this

name was preoccupied by a well known genus of ptinid beetles, *Gibbium* Scopoli 1777.

The name *Micrelenchus* Finlay, 1926, is therefore the valid name for this group, typified by the species *Trochus sanguineus* Gray.—  
H. A. REHDER.

EXTENSION OF RANGE OF *Tethys californicus* COOPER IN CALIFORNIA.—The northern limit of the range of this species is usually given as the northern part of Monterey Bay. Therefore the recent collecting of two individuals at Bodega Bay, about 100 miles to the northward is noteworthy. The specimens were found in three feet of water just inside of the bay on February 2, 1939 and were presented to the California Academy of Sciences by Mr. H. B. Nidever of the California State Division of Fish and Game.—  
G. D. HANNA.

SAY'S CONCHIOLOGY.—Continuing the series of notes which have appeared in late issues of THE NAUTILUS regarding this work, three additional copies are now recorded. These belong to the library of the California Academy of Sciences.

1. This copy is trimmed and bound in paper board; it was secured many years ago, along with the remainder of the library of Gustav Hambach, the paleontologist of St. Louis, Missouri. It once went through the hands of Friedlander u. Sohn, Berlin, but the remainder of its history is not known. A previous possessor's signature has been clipped from title page and covers. Parts 6, 7 and the glossary are missing but otherwise it seems complete. Fifty plates are present and the covers, both front and back, are bound at the end.

2. This copy was presented by Dr. Barton Warren Evermann, March 26, 1921 and is beautifully preserved. There is nothing to indicate its previous history. It is bound in gray paper board, uncut, and very few of the pages are brown stained. All seven parts, complete with 68 plates, are present but the glossary is lacking. Plates and covers, front and back, are bound at the end of the volume.

3. This copy was presented to the Academy by Dr. Hans Schlesch, April 29, 1937, and is complete with glossary and all seven parts. Plates and all covers are bound in their respective

places throughout the volume, thus aiding materially in collation. The name on plate 53 is "*Unio quadrulus* Raf." Only the top of the book has been trimmed. The binding is old half morocco. Dr. Schlesch advised (Nov. 29, 1937) that it formerly belonged to Henry Krebs, the Danish collector, and author of a catalog of West Indian marine shells. It went from him to Dr. C. M. Poulsen, after whose death it passed into the possession of the dealer, Herman Lynge and from whom it was purchased for 30 Danish Crowns.

So far as can be learned from Dr. Wheeler's articles and other notes in late numbers of THE NAUTILUS, these three copies make 29 now known to be in existence. The Krebs-Schlesch copy ranks with the Tomlin copy as being complete and maintaining the original order if the glossary be considered a part of the work. Information regarding such copies as that of Dr. J. H. Beal is not sufficient so that the reader may completely evaluate it.—G. D. HANNA.

---

### PUBLICATIONS RECEIVED

A PRELIMINARY ACCOUNT OF THE UNIONIDAE OF ONTARIO.—By A. La Rocque and J. Oughton. Canadian Jour. Research, Sec. D. Vol. 15, Aug., 1937. A resume of the Unionid fauna of this province is given in tabular form with a comparison (numerical) of the several drainage basins with critical notes on all doubtful species. 40 species and 14 varieties are noted. An important bibliography is given for Canadian references.—W. J. CLENCH.

PHYSIOLOGY OF REPRODUCTION OF *OSTREA VIRGINICA*. I. SPAWNING REACTIONS OF THE FEMALE AND MALE. By Paul S. Galtsoff. Biol. Bull. Woods Hole 75: 461-486, 14 figs., 1938. Spawning of the female consists in the discharge of eggs from the ovary, in rhythmic contractions of the adductor and in contraction and change in the position of the mantle borders. Eggs discharged into the suprabranchial chamber are forced, by an increased pressure there at the time of the widest gaping of the shell, to penetrate through the gills into the pallial cavity, and are expelled by vigorous movements of the valves. Male ejaculation is not accompanied by such rhythmic contractions of the adductor and the sperm are simply carried away by the cloacal current.—H. B. B.

THE REPRODUCTIVE SYSTEM AND SPERMATOGENESIS OF LIMACINA (SPIRATELLA) RETROVERSA (FLEM.). By Sidney C. T. Hsiao. Biol. Bull. 76: 7-25, 7 figs., 1939. This species seems not to show atypical spermatogenesis. No cytological connection has been observed between the "nurse-cells" and the germ cells. Its genitalia agree very closely with those described by Meisenheimer (1905).—H. B. B.

THE HISTORY OF A POPULATION OF LIMACINA RETROVERSA DURING ITS DRIFT ACROSS THE GULF OF MAINE. By Alfred C. Redfield. Biol. Bull. 76: 26-47, 10 figs., 1939. A population of small specimens of this pteropod appears in the eastern part of the Gulf in December, 1933. Collections made during the following 9 months showed that the population was homogeneous, that its members grew to maximum size in 5 months and the numbers decreased as they did so. In addition to the information on the life history, the data indicate the rate of drift of the water in its circuit of the Gulf, supply suggestive information on the dispersal of organisms through the lateral mixing of water and emphasize the dependence of pelagic organisms upon the current systems of the ocean and the difficulty in maintaining a permanent population in any one locality.—H. B. B.

PROSOBRANCHIA ET OPISTHOBRANCHIA. Par W. Adam et E. Leloup. Résult. Scient. Voy. Indes Orient. Néerlandaises, etc., vol. 2, fasc. 19 (Mus. Roy. Hist. Nat. Belgique): 1-209, 8 pls., 38 figs., 1938. Synonymies, localities and dimensions of the specimens obtained are given. Excellent radular figures are included for *Diodora*, *Cellana*, *Acmaca*, *Trochus*, *Turbo*, *Nerita*, *Thecodoxus*, *Neritina*, *Septaria*, *Leptopoma*, *Viviparus*, *Littorina*, *Tectarius*, *Brotia*, *Sulcospira*, *Melania*, *Terebralia*, *Monetaria*, *Drupa* and *Jopas*. Photographs of the shells of many species are beautifully reproduced.—H. B. B.

#### AMERICAN MALACOLOGICAL UNION

The Toronto Meeting, held at the Royal Ontario Museum of Zoology June 20-23, was one of the best we have had, with large attendance and many interesting papers and addresses. The hospitality and arrangements of the local Committee were perfect at every point. A further report will follow.

# THE NAUTILUS

---

Vol. 53

October, 1939

No. 2

---

## COLLECTING ON A CORAL REEF IN FLORIDA

BY THOMAS L. MCGINTY

For some time we had talked of a combined shell collecting and diving trip to the great coral reef which lies just off the Florida Keys and on the edge of the Gulf Stream. After considerable study of the nautical charts a mere speck of land about eight miles southeast of Key West and some five miles from the nearest land was chosen as a base for our operations. A local boatman agreed to maroon us upon our chosen desert island for four days, after which time, weather permitting, he would return to carry us back to the mainland.

On June 19th we reached our destination, Middle Sambo Shoal, and were surprised to find it even smaller than we had expected. Our row-boat, collecting equipment, diving gear and camp supplies were carried ashore, the boatman waved a farewell salute and departed, and we began life as three Robinson Crusoes.

When camp was established there remained only a few feet between our tent and the nearby Atlantic and because of the numerous turtle "erawls" everywhere in evidence it was decided to provide some form of barricade to discourage, if possible, the big fellows from flattening the tent to the annoyance of those within. Even as we worked, a huge loggerhead laboriously came up out of the sea to inspect the island for later use.

In the afternoon, at low tide, much of the reef was exposed and our domain had more than doubled in size. Here were ideal collecting conditions with loose rocks and corals of all sizes which had been broken off the main reef by previous hurricanes. The water was marvelously clear, so with diving goggles we enjoyed a sort of pre-view of the breath-taking beauty which the wonders

of the reef afford. Later with the diving-helmet we were free to move about on the ocean floor and allowed to enjoy in perfect comfort the indescribable beauty of the underwater world.

The largest and finest of the Florida star shells, *Astraea caelata*, was abundant in crevices and under rocks in all the varied stages of growth. Also present were *Mitra barbadensis* and the fast moving *Pisania pusio*; a species of *Epitonium* lived buried in the sand among the rocks and *Cassis testiculus* was found in its favorite station under the larger stones. *Cypraea spurca* and an occasional *Cypraea cinerea* with lovely mantles extended were hidden and waiting to resume their nocturnal habits. The pretty little *Engina turbinella* had found a home to its liking under rocks in shallow water and lived in neighborly fashion with *Arca*, *Cantharus*, *Littorina*, *Planaxis* and *Modulus*. It was a real thrill to turn over a stone and find whole colonies of *Nitidella nitidula*, *Pyrene mercatoria* and *Tegula semigranosa*. Various limpets were left exposed clinging to the rocks, *Aemaca* and *Fissurella*. Occasionally under stones could be had *Lucapina*, *Submarginula* and the pretty little *Diadora minuta*. Large *Conus mus* and that beauty, *Conus nebulosus*, were hidden beneath loose coral. The red colored animal of *Conus nebulosus* was rather shy but often a patient observer could see the action of the poison barb. This single edged barb is really a very highly developed tooth of the radula and there seems to be little doubt that its function is to assist the slow moving carnivorous animal in procuring food rather than for protection from its enemies. Care should be taken in the handling of members of this genus until it can be determined whether the Conidae of Florida are dangerous to man.

Just to the east of our island, where the bottom was grassy, we walked on the ocean floor in the diving-helmet. Conditions here were perfect for the large *Strombus gigas*, judging by their abundance. Occasional *Cassis madagascarensis* and *Cassis tuberosa* were observed fully extended and searching for prey. *Triton nobilis*, one of the most attractive of the larger West Indian molluscs, concealed itself under large hollow corals.

Exploring the outer reef through the medium of the diving gear was a constant source of joy and thrills, for here was all the amazing beauty of a coral reef in a tropic sea. Gorgeous colored

fish of varied size and shape, graceful waving sea-fans, together with an astonishing abundance of many other forms of sea life, made a picture so dazzling in color that once seen it could never be forgotten. Several species of gorgonians were observed and clinging to some was a living cargo, the pretty leopard-spotted *Cyphoma gibbosa*. *Spondylus* and *Chama* were so well camouflaged that a movement of the valves or a glimpse of exposed mantle was needed to distinguish them from their surroundings of multi-hued marine growth. Rarely among the living coral could be seen *Coralliophila abbreviata* or the graceful *Calliostoma jujubinum*.

There were thrills too, for the great barracuda found the coral reef with its abundant food supply to his liking. On one occasion while below, the writer decided to shift the anchor and tow the boat above to unexplored territory. After completing the task a glance towards the surface disclosed an alarming sight. Intently watching and quite motionless were no less than ten huge barracuda, so close that the round spots on their horizontal bodies were clearly visible. It was a *long* trek back to the descending line with spinal shivers all the way, and needless to say diving was discontinued for the day.

The story of the island could hardly be complete without mentioning the hermit crabs. Great legions of them, in all manner of shells, at times came out of the sea. They became bedfellows at night and one even sampled a collecting hat in its search for food. We expressed our thanks only to those in fine homes which now have a place in the collection.

This more or less continuous reef off the Florida Keys presents to the collector almost unlimited possibilities. It is a field which has been touched in but few places. Much of the area can only be worked with the aid of diving gear but there are places favorable for shallow water work. Here, given time and luck, one may well hope to make new discoveries or at least to add some bit to the knowledge of the undersea life at the edge of the Gulf Stream.

The writer is tremendously indebted to the other members of our party, Mr. Orrin Randolph, an experienced diver who furnished the diving equipment, and Mr. Burner Haag. Without their companionship and helpfulness this trip would not have been possible.

**CONUS MELVILLI SOWERBY, AND A NEW  
SPECIES OF THE LAMELLARIIDAE**

BY LOUISE M. PERRY

In the spring of 1938 a small living *Conus* was dredged at six fathoms depth in the Gulf of Mexico about three miles off Little Carlos Pass, Lee County, Florida.

The small cone did not fall into the category of any one of the species established in this locality. Reference to the collections in the National Museum, the Philadelphia Academy of Natural Sciences and the Museum of Comparative Zoology at Cambridge, revealed nothing with which it could be associated. Search of the literature and comparison of the new specimen with the description and illustration of *Conus melvilli* in the *Conchologia Iconica*, determined its identity as a juvenile shell of this species. It is believed to be the second, and only living individual of this species to be recorded, and is illustrated in Plate 8, fig. 1.

Sowerby's description of his cone quoted from the *Conchologia Iconica*, will serve equally well for the new specimen, save in point of size, as for the shell upon which the species is founded.

“*CONUS MELVILLI*, n. sp. (Received July 18, 1878.) *C. testa abbreviato-subcylindracea, solida, obtuse angulata, laevi, antice crenulato-sulcata, griseo-albida, cinnamomeo-fusco longitudinaliter strigata, lineis fuseis undulatis transverse eincta; interstitiis lineis curvatis longitudinalibus hic illic irregulariter divisis; spira obtusa, fusco strigata; anfractibus 7, convexis, laevibus; apertura modica, fauce castanea. Long. 20, maj. lat. 11 mill.*

“Habitat: Key West (J. Cosmo Melvill).

“A small obtuse cone, with characteristic markings, somewhat resembling those of *C. lucidus* (Mawe), on a smaller scale; the transverse brown lines are more numerous, and the short longitudinal ones crossing the interstices less so. The light brown streaks almost cover the shell, leaving small white patches between the transverse lines.

“The shell described was picked up on the beach by Mr. Melvill at Key West (south of Florida) in 1872, and is at present the only specimen known of the species.”

The new specimen has a longitude of 13 mm.; maximum width 6.5 mm.; length of body whorl 10 mm. The apex is obtuse,

the spire is sloping and consists of four whorls below the apex; the shoulder is rounded and the body whorl tapers to a width of 2 mm. at the base. The sutures are slightly canalliculate. The aperture is narrowest above and regularly increases in width to the base of the shell; the outer lip is thin and sharp. The ground color of the shell is bluish-white, the revolving chestnut colored striations are closely placed, very faint near the shoulder, becoming stronger over the expanded portion of the body whorl and developing into elevated threads over the narrowed basal portion. Light brown irregular markings are arranged in indefinite longitudinal bands, with the color much deeper about the sutures and near the base. Well within the aperture the interior of the shell is seen to be chestnut colored. The periostracum is pale brown, thin and papery. The operculum is typical of the genus.

*MARSENINA GLOBOSA*, new species. Pl. 8, fig. 2.

Shell thin, translucent, milky-white, with a shining, diaphanous periostracum. Apex minute, apical whorl very small and thin; two small whorls, the second rapidly enlarging into body whorl which comprises about four-fifths of the total altitude of the shell. The whorls are rounded, inflated and oblique; sutures deeply impressed; sculpture consists of fine incremental lines. The aperture is obliquely expanded downward to the right; the outer lip is thin, sharp and very fragile; the columella is incurved and deeply concave at the center. The interior of the shell is smooth, shining and iridescent and the sutural impressions and cavity of the spire are visible when the shell is viewed from the base.

Height from base of columella 14 mm.; height from base of expanded lip 15.5 mm.; width at posterior angle of aperture 9.75 mm.; greatest width of shell 14 mm.; diameter—greatest thickness of shell—9.25 mm.

The animal is oval and rounded, the tissues firm; the extreme anteroposterior measurement is 18 mm., extreme height 9 mm. The mantle is dull white with abundant opaque maculations; it is reflected over the shell, leaving exposed a circular area of about 4 mm. diameter. The snout is short and very mobile, the tentacles rounded and tapering, black eyes at outer side of base of tentacles. The foot is triangular, lengthened, with bluntly rounded angles.

The specimen upon which this species is based was taken by Jeanne S. Schwengel in Pine Island Sound, Lee County, Florida, in April, 1939.

ASHEVILLE, N. C.

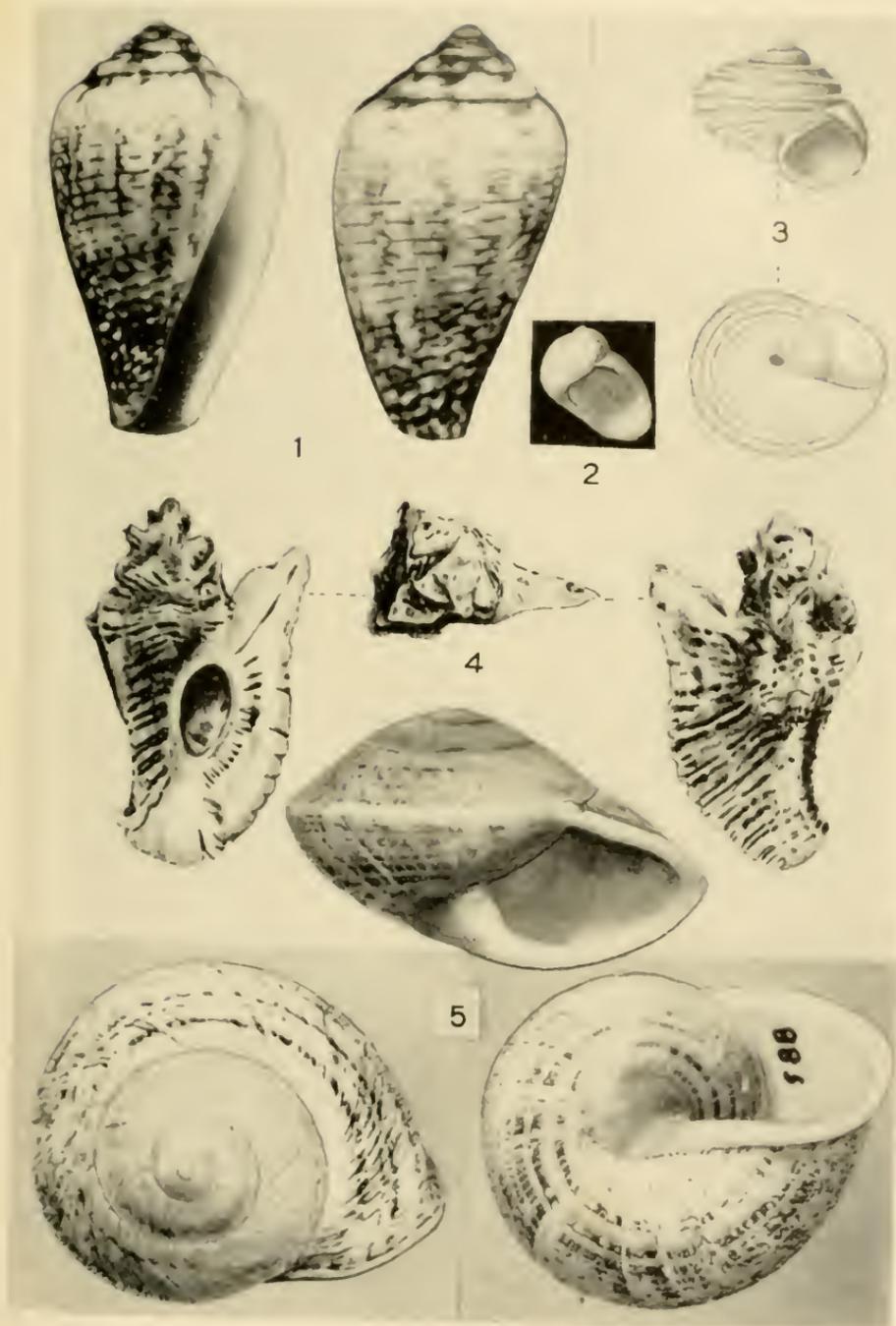
---

### *POLYDONTES OBLITERATUS* (FÉRUSSAC)

BY H. A. PILSBRY

This handsome snail is still rare in collections, though it was defined in 1821 by Férussac's figures of specimens collected by Maugé. These specimens were probably in poor condition; the dark ground color as apparently "restored" by the artist is quite incorrect. The locality was given as Porto Rico. This erroneous habitat was repeated from one author to another up to 1901 (in Dall and Simpson's *Mollusca of Porto Rico*). However, Bland as early as 1876 gave notes on a dead specimen, white with no trace of brown bands, picked up in 1875 by Mr. V. P. Parkhurst in the immediate northern vicinity of Port au Prince, Haiti (*Ann. Lye. N. H. of N. Y.*, 11: 148), and more recently (1887) H. Rolle found it at Jérémie, according to Crosse (*Journ. de Conch.* 1891, p. 51).

The fine specimen now illustrated (Pl. 8, fig. 5) was taken by Dr. S. H. Williams, Professor of Zoology, University of Pittsburgh, on Nouvelle Terrain, at an elevation of 8000 feet, and was transmitted to me by Mr. C. B. Wurtz, one of his students. It measures, height 32, diam. 54 mm., with  $4\frac{1}{2}$  whorls. The first  $3\frac{1}{2}$  whorls are whitish gray, without markings. On the last whorl the very thin periostracum has a faintly buff tint, and is banded with cinnamon brown or somewhat lighter, the bands narrow and interrupted, three on the upper surface, about eight on the base. The embryonic shell, of nearly  $1\frac{1}{2}$  whorls, shows faint growth wrinkles and a fine, weak granulation. This granulation becomes stronger on subsequent whorls, but only weakly reaches to the last whorl, which has irregular retractive wrinkles but no granulation above except in places near the peripheral angle, above which there is a band of short but emphatic wrinkles. The base is granulate throughout. The columella has a low, convex lobe.



1, *Conus micrilli*. 2, *Marsuccina globosa*. 3, *Cyclostrema santhelense*.  
 4, *Typhis lowei*, banded variety. 5, *Polydonte obliteratus*.



By the absence of granulation on the upper surface of the last whorl, this specimen differs from those previously described.

The jaw, mounted by Mr. Wurtz, has strong, narrow ribs. Central and lateral teeth have mesocones only.

---

## TWO NEW SPECIES OF *SAYELLA* WITH NOTES ON THE GENUS

BY J. P. E. MORRISON<sup>1</sup>

The shells called *Sayella* have proved on examination of living material recently collected from the Chesapeake Bay Area to belong to the Pyramidellidae. Their previous incorrect placement in the Ellobiidae<sup>2,3</sup> was occasioned by lack of knowledge of the animal characters. The New England species were included in *Pyramidella* (*Syrnola*) by Dr. Bartsch in 1909,<sup>4</sup> but the less-known southern forms were not until recently suspected as being closely related.

*Sayella* includes species that range from Mass. Bay to Texas and the West Indies; that have an elongate-conic-ovate, microscopically spirally striate shell, and that live in or on the mud or on plants on mud flats, in shallow water a little below low tide line (0-2 fms.). These shells are proportionately shorter than those of *Syrnola*, which possess a much larger number of more completely flat-sided whorls, and whose habitat is in much deeper waters (16 to 440 fms. recorded).

The animal of *Sayella* is proportionately large, the extended foot in the Chesapeake Bay form being longer than the shell. The foot is abruptly truncate before, rounded behind, and about two-thirds as wide as the greater diameter of the shell. The snout is similarly abruptly truncate, about twice as long as its width, which is about one-third that of the extended foot. The flattened triangular tentacles, directed laterally and upward from the head, are a little longer than wide, but are not quite equal in length to the width of the snout. The head behind the tentacles is cylin-

---

<sup>1</sup> Published by permission of the Secretary of the Smithsonian Institution.

<sup>2</sup> Dall, Proc. U. S. N. M., 1885, p. 286.

<sup>3</sup> Johnson, Atlantic Coast List, Proc. Bost. Soc. Nat. Hist., 40, p. 159, 1934.

<sup>4</sup> Bartsch, Proc. Bost. Soc. Nat. Hist., 34, p. 72, 1909.

drical, equal in diameter to the snout. The eye spots are imbedded in the head a little behind the base of the tentacles. As in other Pyramidellidae there is no radula, but only a tubular proboscis, capable of eversion to twice the length of the snout. In color, the animal varies from whitish to a pale leaden gray, the greatest amount of pigment being developed on the snout.

The genus *Sayella* includes the following forms:

*S. fusca* (C. B. Adams) 1839.<sup>5</sup> P. E. I. to Long Id. Sd. (Fla.?).

*S. producta* (C. B. Adams) 1840. Mass. to N. J.

*S. winkleyi* (Bartsch) 1909. Mass. to Conn.

*S. crosseana* Dall 1885.<sup>3</sup> Fla. (W. Indies?).

*S. hemphilli* (Dall) 1883. Fla. (Genotype).

*S. livida* Rehder 1934. Texas.

*SAYELLA CHESAPEAKEA*, new species.

Shell: small, elongate-conic-ovate, with five whorls closely appressed to a shallow suture; whorls widest below the middle, microscopically spirally striate throughout; aperture acutely angled above, widely rounded below to the abruptly truncate columella, at the beginning of the single spiral columellar lamella. The parietal callus extends almost beyond the spiral lamella, leaving only a very minute umbilical pore. The apex is eroded in all specimens seen.

Operculum: thin, corneous, paucispiral.

Animal: see generic description.

The type (U.S.N.M. No. 530766) was collected on a mud flat on the east side of Broome's Island, Maryland, in the lower Patuxent River, has five whorls remaining and measures: Height, 3.85 mm.; diameter, 1.4 mm.; aperture height, 1.25 mm.; aperture diameter, 0.9 mm.

This form is roughly intermediate in size between *fusca* (C. B. Ads.) and *hemphilli* (Dall). It is regularly one-third smaller than *fusca* of the same number of whorls; the upper edge of the whorl is more closely appressed to the preceding whorl, with a distinct but much shallower suture between the flatter-sided whorls.

Every specimen seen was more or less eroded at the tip, from the action of the decay acids of the mud bottom in or on which

<sup>5</sup> Johnson, Atlantic Coast List, p. 86.

they live. They were recovered in numbers (hundreds) by screening the mud from the bottom in about two feet of water at low tide, or by scraping the hand screen through the isolated clumps of Eelgrass. They have been seen also from the lower Potomac River at Colonial Beach, Virginia, and Cobb Island, Maryland, and from the Little Choptank River, near Cambridge, Maryland (Jackson). In both the Patuxent and the Little Choptank Rivers, they were taken in company with *Paludestrina (Ecrobia) truncata* Vanatta.

*SAYELLA WATLINGSI*, new species.

Shell: small, elongate-ovate, pellucid; whorls six, regularly arched from suture to suture, slowly increasing, obsoletely microscopically spirally striate; apex obtuse, nucleus (1 whorl) diagonally upturned. The aperture is a little oblique, obtusely angled above, effuse below, meeting the columellar lamella in a broadly rounded curve. The parietal callus barely reaches the lamella, leaving a minute but distinct spiral, tubular umbilicus.

Animal: not observed.

The type (U.S.N.M. No. 127488) was received from the U. S. Fish Commission, collected from the lagoon at Watling's Island (San Salvador) in the Bahamas, and measures: Height, 3.35 mm.; diameter, 1.2 mm.; aperture height, 1.1 mm.; aperture diameter, 0.7 mm. This species does not exhibit the extreme flattening of whorls seen in *crossicana* Dall; hence is of greater diameter, although nearly equal in height. Its shell appears thinner and more pellucid.

---

## AN UNUSUAL CAVE DEPOSIT

BY J. P. E. MORRISON<sup>1</sup>

Skyline Caverns, one mile south of Front Royal, Warren County, Virginia, were visited through the courtesy of Skyline Caverns, Inc., extended by Mr. Theodor Mussaens, on the third of July, 1938. The writer went to investigate the possibilities of a cave race of *Polygyra tridentata* (Say). One peculiar specimen of this land snail was collected from the cave, near its mouth,

<sup>1</sup> Published by permission of the Secretary of the Smithsonian Institution.

by a student of Dr. John W. Bailey of the University of Richmond, on a previous exploration trip. No additional specimens were found, so this peculiarity must remain in the category of chance or individual variation, occurring when the snail lives in the deeper rock crevices, yet near the ground surface.

In the course of visiting accessible parts of the caverns, the lowermost level, now being eroded by a small stream, was carefully examined. Nothing was seen living in the sandy and gravelly bed of the narrow stream, here cutting a winding passage deeper and deeper into the limestone. It was at the furthest upstream point reached by the writer that the unusual was found. The stream is about 12 to 18 inches wide, and at this date was ankle deep over sand bottom, where it emerges from a tunnel passing underneath some of the other cave chambers. This tortuous tunnel opens beneath a hood whose ceiling is about seven feet above the stream bed. The report of plant seeds seen by the previous exploration party drifted up onto the sides of the cave was fully confirmed. In addition, there were small white objects peppered over the walls and ceiling of this "hood," but most numerous in the crevices. These white objects proved to be snail shells, adhering to the reddish clay coating over the surface of the limestone rock. Apparently the water of a freshet of an earlier date that season had poured out of this tunnel faster than the channels leading out of the cave system could carry off the water. The water rising rapidly in this lowermost chamber had floated the drift shells upward, where, in the eddies, they adhered to the ceiling of the "hood," about five to seven feet above the ordinary water level of this normally tiny underground rill. That this sort of cave deposit is transitory (in this portion of the Shenandoah Valley) is indicated by the extreme fragility of all these drift shell specimens. Only a relatively short exposure to the action of these acid ground waters would dissolve them completely. *It was indeed most unusual to find Land Snail shells in stream drift deposited on the roof of a cave-chamber.*

Twenty-six species of Land Shells were recovered from the cave:

- Polygyra tridentata juxtidentis* (Pils.). L
- stenotrema* (Fér.).
- hirsuta* (Say).

- Haplotrema concavum* (Say). L  
*Gastrocopta armifera* (Say).  
     *contracta* (Say).  
     *pentodon* (Say). L  
*Vertigo gouldii* (Binney). L  
*Columella edentula* (Drap.).  
*Strobilops labyrinthica* (Say). L  
*Guppya sterkii* (Dall). L  
*Euconulus chersinus* (Say). L  
     *chersinus dentatus* Sterki.  
*Striatura meridionalis* (P. & F.). L  
*Hawaiiia minuscula* (Binney).  
*Retinella indentata* (Say). L  
     *rhoadsi* (Pils.).  
     *virginica* Morrison.  
*Ventridens suppressus* (Say).  
*Zonitoides arboreus* (Say).  
*Anguispira alternata* (Say).  
*Helicodiscus parallelus* (Say).  
     *singleyanus inermis* H. B. Baker.  
*Punctum vitreum* H. B. Baker. L  
*Carychium exile* H. C. Lea. L  
     *nannodes* Clapp.

Those species marked L were found *living*, on the same date, in the leafmold on the upper slopes of Dickey's Hill, just above one of the sink-hole entrances, through which this drift was washed into the Skyline Caverns. In addition to the Land Snail shells, one very small specimen of ?*Fontigens nickliniana* (Lea)? was recovered from this drift. Does this little Freshwater Snail live in caves as well as springs?

---

## LAND SNAILS NEW TO THE FAUNA OF PENNSYLVANIA

BY GORDON K. MACMILLAN  
Carnegie Museum

Collections made in some sections of Pennsylvania during the past two years have brought to light three land snails that have never before been recorded in this State. The credit for their discovery belongs to Charles Wurtz, a recent graduate from the University of Pittsburgh. These snails are :

*Polygyra fraterna cava* Pils. & Van., from Wintergreen Gorge, near Erie, Erie Co.

*Paravitrea capsella* (Gould), from Hillside, Westmoreland Co.

*Retinella carolinensis* (Ckll.), also from Hillside, Westmoreland Co.

*Polygyra fraterna cava* Pils. & Van. has been found in various localities from New Brunswick to Minnesota and south from Iowa to West Virginia. The state of Pennsylvania falls within this area, and the presence of this variety in this state is not surprising. It is, however, surprising that *Polygyra fraterna cava* has not been found in Pennsylvania before this time. More thorough collecting throughout this state may bring to light more specimens of this variety, and, perhaps, a revision of the species *fraterna* in the collections of some of our larger museums may reveal the existence of more specimens of this variety in Pennsylvania through misidentification.

Until last summer no specimens of *Paravitrea capsella* (Gld.) had ever been recorded from this state. The species is distributed throughout Alabama, Georgia, South Carolina, North Carolina, Tennessee, Kentucky, West Virginia, and Virginia. Its presence in western Pennsylvania should be expected, as that locality is within the same drainage system as the most northerly extent of *Paravitrea capsella* in West Virginia. Some of the northcentral counties in West Virginia are traversed by the same rivers and mountains that are found in the southwestern section of Pennsylvania. It was along the Monongahela River route and Chestnut Ridge that this species moved northward into that section of Pennsylvania in which it is now found. It is possible that this species followed the Monongahela River valley northward and then the Allegheny, turning southeastward along the Kiskiminetas and Conemaugh until it reached the Chestnut Ridge. Or perhaps it just migrated along the crest of the Chestnut Ridge, being an inhabitant of the entire ridge from West Virginia to the northeastern extent of Westmoreland County.

Along this same water and mountain route *Retinella carolinensis* (Ckll.) has entered the same section of Pennsylvania. This species has much the same distribution of *Paravitrea capsella*, but somewhat greater, being found also in Mississippi and Maryland.

With the last two species of snails there are two factors to be taken into consideration concerning their presence in that part of Pennsylvania. First, that the climatic conditions have been favorable for their existence in this part of the state, that their food has always been available, and that the river courses have made easy routes of distribution to make the northward migration desirable. Second, that this apparent northward migration might be a resettlement or repopulation of territory once occupied by these species before they were driven southward by the encroachment of the last glacier.

To have a complete knowledge of the molluscan fauna of Pennsylvania more thorough collecting must be made in some of the less accessible places in this state, especially those in the more mountainous sections of the central part.

---

## NEW MEXICAN SPECIES OF *SPIRAXIS*

BY H. BURRINGTON BAKER

This constitutes part 5 of a series on Mexican mollusks collected for Dr. Bryant Walker in 1926. The first paper appeared (1928) as Occasional Papers Mus. Zool. Univ. Michigan, no. 193, in which the symbols for localities are explained on pp. 2-25.

*SPIRAXIS* (*RECTAXIS*) *GRANUM*, new species.

Shell (pl. 9, f. 5) cylindrical-turrite, light corneous to whitish, glassy and transparent, with very low, flattened growth-threads. Whorls  $7\frac{3}{4}$ , flattened convex, with rather shallow, weakly crenulate suture. Apex large; embryonic whorls about 3, quite rapidly widening; first  $1\frac{1}{4}$  almost smooth; remainder gradually assuming rounded growth-threads, demarcated by incised lines with weak traces of spiral striae. Later whorls medium in length, very gradually increasing, with low, flattened growth-threads, which die out basally on last whorl and are more than  $\frac{1}{2}$  width of their interspaces, that show fine growth-striae but lack definite spirals; first neanic whorl with 37 threads; second with 40; third with 42 and last whorl with 45. Aperture oval-trapezoidal, with longest dimension about  $35^\circ$  to shell-axis; peristome simple, almost vertical and very little arcuate; columella almost straight, rounded and quite heavy, tapering more abruptly towards basal end. Alt. 2.97 mm., diam. 31 (0.93 mm.), alt. last whorl 39 (1.16 mm.);

aperture alt. 23 (0.69 mm.), diam. 67 (0.46 mm.). Another (station 54) measures: alt. 3.22, diam. 28 (0.89), alt. last whorl 39 (1.25); aperture alt. 23 (0.74), diam. 66 (0.49);  $7\frac{1}{8}$  whorls. Anatomy (to be figured) similar to that of *S. intermedius* but free oviduct (UV) relatively larger and prostate and ovotestis simpler. Radular formula: 12-1-(2+10); teeth more elongate.

Below Necaxa (D, III, a, 52), alt. 3120 ft.; common. *S. granum* is quite variable in shape and columella. It may be the same as *S. linearis* Pfeiffer, which probably was founded on a young or paedogenetoid shell, but the latter appears to have more closely spaced threads and longer, more oblique whorls.

SPIRAXIS (RECTAXIS) SUBTILIS, new species.

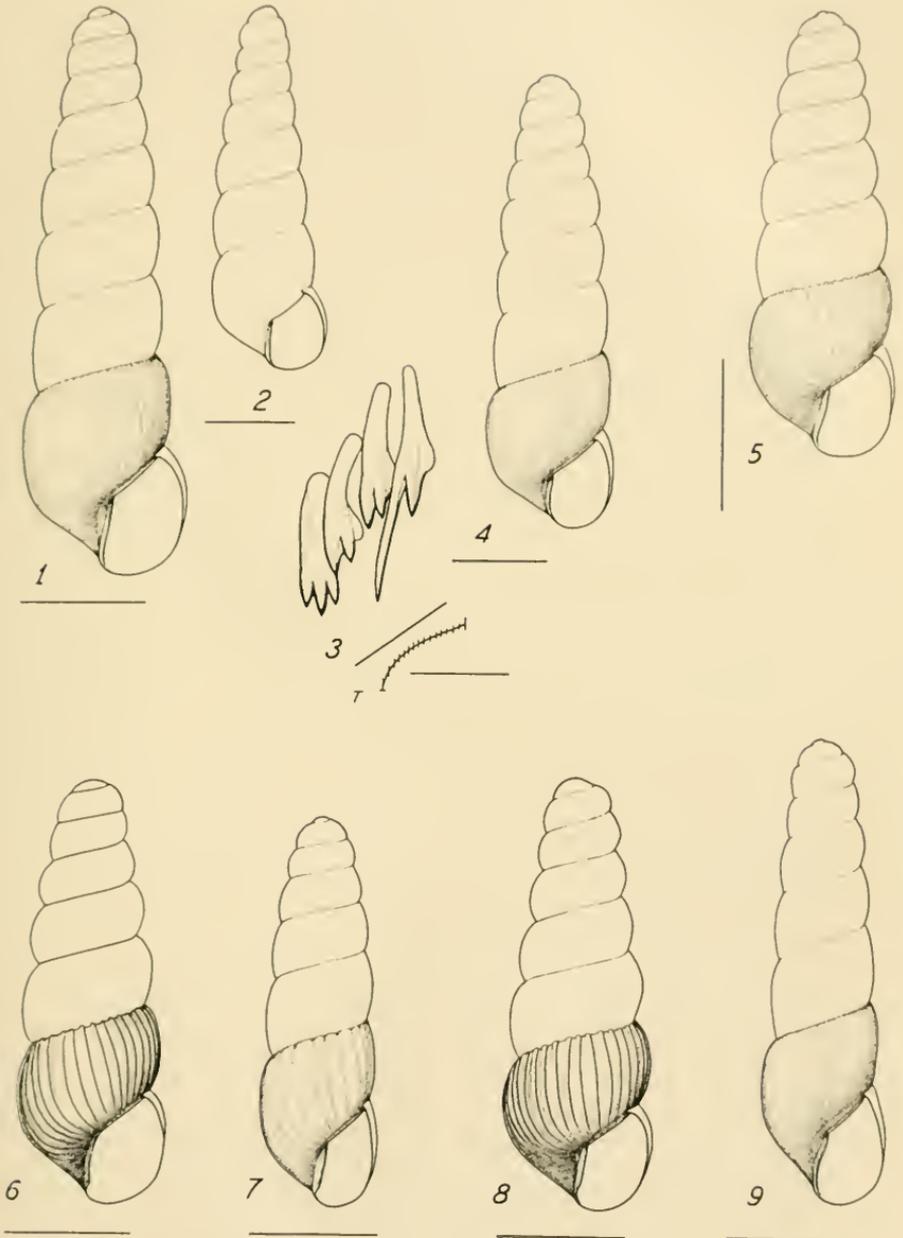
Shell (pl. 9, f. 1) subulate, light corneous, glassy and almost transparent, with numerous incised growth-lines. Whorls  $9\frac{1}{2}$ , flat-sided, with simple, rather shallow, overriding suture. Apex smaller than in *S. granum*; embryonic whorls  $2\frac{3}{4}$ , short, quite rapidly widening; first almost smooth; otherwise as in *S. granum*. Later whorls becoming longer and gradually widening, with sculpture of incised growth-lines and interspaces that slope outwards (rise) in direction of growth (*i.e.*, like the surface of a shingled roof) and, especially on the earlier whorls, may be thickened just before each impressed line so as to approach the condition in *S. granum*; first neanic whorl with about 47 lines; second with 38; third with 41; fourth with 48; fifth with 50 and last with 51. Aperture trapezoidal-ovate, with longest dimension about  $30^\circ$  to shell-axis; peristome simple, almost vertical and very little arcuate; columella narrow, slightly oblique and almost straight. Alt. 4.58, diam. 28 (1.29), alt. last whorl 36 (1.66); aperture alt. 21 (0.96), diam. 68 (0.65).

Las Tortolas, Córdoba (D, I, a, 4), 2625-3000 ft.; quite rare. *S. subtilis* is somewhat similar to, but has a smaller apex and longer, more rectilinear whorls than *S. rhabdus* Pilsbry.

S. (R.) SUBTILIS VITREUS, new subspecies.

Shell (pl. 9, f. 2) similar to *S. subtilis* but with shorter, more convex and more rapidly widening whorls. First neanic whorl with 42 growth-lines; second with 40; third with 43; fourth with 49 and fifth and last each with 50. Alt. 4.16, diam. 31 (1.28), alt. last whorl 37 (1.54); aperture alt. 21 (0.89), diam. 73 (0.65); almost 9 whorls.

Below Necaxa (D, I, a, 54), 2625 ft.; quite rare. This subspecies can scarcely be *S. confertestriatus* (S. & P.) since it has two



1, *Spiraxis subtilis*. 2, *S. subtilis vitreus*. 3,4, *Spiraxis subnitidus*. 5, *S. granum*. 6, *Spiraxis parvus* (NAUTILUS, 52: 134). 7, *S. futilis*. 8, *S. subgranum*. 9, *S. subopacas*.



more whorls although somewhat smaller and appears to have a very much straighter columella than the latter.

SPIRAXIS (RECTAXIS) SUBNITIDUS, new species.

Shell (pl. 9, f. 4) light corneous, similar in shape and size to *S. subtilis*, but with more closely spaced, weaker growth-striae, like *S. nitidus persulcatus*. Whorls 9, relatively shorter than in *S. subtilis*. Embryonic whorls  $2\frac{3}{4}$ , with 2 almost smooth. Later whorls with irregular growth-striae, even more numerous than in *S. n. persulcatus*; first with 67; second with 70; third with 73 and last with 74. Columella very slightly concave and evenly rounded (more spirally wound than in *S. subtilis*). Alt. 4.87, diam. 27 (1.30), alt. last whorl 35 (1.69); aperture alt. 20 (0.95), diam. 70 (0.67). Radular formula (f. 3): 15-1-(2+13).

Above Neaxa (B, II, a, 33), 5000 ft.; rare. This may be *S. nitidus minor* Martens (1898), which was founded on S. & P.'s form B, but is certainly not *S. acus minor* F. & C. (1877). As Strebel und Pfeffer suggested, this species somewhat resembles their *S. confertestriatus* (not seen by me), to which *S. delicatus* Pilsbry must be somewhat similar (although considerably smaller), but *S. subnitidus* apparently has much weaker striae and appears quite glossy to the unaided eye.

SPIRAXIS (VERSUTAXIS) SUBGRANUM, new species.

Shell (pl. 9, f. 8) cylindric-turrite, silvery white to whitish corneous, translucent, with well spaced, very low riblets. Whorls  $7\frac{1}{2}$ , quite convex although progressively less so, with well impressed, weakly eremulate suture. Apex relatively large; embryonic whorls  $2\frac{3}{4}$ , rapidly widening; first two almost smooth. Later whorls gradually increasing, with very low, flat-topped threads, which die out on base of last whorl and are about half as broad as their slightly concave, weakly striate interspaces; first neanic whorl with 44 threads; second with 42; third with 37; fourth with 38 and last with 34. Aperture trapezoid-reniform with greatest dimension almost  $30^\circ$  to shell-axis; peristome slightly thickened, almost vertical and little arcuate; columella somewhat thickened and weakly sigmoid. Alt. 3.44, diam. 33 (1.14), alt. last whorl 41 (1.40); aperture alt. 23 (0.80), diam. 71 (0.57).

Las Tortolas, Córdoba (A, I, a, 4), 3000 ft.; quite rare. *S. subgranum* has heavier threads and a smaller apex than *S. parvus* and its sculpture is more sharply cut than that of *S. granum*. It differs

from both species in its columella, which slightly approaches that of *Volutaxis*.

SPIRAXIS (VERSUTAXIS) SUBOPEAS, new species.

Shell (pl. 9, f. 9) cylindric-turrite, vitreous and almost transparent, with engraved growth-lines. Whorls  $8\frac{1}{8}$ , flat-sided with abruptly overriding suture. Apex relatively large; embryonic whorls  $2\frac{1}{8}$ , of which first two are smooth, gradually widening. Later whorls increasing in length, with narrow, sharply engraved growth-lines separated by finely striate interspaces which irregularly increase in width on penult whorls but decrease again on last; first neanic whorl with 44 major striae; second with 42; third to fifth with about 36 and last with 42. Aperture trapezoid-lanceolate, with greatest dimension  $20^\circ$  to shell-axis; parietal callus rather heavy and extensive; peristome almost vertical and moderately arcuate (more so than in *S. opeas*); columella fairly heavy and lightly twisted. Alt. 5.03, diam. 26 (1.31), alt. last whorl 39 (1.98); aperture alt. 24 (1.19), diam. 58 (0.69 mm.).

Below Necaxa (BCD, III, a, 54), 2625 ft. *S. subopeas* is about the length of *S. opeas* but is slenderer and more nearly cylindric and has longer, more flattened whorls.

SPIRAXIS (VERSUTAXIS) FUTILIS, new species.

Shell (pl. 9, f. 7) long bulimoid-turrite, whitish corneous, translucent and polished, with well spaced growth-sulci. Whorls  $7\frac{1}{4}$ , quite flat-sided, with overlapping, weakly scalloped suture. Apex narrowly rounded; embryonic whorls  $2\frac{3}{4}$ , with 1.5 almost smooth and others assuming neanic sculpture. Later whorls moderately long, very gradually widening, with irregularly, quite widely spaced, shallow, but relatively broad sulci, separated by irregularly wide, weakly striate interspaces; first (neanic) with 21 sulci; second with 22; third with 20; fourth or last with 19. Aperture trapezoid-lanceolate, with greatest dimension about  $20^\circ$  to shell-axis; peristome thickened, almost vertical and little arcuate; columella relatively heavy, twisted and basally subtruncate. Alt. 3.12 mm., diam. 29 (0.91), alt. last whorl 44 (1.38); aperture alt. 26 (0.80), diam. 55 (0.44 mm.).

Tenango Hills, Necaxa (BCD, III, a, 41), 4600 ft. *S. futilis* has more convex outlines than any similarly sculptured species. It is about the size of *S. patzcuarensis* (Pilsbry) and has similar, well-spaced, incised sulci, but lengthens its whorls more regularly so that its earlier ones are shorter and its last considerably

longer. Its peculiarly thickened, subtruncate columella is rather unique.

---

## A NEW FLORIDAN *CYCLOSTREMA*

BY H. A. PILSBRY

*CYCLOSTREMA SANIBELENSE*, new species. Pl. 8, fig. 3.

The low-turbinate shell is narrowly umbilicate, the base impressed, somewhat funnel-like around the perforation; whitish, slightly translucent. There are about  $3\frac{1}{2}$  rounded whorls. The early whorls are smooth, sculpture beginning on the penult whorl. The last whorl has seven narrow spiral cords separated by much wider intervals, which are crossed by very delicate, rather widely spaced threads in the direction of lines of growth. The moderately oblique aperture is rounded, the contour a little flattened by contact with the preceding whorl. Outer and basal margins are thin, the upper margin arching forward. Columella thickened, continuous with the short, adnate parietal callus. Sometimes a few weak, fine spirals can be seen within the umbilical cavity of the base. The operculum is corneous, multispiral, similar to that of *Calliostoma*.

Height 0.8 mm., diam. 1.0 mm.

Height 0.9 mm., diam. 1.1 mm.

It is apparently near *Cyclostrema granulum* Dall from Samana Bay, Santo Domingo, but it has fewer spiral cords and is more depressed, the *C. granulum* being as high as wide.

This is one of the smallest Florida gastropods known, but the series of more than sixty specimens collected on several occasions shows that they are adult shells.

Collected at Sanibel, Florida, on valves of living *Atrina* (Dr. Louise M. Perry).

---

## ON THE LIFE HABITS OF SOME TROPICAL FRESH-WATER MUSSELS

BY FRITZ HAAS

### 1. *Existence of fresh-water mussels in highly polluted water*

On February 16, 1938, I had an opportunity of collecting in the Lagõa da Felipa in NE. Brazil, State of Ceará. The basin named

above belongs to Rio Bunubuiu, a left tributary of Rio Jaguaribe; it is a flat pan with a marly bottom which receives its water by means of a connecting canal from Rio Bunubuiu, when the latter carries high water, and it retains this water during the whole year, though, of course, with heavy losses. Its marly bottom does not encourage a rich aquatic flora and this may be the reason why no mollusks of the families of the Lymnaeids, Planorbids, Physids, Ancyliids and Sphaeriids were seen.

I found the water of the Lagõa da Felipa heavily polluted by the dung of cattle and donkeys; in the rather long part of the shore which I studied the water was literally converted into dung-water, the leached particles of the donkeys' dung floating near the edge or lying on the shore as flood-drift. There was, therefore, but little hope of finding a rich molluscan fauna in the lagoon, and indeed I succeeded in collecting in the marly mud, about 7 inches deep, only the following species:

*Ampullarius (Ampullarius) fuliginus* (Spix).

*Anodontites (Anodontites) obtusus* (Spix).

*Anodontites (Anodontites) trapesialis darochai* W. B. Marshall.

*Anodontites (Anodontites) crispatus salmoncus* W. B. Marshall.

*Mycetopoda siliquosa* (Spix).

The many organic substances dissolved in the water of the lagoon must have made it practically free of oxygen. We, therefore, may imagine that the Ampullarians, with their secondary lung, can stand the anaerobic conditions of their habitat; but it is difficult to understand how the Mutelids can live there. But the fact mentioned above is by no means unique, for the detection of living fresh-water mussels in water heavily polluted by dung in the Brazilian Lagõa da Felipa is supported by corresponding observations in South Africa, where I found living specimens of *Aspatharia (Spathopsis) wahlbergi* (Krauss) in the last residual pools of rivers and brooks, the water of which was reduced to veritable dung-water by the dung of antelopes and zebras coming to quench their thirst there in the evenings (Haas, Abh. Senek. Nat. Ges., Nr. 431, p. 95; 1936).

Both in Africa and in South America, these observations refer to Mutelid mussels only; can it be that these are more resistant than Unionids? We can only guess at the reasons which enable mussels to live under such unfavorable conditions.

Perhaps the undeniable property of many mussels, specially those that live in fresh water, to nourish themselves at least partly by means of adsorption—that is, by taking in through the surface of their body and by digesting materials dissolved in the water—can explain why dung-water almost free of oxygen does not suffocate the mussels living in it; for the organic matter contained in the water may be adsorbed by the animals, and the oxygen freed by its decomposition during digestion may be used for respiration.

This ideology is supported by Cole's statement (Journ. Exp. Zool., 33; 1921) that animals living in water containing no dissolved oxygen develop an oxydase in their tissues, mainly in their crystalline stile.

## 2. Estivation in fresh-water mussels

On March 3, 1938, I collected in the Dam of Umarizeira, 30 miles southwest of Fortaleza, State of Ceará, NE. Brazil, where, as I had learned, fresh-water mussels or "itans," as they are called in the vernacular language of the people, had already been found. The man who was to help me, however, refused to go into the water as I had done; he repeated to me again and again that "the itans are living in the dry earth at the margin of the water."

While I was looking for living shells in the water, the man worked in the sandy-earthly ground just near to me, where there were tomatoes growing, cutting up a layer about 2 inches thick; and there he really found, after a while, a living mussel, an *Anodontites* (*Anodontites*) *crispatus salmoneus* W. B. Marshall, about three-fourths grown. So, though no more species were obtained, it was proved that in quite dry earth, 10–15 inches above the water level for more than 6 months of the year, fresh-water mussels of the genus *Anodontites* can endure dryness and can live for half a year or still longer out of water, imbedded in dry, stone-like bottom. In order to characterize this bottom, I may mention that we found, together with the mussel, an eel, *Symbranchus marmoratus* Bloch estivating too, and a living chrysalis of a moth of the Sphingid family. Is there need of more evidences to prove that the ground in which the above-mentioned living mussel was found, must have been absolutely dry?

More corroborating facts about the estivation of mussels in dry ground were obtained in other dams of the Fortaleza region.

One must not believe, however, that *all* the mussels in a pond or a dam can endure summer dryness out of water and in dried-out ground at the margin, which is laid bare when the water begins to shrink in consequence of the heat. For only those which have been surprised by the retreating water and which could not follow it toward the center of the basin will bury themselves in the ground, while the rest of the mussels, living at greater depths, remain in the water throughout the entire summer.

Similar resistance to dryness on the part of fresh-water mussels has been described only once, to the best of my knowledge. Deshayes (N. Arch. Mus. Paris, 10; 1874) mentions that a specimen of *Pilsbryoconcha*, that is to say, an anodontine Unionid, sent to Paris from Cambodia by the then long way around the Cape of Good Hope, could be brought back to life by being placed in water.

---

## TWO NEW POLYGYROID HELICOIDS FROM NORTHERN CALIFORNIA

BY S. STILLMAN BERRY

Redlands, California

The seed of future doubt and confusion must ever be implicit in the description and naming of a species, and more especially a subspecies from our western states, bearing no better locality data than the citation of a county, for the western counties are often very large and oftentimes one of them will be found inhabited by a whole series of closely related forms difficult to discriminate with any surety without the most precise information. For example it appears that at least three distinguishable races of the *columbiana-megasoma* group of Polygyroid snails occur within the limits of Humboldt County, California. *P. c. megasoma* was described from this county without specific locale, and it remains in other respects somewhat inadequately known. If I do not go astray in my interpretation of it, the two races described below are receptive candidates for new names.

1) MESODON (*megasoma*, subsp.?) ERITRICHUS nov. Fig. 1 B, C.

DESCRIPTION: Shell small, low-conic, rather thin; base tumid.

Spire low, the slopes nearly straight. Whorls about  $6 \pm$ , convex, with well-marked sutures, quite regularly enlarging; body-whorl strongly swollen basally, slightly but rather suddenly descending at the suture to the aperture; abruptly constricted just back of the peristome. Lip white in front, well thickened and reflected; rounded anteriorly, flattened below, narrowed parietally and again at the columella, where it is suddenly widened and reflected to kink over and nearly cover the umbilicus. Aperture usually toothless, but a trace of a parietal tooth is sometimes present and an occasional shell has this quite well developed, whitish and arcuate. Terminations of lip connected by a thin but sharply bounded parietal wash of callus, the outer margin of which flares forward in a wide sweep in front of the columella and then abruptly recedes to it. Umbilicus very narrow, hardly permeable, heavily pilose within, and almost completely covered by the columellar flare even in very young shells.

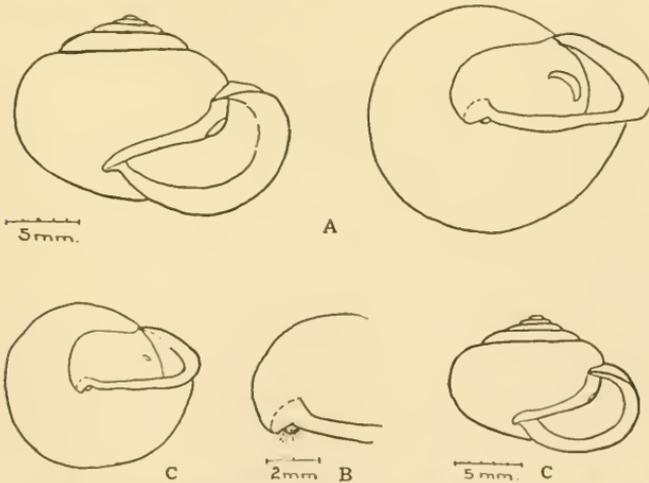


FIG. 1. A, *Mesodon (megasoma, subsp.?) euthales*. C, C, *M. (megasoma subsp.?) critrichius*; camera outlines of the holotypes. B, Camera sketch of columellar region of specimen C, more enlarged.

Embryonic whorls tumid, translucent, polished, closely finely axially wrinkled, with a minute granulation superimposed. On the later whorls these granules become elongate and extremely numerous, showing an alignment in obliquely descending series, and when not crushed or abraded bearing each a short erect acute

hair-like process which gives the surface a fine satiny plush-like surface if clean, but in life causes the adherence of much finely particulate mud or humus, which must be carefully washed away if the true ornamentation is to be seen. Growth-lines, other than those marking the rather frequent resting stages, hardly evident due to the papillation and pilosity, but there is an extremely fine and close axial microscopic wrinkling of the periostracal surface between the papillae.

Color of shell in the main close to Snuff Brown, but paling on the anterior portion of the last whorl to Honey Yellow or Chamois, and to Cream Buff behind the peristome.

MEASUREMENTS:	Maximum	Minimum	Altitude	Number of whorls
	diameter	diameter		
	<i>mm.</i>	<i>mm.</i>	<i>mm.</i>	
8815. Largest paratype...	16.4	14.0	11.2	6.1
8971. Holotype .....	14.4	12.2	10.2	5.8
8815. Small paratype .....	13.4	11.5	9.6	5.5

*Holotype*: Cat. No. 8971 Berry Collection; Paratypes No. 8815 of same collection; others to be deposited in the collections of Stanford University, the Academy of Natural Sciences of Philadelphia, the United States National Museum, and the private collection of Mr. Allyn G. Smith.

*Type-locality*: Foot of bluff on ocean side of peninsula at Table Bluff Light, Humboldt County, California; among moist ferns, poison oak, wild blackberries, Equisetum, etc.; Leo Shapovalov and Elden H. Vestal, 13 August 1938; 16 adults, 4 juvenals.

*Remarks*: This species, which is the dominant Mesodon in the coastal belt of Del Norte and northern Humboldt Counties, appears very distinct from *columbiana* in all its forms, and these two at least I believe to be specifically separable. Probably its nearest ally is *megasoma* "Dall" (1905: 26) as redefined by Pillsbry (1928: 182) to cover a low-conic shell having a very narrow umbilicus and a long strong parietal tooth, and in size apparently somewhat smaller (13.3 mm.) than the commonality of *critrichius*. From this latter our form differs most notably in its peculiar rounded form, swollen body-whorl, and usual obsolescence or ab-

sence of the parietal tooth. Other peculiar features are the curiously kinked columellar reflection of the peristome, the equally unique forward sweep of the parietal callus, and the *extremely* fine and close pelage. It is possible that these features may be partly shared or foreshadowed in *megasoma*, but I have seen no specimens which agree in all respects with Pilsbry's description and figures of the latter (1928: 182, figs. 8, 8a, 9). The nearest apparently are certain lots from extreme southern Humboldt County and northern Mendocino County (notably my No. 8808 from Red Mountain Creek, 1 mile above mouth; L. S., 13 Nov. 1937), which have a strong and long parietal tooth, a much less tumid body-whorl than has *eritrichius*, less copious pilosity, and not so much of a forward flare to the parietal callus. Where best developed the parietal tooth in this lot is peculiar in that it often raises a small secondary unwhitened hummock just outside the anterior termination of the main crescent. Most of these shells are much more depressed than those illustrated by Pilsbry and further collecting in crucial areas may show that yet another race should be recognized in this region.

Pilsbry (p. 183) finds *megasoma* "hardly distinguishable from *P. c. armigera*, which differs chiefly by its remote habitat," but I have seen no Humboldt County examples which were not clearly distinguishable, if not superficially, at least by the microscopic detail of the periostracal sculpturing, which in the southern species (*e.g.*, my 2749 from Big Basin, Santa Cruz County), comprises a close, highly irregular papillation on a glossy surface showing quite coarse growth-wrinkles. Pilsbry's second and more detailed account of *megasoma* (1931: 101) I find difficult to harmonize except on the assumption that his later material was practically all of it representative of the form I now call *eritrichius* rather than typical *megasoma* as first defined by him. True, he does not mention the remarkable flare of the parietal callus, but he does refer to the columellar kink and his localities, excepting Inverness, are all within the known range of *eritrichius*.

To summarize, I am persuaded that in relation to the more widely distributed *columbiana*, both *eritrichius* and *armigerus* are distinct and clear-cut species, but the true position of *megasoma* is still to be demonstrated. It and *eritrichius* seem close akin, yet

in the large series of specimens examined I am unable to establish complete intergradation.

The name chosen is from the Gr. *eri-*, very, + *trichios*, hairy. The type-locality is described by Mr. Shapovalov as being hardly 15 yards from extreme high-tide line.

2) MESODON (*megasoma*, subsp.?) EUTHALES NOV. Fig. 1 A.

*Description*: Shell similar to *eritrichius* in most characters, but with a strongly developed arcuate parietal tooth, a much wider and more sinuate peristome, and the attainment of enormously greater size.

MEASUREMENTS:	Maximum diameter	Minimum diameter	Altitude	Number of whorls
	<i>mm.</i>	<i>mm.</i>	<i>mm.</i>	
7830. Paratype .....	20.2	16.6	14.8	6.5
7830. Paratype .....	19.0	16.0	13.4	6.3
8972. Holotype .....	18.7	15.5	13.3	6.7
7830. Paratype .....	17.8	15.0	12.2	6.1

*Holotype*: Cat. No. 8972 Berry Collection. *Paratypes*: No. 7830 same collection and another in the collection at Stanford University.

*Type-locality*: Chaffey Ranch, 7 miles above mouth of Klamath River, Del Norte County, California; in redwoods, Leo Shapovalov, 22 Aug. 1934; 4 adult shells.

*Remarks*: This is very much the largest *Mesodon* known to me from within the bounds of California, although it is still a pygmy as compared with the giants of Oregon and Washington. I have as yet seen it only from the type-locality where it occurs in association with a very much smaller race<sup>1</sup> scarcely separable from the typical form of the species, except for the presence of a strong parietal tooth. Dimensions of two specimens of the smaller form are appended for comparison:

MEASUREMENTS:	Maximum diameter	Minimum diameter	Altitude	Number of whorls
	<i>mm.</i>	<i>mm.</i>	<i>mm.</i>	
7831. ....	13.0	11.1	9.3	6.0
7831. Dead .....	13.0	11.2	8.7	5.9

<sup>1</sup> A not infrequent phenomenon with this genus in northern California, but one as yet without satisfactory explanation.

The subspecific name is derived from the Gr., *eu*, well, + *thales*, fed.

## LITERATURE

ANCEY, C. F.

[1881. ———— Le Naturaliste, ser. 1, 1: 404, 1881.  
*teste* Fulton.]

1887. Description of North American shells. Conchologists' Exchange, 2 (5): 63-64, Nov. 1887.

DALL, W. H.

1905. Land and fresh-water mollusks of Alaska and adjoining regions. Harriman Alaska Expedition, 13: i-xii, 1-171, text figs. 1-118, pl. 1-2, 1905.

PILSBRY, H. A.

1928. Species of *Polygyra* from Montana, Idaho, and the Pacific Coast states. Proceedings Academy Natural Sciences Philadelphia, 80: 177-186, text figs. 1-13, Aug. 1928.

1931. *Polygyra columbiana* megasoma (Dall). . . NAUTILUS, 44 (3): 101-102, Jan. 1931.

---

## LAND SNAILS COLLECTED AT UGANIK BAY, KODIAK ISLAND

BY WALTER J. EYERDAM

The report on "Land Snails of Kodiak"<sup>1</sup> by S. Stillman Berry in THE NAUTILUS, 1937, pp. 87-88, reminded me that I should contribute the results of a small collection that I made on the shore of Uganik Bay in October, 1924.

At that time I was cooper on the great 2200-ton, 5-masted schooner "Bianca" which had been built during the war for the Australian Government. It had made only one round trip to that southern continent. In 1924 she was sold to a fishing company, and used during the Summer as a herring saltery. The Fall herring fishing was finished at Red Fox Bay on Shuyak Strait, Afognak Island when we got orders to proceed to Halibut Cove which is on Cook's Inlet on the Kenai Peninsula, not far from Seldovia, where we would try our luck at Winter herring fishing. Our ship with most of the Summer and Fall herring stowed in the hold and with about 40 men and women aboard was being

<sup>1</sup> Kodiak is the old Russian spelling. Kodiak is now in general use.

towed by the steamer "Redondo" toward the Winter fishing grounds during a very heavy storm. The tow hawser broke twice and a cable was then used but it also snapped finally, and then we drifted for two days and nights, down Shelikof Strait and into Uganik Bay, which is a long indentation of the N. W. shore of Kodiak Island. We chose the end of the south arm of the bay for anchorage, where we stayed during the first half of October until the "Redondo" came back. Part of the passengers were taken aboard the steamer, which towed the "Bianca" out to the sea again. The Winter fishing was, of course, given up, and she started on her return trip to Seattle. After 6 weeks of a very stormy voyage, the "Bianca" was completely wrecked in a terrific snow storm, not far from Cape Flattery, in the strait of Juan de Fuca, on December 26, 1924. The crew was rescued through the heroic efforts of Alolph Mortensen, the second mate, who swam through the heavy surf with a line, tied it to a tree and then rigged up a boatswain's chair, with which each man was carried to safety. The ship was nearly broken in half, but the second mate went back on the wreck to the severely injured first mate and stayed 2 weeks longer, until rescued by a fishing boat.

While anchored in the south arm of Uganik Bay, I went ashore on several occasions, for water and firewood, or to roam along the beaches. I utilized part of this time to search diligently for land shells. At this particular spot the Kodiak bears were numerous. Bear trails were large and well worn and are, in fact, the only paths that one can follow. If one got up at the break of day, he could be sure of seeing one or more of these huge beasts. Seventeen bears were sighted at the same time one morning.

There are no coniferous trees on this part of the island, but cottonwoods and alders are plentiful in the valleys and grass and other herbage grows rank and high and is very difficult to walk through in the late Summer and Fall. A dominant large perennial herb is the wild rhubarb, *Heracleum lanatum*.

I have visited parts of Kodiak and Afognak Islands on numerous occasions, in different years, and always looked for land shells at each opportunity to do so. Most of the results were very poor except ashore near our anchorage, on the west side, near the end of the south arm of Uganik Bay. This is the only place that I have found it worth while to look for land shells.

The following species were taken during the several hours that I collected in that locality, about the middle of October, 1924. They were all identified by Mr. Vanatta.

*Euconulus fabricii* (Beck). 43 specimens at grass roots.

*Euconulus fulvus alaskensis* (Pilsbry). Under cottonwood logs and dead leaves. Like Dr. S. S. Berry, I found practically no difference between this variety and the typical species which I collected in Kamchatka in 1925 and in 1928, and which I suspect is really the varietal form. I have some specimens from Vancouver Island that are labeled with the same name that are more amber colored and with a slightly greater height than the northern shells. These approach *Euconulus trochiformis* Mtg., and are probably that species. I also have *Euconulus fulvus alaskensis* Pilsbry, that I collected on Unimak, Akutan, Unalaska and Atka Islands, that are exactly the same as those from Kodiak Island and Kamchatka.

*Pristiloma arcticum* (Lehnert). Several specimens under wild rhubarb.

*Discus cronkhitei* (Newcomb). About 300 specimens. Very common at the base of wild rhubarb and grass roots. Like those of S. S. Berry found at Karluk, Kodiak Island, these are for the most part smaller than the typical race. They are similar in color and with slight sculpture compared with the Kamchatka specimens, being a light greenish yellow brown, are quite smooth but are much less in size. The habitat and environment and climate is similar. There is, quite likely, an imperceptible intergradation between these two forms. The specimens which I collected at Yakima, Washington, are more like the typical. They are normal size, much darker brown than the northern form and have a well defined sculpture which is easily visible. It may be quite justifiable to describe the northern form as a new sub-species and the one from Kamchatka as a variety, but whoever undertakes a revision of the western form of this species should have a great many specimens at hand for comparison from many localities.

*Punctum conspectum* (Bld.). 1 specimen, under wild rhubarb.

*Vitrina alaskana* Dall. 12 specimens; a smaller race. Under wild rhubarb leaves and grass roots.

*Retinella radiatula* (Alder). 8 specimens, typical. Under wild rhubarb and grass roots.

*Vertigo modesta* Say. 15 specimens. Under decaying cotton-wood logs.

*Columella edentula* (Drap.). 25 specimens. Under dead alder leaves (*Alnus hirsuta*).

*Succinea chrysis* Westerl. 22 specimens. Under dead alder leaves. The mature specimens are large, (24 mm. long by 15 mm. wide). The aperture is of a beautiful golden red amber color.

*Succinea rusticana alaskana* Dall. Several specimens. Under wet springy moss along a small ditch.

*Succinea grosvenori* Lea. 9 specimens, in wet moss.

It is possible that a more intensive search in this locality would reveal other species of land shells.

The rain of fine ash from the eruption of Katmai across Shelikof Strait does not seem to have fallen as heavily in this section as it did on Afognak Island and some parts of Kodiak Island, where the ash fell several feet deep. Vegetation seems not to have been adversely affected, but it may have been disastrous to certain species of land snails in districts where ash fell deeply. This may partly explain the absence of these animals in some rather promising looking spots that I have visited.

---

### WENDELL CLAY MANSFIELD

Wendell Clay Mansfield was born on June 9, 1874, in Charlotte Center, in western New York, a little to the south of Lake Erie and to the east of Lake Chautauqua. His A.B. degree was received from Syracuse University in 1908. For the two years following his graduation he taught science in the secondary schools. On June 20, 1910, he entered the Federal service as preparator to Dr. William Healey Dall, replacing the veteran collector Frank Burns. Mr. Mansfield advanced through the usual stages to the rank of Geologist, and in the meantime he had in 1913 received a M.S. degree from George Washington University and in 1927 his doctorate. He was a member of the Geological and Biological Societies of Washington, the Paleontological Society, the Washington Academy of Sciences, and the Geological Society of America. His wife, Katherine Gibson Mansfield, died several years ago after a long illness, and there were no children. He accepted

without bitterness, but with full realization, the comparative loneliness of his later life. He himself was in wretched health for a number of years, but there was no word of complaint nor of morbid reflection. He was spared, however, a long dependence that would have been harder than physical pain, for the end came suddenly on July 24, 1939, his first day of absence from his office desk. Two sisters, a brother, and two nephews, whom he regarded with pride and with affection, survive him.

Trained under the aegis of Dr. Dall, his natural regard and respect for books and museum collections was deepened and strengthened, and the Tertiary molluscan collections at the U. S. National Museum bear the imprint of his care. His faunal and stratigraphic studies were focused on the middle and later Tertiary and the Pleistocene of the Atlantic seaboard from Virginia to Florida. To those familiar with the deliberation with which he worked, the sum total of his published writings is surprisingly large, and most of his papers include a distinct stratigraphic contribution. He was the first to extend the Yorktown formation inland to Petersburg, Va. The description of the upper Miocene faunas of Florida—those of the Choctawhatchee formation—and their careful zoning are, perhaps, his most comprehensive work. In this he established the upper faunal and stratigraphic limit of the Miocene, while his work upon the Tampa has greatly aided in fixing the lower limit of the Miocene. His study of the controversial faunal and field relations of the Chickasawhay, on which he was engaged for some months before his death, was sufficiently far advanced so that it can be published in part.

Possibly the foremost quality of the man and of his work may be indicated by the outmoded word *integrity*. Too little self-assertive and too little self-confident to be sure of the rightness of his own opinions, he was yet tenacious of a belief which he had well considered and made his own. He was never too busy to be approached, and gave generously of all that was his, whether material or immaterial. He asked little of life during the later years, and those of us accustomed to the simple tenor of his ways were surprised at the diversity of interests and organizations represented in the chapel filled by those who gathered to pay the final tribute.

## JOHN RITCHIE, JR.

John Ritchie died July 22, at his home in Malden, Mass., at the age of 88 years. Most shell collectors of twenty-five or thirty years ago knew Mr. Ritchie personally or by correspondence. At that time he was actively amassing what became one of the large private collections of the time, and getting together a considerable conchological library. His shells were practically all obtained by exchange or purchase, for I doubt whether Mr. Ritchie himself ever collected in the field.

Besides collecting shells and shell literature, Mr. Ritchie had several other scientific interests, particularly astronomy. For twenty-three years he was in charge of the collection and distribution of astronomical news from the Harvard Observatory, where he had earlier been an assistant.

He was an Associate Editor of the *American Journal of Public Health*, and was Health Commissioner of Boston, 1908-1910.

Mr. Ritchie was a member of the Boston Malacological Club, The American Malacological Union, and of various other musical, sanitary and philanthropic bodies.

---

## NOTES AND NEWS

A BANDED VARIETY OF *Typhis lowei* PILS.—This West Mexican species as originally described is uniform cream colored. Miss Bourgeois in a recent letter enclosed drawings by Prof. Ignacio Ancona H. of the Instituto de Biología, Mexico D. F., which represent a specimen profusely marked with interrupted narrow dark brown bands, the shape remaining as in the type. This color-variety was found at Zihuatanejo, Guerrero. We reproduce these figures on pl. 8, fig. 4.—H. A. PILSBRY.

WHO OR WHAT?—A paper entitled "Publications of the O.G.B., III, Mollusca of Cincinnati," was issued in 1876. For at least indexing purposes, it would be helpful to know who or what O.G.B. might be. Information on the point was asked of the Cincinnati Society of Natural History. Mr. Ralph Dury, the Director, answered that though he was familiar with the paper he had never been able to trace its origin or to discover the mean-

ing of O.G.B. It is possible that one of the early recipients of the publication may have filled out the words for which O.G.B. stood in the same way that librarians write out the full names of authors who have been content to supply only the initials of their given names for title pages. In the hope that this is so, I am asking owners of the little pamphlet to look up their copies to see if they can solve the mystery.—CALVIN GOODRICH.

DR. H. BURRINGTON BAKER has returned from Porto Rico, where he studied and collected mollusks during July and August.

THE TYPE LOCALITY OF *Cochliopa rowelli* (TRYON).—Definite confirmation of Panama as the original (type) locality for *Cochliopa rowelli* (Tryon)<sup>1</sup> has come to light in the United States National Museum collections. One specimen (USNM No. 24884) was catalogued February 22, 1875, and labelled in Carpenter's handwriting: "24884 / Rowell 21 / Panama (and on back of label) What is this? 'Leptoxis' H. Adams / ? *Fluminicola* / Shell for S. I. : Name and number to / Rowell." At a later date, R. E. C. Stearns wrote *Leptoxis* ? *H. Adams* on the front of the label, and still later someone else, possibly Dr. Dall, crossed this name out and wrote in *Fluminicola*.

Another specimen (USNM No. 28107) was catalogued March 25, 1876, as "type" from California from Tryon.<sup>2</sup> Several additional specimens are in the National Museum Series of this species, all apparently part of the original lot, as they are labelled "Clear Lake" or "California" and all seemingly came from the Stearns Collection.

Rowell's note<sup>3</sup> as to his taking this species "near Baulinas Bay (not Clear Lake) Marin Co., California," must be regarded as a slip of memory, supported by misidentifications. In the National Museum collections are shells from Baulinas Bay, labelled *Amnicola rowelli* Tryon by Stearns, but these are clearly misidentified, being *Pomatiopsis*.—J. P. E. MORRISON.<sup>4</sup>

THE SYSTEMATIC POSITION OF THE GENUS *Ekadanta* RAO.—The

<sup>1</sup> Pilsbry, NAUTILUS, 19, p. 91, 1905; also: Proc. A.N.S.P. 1906, p. 172.

<sup>2</sup> The type of *C. rowelli*, so marked by Tryon, is 58281, A.N.S.P. (Ed.).

<sup>3</sup> NAUTILUS, 20, p. 10, 1906.

<sup>4</sup> Published by permission of the Secretary of the Smithsonian Institution.

Subfamily Ekdantinae (Hydrobiidae), including the single genus *Ekdanta* Rao 1928,<sup>1</sup> is misplaced in Thiele's admirable system of classification.<sup>2</sup> Comparison with the family Syneeridae (Assimineidae)<sup>3</sup> will show that *Ekdanta* belongs near the genus *Paludinella* L. Pfeiffer, 1841, having almost identical characters of animal, radula, and shell. This similarity has been noted in the case of *Ekdanta shanensis* Rao (the genotype), recently received from L. C. Bulkley from Trang, Siam, and in the case of *Ekdanta colombiensis* (Heude),<sup>4</sup> recently received from C. C. Tang from Sa Hsien and from Futsing, Fukien Prov., China. *Assiminea scalaris* Heude 1890, from a fresh-water habitat at Shanghai, may belong to this group also. The radulae were prepared by S. F. Chen, research student at George Washington University, in studying United States National Museum material.—J. P. E. MORRISON.<sup>5</sup>

LITTORINA MINIMA (Wood).—During a visit to East Sister Key this past winter a number of these interesting mollusks in company with *Neritina pupa* L. were taken by the writer. These *Littorina* were living in the splash pools at about the high tide line. The larger specimens were somewhat eroded, largest measuring about 9 mm. in length, with the characteristic black spots being rather inconspicuous on the darker specimens. East Sister Key is located on the ocean side of Key Vaca, one of the Middle Florida Keys.—T. L. MCGINTY.

---

## THE NINTH ANNUAL MEETING OF THE AMERICAN MALACOLOGICAL UNION

BY IMOGENE C. ROBERTSON

The ninth annual meeting of the American Malacological Union was held in the Royal Ontario Museum of Zoology in Toronto, Canada, Tuesday through Friday, June 20 to 23, 1939. Mr. Max-

<sup>1</sup> Rao, *Rec. Indian Mus.*, 30, p. 438, 1928.

<sup>2</sup> Thiele, *Handbuch der Syst. Weichtierk.*, Teil I, p. 149, 1929.

<sup>3</sup> *Ibid.*, p. 168 and following.

<sup>4</sup> Heude, *Moll. Fleuve Bleu*, p. 123, pl. 31, fig. 17, 1890.

<sup>5</sup> Published by permission of the Secretary of the Smithsonian Institution.

well Smith, President of the Union, opened the sessions at two o'clock Tuesday afternoon, Dr. J. B. O'Brien, Chairman of the Board of Trustees of the Royal Ontario Museum giving the address of welcome, to which Mr. Smith responded on behalf of the visitors.

Professor J. R. Dymond, Director of the Museum of Zoology, then gave, in "An Outline of the Organization of the Royal Ontario Museum," a comprehensive view of this great institution which comprises five separate museums, each having its own director. These are the museums of Geology, Paleontology, Mineralogy, Zoology and Archeology.

Following these introductory speeches, Dr. Paul Bartsch gave the first of the scientific papers, "A Synopsis of the Cuban Operculate Mollusks of the Family Annulariidae," which dealt with the results of a joint study by Dr. Carlos de la Torre and the speaker. The President then delighted the audience with a showing of two films: "The Cuban Meeting of the American Malacological Union," and "Dredging off Florida." "More about Father Kino," by Joshua L. Baily, Jr., and "Collecting Mollusks in West Virginia," by Gordon K. MacMillan, concluded the first day's program.

The second day's sessions opened at ten o'clock, Aurele LaRocque being the first speaker. His subject was "Canadian Malacology; Its History and Present Status." This historical sketch was followed by an appreciation of the late Honorable Justice F. R. Latchford, by John P. Oughton. "An Invasion of Mississippi River Naiades into the Northern Peninsula of Michigan," by Dr. Henry van der Schalie concluded the session.

A luncheon in the Museum Tea Room was given in honor of the Union by the Board of Trustees of the Royal Ontario Museum and was a most enjoyable and appreciated courtesy.

Following the luncheon three papers were presented. Dr. Paul Bartsch read a contribution by Dr. Harald A. Rehder on "An Interesting Bulimulus Problem" and Mr. Oughton read one by Dr. Ricardo de la Torre entitled "On the Probable Causes of Dispersion of Manganese in Jurassic Rocks." Dr. Abelardo Moreno gave a valuable report on recent "Anatomical Studies of Cuban Polydontes," illustrated with lantern slides of his superb drawings of the details of structure studied.

Two field trips had been planned to accord with the desires of those who wished lake shore collecting and the smaller group interested in Pleistocene fossils. Mr. Oughton led the first group to a favorable section of Sunnyside Beach where the eager collectors went immediately into action examining the drift for minute land and fresh-water forms which occur here in abundance. The fossil hunters, led by Mr. LaRocque, prospected more or less successfully in Don Valley Brick Yard, notwithstanding the merciless rays of the afternoon sun which added little to the joys of collecting.

Mrs. Frank R. Schwengel's delightful cocktail party in the Royal York Hotel at six o'clock was a refreshing finale to the hot afternoon.

The reading of papers was resumed on Thursday morning, the first being by Calvin Goodrich on "Phases of Lake Tanganyika Mollusea." This gave personal observations made on the occasion of the visit of Mr. and Mrs. Goodrich to Africa last year. The presidential address by Maxwell Smith followed, a valuable paper on "Distribution of East Coast Marine Mollusea together with a Survey of Tertiary Species," illustrated with numerous lantern slides.

A tour of the Museum under the leadership of Miss Ruth Home, had been arranged with special reference to the interests of the visiting ladies, and the meeting adjourned to allow for an inspection of the splendid exhibits in all parts of the Museum.

At one o'clock the ladies enjoyed a luncheon given them at the University Women's Club, with Mrs. J. R. Dymond, Mrs. L. L. Snyder and Mrs. John P. Oughton.

The afternoon program comprised papers as follows: "The Taxonomy of Naiades Inhabiting a Lake Environment" by Henry van der Schalie; "Non-Marine Mollusea in the Carboniferous of Nova Scotia" by Aurele LaRocque; "Land Snails New to the Fauna of Pennsylvania" by Gordon K. MacMillan; "Florida Shells," being kodachrome pictures by Harry B. Archer, Dan L. Emery giving the explanatory notes.

Before adjourning Mr. Harold R. Robertson presented an invitation from Dr. Louise M. Perry and Mrs. Frank R. Schwengel to hold a meeting in Sanibel, Florida, suggesting that the spring

months, April or May would be the most propitious time, although a Christmas meeting might be equally delightful. This invitation was received with pleasure to be considered at a future meeting when invitations from Dr. R. L. Wilbur for Stanford University and from Dr. Roy Chapman Andrews for the American Museum of Natural History will also be taken up.

Mr. William J. Clench read a letter from Dr. Frank Collins Baker regretting his inability to attend this meeting and asking an expression from the Union on the matter of eliminating the parentheses from names of authors in specific names. Since the practice causes endless research and consumes much valuable time, the motion to recommend to the International Commission on Nomenclature the wisdom of eliminating parentheses was adopted unanimously.

At the conclusion of the program the ladies attended a tea graciously given by Mrs. H. D. Warren in her charming home in Wellesley Avenue, so filled with art treasures and radiating hospitality.

The annual dinner was held in the Great Hall, Hart House, University of Toronto. This was the high point of the convention. Mr. Robertson acted as Toastmaster. Toasts were drunk in ginger ale to King George VII and Queen Elizabeth, to President Franklin Delano Roosevelt and Mrs. Roosevelt, to President Laredo Bru and Señora Bru, and to the absent members of the American Malacological Union. After the last toast, Mr. Robertson asked for a moment of silence in tribute to the members departed during the year that has passed, the Honorable Justice F. R. Latchford, Mr. E. G. Vanatta, and Mr. John McCausey.

Adjourning to the Music Room, the annual election was held resulting in the following Executive Council for 1939-40:

Honorary Presidents: Mrs. Ida S. Oldroyd, Dr. Henry A. Pilsbry, Mrs. Harold R. Robertson. President, Dr. Horace Burrington Baker; Vice-President, Dr. Harald A. Rehder; Corresponding Secretary, Norman W. Lermund; Financial Secretary, Mrs. Harold R. Robertson. Councillors-at-large: Dr. Myra Keen, Aurele LaRocque, Dr. Henry van der Schalie, Dr. H. E. Wheeler. Past Presidents: Dr. Joshua L. Baily, Jr., Dr. Paul Bartsch, William J. Clench, Calvin Goodrich, Dr. Henry A. Pilsbry, Maxwell Smith, Dr. Carlos de la Torre.

It was decided to hold the next meeting in the Academy of Natural Sciences of Philadelphia, where the first meeting was held in 1931. This tenth meeting will especially honor Dr. Pilsbry, the first president of the Union and dean of American malacologists.

After the business session Dr. Pilsbry spoke briefly on a new *Cyphoma* recently discovered in Florida which is being called the "fingerprint" because of the characteristic lines on the body. Lantern slides illustrated the relationships of this and other species.

Mr. Goodrich gave a fascinating account of "A Short Visit to Equatorial Africa," illustrated with lantern slides of the countryside and people of this strange continent.

The program was brought to a close by a showing of moving pictures, an especially timely one being that taken the day before showing American Malacological Union collectors on Sunnyside Beach.

Friday was an ideal day for the picnic at "Glenorehy," the summer home of Mr. C. M. Heddle, on a branch of Oakville Creek. Here collecting in the wooded areas and in the creek was found productive, but of greatest enjoyment was the quiet beauty of the estate. The lodge overlooks the lovely valley of Oakville Creek and steep paths lead down to the foot of the bank which is nearly a hundred feet high. A luncheon of surpassing goodness had been prepared by Mrs. Oughton and her cheerful Committee which was enjoyed and appreciated by the happy picnickers whose appetites had been sharpened by the hours in the open air and the strenuous climbing.

Leisurely chatting, and at last the parting, to carry away grateful memories of the perfect arrangements carried out by the local Committee: Professor J. R. Dymond, Dr. L. S. Russell, Aurele LaRocque, G. E. Fairbairn, G. M. Neal, and last but not least, Mr. and Mrs. John P. Oughton.

# THE NAUTILUS

---

Vol. 53

January, 1940

No. 3

---

## SEQUENCE IN THE DISTRIBUTION OF AQUATIC SPECIES

BY CALVIN GOODRICH

That section of Tennessee made up of the counties of Clay, Jackson, Overton, Pickett and Fentress has the Cumberland River for its main stream. The largest tributary is Obey River, dividing upstream into West and East Forks. Resembling it faunistically to a certain degree is Wolf River. Fringing the Cumberland, Obey, the Obey Forks and the Wolf are numbers of streams locally called creeks or branches, but most of them too small for recognition by name on the ordinary maps. Matching those streams of East Tennessee known as Sinking creeks is Cowan's Branch, which like them is both of the surface and underground. The section is the country known to malacologists by the collecting enterprises of Paul Adams, whose home is (or was) Alpine, and W. S. Parris, living in a community that began as Boom, became Wirmingham and now, by recent choice, is Boom again. It is the land, too, of Alvin York who in the World War and all alone took prisoners in what you might speak of as herds.

Mr. C. S. Shoup of Vanderbilt University has made a fisheries survey of the section. As a part of the task, he gathered mollusks at more than fifty different stations. The Pleuroceridae were sent to me, and what follows is the result of a study of the specimens.

The Cumberland River contains the largest number of species and probably the largest colonies. A single genus of the four genera inhabiting the region is absent from the river, and that one is present in the Cumberland above the head of navigation. From the river in something like orderly sequence as we pass from big stream to smaller stream and then to smallest, the species



*P. c. undulatum* inhabits the whole length of Obey River proper. It is less robust than in the Cumberland and sulcae are absent, but the relative proportions of altitude to diameter are virtually the same. The sculpture of *P. alveare* is typical although less pronounced and this may be simply because the shells are comparatively small. Going upstream, *L. armigeru* retains its sculpture until the uppermost station is reached. The shells of this locality, subspecies *stygia*, are without nodes on the periphery, but still plicate on the spire. Contrasting with this is *L. geniculata*. The typical, short-spired, nodulous shell of the Cumberland does not appear to enter the Obey River at all. It is replaced by the smooth, high-spired form which Lea gave specific rank as *venusta*. The subspecies occurs in the four lower stations, but seemingly is absent from the three higher ones. *L. obovata*, as form *depygis*, is in the middle reaches of the river. With the shells were taken two specimens much nearer the typical conformation. The *Goniobasis* sp. is a single juvenile individual too small to be determined. The genus, where it occurs in the Obey, is probably a straggler from creeks or brooks. *Campeloma*, collected in only one locality, is *decisum* or near it.

So far as collecting records show, the East Fork of Obey River is barren of Pleuroceridae. Mr. Shoup has indicated a reason for this by marking the results of hydrogen ion concentration tests upon a copy of his field chart. The average of five such analyses in the East Fork is 6.1. The pH in the highest station is 5. It is as low as 2.6 in one tributary. Comparison may be made with a pH of 7.8 near the mouth of the West Fork. Pleuroceridae of this stream are:

- Pleurocera canaliculatum undulatum* (Say)
- alveare* (Conrad)
- Lithasia obovata* (Say)
- obovata sordida* (Lea)
- Anculosa praerosa* Say
- subglobosa* Say
- Goniobasis ebum* (Lea)
- edgariana* (Lea)

*P. c. undulatum* and *A. praerosa* are in the list on the basis of Mr. Parris' findings. *A. subglobosa*, taken by Mr. Shoup near the

mouth of Nettlecarrier Creek, is represented by two specimens and may be counted as a small stream inhabitant. The large *Lithasiae* have dropped out. *L. obovata sordida* is of irregular occurrence in this drainage basin and it is possible that the exact environmental conditions suitable for it are of irregular occurrence also. *Goniobasis* is becoming the dominant genus. *P. alveare* in the West Fork is of the form described by Anthony as *Melania grossa*. In this shell, the plicae of the spire remain, but the nodules of the lower whorls have disappeared. In most regards, the pleurocerids of Wolf River resemble those of the West Fork of the Obey, but *L. armigera stygia* occurs in the stream near its mouth and *G. edgariana* has not been taken in it anywhere.

*Lithasia armigera* is present in Roaring River, which appears to be the third largest tributary of the Cumberland in the area, but is confined to its mouth. About midway in this stream, *Anculosa praerosa* was taken. At one time, it probably occupied lower stations also. Three shells, identifiable as *Goniobasis laqueata*, were found in Roaring River. This is a rare species in this particular region, but it occurs in Cumberland River forks, creeks and springs both up the river and down it. Collections made in tributaries of the streams dealt with are made up of:

- Lithasia obovata* (Say)
- obovata sordida* (Lea)
- Goniobasis ebum* (Lea)
- edgariana* (Lea)
- laqueata* (Say)

The commonest species is *G. edgariana*. It is an occupant of springs as well as of creeks. *G. laqueata* is from only one of twenty-five streams. *G. ebum* although at three stations of Wolf River was found in only one of eight of its tributaries. *L. obovata* was in fourteen of these lesser streams, *L. o. sordida* in eleven.

To summarize: The heavy, most ornate and best characterized species are of the main river. In the main tributary, two of these riverine species persist to the Forks little modified, one is altered to sub-specific phase immediately after entering this tributary, one is altered just before the Forks are reached, two species appear

that are not in the main river. In that fork of the Obey River containing mollusca are still three of the riverine species, one of which retains the original characteristics save in the matter of size. Three species are present that were absent in lower waters. The pleurocerid fauna of the small tributaries is reduced to relatively small species of two genera. The relationship of all the species, one with another, is probably closer than may be presumed from the exo-skeletons alone. In any case, we have here a compact series of intimate adaptations to differing environments.

---

## MOLLUSKS OF A KANSAS PLEISTOCENE DEPOSIT

BY CALVIN GOODRICH

In the summer of 1939, Mr. Claude M. Hibbard of the Museum of Paleontology, University of Kansas, carried on excavations in a deposit of Pleistocene times of Meade County, Kansas. The county is in the southwestern part of the state and borders on Oklahoma. It is about eighty miles east of the Colorado line. The drainage is through the Cimarron and Arkansas rivers to the Mississippi. The molluscan material, which I have examined, is in two zones, one of them fifteen feet below the top of the exposure, the other fifty feet below. Upon a chart with which Mr. Hibbard has kindly provided me the upper bed is described as "stream deposited sand with invertebrate and vert. fossils; fine sandy laminated clay, gray to bluish." The lower one is marked "Soil zone? Dark gray to dark slate color, sandy with few gastropods."

The shells of the upper zone are:

*Gastrocopta armifera abbreviata* (Sterki)

*procera* (Gould)

*Hawaiiia minuscula* (Binney)

*Pupoides inornatus* Vanatta

*marginatus* (Say)

*Pupilla muscorum* (Linnaeus)

*Vertigo modesta* (Say)

*ovata* (Say)

*Vallonia costata* (Müller)

*Succinea grosvernori* Lea

- Gyraulus parvus* (Say)  
*Helisoma lentum* (Say)  
*Lymnaea bulimoides cockerelli* Pilsbry and Ferriss  
     *caperata* Say  
     *palustris* (Müller)  
     *stagnalis* subsp.?  
*Musculium partumeium* (Say)  
*Pisidium abditum* Haldeman  
     *noveboracense* Prime  
*Valvata tricarinata* (Say)

*H. lentum* has been put down as that species on the basis of identity with specimens at hand that have been so named. The shells would probably be called *H. trivolvis* if they occurred east of the Mississippi. All that remains of *L. stagnalis* are three or four whorls of as many spires. Whatever the fragments are, they belong to the *stagnalis* complex. Junius Henderson has reported subspecies *appressa* as occurring at Gunnison, Colorado, and that is the locality for known living colonies which is nearest to the Meade County site. The occurrence here might seem to argue colder all-round-the-year waters in Pleistocene southwestern Kansas than in these days. *V. tricarinata* is still farther away from the present frontier of its range. The western edge of distribution is given by Mr. Frank C. Baker now as Iowa. The shells, fairly plentiful in the Hibbard collection, would, I think, be pronounced typical although the carinae are noticeably more developed than in shells from Delaware River, the type stream, with which they have been compared. The rest of the findings corresponds with the fauna of today so far as it is known.

In the bottom exposure were taken:

- Gastrocopta armifera abbreviata* (Sterki)  
     *procera* (Gould)  
*Hawaiiia minuscula* (Binney)  
*Pupoides marginatus* (Say)  
*Succinea grosvernori* Lea  
*Gyraulus parvus* (Say)  
*Lymnaea palustris* (Müller)  
*Pisidium noveboracense* Prime

These eight species, it will be observed, occur also in the zone thirty-five feet above. Unless the two beds were laid down with

something of the rapidity marking the formation of aeolian deposits in the "Dust Bowl" in recent years—which is highly improbable—we have another illustration of the fact that in a given area, under the conditions we call natural, the molluscan fauna is persistent, tenacious, changing little.

In Meade County material sent to him by Mr. Hibbard, Mr. F. C. Baker recovered new species of *Vertigo*, *Strobulops*, *Carychium* and *Menclus*, of which only one genus is represented in the 1939 collecting. That deposit is recognized as Pliocene. (See Nautilus, 51, 1938, pp. 126–31.) Mr. Baker reported at the same time on Pleistocene mollusca of Brown County, Nebraska. Shells of these beds more nearly resemble the Meade County specimens I have dealt with above than the latter do those of the Meade County Pliocene.

Associated with the mollusks, Mr. Hibbard found bones of salamanders, frogs, toads, small fish, birds, shrews and squirrels.

I am indebted to Dr. Phil Marsh for the identification of the land shells.

---

A NEW TELLIN OF THE SUBGENUS ANGULUS, A  
NEW LAMELLARIA AND A NEW SUBSPECIES  
OF CRASSISPIRA, FROM SOUTHWEST  
FLORIDA

BY LOUISE M. PERRY

TELLINA RUBRICATA, new species.<sup>1</sup>

Length 8; width 4.1 mm. Its color is pale pink with rays and extremely minute pencillings of deeper pink, the tint becoming paler toward the margin with the widest and most deeply colored ray over the posterior rostration. The valves are sculptured with fine, closely placed, equidistant, concentric threads, continuous over rostrum to the posterior border, with some intercalation of threads at the umbonal ridge; the interspaces are a little wider and somewhat irregular and the growth lines more evident near the margin. Immediately posterior to the umbos the border is slightly concave, the posterior extremity is narrow and bluntly rounded; the ventral margin curves gently to the rounded anterior extremity and the anterior border rises in a straight line

<sup>1</sup> Lat., *rubricatus*, marked with red.

to the umbos. The external hinge ligament is yellow-brown. The right valve has two cardinal teeth, an anterior and a strong posterior lateral; the left valve has a bifid anterior with a weak posterior cardinal and feeble anterior and posterior laterals. The interior is polished and tinted with shade of the exterior color; the posterior muscle scar is impressed; the pallial sinus is confluent with the pallial line almost to the anterior adductor impression, the tip distant from it one half millimeter and the upper border one and half millimeters below the umbo.

The species is near *T. flagellum* Dall 1900, dredged by the U. S. Fish Commission near Cape San Roque, Brazil. The shell in that species is white with a rose colored ray parallel to the umbonal ridge and occasionally a few other obscure rose colored rays. The shell of the new species is unicolorous; of six specimens collected in one locality four were rose color, two rosy orange, with a deeper colored radiate pattern and faint pencillings of deep pink. The pallial sinus of *T. flagellum* is slightly longer, a little broader and approaches the anterior adductor scar a little more nearly than in the new species.

The holotype, dredged in five fathoms off Blind Pass, Sanibel Island, Florida, is in the collection of the Academy of Natural Sciences, Philadelphia.

A number of individuals of a small Lamellaria were collected in the course of dredging operations in the Gulf of Mexico, off Sanibel Island, Florida. All that were found were in or about crevices in Compound Ascidians.

#### LAMELLARIA COCHINELLA, new species.<sup>2</sup>

The mollusc is brilliant scarlet, its shape and undulating movement suggest a flatworm or a nudibranch rather than a shelled mollusc. The mantle edges are wavy, cleft in front by a deep notch with rounded base. The cephalic end bears a short proboscis, two cylindrical tentacles. The foot is oval, narrowed behind, slightly truncate in front. The mantle completely covers and conceals the shell. The dorsal aspect of the animal is smooth and convex. Length 15, width 11 millimeters.

The small shell is auriform, oblique, altitude 6; greatest diameter 4; greatest thickness 3 millimeters; from upper angle of aperture to apex 1.5 millimeters.

The shell is pure white, with glossy, diaphanous epidermis.

---

<sup>2</sup> Lat., *lamella*, dim. of lamina, leaf, plate; Fr., *cochineille*, Castilian red.

The apex and first whorl extremely small, nucleus slightly depressed; the next whorl is larger and convex, the body whorl very convex and widely expanded; the sutures are incised and distinct. The body whorl is inflated and very convex at its junction with the columella and there is no trace of umbilication.

Above the periphery of the body whorl are two faint, revolving, incised lines; above these and nearer to the suture is one less distinct, interrupted line. Delicate incremental lines form fine longitudinal striations over the entire surface. The aperture is wide, entire; the outer lip is somewhat protracted into thin callus over the lower convexity of the whorl above. The columella is arcuate.

*CRASSISPIRA TAMPAENSIS* BARTSCHI, new subspecies.

Altitude 24; maximum diameter 7; altitude of spire 13 mm. Shell elongate, turreted, chocolate or mahogany-brown. Nucleus and post-nuclear whorl smooth. Riblets and faint spiral striations begin on first half of following turn; succeeding whorls bear increasingly stronger ribs and spirals. Eleven whorls, sutures distinct, wavy. A strong, undulating sub-sutural cord angulates summit of the whorls above a wide concave sulcus; the sulcus shows one, two, or three unequal spiral threads overlying retractively curved incremental lines. Below sulcus the axial ribs extend to the suture below. Ribs and interspaces crossed by three elevated ridges separated by wider interspaces. On body whorl eight strong revolving ridges cross and nodulate the axial ribs; the interspaces have fine spiral threads. Nine revolving cords below, beginning at columella. Aperture pyriform, dark within; outer lip with moderately deep notch in the subsutural sulcus. Columella callus. Anterior canal slightly oblique. Operculum dark, shape of aperture, with apical nucleus.

The subspecies differs from *C. tampaensis* Bartsch and Rehder in having definite, constant spiral threads in the sub-sutural sulcus, one or two more axial ribs, more generally distributed spiral striation and a uniformly dark-colored aperture.

Dredged in four to seven fathoms off Sanibel and Captiva Islands, Lee County, Florida.

SANIBEL, FLORIDA.

---

## NEW LAND AND MARINE TERTIARY SHELLS FROM SOUTHERN FLORIDA

BY THOMAS L. MCGINTY

*CEPOLIS CAROLI*, new species. Pl. 10, Figs. 6, 6a.

Shell imperforate, globose-depressed, solid; surface finely

rugose; spire low; whorls  $4\frac{1}{2}$ ; periphery strongly angular; base convex; a shallow furrow just below the periphery and a short distance behind the slightly expanded peristome which inside forms a callous fold. Aperture oblique, truncate-oval, with a columellar tooth within. Height 16.7 mm., width 29.4 mm.

Locality: Range line canal west of Boynton, Palm Beach County. Horizon: probably Pleistocene. Type in McGinty collection.

This *Cepolis* is one of the outstanding recent discoveries in the fossil fauna of south Florida. A single specimen was taken by the writer about 6 miles inland after canal dredging. Its characters are those of the small, typical imperforate form of *C. cepa* (Müll.), except that the apical whorls are more depressed, the summit not so conoidal as in *C. cepa*. The pit below the periphery, back of the outer lip, is narrow and long, as in some *C. cepa* from Sierra La Salle, Haiti; not a short, open pit as is more common in *C. cepa*. The periphery is strongly angular in front.

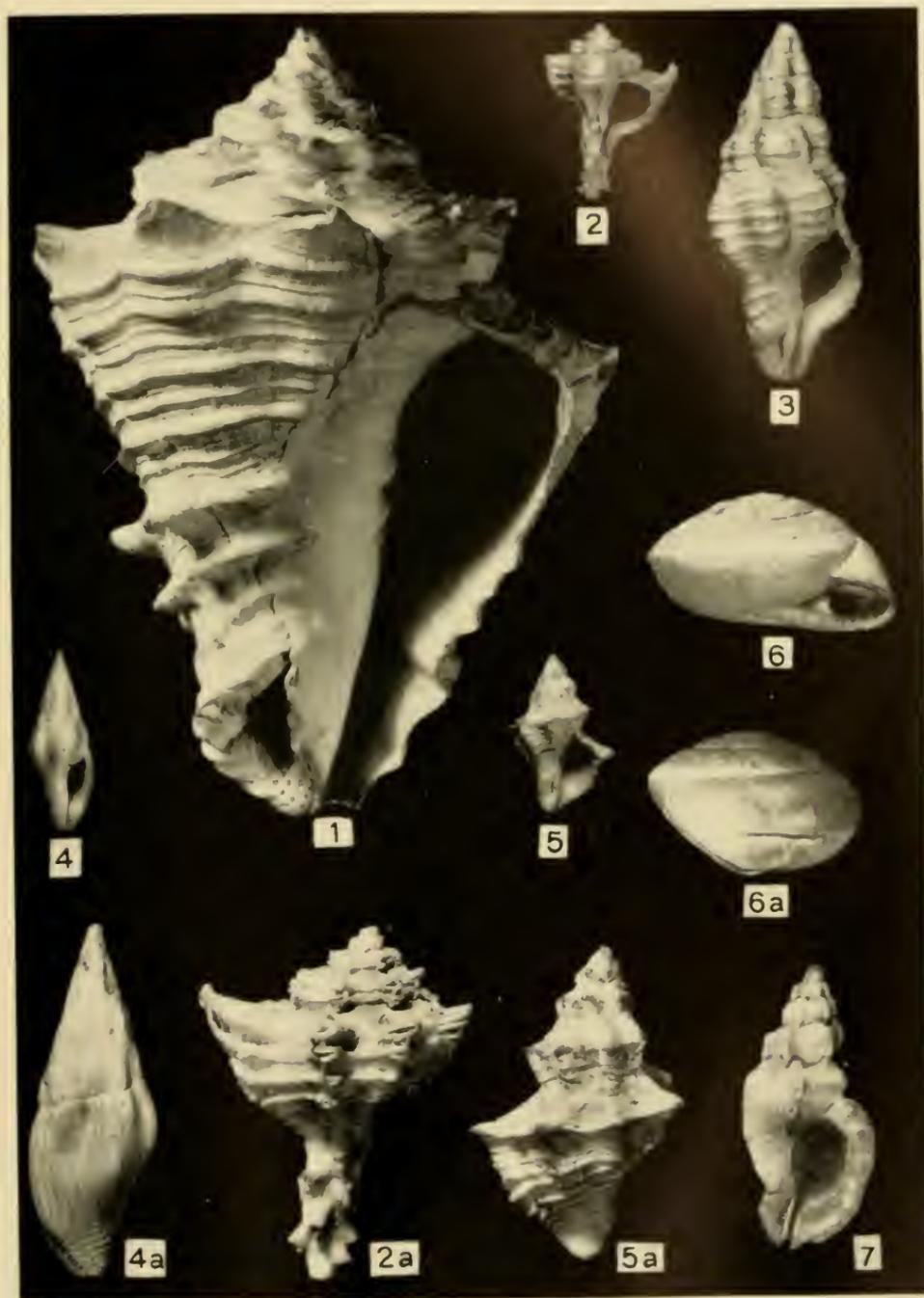
Named in honor of Dr. Carlos de la Torre.

VASUM FLORIDANUM, new species. Pl. 10, Fig. 1. Floridan  
*Vasum*.

Shell large, spire somewhat elevated, whorls about 7 (nucleus lost), prominently spined; a single row of large spines, not sharp, nine in number on the last whorl; surface sculpture of irregular mostly small spiral ridges, most conspicuous are two flat v-shaped ridges below the crown and two rounded ridges with a smaller between just above the basal spines, two rows of basal spines, about 6 in number with a smaller ridge below not spined each about equidistant; columellar plaits 4, upper largest; surface of shell covered with fine rugose lines of growth. Height 108 mm. (without nucleus), width 81 mm.

Locality: Ortona Locks, Caloosahatchee Canal (south side), Glades County. Horizon: Caloosahatchee marl, Pliocene. Holotype in McGinty collection.

This species may well be the pliocene progenitor of the recent *V. muricatum*. So far only the holotype, in splendid condition, and a recognizable fragment of this grand shell have turned up in the Caloosahatchee beds. *V. floridanum* differs from *V. muricatum* in having a more elevated spire, being gracefully spined and the sculpture is quite unlike the heavy ridges of the recent species.



1, *Vasum floridanum*. 2, 2a, *Tritonulia graciae*. 3, *Latirus juvenis*.  
 4, 4a, *Anachis chariessa*. 5, 5a, *Muricidea mansfieldi*. 6, 6a, *Cepolis caroli*.  
 7, *Aspella dirabothai*.  $\times 3$ . (Figs. 2a, 4a, 5a,  $\times 2$ .)



LATIRUS JUCUNDUS, new species. Pl. 10, Fig. 3. The delightful Latirus.

Shell fusiform, whorls 7 (apex lost), solid, with spire longer than the aperture, umbilicus slightly open; sculpture of rounded axial folds, about 7 in number on the last whorl, weak at suture and on the base; spiral threads on the shoulder and stronger cords below, the upper-most and those on the base alternating with smaller threads. Aperture elongate, lirae in the throat about 8. There are 4 columellar folds, about equal, and a strong ridge on the parietal wall near the posterior angle of the aperture. Height 43.8 mm., width 19 mm.

Locality: Belle Glade, Palm Beach County. Horizon: Pliocene (?) Holotype in McGinty collection.

*L. jucundus* can be most easily distinguished from *L. maxwelli* by the smaller size, the more slender shell, surface sculpture and the only slightly open umbilicus. The presence of two well developed cords on the earlier whorls suggests the recent *L. mcgintyi*.

ANACHIS CHARIESSA, new species. Pl. 10, Figs. 4, 4a. The graceful Anachis.

Shell slender, spire elevated, 7 whorls (nucleus lost), suture distinct; surface of shell smooth with well rounded separated ribs, strongest at suture, 4 largest on the last whorl; about 16 feeble threads on the base becoming a little stronger at the canal; aperture narrow and long, canal short, outer lip not much thickened with about 10 lirae within. Height 21.5 mm., width 7.8 mm.

Locality: Clewiston, Hendry County. Horizon: Caloosahatchee marl, Pliocene. Holotype in McGinty collection.

This graceful little shell appears to be the largest *Anachis* yet taken in the marls. The beautifully preserved holotype shows clearly some of the original color markings in the form of wavy brown lines on the surface of the shell.

MURICIDEA MANSFIELDI, new species. Pl. 10, Figs. 5, 5a.

Shell small, spire elevated about 6 shouldered whorls (nucleus lost), a single row of v-shaped spines not recurved, suture indistinct; sculpture of axial folds terminating with a row of spines (about 7 on the last whorl); spiral sculpture of weak threads on the shoulder becoming stronger below, about midway between the

crown and the base are 4 more prominent threads with smaller ones between. Aperture about one-half length of shell, lirate within about 6 in number; umbilicus almost closed. Height 20 mm., width 13 mm.

Locality: Clewiston, Hendry County. Horizon: Caloosahatchee marl, Pliocene. Holotype in the McGinty collection and a paratype in the U. S. National Museum.

This species is named for the late Dr. Wendell Clay Mansfield whose contributions to the knowledge of the tertiary of Florida were many and will prove invaluable to students in the future.

TRITONALIA GRACEAE, new species. Pl. 10, Figs. 2, 2a.

Shell small, spire low, about 5 whorls (nucleus lost), suture appressed, indistinct; whorls shouldered; about 7 foliated ribs or varices; ribs spined, stronger and some recurved on the crown; double row of basal spines in the siphonal region; aperture truncate-oval; canal straight, longer than the aperture. Height: 22 mm., width 16.8 mm.

Locality: Belle Glade, Palm Beach County. Horizon: Pliocene (?). Holotype in McGinty collection.

This attractive little shell is named for Grace Pilsbry, the discoverer. *T. graceae* can be distinguished from *T. macgintyi* by the lower spire, shouldered whorls, having larger recurved foliated spines on the crown and the straight canal.

---

## NEW STATE AND COUNTY RECORDS OF LAND-SNAILS IN PENNSYLVANIA

BY CHARLES B. WURTZ

This material is offered as an annotation to the list compiled by the Laboratory of Recent Invertebrates of the Carnegie Museum in 1931. The records are from the collections of the Carnegie Museum and the writer. Those from the Carnegie Museum collection are indicated by the initials "C.M." after the county name.

Three of the state records indicated by a star (\*) were recently published by the Laboratory of Recent Invertebrates at Carnegie Museum, but they are included here as a matter of convenience.

Many people have contributed to the writer's collection and aided in the accumulation of these records. Chief among these

are Mr. L. W. Henderson, of Waynesburg College, and Miss Dorothy Wentling of Mt. Holyoke College, who was in a large part responsible for the Lebanon County records.

Records new to the state are:

#### HELICIDAE

1. *Polygyra profunda efasciata* Walker. Counties: Allegheny C.M., Beaver C.M., Lawrence C.M.
2. *Polygyra monodon* (Rackett). Counties: Allegheny C.M., Butler, Crawford, Cumberland, Fayette C.M., Lawrence C.M., Schuylkill C.M., Westmoreland.
3. *Polygyra fraterna cava* (Lea).\* Erie County.

#### ZONITIDAE

4. *Ventridens suppressus virginicus* Vanatta. Counties: Allegheny C.M., Columbia C.M., Indiana C.M., Lebanon Philadelphia C.M., Westmoreland C.M.
5. *Paravitrea placentula lacteodens* (Pilsbry). Westmoreland County.
6. *Paravitrea capsella* (Gould).\* Westmoreland County.
7. *Retinella binneyana* (Morse). Counties: Allegheny, Cumberland.
8. *Retinella carolinensis* (Ckl.).\* Counties: Cumberland, Lawrence, Lebanon, Westmoreland.
9. *Retinella wheatleyi* (Bland). Allegheny County.
10. *Euconulus chersinus* (Say). Counties: Allegheny, Schuylkill C.M.

#### ENDODONTIDAE

11. *Anguispira alternata carinata* Pilsbry. Counties: Allegheny, Armstrong, Beaver, Erie C.M., Fayette C.M., Greene, Lancaster C.M., Lawrence, McKean C.M., Mercer C.M., Westmoreland.
12. *Anguispira alternata eriensis* (Clapp). Counties: Erie C.M., Lawrence.
13. *Discus patulus angulatus* Kutchka. Counties: Allegheny.

Records of species in counties, which have not, as yet, been published, are:

## HELICIDAE

1. *Polygyra tridentata* (Say). Counties: Center C.M., Erie, Mercer, Perry, Pike.
2. *Polygyra tridentata juxtidentis* Pilsbry. Counties: Berks C.M., Fayette.
3. *Polygyra fraudulenta* Pilsbry. Counties: Armstrong, Cumberland.
4. *Polygyra fallax* (Say). Counties: Allegheny C.M., Cumberland, Greene, Washington C.M., York C.M.
5. *Polygyra profunda* (Say). Washington C.M. County.
6. *Polygyra sayana* Pilsbry. Counties: Beaver, Clarion.
7. *Polygyra albolabris* (Say). Counties: Mercer, Tioga C.M.
8. *Polygyra zaleta* (Binney). Counties: Berks C.M., Erie.
9. *Polygyra multilineata* (Say). Crawford County.
10. *Polygyra dentifera* (Binney). Greene C.M. County.
11. *Polygyra denotata* (Fér.). Counties: Butler C.M., Fayette.
12. *Polygyra thyroidus* (Say). Counties: Berks C.M., Cumberland, Dauphin, Lebanon, Lycoming, Mercer.
13. *Polygyra clausa* (Say). Philadelphia County.
14. *Polygyra mitchelliana* (Lea). Beaver C.M. County.
15. *Polygyra hirsuta* (Say). Counties: Cumberland, Lebanon, Somerset C.M.
16. *Polygyra fraterna* (Say). Counties: Crawford C.M., Cumberland, Lawrence C.M.

## ZONITIDAE

17. *Ventridens intertextus* (Binney). Counties: Lawrence C.M., Tioga C.M.
18. *Ventridens demissus* (Binney). Fayette C.M. County.
19. *Ventridens ligerus* (Say). Counties: Cumberland, Lawrence, Schuylkill C.M.
20. *Ventridens suppressus* (Say). Counties: Beaver, Butler, Cumberland, Dauphin C.M., Lawrence, Lebanon, Schuylkill, Westmoreland.
21. *Ventridens gularis* (Say). Fayette County.
22. *Zonitoides nitidus* (Müller). Counties: Cumberland, Mercer C.M., Montgomery, Westmoreland.
23. *Zonitoides arboreus* (Say). Counties: Center C.M., Cumberland, Lebanon, Luzerne C.M.

24. *Striatura ferrea* Morse. Counties: Cumberland, Fayette, Lebanon.
25. *Striatura exigua* (Stimpson). Schuylkill C.M. County.
26. *Hawaiiia minuscula* (Binney). Cumberland C.M. County.
27. *Mesomphix perleavis vulgatus* (H. B. Baker). Counties: Beaver C.M., Fayette C.M., Greene, Somerset C.M.
28. *Mesomphix inornatus* (Say). Counties: Armstrong, Clarion C.M., Erie, Mercer, Somerset C.M., Tioga, C.M.
29. *Omphalina cuprea* (Raf.). Tioga C.M. County.
30. *Retinella electrina* (Gould). Counties: Clarion C.M., Fayette, Warren C.M.
31. *Retinella indentata* (Say). Counties: Cumberland, Lebanon, Potter C.M., Schuylkill.
32. *Retinella rhoadsi* (Pilsbry). Counties: Cumberland, Fayette, Mercer.
33. *Euconulus fulvus* (Müller). Counties: Allegheny, Erie C.M.

## ENDODONTIDAE

34. *Anguispira alternata* (Say). Counties: Dauphin, Erie, Lebanon, Tioga C.M.
35. *Discus patulus* (Desh.). Counties: Butler, Erie.
36. *Discus cronkhitei anthonyi* (Pilsbry). Counties: Cumberland, Fayette, Franklin, Green C.M., Lycoming C.M., Westmoreland C.M.
37. *Discus cronkhitei catskillensis* (Pilsbry). Counties: Allegheny C.M., Cumberland, Fayette C.M., Lawrence C.M., Philadelphia, C.M., Wyoming C.M.
38. *Helicodiscus parallelus* (Say). Counties: Cumberland, Fayette C.M., Lebanon, Schuylkill, Tioga, C.M., Wyoming C.M.

## SUCCINEIDAE

39. *Succinea avara* Say. Crawford C.M. County.
40. *Succinea ovalis* (Say). Counties: Butler, Lawrence, Mercer C.M., Schuylkill C.M.
41. *Succinea retusa* (Lea). Counties: Berks C.M., Philadelphia C.M.

## PUPILLIDAE

43. *Pupoides marginatus* (Say). Counties: Fayette, Lawrence, Lebanon.
44. *Gastrocopta armifera* (Say). Counties: Cumberland, Fayette, Franklin, Lebanon, Washington C.M.
45. *Gastrocopta contracta* (Say). Counties: Cumberland, Lebanon, Schuylkill C.M.
46. *Gastrocopta pentodon* (Say). Schuylkill C.M. County.
47. *Gastrocopta tappaniana* (C. B. Adams). Erie C.M. County
48. *Gastrocopta corticaria* (Say). Counties: Butler, Lebanon.
49. *Vertigo ovata* Say. Counties: Erie C.M., Lebanon, Washington C.M.

## STROBILOPSIDAE

50. *Strobilops labyrinthica* (Say). Cumberland County.

## VALLONIIDAE

51. *Vallonia costata* (Müller). Counties: Cumberland C.M., Lebanon.
52. *Vallonia pulchella* (Müller). Counties: Bucks C.M., Butler, Cumberland, Lebanon, Wyoming C.M.
53. *Vallonia excentrica* (Sterki). Cumberland C.M. County.

## CARYCHIIDAE

54. *Carychium exiguum* (Say). Counties: Erie C.M., Schuylkill C.M.
55. *Carychium exile* H. C. Lea. Washington C.M. County.

## REFERENCES

- BROOKS, S. T., A List of the Land-Snails of Pennsylvania with a Summary of Their Distribution, *Annals Carnegie Mus.*, vol. xx, pp. 313-331, 1931.
- MACMILLAN, G. K., Land Snails New to the Fauna of Pennsylvania, *NAUTILUS*, vol. 53, no. 2, pp. 47-49, 1939.

MEXICAN SUBULINIDAE AND SPIRAXINAE WITH  
NEW SPECIES OF SPIRAXIS

BY H. BURRINGTON BAKER

This constitutes part 6 of a series on Mexican mollusks collected for Dr. Bryant Walker in 1926. The first part appeared (1928) as Occasional Papers Mus. Zool. Univ. Michigan, no. 193, in which the symbols for localities are explained on pp. 2-25. In each new species, the figured shell is the type [University of Michigan Museum of Zoology; part of type lot in Academy of Natural Sciences of Philadelphia.].

SPIRAXIS (VERSUTAXIS) ARCTATUS, new species. Pl. 11, fig. 5.

Shell (pl. 11, f. 5) cylindric turrite, whitish corneous, polished, translucent, with widely spaced incised major growth-lines interspaced with weaker ones. Whorls  $7\frac{1}{2}$ , flat-sided with prominent, overlapping suture. Apex small; embryonic whorls about 2.5, quite rapidly widening; first 2 almost smooth and remainder assuming neanic sculpture. Later whorls lengthening; first with 18 major growth-lines; second with 15; third and fourth with 19; fifth with 18 and last with 20. Aperture trapezoid-lanceolate, with greatest dimension about  $20^\circ$  to shell-axis; peristome slightly thickened, almost vertical and moderately arcuate; columella weakly sigmoid and thickened. Alt. 3.49 mm., diam. 25 (0.86), alt. last whorl 39 (1.35); aperture alt. 24 (0.84), diam. 54 (0.45 mm.).

Below Necaxa (D, I, a, 54), 2625 ft. *S. arctatus* presents in miniature an outline like that of *S. subopeas* but has more widely spaced, stronger growth-lines. It has longer, more flattened whorls than either *S. futilis* or *S. patzcuarensis*, which are of similar size.

S. (VOLUTAXIS)SULCIFERUS ATOYACENSIS, new variety. Pl. 11, fig. 3.

Shell (pl. 11, f. 3) similar to *S. sulciferus* (Mo.) in shape. Embryonic whorls 2.5; last gradually assuming a sculpture of low, relatively closely spaced threads. Later whorls with more widely spaced riblets than in typical form and with interspaces increasing up to last (instead of penult) whorl; first with 25 riblets; second with 15; third with 18; fourth with 22; fifth with 21 and last with 36. Alt. 7.52 mm., diam. 34 (2.55), alt. last whorl 42 (3.16); aperture alt. 26 (1.97), diam. 72 (1.42 mm.); 9 whorls.

Atoyae (D, I, a, 1), 1300 ft., frequent.

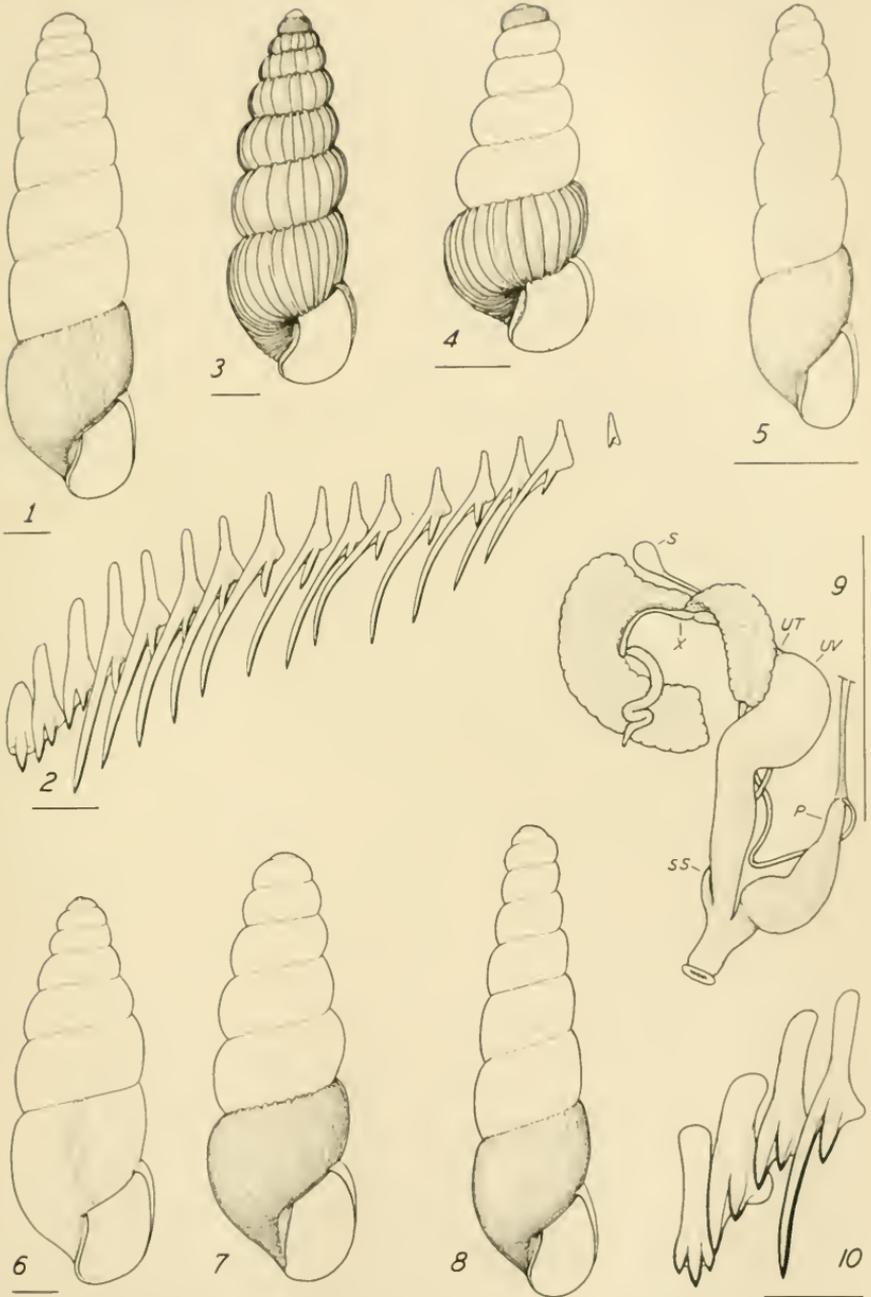
SPIRAXIS (VOLUTAXIS) FALLAX, new species. Pl. 11, fig. 4.

Shell (pl. 11, f. 4) conical-turrite, silvery-white, translucent, with thin, widely spaced ribs. Whorls  $7\frac{1}{4}$ , very convex, with deep, broken suture. Embryonic whorls  $2\frac{1}{4}$ , quite rapidly widening; first large, almost smooth; remainder gradually assuming closely spaced threads. Later whorls short, fairly rapidly increasing, with thin papery ribs and wide, finely striate interspaces; first with 27 ribs; second with 24; third with 28; fourth with 32 and last with 31. Aperture subquadrate, quite large; longest dimension about  $30^\circ$  to shell-axis; peristome slightly thickened, almost vertical and nearly straight. Columella sinuous, but less so than in *S. sulciferus*. Alt. 4.62 mm., diam. 41 (1.88), alt. last whorl 44 (2.05); aperture alt. 26 (1.19), diam. 85 (1.01 mm.).

Los Tortolas, Córdoba (ABCD, III, a, 4), 3000 ft.; quite common. *S. fallax* has probably been confused with young specimens of *S. sulciferus* (or its paedogenetoid form) but has a more conical shell with thinner ribs and is considerably smaller for the same number of whorls. It is actually closer to *S. uruapamensis* Pils., but appears to be uniformly smaller with more distant ribs.

SPIRAXIS (VOLUTAXIS) SUBULINUS, new species. Pl. 11, figs. 1, 2.

Shell (pl. 11, f. 1) cylindric-turrite with convex sides, whitish corneous, weakly translucent, rib-striate. Whorls  $9\frac{1}{8}$ , lightly convex, with well impressed, quite simple suture. Apex small; embryonic whorls about 3, quite rapidly widening; first 2 almost smooth; last assuming low, rounded, regularly and closely spaced growth-wrinkles. Later whorls short, gradually increasing at first but noticeably lengthening at last; earlier ones with low, closely spaced, rounded threads; later ones with irregular wrinkles which become so low and poorly demarcated from each preceding interspace that the sculpture practically consists of weak slopes, each followed by an incised line that is deepest just below suture and dies out toward base of last whorl; first four neanic whorls with 52-53 threads; fifth and sixth with about 58 and last with 61. Aperture trapezoidal, with longest dimension about  $25^\circ$  to shell-axis; peristome almost vertical ( $10^\circ$  to shell-axis) and very little arcuate. Columella somewhat thickened, sigmoid. Alt. 10.54 mm., diam. 26 (2.75), alt. last whorl 36 (3.79); aperture alt. 21 (2.21), diam. 64 (1.41 mm.). Radular formula (f. 2): 15-1- (2  $\pm$  13), with 36 rows.



1-2, *Spiraxis subulius*. 3, *S. sulciferus atoyacensis*. 4, *S. fallax*. 5, *S. arcatus*. 6, *S. tenuicostatus obesus*. 7, *S. minusculus*. 8, *S. altitudus persulcatus*. 9-10, *S. (Reclaxis) granum*.



Above Necaxa (BCD, III, a, 34), 5000 ft., quite common. *S. subulinus* must be somewhat similar to *S. tenuis* Pfeiffer, but is much slenderer and apparently has more flattened threads. A smaller form, with more regular whorl-increase and less arcuately spiral columella, occurs (station 35); it measures: alt. 8.90 mm., diam. 26 (2.28 mm.), alt. last whorl 37 (3.25); aperture alt. 21 (1.97), diam. 62 (1.23);  $9\frac{1}{2}$  whorls.

*S. (VOLUTAXIS) TENUECOSTATUS OBESUS*, new subspecies. Pl. 11, fig. 6.

Shell (pl. 11, f. 6) bulimoid-turrite, greenish white, little translucent, closely thread-ribbed. Whorls,  $8\frac{1}{4}$ , quite convex with impressed, erenulate suture. Apex small; embryonic whorls  $2\frac{3}{4}$ , with first two almost smooth. Later whorls short but last relatively long, with thread-riblets about as wide as interspaces, crested below suture and weaker on base of last whorl; first two neanic whorls with 65 threads; third with 76; fourth with 83; fifth with 72 and last with 68. Aperture trapezoidal, with longest dimension about  $30^\circ$  to shell-axis; peristome almost vertical and moderately arcuate (less so than in some examples of *S. tenuecostatus*). Columella twisted but almost straight, moderately thickened. Alt. 8.56 mm., diam. 37 (3.14 mm.), alt. last whorl 48 (4.12); aperture alt. 29 (2.49), diam. 63 (1.57).

Tenango Hills, near Necaxa (D, III, a, 41), 4600 ft. Although sculptured like the typical form, this subspecies has more rapid whorl-increase, which makes adults bigger and more swollen; no intergrading individuals have been observed.

*S. (VOLUTAXIS) NITIDUS PERSULCATUS*, new subspecies. Pl. 11, fig. 8.

Shell (pl. 11, f. 8) subulate-turrite, very light corneous, glassy, transparent, with quite close, deeply incised growth-lines. Whorls  $9\frac{1}{4}$ , with flattened sides and simple suture. Apex relatively small; embryonic whorls almost 3; first  $2\frac{1}{4}$  almost smooth but remainder assuming close growth-striae, which demarcate rounded threads. Later whorls with much closer growth-striae than in typical *S. nitidus*, especially on the last whorl, and with very weak traces of spirals; first with about 55 striae; second to fourth with 45 or 46; fifth with 54 and last whorl with 72. Aperture renate-trapezoidal, with long dimension almost  $30^\circ$  to shell-axis; peristome almost vertical, weakly arcuate; columella slightly thickened, oblique and lightly twisted. Alt. 7.28 mm., diam. 26

(1.89), alt. last whorl 37 (2.69); aperture alt. 22 (1.60), diam. 67 (1.07).

Below Necaxa (BD, III, a, 54), 2625 ft. Strebel and Pfeffer state that this form intergrades with typical *S. nitidus* (S. & P.), which has widely spaced sulci on the last whorl, but I see no evidence of this in my material. The columella is less sigmoid than is usual in *Volutaxis*.

SPIRAXIS (MICROMENA) MINUSCULUS, new species. Pl. 11, fig. 7.

Shell (pl. 11, f. 7) cylindric-turrite, greenish white, translucent, thread-costulate. Whorls  $7\frac{1}{4}$ , fairly short, convex; suture crenulate. Apex rounded; embryonic whorls  $2\frac{1}{4}$ , quite rapidly widening, almost smooth (weakly punctate) except last half-whorl, which develops fine, closely spaced growth-threads and spiral impressed lines. Later whorls quite short, gradually increasing, last rather abruptly tapered basally; each with about 37 thread-riblets, which are not as wide as interspaces, are crossed by fine spiral striae and become weaker on base of last whorl. Aperture slightly oblique (about  $20^\circ$  to shell-axis), broadly ovate-trapezoidal; peristome little arcuate, almost vertical, not thickened; columella almost straight, expanded above, tapering and almost without truncation. Alt. 3.08 mm., diam. 34 (1.06 mm.), alt. last whorl 42 (1.30); aperture alt. 26 (0.80), diam. 62 (0.50 mm.).

Below Necaxa (D, III, a, 54), 2625 ft.; infrequent. This species rather closely resembles *S. canalzonalis* (Pilsbry), but the latter has a high last embryonic whorl and narrow columella like *S. (Rectaxis) decussatus* and its riblets do not appear to crenulate the suture. *S. minusculus* also may have similar growth sculpture to *S. linearis* Pfeiffer, as figured by Strebel und Pfeffer, but the last has much more oblique whorls and appears to have the columella of a *Versutaxis*. The spiral striae of *S. minusculus* become much weaker and more irregular, especially on the last whorl, than in the smaller *S. minutus*.

The following Subulinidae and Spiraxinae were collected in 1926:

*Lamellaxis (Leptopeas) argutus* (Pilsbry), Córdoba (alt. 2625–3000 ft.) and Necaxa (2625–5500 ft.); ABCD, III, a, 3, 4, 33–37, 52–54; especially common in disturbed places without excessive leaf-humus; often stouter [ $9.02 \times 38$  (3.43 mm.)], with stronger columellar truncation and weaker growth-wrinkles on last whorl at Necaxa.

*L. (s. s.) mexicanus* (Pfr.) and f. *abbreviatus* (Marts.), Necaxa (2215–5500 ft.); ABCD, III, a, 33–36, 51–55; mores like preceding; with weaker growth-riblets at higher altitudes (thus approaching *L. tamaulipensis*). *L. martensi* (Pfr.), Atoyac (1400 ft.); and form *modestus* (S. & P.), Atoyac to Córdoba (1300–3000 ft.); AD, I, a, 1, 4.

*Synopeas beckianum* (Pfr.), Atoyac to Córdoba (1300–3000 ft.) and Necaxa (2215–5500 ft.); ABCD, III, a, 1, 3, 4, 24, 33–35, 52–55; in leaf humus.

*Spiraxis (Miraradula) similaris* (S. & P.), Peñuela to Sumidero (2625–3400 ft.) and Necaxa (2215–3120 ft.); AD, III, a, 3, 4, 6, 52–54; common. *S. (M?) miradorensis* (S. & P.), Peñuela to Córdoba (2625–3000 ft.); AD, III, a, 3, 4; infrequent.

*S. (Rectaxis) intermedius* (S. & P.), Peñuela to Córdoba (2625–3000 ft.); AD, III, a, 3, 4; quite common. *S. granum* H.B.B., Peñuela (2700 ft., rare) and Necaxa (2625–3120 ft., common); D, III, a, 3, 52–54. *S. subtilis subtilis* H.B.B., Córdoba (2625–3000 ft.); D, I, a, 4; quite rare. *S. s. vitreus* H.B.B., Necaxa (2625 ft.); D, I, a, 54; quite rare. *S. subnitidus* H.B.B., Necaxa (5000 ft.); B, II, a, 33; rare.

*S. (Versutaxis) subgranum* H.B.B., Córdoba (3000 ft.), A, I, a, 4; quite rare. *S. opeas* H.B.B., Necaxa (3120–5000 ft.); BD, I, a, 34, 52; infrequent. *S. subopeas* H.B.B., Necaxa (2625–5500 ft.); BCD, III, a, 31, 33, 37, 53, 54; frequent. *S. futilis* H.B.B., Necaxa (3000–5000 ft.); BCD, III, a, 33, 35, 41, 53; quite infrequent. *S. arctatus* H.B.B., Necaxa (2625 ft.); D, I, a, 54; very infrequent.

*S. (Mirapex) acus* (Sh.?) *enigmaticus* H.B.B., Córdoba (2650 ft.); D, I, a, 4; infrequent.

*S. (Volutaxis) sulciferus sulciferus* (Mo.), Atoyac (1300 ft.), D, I, a, 1; rare; and paedogenetoid form (*berendti* Pfr., preoccupied in *Spiraxis*), Potrero to Peñuela (2150–2950 ft.); 2, 3; quite rare. *S. s. atoyaccensis* H.B.B., Atoyac, with paedogenetoid form, Córdoba (3000 ft.); D, I, a, 1, 4; frequent at Atoyac. *S. fallax* H.B.B., Peñuela to Córdoba (2625–3000 ft.) and Necaxa (2215–5500 ft.); ABCD, III, a, 3, 4, 33–35, 37, 52–55; quite common. *S. subulinus* H.B.B., Necaxa (3000–5500 ft.); BCD, III, a, 33–36, 53; quite common, especially above falls. *S. tenuccos-*

*tatus tenuicostatus* (S. & P.), Necaxa (2625–3120 ft.); D, III, a, 52–54; frequent. *S. t. obesus* H.B.B., Necaxa (4600–5000 ft.); B, I, a, 34, 41; rare. *S. nitidus* (S. & P.) *persulcatus* H.B.B., Necaxa (2625–5000 ft.; frequent) and Peñuela (2625 ft.); BD, III, a, 3, 34, 35, 51–54.

*S. (Pseudosubulina) berendti berendti* (Pfr.), Necaxa (3000–5500 ft.); ABCD, III, a, 33, 35, 41, 53; frequent. *S. irregularis negligens* H.B.B., Necaxa (2215–5500 ft.); ABCD, III, a, 24, 31, 33–38, 42, 53, 55; and stout form (4430–5000 ft.); ABC, III, a, 34, 35, 37, 38, 41; both quite common. *S. ventrosus* H.B.B., Necaxa (4600 ft.); B, I, a, 41. *S. borealis* Pilsbry, Necaxa (4600 ft.); C, I, a, 36; infrequent. *S. caducus* H.B.B., Córdoba (2625–3000 ft.); AD, III, 3, 4; quite common but stout form quite infrequent. *S. orizabensis* (Pils.), Córdoba (2625–3000 ft.); D, I, a, 4; quite infrequent. *S. costatus* H.B.B., Atoyac to Córdoba (1300–3000 ft.); AD, I, a, 1, 4; infrequent. *S. arcuatus* H.B.B., Sumidero (3400 ft.); D, I, a, 6; very rare. *S. parvus* H.B.B., Necaxa (2625–5500 ft.); BCD, III, a, 33, 34, 52, 54; quite infrequent.

*S. (Micromena) minutus* H.B.B., Necaxa (2625–3120 ft.); D, III, a, 52–54; very common in limestone talus. *S. minusculus* H.B.B., Necaxa (2625–3000 ft.; infrequent) and Córdoba (2650 ft.; rare); D, III, a, 4, 53, 54.

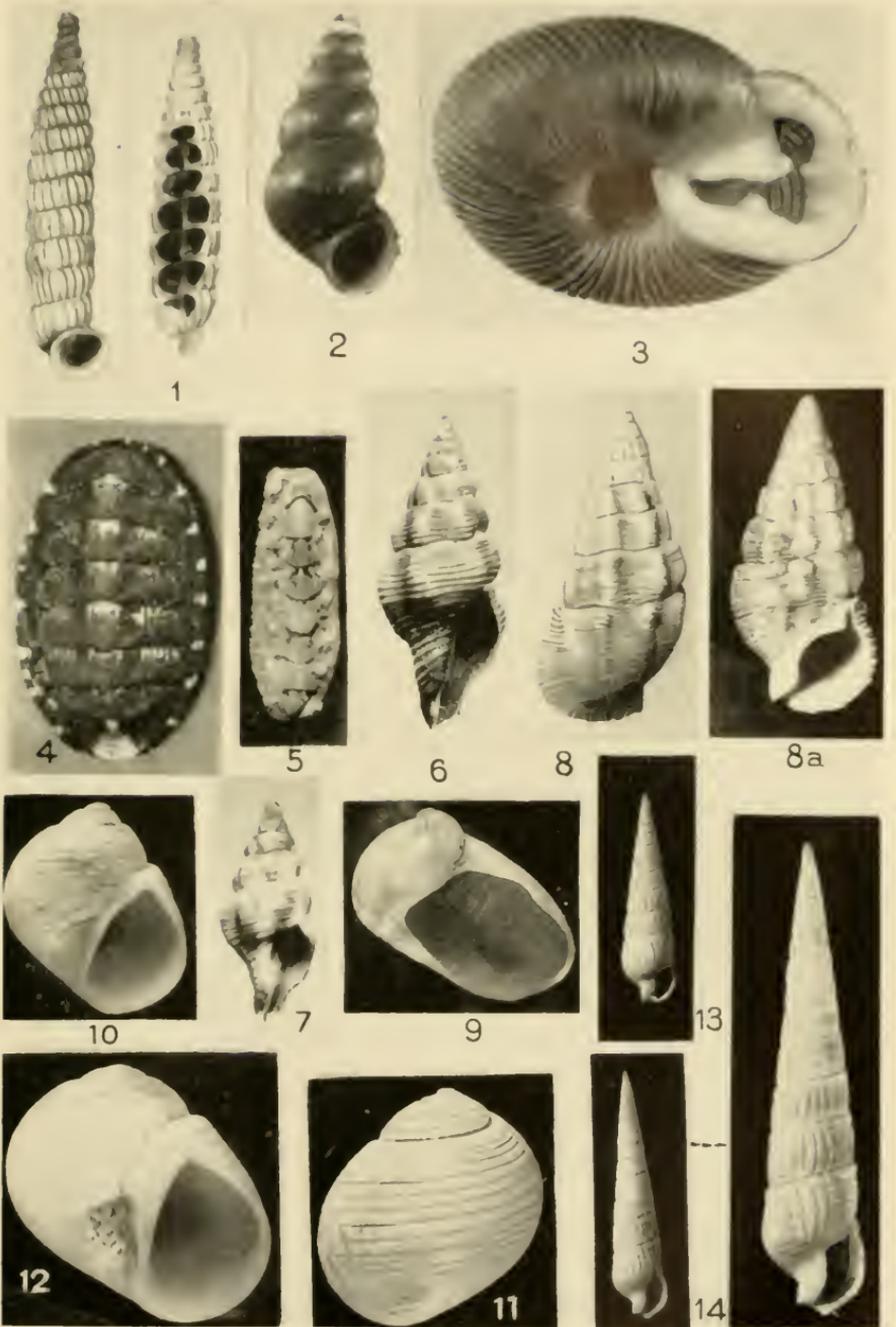
---

## A NEW UROCOPTID MOLLUSC FROM THE STATE OF SONORA, MEXICO

BY JOSHUA L. BAILY, JR. AND RUTH INGERSOLL BAILY

HOLOSPIRA (HAPLOCION) KINONIS, sp. nov. Plate 12, fig. 1.

Shell with elongated spire of about 16 whorls, the upper 11 of which taper toward the apex, the remainder of the spire being cylindrical. The later whorls show an extremely slight taper. The nuclear whorls are smooth, inflated, somewhat irregular in shape and their axis is tilted. The remaining whorls are ornamented with fine transverse ribs, of which there are 24 on the penultimate whorl of the holotype, somewhat less on the other whorls. The intercostal spaces are much wider than the ribs. On the early whorls these ribs are somewhat oblique, so that in immature shells the aperture faces slightly away from the apex, but in the mid part of the spire they lie in planes normal to the



1, *Holospira kinouis* J. L. & R. I. Bailey. 2, *Pomatopsis praelonga* B. & M. 3, *Polygyra tridentata rugosa* B. & M. 4, *Lepidochitona tropica* Pilsbry, length 13.8 mm., Bonefish Key, Fla. 5, *Acanthochitona balesae* Pilsbry, length 10.5 mm., Bonefish Key, Fla. 6, 7a, *Latirus cymatius* Schwengel, Palm Beach. 8, 8a, *Cerithium auricoma* Schwengel, Pelican Shoals, Fla. 9, *Marseniina* sp., - 3, Palm Beach. 10, 11, *Sigatica semisulcata holograpta* McGinty, - 3; Boynton Beach, Fla. 12, *Sigatica semisulcata* Gray, - 3. 13, 14, *Terebra glossoma* Schwengel, Pelican Shoals, Fla.



suture. On the lower whorls they become sigmoid and on the body whorl they are continued over the angulation at the base of the shell into the umbilicus which is very narrow but distinctly open in the adult shell. The terminal portion of the body whorl projects somewhat, so that the aperture is nowhere in contact with the penultimate whorl. The aperture is ovate, with its axis inclined to that of the shell; the peristome is continuous and expanded.

Internally the axis is extremely slender and smooth, without lamellae or any other ornamentation, referring this species to the subgenus *Haplocion* beyond any doubt. The shell is gray, the apical whorls being much darker than the rest of the shell.

Length	14.5 mm.	Breadth	3.1 mm.	Holotype
"	13.7 "	"	3.1 "	Paratype
"	11.5 "	"	3.3 "	"
"	10.8 "	"	3.2 "	"

The shells were collected by the senior author in February, 1939, in tidal drift, about two miles south of Cochore, near Guaymas, Sonora.

The long, attenuated spire gives this shell the appearance of an *Epirobia*, or a *Urocoptis*, but the smooth columella is conclusive evidence as to its systematic position. The shells did not contain the soft parts, consequently nothing is known of the anatomy.

The specific name has been given in honor of Father Eusebio Francisco Kino, the cartographer who explored and mapped the "Vermilion Sea" in 1683-5, who proved the peninsular nature of Baja California, and who made the first collection of shells from the Pacific coast of North America.

In appreciation of the kindness of Dr. H. A. Pilsbry in assisting with the determination of this material, the holotype and three paratypes have been deposited in the collection of the Academy of Natural Sciences, (No. 174953).

## NEW GASTROPODA FROM WEST VIRGINIA

BY STANLEY T. BROOKS AND GORDON K. MACMILLAN

Collections made throughout West Virginia during the summer of 1938 by the junior author have brought to light the following mollusca, which are new to conchology:—

## POMATIOPSIS PRAELONGA, sp. nov. Pl. 12, fig. 2.

Shell elongate, turreted, and narrow. Color brownish horn. Surface somewhat shining and somewhat wrinkled, lines of growth very fine and hardly discernible. Apex slightly rounded, flattened; nuclear whorl emergent, sculpture worn and smooth. Whorls 8, somewhat rounded, slowly and regularly increasing in diameter. Suture deeply impressed. Spire acute, about three and a half times as long as aperture. Aperture ovate, somewhat narrowed and angled above, rounded below. Peristome thickened and extremities connected. Umbilicus well marked, emargined by inner lip which is reflected over the umbilical region. Base rounded. Length 7.5, width 2.25 mm.

Type Locality: Hillside along Elk River, 1.5 miles south of Clay, Clay County, West Virginia. Holotype: Carnegie Museum #62.32897, Section of Recent Invertebrates. Paratypes: United States National Museum #473964, Academy of Natural Sciences #174910, and Carnegie Museum #62.32898, Section of Recent Invertebrates.

This is a much longer and narrower species of *Pomatiopsis* than *lapidaria*. *P. praelonga* has a coarser sculpture, more thickened peristome, and much flatter whorls than *lapidaria*. In the number of whorls and the length of the shell, *praelonga* is much like *P. scalaris*, but it is much narrower and a recent shell in comparison to *scalaris* from the loess of the Wabash River near New Harmony, Ind.

*P. praelonga* was found under the dead fronds of ferns near the base of the plant usually where the immediate hillside was rocky and covered with dead leaves. This habitat was from 100 to 150 feet above the Elk River.

## TRIODOPSIS TRIDENTATA RUGOSA var. nov. Pl. 12, fig. 3.

Shell somewhat depressed, costate, reddish-horn color, with a narrow umbilicus. Whorls  $5\frac{1}{2}$ , flattened above and rounded below, the body-whorl rounded. Suture impressed. Rib-striations prominent and continue undiminished into the umbilicus; interstitial striae few and faint; spiral striae weak, hardly discernible; a few granulations are visible on the upper whorls, becoming more numerous on the basal part of the shell. Striations on embryonic whorl and a quarter very weak; on next whorl and a half they become broken into short bars; and on remaining whorls they become gradually larger until they are rib-like on the last two whorls. Aperture lunate, tridentate; peristome white, broad, thickened

within; outer margin bearing a small, narrow, squarish tubercle which is bent slightly inward; basal lip bearing a marginal tubercle; parietal denticle tongue-shaped, entering slightly into the aperture, and separated from the umbilical margin of the peristome by a narrow channel. Umbilicus narrow, deep, the inner whorls hardly perceptible. Greater diameter 10.9, lesser diameter 9.2, height 5.6 mm.

Type Locality: Damp Ravine, Blair Mountain, 1 mile southwest of Blair, Logan County, West Virginia. Holotype: Carnegie Museum #62.32899, Section of Recent Invertebrates. Paratypes: United States National Museum #473963, Academy of Natural Sciences #174909, and Carnegie Museum #62.32900, Section of Recent Invertebrates.

Distribution: In addition to the type locality it occurs as follows: West Virginia: Cliffs and hillside, 2 miles southeast of Blair, Logan Co.; Sandstone bluffs and hillside, along Salmon Creek, Hughes Ferry Bridge, 3 miles south of Summersville, Nicholas Co.; Hill and ravine, along Cranberry River, Camp Woodbine, 7 miles north of Richwood, Nicholas Co.; woods along Muddlety Creek, near Summersville, Nicholas Co.; and Slagle, Logan Co.

This shell might easily be mistaken for *Triodopsis hopetonensis*, but it is a small variety of *T. tridentata*. However, it differs from *hopetonensis* by the shape of the aperture, marginal teeth, and parietal denticles; the rib-striations of *hopetonensis* are more numerous, closer together and not as prominent as in *rugosa*; there is also a difference in the embryonic and post-embryonic sculpture.

In *Triodopsis vannostrandi alabamensis* the shape of the parietal denticle is somewhat like that of *rugosa*, although the aperture is squarish and the marginal tooth is bent much more inwardly. In both these last two species the peristome is not nearly as thick as in *rugosa*.

In *T. tridentata rugosa* the rib-striations are farther apart, the granulations are not as numerous on the upper or lower parts of the shell, and the striations on the embryonic and post-embryonic whorls are more numerous and more crowded together than in the form *juxtidentis*. In the latter form there is a wider channel between the parietal denticle and the umbilical margin of the peristome than in *rugosa*.

*Triodopsis tridentata rugosa* is found particularly in ravines and valleys that are narrow and damp.

A NEW VARIETY OF *POLYGYRA APPRESSA* (SAY)

BY GORDON K. MACMILLAN

While engaged in the task of re-organizing the collection of North American Land Snails at the Carnegie Museum, I discovered a variety of *Polygyra appressa* (Say) that was different in many aspects from this species and its varieties. This new variety is:—

*POLYGYRA APPRESSA EXTREMA* n. var.

Shell somewhat depressed, pellucid, costate, punctate, reddish-horn colored, and with a closed umbilicus. Whorls  $5\frac{1}{4}$ , flattened above and rounded below, the body-whorl acutely angular above the median line. Striations large, prominent, and far apart above, slightly less prominent below, crowded and continuing to the covered umbilical region; spaces between striations crowded with small and fine punctations; spiral striae few and very weak, hardly discernible, and present only on the body-whorl. Striations on embryonic whorl and a quarter weak and crowded, with one longitudinal row of punctations between them; on the remaining whorls the striations become gradually larger and further apart, and the punctations become more numerous. Aperture oblique, compressed and sub-triangular in shape; peristome broad, angularly reflected, and thickened within, the basal margin possessing a long, lamella-like denticle; the parietal wall bears an erect, curved and tongue-shaped tooth which enters the aperture at an oblique angle. Greater diameter 17, lesser diameter 14 mm.; height  $7\frac{1}{2}$  mm.

Type Locality: Jefferson County, Tennessee. Holotype: No. 6467, George H. Clapp Collection in the Laboratory of Recent Invertebrates, Carnegie Museum; Paratypes, 71887, Acad. Nat. Sci. Phila.

In general shape *P. appressa extrema* is much like *P. appressa* (Say), but the periphery is much more acutely angulated and the shell is more depressed, the striations are more prominent and further apart, and the spiral striae are very few or wanting in comparison to the numerous ones revolving around the body-whorl of *P. appressa*. The striations are even more prominent than those of *P. appressa tryoni*, Pils., *P. appressa perigrapta*, Pils., and *P. appressa fosteri*, F. C. Baker; they are more like the striations of *P. appressa linguifera* (Lam.).

## OBITUARY

## FRANCIS ROBERT LATCHFORD

1856-1938

The death last year of Chief Justice Latchford marks the end of an era in Canadian conchology. While he lived there was a link between the "new recruits" and the "old guard," for Latchford knew personally or by correspondence most of the pioneers not only of Canadian but also of American Conchology. His personal friends included Bryant Walker, the Reverend Mr. Taylor, A. W. Hanham and many more; to name his correspondents would involve enumerating most of the American conchologists of the latter half of the nineteenth century. We count ourselves fortunate to have known this grand old man and to have listened to his tales of collecting in earlier days.

First let us set down the milestones of his life and then attempt to fill in the picture with stories from our acquaintance with him. Francis Robert Latchford was born of Irish parents in the village of Aylmer, Quebec, some ten miles west of Ottawa, on the banks of the Ottawa River. His birthplace was to have an important bearing on his life; Aylmer, though English in name, had, and still has, a population about equally divided between French and English Canadians; in the 1860's and 1870's it had a number of inns much frequented by the lumbermen going to or from the lumber camps on the upper Ottawa. Here Latchford learned French as well as English, and all his life spoke both fluently. Here he learned to know the rough and sometimes boisterous lumbermen and later had many a story to tell about the bush and the lumber camps.

Early in life he showed promise, and as a student at Ottawa University he won medals and awards for English and Latin essays, Christian doctrine and science. He graduated from the University of Ottawa in 1882 and continued his studies in law, became a barrister in 1886 and a King's Counsel in 1899. He practised in Ottawa where he became a leader in his profession.

Politics soon attracted him and in 1899 he was elected as a member of the provincial parliament for South Renfrew, retaining that seat until 1905, being successively appointed Commissioner of Public Works and Attorney-General. In 1908 he was

appointed a judge of the Supreme Court of Ontario, which position he held until his death. But his public duties did not end there; under his stimulus the Temiskaming and Northern Ontario railroad was pushed to completion and one station on this railroad bears his name. The construction of the T. & N. O. opened up the rich mining regions of Northern Ontario; the names of its stations alone conjure up pictures of vast mineral wealth: North Bay, Cobalt, Cochrane; mine after mine delving into the Pre-Cambrian Shield for precious metals.

A man with such a full life might be forgiven for not having many hobbies; but Latchford found time during his busy career for natural history, hunting, golf and the study of Canadian and Irish history.

In natural history we know him best as a conchologist but he also had a surprisingly wide knowledge of botany and ornithology; his hunting and fishing were not mere slaughter, but, as a fellow hunter of his told one of us, he hunted and fished like a gentleman, confining himself to a decent bag. His interest in conservation led to his election as President of the North American Game Protective Association in 1902.

In the field of history his contributions were numerous and his knowledge encyclopaedic. A few years before his death he was elected President of the Catholic Historical Society of Canada.

We come now to a facet of his varied career which was the link which brought us into contact with him. Both of us, in our earlier conchological groupings, had come across the name of Latchford but we unconsciously thought of him as one of the long-departed pioneers. It was a pleasant shock, therefore, to find that F. R. Latchford was very much alive and active and willing to become counsellor and friend to struggling young shell-hunters. As we came to know him better, in his own home, in the field and through letters, our admiration grew for him and we drew more and more from his knowledge of Canadian Mollusca.

Even before his admission to the Bar he was interested in Mollusca and had become a leader of the Conchological Branch of the Ottawa Field-Naturalists' Club. The reports of the Branch contain much of the information on which the 1890 list of Ottawa shells was based and represents much painstaking and enthusi-

astic work. His travels took him to Niagara and to northern Ontario where he collected shells, as may be seen by glancing through the list of his papers. After his elevation to the Bench his duties took him all over the province and as always he collected wherever he went. He used to enjoy telling us of his Jekyll and Hyde existence: surreptitious excursions in old clothes and waders to river and woods in the morning and dignified afternoons on the Bench in black silken gown. It was always a gala occasion when his work brought him to Windsor. When court adjourned for the day he would cross to Detroit and spend the evening with Bryant Walker, talking about shells. These conchological sessions often lasted far into the night. Sometimes, no doubt, the court officials noticed next morning that the judge would conceal many a yawn behind an ample judicial sleeve; no doubt they drew their own conclusions about the cause but it is safe to say that their guesses were wide of the mark. Possibly they would have done better had they known that His Honor's pockets were bulging with duplicates heaped upon him by the ever-generous Bryant Walker.

Two legal characteristics, a keen memory and an orderly mind served him well in conchology. Furthermore he was no seeker of rarities or showy specimens; but rather a keen observer able to appreciate the apparently drab and commonplace shells characteristic of Canada. Those ubiquitous and often tedious shells, the pearly mussels, finger-nail clams, planorbids, lymnaeids and physids were his special concern. His published papers and his collection, now in the Royal Ontario Museum of Zoölogy, reflect this interest. Given a different background, he would have made an excellent experimental scientist; the varieties of our common molluscs stimulated him to many ingenious but unpublished theories. When he turned to the law Canada gained a great jurist but lost a potential scientist.

He did manage, however, to publish a number of papers surprising for one so busy; these have appeared mostly in the publications of the Ottawa Field-Naturalists' Club, of which he was a member for some sixty years. The appended bibliography includes all those known to us, but we would be grateful for information concerning any others which we may have overlooked.

Chief Justice Latchford died at Toronto, August thirteenth 1938, at the age of 82. His death caused wide-spread regret and called forth messages of appreciation and sympathy from men in all walks of life, extolling his qualities and achievements, but he could have had no better epitaph than the words applied to him some thirty years ago by Sir George W. Ross: "An able, upright, industrious and painstaking judge."

## BIBLIOGRAPHY

- 1882—Notes on the Ottawa Unionidae. Trans. Ottawa Field-Nat. Club 3, pp. 48–57, 1 plate.
- 1884—Shells of Anticosti. Amer. Nat. 18: 1051–1052, Oct.
- 1885—Observations on the Terrestrial Mollusca of Ottawa and vicinity. Trans. Ott. Field-Nat. Club 2: 1–21.
- 1887—Report of the Conchological Branch. Ottawa Naturalist 1: 107.
- 1887—Fifteenth Sub-excursion of the Ottawa Field-Naturalists' Club. Ott. Nat. 1: 114.
- 1889—Report of the Conchological Branch for the years 1887–88. Ott. Nat. 3: 65–68.
- 1893—Conchology (Notes). Ott. Nat. 6: 118.
- 1893—Conchology. Ott. Nat. 7: 114–116, October.
- 1894—Conchology. Ott. Nat. 7: 132, 1894.
- 1895—Casselmann Shells. Ott. Nat. 9: 156, October.
- 1895—Conchology. Ott. Nat. 9: 156, October.
- 1896—Notes on Recent Canadian Mollusca. Ott. Nat. 10: 14–16, April.
- 1903—Niagara River Shells. Ott. Nat. 16: 205.
- 1904—Conchological Notes. Ott. Nat. 18: 91.
- 1905—Notes on Canadian *Unio luteolus*. Nautilus 19: 34–35.
- 1906—*Limnaca megasoma*. Ott. Nat. 20: 172.
- 1906—*Lymnaea megasoma*. Naut. 20: 83 (reprint of previous item).
- 1906—A visit to Duck Island. Ott. Nat. 20: 187, December.
- 1911—Conchological Notes. Ott. Nat. 25: 19.
- 1911—Conchological Notes. Ott. Nat. 25: 67, July.
- 1912—Notes—Conchological and otherwise. Ott. Nat. 25: 189.
- 1913—Preliminary List of Ottawa Sphaeriidae. Ott. Nat. 27: 19, April.
- 1914—*Valvata piscinalis* in Canada. Nautilus 28: 10.
- 1915—Conchological Notes. Ott. Nat. 29: 51.
- 1915—*Littorina littorea*, a fish. Naut. 29: 96.
- 1916—New Sphaeriidae. Ott. Nat. 30: 93.
- 1919—Canadian Sphaeriidae. Can. Field-Nat. 33: 83–86, Nov.

- 1920—Canadian Sphaeriidae. Can. Field-Nat. 34: 30-34, Feb.  
 1920—Canadian Sphaeriidae. Can. Field-Nat. 34: 69-71, Apr.  
 1921—Canadian Sphaeriidae. Can. Field-Nat. 35: 68-70, Apr.  
 1922—Canadian Sphaeriidae. Can. Field-Nat. 36: 4, Jan.  
 1924—The First Ottawa Field-Naturalist. Can. Field-Nat. 38:  
 137, Sept.  
 1925—Lymnaea (Bulinnea) megasoma Say. Ott. Nat. 39: 193-  
 194, November.  
 1925—Bythinia tentaculata Linn. Can. Field-Nat. 39: 41.  
 1926—A new Lymnaea—Can. Field-Nat. 40: 47, plate.  
 1927—Lymnaea (Bulinnea) megasoma Say. Naut. 40: 136.  
 1930—Some introduced Molluscs. Can. Field-Nat. 44: 33.

With J. Fletcher:

- 1894—Report of the Conchological Branch. Ottawa Field-Nat.  
 Club, 1893. Ott. Nat. 8: 97-98, September.

With Pascal Poirier:

- 1884—Report of the Conchological Branch (for 1883). Trans.  
 Ott. Field-Nat. Club 2: 130-134.  
 1885—Report of the Conchological Branch (for 1884). Trans.  
 Ott. Field-Nat. Club 2: 263-266.  
 1887—Report of the Conchological Branch (for 1885). Trans.  
 Ott. Field-Nat. Club 2: 350-351.

With G. W. Taylor:

- 1890—Report of the Conchological Branch. Ott. Nat. 4: 51.  
 (A revised list of Ottawa shells is appended to this  
 paper.)

A. LA ROCQUE  
 J. OUGHTON

October, 1939

---

## PUBLICATIONS RECEIVED

HANDBUCH DER PALÄOZOLOGIE. Herausgegeben von O. H. Schindewolf. Bd. 6, Gastropoda, von W. Wenz. Teil 1, comprising general matter and beginning of the Prosobranchia, and Teil 2, continuing Prosobranchia as far as the Cyclophoridae, have appeared. The work contains definitions of all families, genera and subgenera, with statement of geologic and geographic range, and with excellent figures of typical species in the text. It is more comprehensive than Thiele's *Handbuch* by including all fossil genera, and by the far more copious illustration; moreover, the type species of each genus and subgenus is given. How-

ever, as no anatomic details of the groups are given, it does not fully cover the field occupied by Thiele's volumes. This work will be of great value to everyone working on living mollusks and molluscan paleontology, and it will be particularly useful to all concerned with the arrangement of paleontologic collections.—H. A. PILSBRY.

INTERNATIONAL DIRECTORY OF MALACOLOGISTS (including shell collectors). By Maxwell Smith. Tropical Laboratory, Lantana, Florida. Price \$1.35. In this brochure of 50 pages the names are arranged by countries, and in the United States by states. California and Florida lead in number of names.

VICTORIAN SEA SHELLS. By C. J. Gabriel. This handbook for collectors and students contains descriptions and figures of a large number of the shells most likely to be found, with directions for cleaning and collecting shells. It is admirably adapted to the use of beginners in the study. The drawings by Joyce K. Allan are good examples of her beautiful work.—H. A. P.

AN ILLUSTRATED CATALOG OF THE RECENT SPECIES OF ROCK SHELLS. By Maxwell Smith. Small 4to, 84 pp., 21 plates. \$5.00. The popular families Muricidae, Thaisidae and Coraliophilidae are treated, the text giving brief comparative notes, localities, etc., on more than 500 species, which are figured on the plates and in text-figures.—H. A. P.

WHAT SHELL IS THAT? A GUIDE TO THE SHELL-BEARING MOLLUSKS OF EASTERN NORTH AMERICA. By Percy A. Morris. D. Appleton-Century Company, New York. \$2.25. To help collectors who like to make identifications in the field, Mr. Morris has prepared a pocket manual of shells covering the Atlantic coastline from Labrador to Cape Hatteras and inland as far as the Mississippi River. A handbook of this size cannot contain all the forms known to science from the region it covers but those likely to be picked up by the amateur naturalist are there. The author is an accomplished nature photographer and the pictures accompanying each description make the identification of shells easy. The book deals with land and fresh-water forms as well as shells of the sea.—R. A. McLEAN.

AN ANNOTATED BIBLIOGRAPHY OF THE ZOOLOGY OF TENNESSEE. By Charles S. Shoup. Vanderbilt Univ. Bookstore, Nashville, 50 cents. About 1,000 titles are given of papers which contain lists or descriptions of animals from the state and vicinity. The 65 titles of mollusks are useful for reference, even though such names as Bland, Amos Binney and Shuttleworth do not even appear.—H. B. B.

FIELDBOOK OF ILLINOIS LAND SNAILS. By Frank Collins Baker. Natural History Survey, State of Illinois, Theodore H. Frison, Chief; Manual 2. Urbana, Illinois. This fieldbook, of pocket size, is designed primarily for the use of beginners in the study of nature, being written in untechnical language and supplied with keys for determination of the species. The figures, drawn by Dr. Carl O. Mohr in admirable line work, include all of the species, and have the great advantage of representing Illinois examples. Being based upon over 20,000 specimens, the results of several years survey of the State, the Fieldbook is believed to be nearly complete for Illinois species, and therefore also of interest to advanced students of mollusks in the Middle West generally. Manuals such as this and as Baily's West American Shells, scientifically accurate, but in simple terms, are greatly needed in malacology.—H. A. P.

---

### NOTES AND NEWS

ANOTHER IMMIGRANT.—While engaged in entomological work in Orleans Parish, Louisiana, Mr. Mike Wright, of Ohio State University, collected numerous specimens of *Bradybaena similis hongkongiensis* (Deshayes). Dr. Pilsbry who identified the shells—which I had mistaken as belonging to *Praticolella*—informs me that *similis* has come “from South China, Java or anywhere over there,” is domiciled now in Hawaii and Bermuda, but “has not before been reported from the United States.” An earlier invader, occurring also in rural parts of the parish, is *Rumina decollata* (Linnaeus). Mr. Wright found it on trunks of trees as well as upon the ground. With these shells came *Polygyra texasiana* (Moricand), the occurrence of which in this locality, Dr. Pilsbry says, “is far east of its regular beat.” Two

subfossil specimens of *Pleurocera acuta* (Rafinesque) were in the sending. They were probably transported in time of flood from Mississippi River tributaries well upstream.—CALVIN GOODRICH.

REGARDING O. G. B.—In the October, 1939, issue of NAUTILUS, I asked for information about a small pamphlet entitled "Publications of the O. G. B., III, Mollusca of Cincinnati" (1876). The perplexity was over who or what "O. G. B." might be. Dr. Harold A. Redher calls my attention to the fact that the question has risen before and has been fully answered. Mr. C. W. Johnson, coming upon the paper, wrote to Cincinnati about it. The correspondence proved more fruitful than my own. "O. G. B.," Mr. Johnson learned, stood for "Our Geological Boys," all of them at the time their paper was put out being members of the Woodward High School of Cincinnati. The account of the pamphlet will be found in the NAUTILUS, 30, 1916, p. 57.—CALVIN GOODRICH.

SOUTH AMERICAN SPECIES REFERRED TO PLANORBULA.—In a recent paper Dr. Fritz Haas<sup>1</sup> diagnoses a new subgenus for the South American species of planorbids which have been referred to *Segmentina*, basing the new group name on characteristics of the lamellae within the aperture. Pilsbry<sup>2</sup> has shown that these Central and South American forms resembling *Segmentina* and *Planorbula* belong to a distinct genus which was named *Tropicorbis* Pilsbry and Brown in 1914. It has also been shown<sup>3</sup> that *Planorbula* is a genus distinct from these South American species, differing so much in anatomy that it belongs in another subfamily, Helisomatinae. Unpublished data, in addition to that by Pilsbry, shows conclusively that no true *Planorbula* is found south of the United States. The name *Obstructio* Haas, therefore, becomes a synonym of *Tropicorbis* Pilsbry and Brown. In the Planorbidae it is difficult to make group distinctions without reference to the anatomy because of such parallelisms as the presence of apertural lamellae in two such diverse groups as *Planorbula* and *Tropicorbis*.—FRANK C. BAKER.

<sup>1</sup> Malacological Notes, Zool. Series Field Mus., 24, 99, 1939.

<sup>2</sup> Pilsbry, H. A. Proc. Acad. Nat. Sci. Phil., 86, 52, 1934.

<sup>3</sup> Pilsbry, l. c., 46, 54. Baker, NAUTILUS, 49, 104, 1936.

NEW NAMES FOR PUERTO RICAN SNAILS.—*Varicella* (*Laevari-cella*) *playa*, new species, is founded on *V. glabra gracilior* Pilsbry, 1907, Man. Conch. 19: 127, pl. 19, fig. 37, from near Humacao, P. R. The type lot is ANSP. 3625 (from T. Bland). Probably Shuttleworth, 1854, Mitth. naturf. Ges. Bern: 51, did not mean to name his var.  $\beta$ , and the name used by Pilsbry is, as he states, preoccupied in *Varicella* by *Achatina gracilior* C. B. Adams, 1850, Contr. Conch. 7: 104. Considerable numbers of specimens before me show no intergradation between the high-spired *Varicella playa*, a lowland species, and *V. glabra* (Pfeiffer), which seems to be limited to the eastern mountains around El Yunque. Shuttleworth was probably deceived by the general resemblance in form between young shells of *V. playa* and much larger examples of *V. glabra*.

*Cepolis* (*Plagioptycha*) *boriquenae*, new species, is founded on the shell, from Loiza (Swift!), described and figured as *Helix diaphana* by Pilsbry, 1889, Man. Conch. 5: 22, pl. 19, figs. 51 & 52. The type lot is ANSP. 28335. The figures cited exaggerate the growth-lines and the extremely weak columellar thickening. This may be *Helix diaphana* Lamarek, 1822, Anim. s. vert. 6 (2): 85, from Teneriffe (sic), but is certainly not *Helix diaphana* of Poiret, 1801, Coquilles fluv. terr. Aisne & Paris: 77, 116.—H. BURRINGTON BAKER.

THE NORTHERN RANGE OF *MONADENIA FIDELIS* GRAY.—The northern range of *Monadenia fidelis* Gray is not well known. A letter received from Mr. A. W. Hanham of Duncan, B. C., who has collected shells in B. C. for about 50 years, stated that this species was of frequent occurrence on Vancouver Island as far as Port Alberni on the west coast and as far north as vicinity of Nanaimo on the east coast. He found none while collecting shells at Pt. Renfrew on the west coast of Vancouver Island, and none at Agassiz, inland from Vancouver City. None of this species were found while collecting land shells in Sillwet district or on Mt. Cheam. The non-occurrence of the species in a district where it might be expected is no conclusive evidence, however, because it is often very scarce within its range and requires extensive search under favorable conditions to reveal its presence.—WALTER J. EYERDAM.

EXTENSION OF RANGES OF NORTH AMERICAN MARINE SHELLS TO CHILE.—While collecting shells along the Chilean coast in March, 1939, I found four species of North American pelecypods at Arica in northern Chile. They have been definitely classified and differ but very slightly from the same species collected in California and Alaska. They are as follows: *Saxidomus giganteus* (Desh.). Not uncommon on some of the sandy beaches. They differ but little from North American specimens, but on account of wave and sand action they are smoother than those which I have collected in California, Oregon, Washington, British Columbia, Alaska and the Aleutian Islands. The southern limit in Dall's Bulletin 112 is Monterey, California.

*Venerupis (Protothaca) staminea staminea* (Conrad.) is not uncommon near Arica, Peru. Previously reported as found from Crescent City, California, to Socorro Island, Lower Calif.

*Venerupis (Protothaca) grata* (Say) is rather common. Previously known range is San Pedro, California, to Panama.

*Tagelus californianus* Conrad. Not common; previously known range is Santa Barbara, California, to Gulf of Tehuantepec.—WALTER J. EYERDAM.

EXTENSION OF RANGE OF *MONADENIA SEMIALBA* HENDERSON.—In a lot of six specimens of *Monadenia fidelis* received recently from Dr. W. A. Newcombe, Victoria, B. C., which were collected by his father, C. F. Newcombe, in 1890 in the vicinity of Victoria, B. C., was one typical yellow-based specimen of *Monadenia semialba* Henderson. Hitherto this color form has been reported only from the type locality which is amongst the rocks back of Rosario Beach, Fidalgo Island, Shagit County, Washington. Victoria, B. C., is situated on the southeast coast of Vancouver Island and is almost due west across the north end of Puget Sound from Rosario Beach. Some of the larger islands of the San Juan group are in between, and have similar conditions of habitat in general as Rosario Beach. It is likely that this species will also be found in the San Juan Islands, as the species *M. fidelis* Gray is known to occur there.—WALTER J. EYERDAM.

# THE NAUTILUS

Vol. 53

April, 1940

No. 4

## TWO NEW FLORIDAN MARINE SHELLS

BY JEANNE SCHWENGEL

CERITHIUM AURICOMA, new species. Pl. 12, figs. 8, 8a.

The strong, solid shell has the general form of *C. literatum*. The outlines of the spire are straight. Color white, the intervals of the spiral striae pale yellow, or at the anterior canal, light brown.<sup>1</sup> The early whorls are worn; the last four whorls with axial sculpture of rather massive, rounded ribs, continuous from whorl to whorl, about equal in width to their intervals, eight on each whorl; the earlier whorls have more numerous small ribs with occasional larger ones. On the last whorl there is a strong varix opposite the aperture, and the other ribs are short, not extending to the periphery, and project in blunt prominences below the suture. Over all is a sculpture of fine spiral threads, those on the base alternately smaller. Aperture about as in *C. literatum*, the callus defining the posterior channel strongly developed.

Length 36.3 mm., width 16.2 mm.; 9½ whorls remaining.

Washerwoman Key, Pelican Shoals, near Key West, Florida. Type in A.N.S.P., paratypes in my collection.

This fine cerite is quite distinct from all species known to me by its very strong, heavy ribs and fine, nearly even, hair-like, spiral striation. It was found in great abundance all over the shore, each shell containing a hermit crab with a beautiful, red claw, which he used as an effective operculum when disturbed. A great many were collected, but having no container with a tight lid, most of them disappeared overboard before we reached Key West, hence, there are only four specimens at the present time.

<sup>1</sup> As all of the specimens are dead shells, the tints given are approximate.

*LATIRUS CYMATIAS*, new species. Pl. 12, figs. 6, 7.

The shell is somewhat similar in form to *L. brevicaudatus* Reeve but differs by being decidedly narrower, with less convex whorls, fewer axial folds and finer spiral threads. Color sayal brown, the ribs duskier, the anterior end of the canal cinnamon-brown to russet. The small apical whorl is blunt and smooth; the last half of the second whorl has numerous small axial riblets. After that the shell has axial sculpture of broad, rounded folds over the peripheral region but not extending to the suture or the concavity of the base, six on each whorl. Spiral sculpture of spiral threads with much more minute threads in the intervals, about seven main threads on the penult whorl, 18 on the last whorl, exclusive of those on the siphonal fasciole. The suture is not so deep as in *L. brevicaudatus*, somewhat waved, with a slightly crenulate border. The aperture is far narrower than in *L. brevicaudatus*, cinnamon-brown within, with about 7 narrow lirae in the throat. Columella with three folds. Siphonal fasciole rather narrow, not very prominent.

Length 36.6 mm., width 15.3 mm., length of aperture 17.8 mm.; about 10 whorls. Type.

Length 25.5 mm., width 11 mm. Paratype, fig. 7.

Off Palm Beach in about 12 fathoms. Type 175132 A.N.S.P., paratypes in collection of the author.

---

## A NEW NATICOID SNAIL FROM FLORIDA

BY THOMAS L. MCGINTY

*SIGATICA SEMISULCATA HOLOGRAPTA*, new subspecies. Plate 12, figs. 10, 11.

Shell small, of about five well-rounded whorls, separated by a deeply impressed suture; the glassy nucleus of one and a half whorls; only the nucleus and the inside of the umbilicus lack the spiral sculpture of encircling linear grooves, of which there are from eighteen to twenty-four on the last whorl. Umbilicus wide and deep. Operculum not known.

Height 10 mm., diameter 8.4 mm.

Height 8.7 mm., diameter 7.6 mm.

Height 11 mm., width 9.5 mm.

The type is 175025 A.N.S.P. from Boynton Beach, Palm Beach County, Florida. Paratypes in the McGinty collection.

This attractive little shell has only been taken occasionally on the lower Florida east coast. The encircling grooves covering the whole surface of each whorl easily distinguish it from *Sigatica semisulcata* (Gray), in which there are spirals below the suture and in the umbilicus, but none over the middle part of the last whorl (Pl. 12, fig. 12). This appears to be a constant character of *semisulcata*.

*S. semisulcata* was dredged by the writer off Boynton Beach on sand bottom in about twelve fathoms. The operculum is corneous, yellowish and simple, not unlike that of *Polinices lactea*, and the shell is wholly external, as in that species. Dr. Pilsbry informs me that the reference of *S. semisulcata* to *Eunaticina* in the current literature is an error. That is a Pacific genus, not known from the West Indies, at least in the present fauna. *Sigatica* comprises Naticidae with the figure of *Polinices*, but the suture is deeply impressed and there is a sculpture of spiral grooves.

---

## NEW MOLLUSKS OF THE GENUS *NAESIOTUS* FROM ECUADOR<sup>1</sup>

BY HARALD A. REHDER

In determining a large number of specimens of bulimulids from Ecuador sent to the National Museum by Mr. Ralph W. Jackson of Dorchester, Maryland, it was discovered that several lots represented new subspecies. Moreover, in determining the generic relationships of these shells several facts were uncovered and conclusions reached that seem worth putting on record.

This highly interesting and valuable material consisted of five large lots of what has been called *Bulimulus quitensis* Pfeiffer and *Bulimulus catlowiae* Pfeiffer, collected at various localities in the high interandine plateau of Ecuador between the eastern and the western Andes. Further material of this same group was present in the collection of the National Museum, and some was borrowed from the Museum of Comparative Zoölogy at Harvard University, through the kindness of Mr. William J. Clench.

---

<sup>1</sup> Published by permission of the Secretary of the Smithsonian Institution.

In 1848<sup>2</sup> Pfeiffer described two species of *Bulimulus* from the Cuming collection as *Bulimus quitensis* and *Bulimus irregularis*, both stated to have been collected near Quito, Ecuador, by De Lattre. In 1854<sup>3</sup> he described a third species, *Bulimus catlowiae*, collected also near Quito by Bourcier. In 1856<sup>4</sup> Pfeiffer placed all three in *Bulimus*, subgenus *Mesembrinus*, while von Martens, in 1860<sup>5</sup> placed *catlowiae*, the only species he mentioned, in the subgenus *Scutalus* of the genus *Bulimulus*.

Hidalgo was the first to seriously study these species, and he, after a study of a great many specimens, came to the conclusion that they were variations of a single species.<sup>6</sup> Pfeiffer, in 1877,<sup>7</sup> still considered them distinct species, but von Martens in 1885<sup>8</sup> united *B. catlowiae* with *irregularis*, without having type material at hand. Since the type locality is not known exactly (the localities "near Quito," or, "near Bogota," given by early collectors in northwestern South America, are to be taken only in the broadest sense), we must be content with the literature on the subject, and the specimens at hand. Fortunately I was able to consult large suites of specimens of this group, one lot having been collected only ten miles or less from Quito. With all this material available I have come to agree with Hidalgo, von Martens, and Pilsbry,<sup>9</sup> that the three species described by Pfeiffer are merely variations of one species, which will bear the name *Naesiotus quitensis*.

Pfeiffer originally placed his three species in the genus *Bulimus*, and later authors assigned them to the groups *Mesembrinus* and *Scutalus*. Pilsbry, in his epochal monograph of the Bulimulidae in the Manual of Conchology, placed *B. quitensis* in *Bulimulus*, section *Lissoacme*,<sup>10</sup> not knowing the nature of the nuclear sculpture; in the following volume<sup>11</sup> he placed *B. irregularis* and

<sup>2</sup> Proc. Zool. Soc. London, pt. 15, 1847, pp. 230, 231 [1848].

<sup>3</sup> *Op. cit.*, pt. 20, 1852, p. 154 [1854].

<sup>4</sup> Malakozool. Blätter, vol. 2, pp. 158, 159.

<sup>5</sup> Albers, Die Heliceen, ed. 2, p. 218.

<sup>6</sup> Journal de Conch., vol. 18, 1870, p. 63.

<sup>7</sup> Monogr. Helic. viv., vol. 8, 1877, pp. 157, 171.

<sup>8</sup> Conch. Mittheil., (vol. 2), p. 162.

<sup>9</sup> Man. of Conch., ser. 2, vol. 11, 1897, p. 34.

<sup>10</sup> *Op. cit.*, vol. 10, 1896, p. 158.

<sup>11</sup> *Op. cit.*, vol. 11, 1897, p. 34.

its variety *catlowiae*, in *Bulimulus*, subgenus *Scutalus*, and stated there that *Bulimulus quitensis* was specifically identical with these forms, which had a nucleus that was minutely lineolate-punctate.

An examination of the nucleus of these forms, however, shows that the sculpture consists of regular straight axial riblets. This sort of apical sculpture is found in three or more less isolated groups of Bulimulidae: *Protoglyptus* from eastern South America and some of the Lesser Antilles; *Orthotomium* from central and northern Mexico, Lower California, and the southwestern United States, and *Naesiotus* from the Galapagos Islands. Both in the character of the shell and in geographic distribution, *Bulimulus quitensis* is closest to *Naesiotus*, and indeed it so closely resembles some forms from the Galapagos that I cannot see any super-specific difference, and I am therefore placing this species in *Naesiotus*.

The presence of *Naesiotus* on the west coast of South America is another bit of evidence in favor of the hypothesis that the geographic range of the ancient stock of bulimulids with straight axial riblets on the nuclear whorls once extended pretty well over the region from northern Mexico south to the Argentine and Peru. Then during the Tertiary several of these regions were isolated and there developed the groups named above; namely, *Orthotomium*, *Protoglyptus*, and *Naesiotus*, all differing slightly from each other but all obviously related.

The origin of the fauna and flora of the Galapagos is still a matter of dispute. The theory has long been held that it is an adventitious fauna, brought to the islands by wind and currents. However, the cold north sweeping Humboldt current that bathes the shores of this group cannot explain the presence of forms, such as the reptiles, with Central and northern South American affinities. Furthermore, the land tortoises and reptiles can hardly have been brought over by the agency of the wind. *Naesiotus* could have been carried to the islands by wind only if this group had formerly occupied the western slopes and coastal foothills of the Andes. At present it lives in the interandine plateau, separated from the coastal regions by the high western Andes.

The hypothesis is gaining credence that these islands were once connected to the mainland. We have evidence of considerable

crustal movement along the west coast of South America during the middle and late Tertiary, and although very little is known as to the exact geological history of these movements, it is very possible that the islands were separated from the mainland by a subsidence or a down-faulting of the intervening area, and that then the island land mass gradually subsided, leaving above the surface of the water only the mountain tops to which the animal life gradually withdrew as the land subsided. Later the islands rose again, as is evidenced by the presence of fossiliferous beds on Albemarle, Indefatigable and Seymour Islands, of which some at least are of Pliocene age, and which are both underlain and overlain by lava deposits. Whether there were more periods of submergence and emergence than these is not known. This hypothesis is supported by the fact that in several groups, such as *Naesiotus*, for instance, each island bears distinct races belonging to one species, or a group of interrelated species, both cases being the results of isolation.

We, therefore, have a large group of very diversified species of *Naesiotus* in the Galapagos Islands, bearing the marks of long isolation, and another smaller complex of *Naesiotus* in the Andes, showing a trend towards diversification, and, therefore, also isolated there for a considerable period of time.

I am using the generic term *Naesiotus*, as I believe that the extensive genus *Bulimulus* as now conceived may well be broken up into several genera based in general on apical sculpture. Thus *Naesiotus* would be the name for those possessing an axially ribbed nucleus, with *Orthotomium* and *Protoglyptus* as subgenera, while *Bulimulus* would be restricted to those with crowded, irregular and zig-zag riblets on the nuclear whorls.

#### NAESIOTUS QUITENSIS Pfeiffer.

Shell elongate-ovate to conic-ovate, rather small, 17 to 32 mm. high, of moderately stout texture, composed of about 7, slightly convex whorls, separated by a moderately impressed suture. The  $1\frac{3}{4}$  nuclear whorls have slender, straight, regularly spaced and rather separated, axial riblets; the postnuclear whorls are more or less rugosely wrinkled along the lines of growth. The color varies from pale flesh-color and whitish straw-yellow to dark brown or vinaceous. The pale forms may be streaked with brown and the darker specimens are often finely streaked with white.

The umbilicus is narrow or more widely open and slightly covered by the slightly expanded columellar portion of the lip. The aperture is ovate, the lip simple, unreflected.

This species inhabits the interandine plateau of Ecuador, from Otavalo and Ibarra, Prov. del Imbabura, south to near Riobamba, Prov. del Chimborazo. This narrow area, about 150 miles long and 30 to 40 miles wide, lies in the arid temperate life zone at an elevation of between 9,000 and 12,500 feet, between the main chains of the Andes, the western and the eastern Andes. Within this region *Naesiotus quitensis* has become broken up into several geographically localized subspecies.

NAESIOTUS QUITENSIS QUITENSIS Pfeiffer. Pl. 13, figs. 2-4, 7-9, 11, 13, 15, 16, 18, 20.

The form that I am calling the typical *quitensis* occurs in two phases, apparently living together. One, which may be known as the *quitensis* or light phase (figs. 7-9), is pale brown or light straw-yellow, and the specimens usually have darker brown axial streaks; the interior is pale except where the axial streaks show through. The other color form, the *irregularis* or dark phase (figs. 2-4), resembles the original figures of *Bulimus irregularis* Pfeiffer and *B. catlowiae* Pfeiffer, and varies in color from pale flesh-color to dark brown, occasionally ornamented with darker streaks. There are, however, intermediates between these two phases and as the two color forms apparently are found in the same colony, I hesitate to separate them. The spire may have a bluish tinge and the nuclear whorls are either pale yellowish or darker vinaceous brown; the apical color is independent of the depth of color of the later whorls. The interior of the shells is of a vinaceous brown color.

The height of two hundred measured specimens varied from 17.2 to 26.6 mm., and the diameter from 8.4 to 14.1 mm. The average dimensions of these specimens were: Height, 21.8 mm.; diameter, 11.2 mm. In comparing these measurements with those given by Pfeiffer for his species, it must be borne in mind that the older authors generally did not measure their shells as we do now, and hence their measurements may be at variance with ours.

Several hundred specimens of this form were examined by me which were collected on the slopes of the Volcano Pichincha, 9-10 miles northwest of Quito, at an elevation of about 12,000 feet.

A second large lot of specimens, which I am for the present referring here, comes from near Pillaro. These shells are larger and slightly more slender, possibly due to their inhabiting a lower elevation and consequently enjoying a warmer climate and a richer vegetation. They have, however, the same coloration, even to being divisible into the two above-mentioned color phases (figs. 11, 13, 15, 16, 18, 19). The measurements of these specimens, which were collected at Pillaro, Prov. de Tunguragua, at an elevation of 7500 feet, were as follows: Height, from 21.0 mm. to 30.2 mm.; diameter, from 11.1 mm. to 14.6 mm. The average measurements are: Height, 26.1 mm.; diameter, 12.7 mm.

The rather striking difference in size, and the distance between them, about 66.5 miles, make it possible that we are dealing here with a distinct race, but only further collections in the intervening area will determine this question.

Two specimens, M.C.Z. No. 113824, from Caucagua, Ecuador, seem to belong here.

*NAESIOTUS QUITENSIS JACKSONI*, new subspecies. Pl. 13, figs. 1, 5.

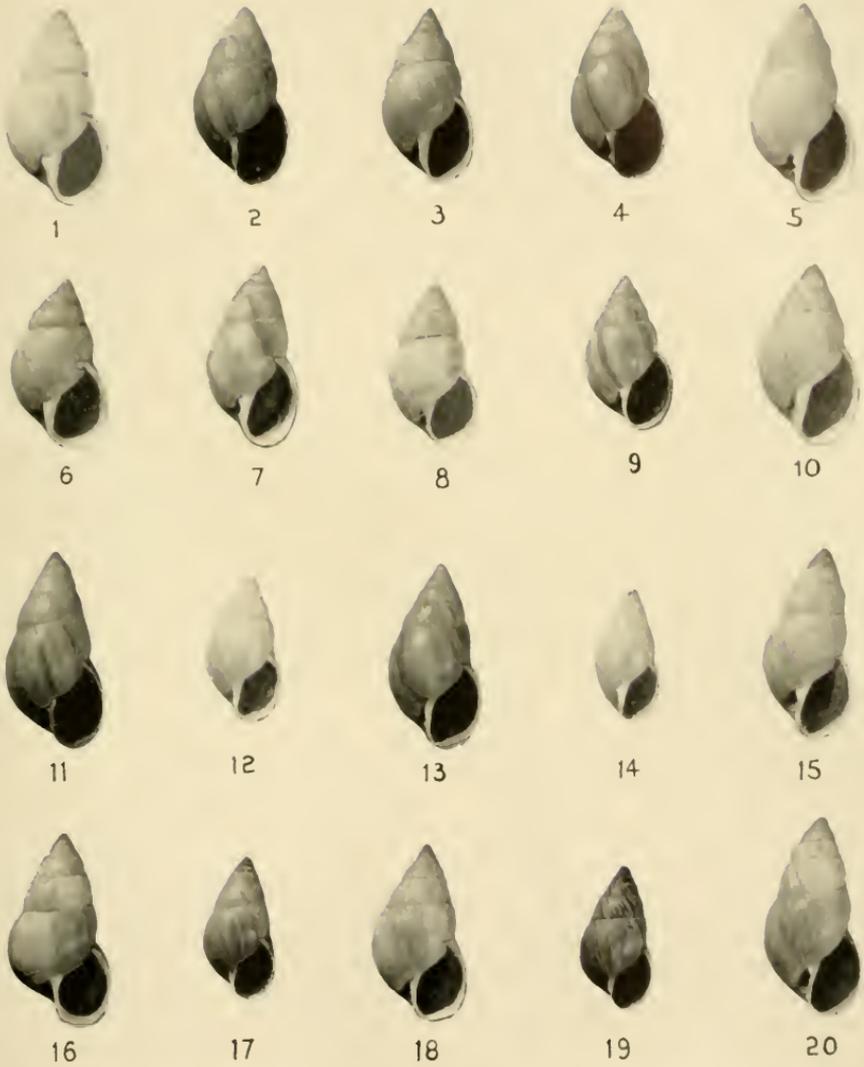
This form is always pale, varying from very pale flesh-color to light straw-color, occasionally with axial streaks of darker brown. The nuclear whorls may be pale or darker flesh-color. The shells are generally larger and slightly more slender than the typical form, as is evident from the average measurements given below. The aperture may be whitish with the darker brownish streaks showing through, or the whole interior may be suffused with a more or less brown-vinaceous hue.

The type, U.S.N.M. No. 473969, measures: Height, 28.9 mm.; diameter, 14.1 mm. The measurements of a hundred specimens range as follows: Height, from 23.5 to 32.4 mm.; diameter, from 11.6 to 14.8 mm. The average measurements are: Height, 26.9 mm.; diameter, 13.1 mm.

This form was collected from Guailabamba (or, as it is occasionally spelled, Huayabamba), Prov. del Pichincha, some 22 miles northeast of Quito on the western slope of the eastern Andes.

*NAESIOTUS QUITENSIS ORINUS*, new subspecies. Pl. 13, figs. 6, 10.

This race represents a rather short stout form which is of a dirty pale straw-color, and slightly more rugose than the other



FIGS. 1, 5, *Nautilus quitensis jacksoni*. FIGS. 2-4, 7-9, 11, 13, 15, 16, 18, 20, *N. q. quitensis*. FIGS. 6, 10, *N. q. orinus*. FIGS. 12, 14, *N. q. ambatusis*. FIGS. 17, 19, *N. q. vermiculatus*.



forms. The nuclear whorls are pale brown to dark purplish brown, and in the early postnuclear whorls the grayish white may be irregularly streaked with the pale brown of the nucleus. There are no axial color markings. The interior of the mouth is of a pale brown color to somewhat darker.

The type, U.S.N.M. No. 473971, measures: Height, 26.4 mm.; diameter, 14.1 mm. These measurements range as follows: Height, 16.9 to 27.8 mm.; diameter, 9.3 to 14.8 mm. The average dimensions are: Height, 22.7 mm.; diameter, 12.5 mm.

This form was collected in the foothills of Chimborazo, near Riobamba, Prov. del Chimborazo, at an elevation of approximately 12,000 feet.

*NAESIOTUS QUITENSIS VERMICULATUS*, new subspecies. Pl. 13, figs. 17, 19.

This rather distinct race is smaller and darker than any of the other subspecies and is characterized by having many slender, irregular, pale straw-colored streaks over the vinaceous-brown ground color, giving the shell a vermiculate appearance. The nuclear whorls are dark brown to deep purplish brown. The interior of the aperture is usually dark brown.

The type, M.C.Z. No. 64957, measures: Height, 20.6 mm.; diameter, 9.9 mm. The measurements of ten specimens average: Height, 19.9 mm.; diameter, 10 mm.; the height ranges from 15.9 to 22 mm., and the diameter from 8.5 to 11.1 mm. Paratypes are in the Museum of Comparative Zoölogy at Harvard, and the U. S. National Museum.

This race was collected at Agoyan on the Rio Pastaza, near Baños Tunguragua, in the Provincia del Tunguragua.

*NAESIOTUS QUITENSIS AMBATENSIS*, new subspecies. Pl. 13, figs. 12, 14.

By this name I am designating a small race from Ambato, Prov. del Tunguragua, which is of a pale orange-straw yellow color, usually with slender, irregular, white, axial streaks. The interior of the aperture is light brown, occasionally with a darker band just inside the outer lip. The type, U.S.N.M. No. 473973, measures: Height, 20.7 mm.; diameter, 10.6 mm. Paratype material is in the U. S. National Museum and in the Museum of Comparative Zoölogy of Harvard University.

#### EXPLANATION OF PLATE 13

Figs. 1, 5.—*Naesiotus quitensis jacksoni*, n. subsp. 1, Type. 3, Paratype. Figs. 2-4, 7-9, 11, 13, 15, 16, 18, 20.—*Naesiotus quitensis quitensis* Pfeiffer.

2-4, dark phase, Pichincha. 7-9, light phase, Pichincha. 11, 13, 15, dark phase, Pillaro. 16, 18, 20, light phase, Pillaro. Figs. 6, 10.—*Naesiotus quitensis orinus*, n. subsp. 6, Paratype. 10, Type. Figs. 12, 14.—*Naesiotus quitensis ambatensis*, n. subsp. 12, Type. 14, Paratype. Figs. 17, 19.—*Naesiotus quitensis vermiculatus*, n. subsp. 17, Type. 19, Paratype.

## THE OZARK AMNICOLAS

BY LESLIE HUBRICHT

In the eastern Ozark region of Missouri are many springs and caves in which are found small snails of the genus *Amnicola*. For several years, as opportunity permitted, the author has been studying these snails. This study has resulted in new information concerning the status and distribution of the previously known species, together with one new species and two new subspecies.

Not enough collecting has been done to determine the exact distribution of any form. Only the region in the vicinity of St. Louis has been studied carefully. Several caves and springs in the western Ozarks have been visited but no amnicolas have been found. This does not, however, mean that they do not occur in that region. These snails are very sporadic in their occurrence and unless a region has been explored carefully they may be overlooked. A stream may be fed by a dozen or more similar springs issuing from the same limestone formation and yet only one or two will contain the snails. The subterranean forms have been found only in running streams with rock or very coarse gravel bottoms.

AMNICOLA ALDRICHI ALDRICHI (Call & Beecher). Pl. 14, figs. A, D, E, F, G, H.

*Bythinella aldrichi* Call & Beecher, 1886. Bull. Washburn Coll. Lab. Nat. Hist. 1: 190-192.

*Amnicola missouriensis* Pilsbry, 1898. Nautilus 12: 43.

Original description: "Shell small, subimperfect, elevated, cylindrical, thin; apex obtuse; whorls four, convex, slightly shouldered above, body-whorl twice the size of rest of shell, not marked by lines of growth; suture distinctly and regularly impressed; aperture ovately rounded, nearly as long as broad, scarcely angled posteriorly, within whitish; peristome simple, slightly reflexed in columellar region, continuous as a slight callus

over parietal wall; epidermis light horn color or greenish, shining.

"Operculum light horn color; excentrically spiral, with polar point pit-like and nearly central, lines of accretion inconspicuous."

The animal is black or gray with well developed eyes.

	Ht.	Diam.	Aper. Ht.	Aper. Diam.	No. of Whorls	Index
	<i>mm.</i>	<i>mm.</i>	<i>mm.</i>	<i>mm.</i>		
Topotype .....	2.2	1.5	1.1	0.9	4.0	1.47
" .....	2.0	1.5	1.0	1.0	3.7	1.33
Montauk Spring .....	3.1	1.9	1.4	1.2	4.3	1.63
" " .....	3.0	1.9	1.3	1.1	4.5	1.58
Spring near Koester .....	2.4	1.8	1.1	1.1	4.0	1.33
" " " .....	2.2	1.7	1.1	1.0	3.5	1.29

*A. missouriensis* is based upon immature shells. It is not distinguishable from specimens of *A. a. aldrichi* with the same number of whorls.

Localities.—Missouri: St. Louis Co.: spring on Glencoe Creek, 2.8 miles northwest of Glencoe Station; spring on Antire Creek, 4 miles east of Eureka. Jefferson Co.: spring on Antire Creek, 4 miles south of Tyson; Becker's Spring, 0.5 mile east of Seckman; spring on hillside, Moss Hollow, 2.5 miles southeast of Antonia; spring on bluff above Glaize Creek, 2 miles west of Barnhart. Crawford Co.: Onondaga Spring, 5 miles southeast of Leasburg. St. Francois Co.: spring, 0.4 mile south of Koester. Franklin Co.: spring 2 miles west of Lone Dell. Dent Co.: Montauk Spring. Shannon Co.: Cave Hollow Spring, 6 miles north of Birchtree. Butler Co.: Keener Spring, Keener. Reynolds Co.: spring (type locality). Carter Co.: (type locality of *A. missouriensis*).

At Montauk Spring about one shell in five hundred is banded with red.

AMNICOLA ALDRICHI INSOLITA, new subspecies. Pl. 14, figs. B, C.

The shell differs from that of the typical form in having deeper sutures, strongly shouldered whorls, and a free lip.

	Ht.	Diam.	Aper. Ht.	Aper. Diam.	No. of Whorls	Index
	<i>mm.</i>	<i>mm.</i>	<i>mm.</i>	<i>mm.</i>		
Holotype .....	2.4	1.7	1.1	1.0	4.0	1.41
Paratype .....	2.3	1.9	1.3	1.1	3.5	1.21
" .....	2.4	1.8	1.2	1.2	4.0	1.33

Holotype A.N.S.P. No. 175556, paratypes, A.N.S.P. No. 175557; paratypes, No. A4418, author's collection.

Localities.—Missouri: Phelps Co.: Meramec Spring, 5 miles southeast of St. James. Wayne Co.: Coldwater Spring, Coldwater (type locality).

AMNICOLA ALDRICHI ANTROECETES, new subspecies. Pl. 14, figs. I, J, K.

Shell not distinguishable from the more slender forms of *A. a. aldrichi*. Opereulum apparently without growth lines or sculpture. Animal unpigmented and blind.

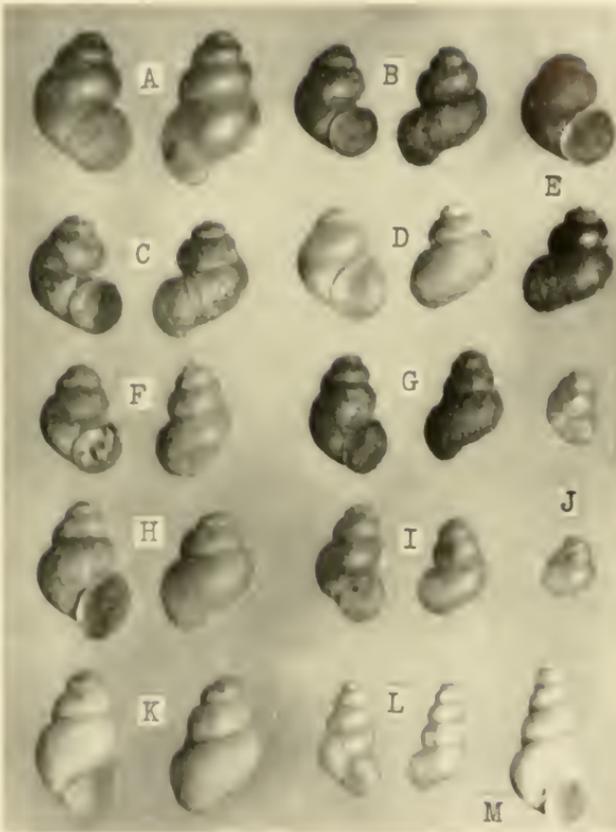
Holotype A.N.S.P. No. 175554, paratypes, A.N.S.P. No. 175555; paratypes, No. A4295, author's collection.

Localities.—Illinois: St. Clair Co.: Stemmler's Cave, 2 miles south of Bluffsides (type locality). Missouri: St. Louis Co.: Cliff Cave. Crawford Co.: Cathedral Cave, 5 miles southeast of Leasburg; Missouri Caverns, 5 miles southeast of Leasburg. Phelps Co.: Saltpeter Cave, 7 miles north of Newburg. Shannon Co.: twilight zone, Round Spring Cavern Spring, 12 miles north of Eminence.

	Ht.	Diam.	Aper. Ht.	Aper. Diam.	No. of Whorls	Index
	mm.	mm.	mm.	mm.		
Holotype .....	2.9	1.7	1.3	1.2	4.0	1.71
Paratype .....	3.2	2.0	1.3	1.3	4.2	1.60
Round Spr. Cav. Spr.	2.3	1.4	1.0	0.8	4.0	1.64
“ “ “ “	2.2	1.5	1.0	0.9	4.0	1.47
Cathedral Cave .....	1.5	1.0	0.7	0.6	4.0	1.50
“ “ .....	1.3	0.9	0.6	0.6	3.5	1.44
Missouri Caverns .....	1.6	1.2	0.8	0.6	3.8	1.33
“ “ .....	1.4	1.0	0.7	0.6	3.7	1.40
Saltpeter Cave .....	1.9	1.2	0.8	0.7	4.0	1.68
“ “ .....	1.6	1.1	0.8	0.6	4.0	1.45

Because it is quite probable that this blind form has developed independently in each cave stream in which it occurs it is treated as a subspecies, although the differences in the animal, in the absence of intergrading forms, might properly be considered of specific rank.

The size of these snails is extremely variable and is apparently determined by the food supply. They have always been found



*Amnicola aldrichi aldrichi*: A, Montauk Spring (left, banded). D, 2 miles west of Barnhart. E, 0.4 mile south of Koester. F, Reynolds Co. (topotypes). G, 2 miles west of Lone Dell. H, 2.8 miles northwest of Glencoe Station. *A. a. insolita*: B, Meramec Spring. C, Coldwater (paratypes). *A. a. antroceles*: I, Round Spring Cavern Spring. J, Cathedral Cave. K, Stemmler's Cave (paratypes). *A. proserpina*: L, Rice's Cave (paratypes). M, Kirkwood.



associated with blind crustaceans of the genus *Caccidotea*, and in every case there is a high positive correlation between the size of the crustacean and the size of the snail.

At Round Spring Cavern there has been, at some time in the past, a reduction in the food supply, which has driven the snails out into the spring where they live in the twilight zone from the mouth of the cave back to the limits of algal growth. (Round Spring Cavern is so named because of its proximity to Round Spring with which it is not connected. The small stream which flows through it emerges about one-fourth mile from Round Spring.)

*AMNICOLA PROSERPINA*, new species. Pl. 14, figs. L, M.

Shell pale amber colored, subimperforate, elevated, conical, with numerous growth lines and spiral striae; whorls five to six, very convex, separated by deep sutures; apex obtuse; aperture not quite as broad as long; peristome continuous, not reflexed in the columellar region, nor closely appressed in the parietal region. Operculum apparently devoid of growth lines or sculpture. Animal unpigmented and blind.

	Ht.	Diam.	Aper. Ht.	Aper. Diam.	No. of Whorls	Index
	<i>mm.</i>	<i>mm.</i>	<i>mm.</i>	<i>mm.</i>		
Paratype .....	2.2	1.2	0.8	0.6	5.0	1.81
“ .....	2.5	1.4	0.8	0.7	5.0	1.79
Kirkwood .....	3.2	1.6	1.0	0.9	6.0	2.00
“ .....	4.3	1.8	1.2	1.0	6.0	2.39

Holotype A.N.S.P. No. 175558, paratypes, A.N.S.P. No. 175559; paratypes, No. A4676, author's collection.

The ancestor of this snail has either become extinct; or it has become so modified by its subterranean life that its ancestor cannot be recognized. No epigeal form resembling it has been found in the Ozark region. It may be readily distinguished from *Amnicola aldrichi antroecetes* by its higher index (height/diameter), its more convex, spirally striate whorls, and deeper sutures.

Localities.—Missouri: St. Louis Co.: outlet of drain (spring), Osage Hills golf course, Kirkwood. Jefferson Co.: Rice's Cave, 3 miles northeast of Goldman (type locality).

During the construction of the Osage Hills golf course at Kirkwood a spring branch was tiled in. The snails which lived in the underground stream added this to their domain, where they frequently become dislodged and are washed out.

---

## OXYSTYLA ON SANIBEL ISLAND, FLORIDA

BY WILLIAM J. CLENCH

Mr. G. J. Kissen introduced on his homestead on Sanibel Island in 1921, 4 specimens of *Oxystyla undata floridensis* Pils. that he had collected on Sandy Key, off Cape Sable, Florida. The colony is now quite large and extends over some two acres of trees that cover an Indian kitchen midden.

There are three points of interest relative to this introduction: (1) This colony has survived some 19 years of at least a normal temperature range, and though an extreme low temperature may kill the colony it can at least exist for a reasonable period considerably north of its northern natural limit (Marco Island, 45 miles to the south). (2) This may indicate that the present natural distribution in Florida may possibly be incomplete and that, by mechanical means, the genus could have spread and possibly survive over a much larger territory than it now occupies, and that the present distribution may then be indicative of a rather late introduction. In Florida, *Oxystyla* is found on Lower Matecumbe Key southwest to the Key West group of islands and on the mainland in the vicinity of Cape Sable and north as far as Marco Island. So far as known, it is limited only to a very narrow coastal strip on the mainland and on a few of the lower Keys between the two named above. (3) The present Sanibel colony perpetuates one that is now extinct (?) on Sandy Key. We visited this small island in 1933 and found that the hurricanes of the few years before had destroyed nearly all of the vegetation. The trees had completely disappeared and only a small patch of brush and grass remained. No dead shells were to be found.

I may add a note that on the same trip we failed to find any live specimens of this species on Pavilion Key, which lies some 30 miles to the southeast of Cape Romano, though a few dead speci-

mens were found after considerable search. Scrub was fairly thick and high and no natural reason appeared to us for their extermination.

Mr. Kissen has just introduced on his hammock land *Liguus* that he had obtained from Long Pine Key in the south central Everglades. It will be of considerable interest to see if these manage to survive on Sanibel.

---

## ANOTHER PLEISTOCENE SNAIL IS NOT EXTINCT

BY J. P. E. MORRISON<sup>1</sup>

In the course of cataloguing the Shimek Collection of Loess fossil shells and the recent shells included in that collection, acquired in 1937 by the United States National Museum, one unfamiliar lot of specimens was seen. The distinct differences of this lot of *Discus*, with a high, dome-shaped spire, and an almost smooth base of the body whorl, stuck in the mind as such things will, until that puzzle suddenly resolved itself two years later. Upon reading the description of *Discus macclintocki* (F. C. Baker), NAUTILUS 41: 133, 1927; also: Journ. Paleont. 5: 281, 1931, known from many localities in Illinois and Iowa as a Pleistocene Loess fossil, the "peculiar" lot of specimens was immediately recalled.

These specimens (U.S.N.M. No. 505741), collected *alive* by Shimek on September 8, 1928, from under a decaying White Birch log, in Bixby State Park, Clayton Co., Iowa, prove to be recent individuals of *Discus macclintocki* (F. C. Baker). These Iowa specimens are evenly horn-colored, as in *D. c. anthonyi* (Pils.). There is no trace of the basal callus within the aperture, nor of the reddish color present in *D. patula* (Desh.).

Shimek's discovery of a living colony of *Discus macclintocki* places this species in the category of *Hendersonia occulta*, known for years only as a Loess fossil. This discovery of *D. macclintocki*, identical in the recent fauna with the Pleistocene form, also removes any possibility that it may have been ancestral to *Discus patula* (Desh.). The two were and are co-existent, neither ancestral to the other.

---

<sup>1</sup> Published by permission of the Secretary of the Smithsonian Institution.

A NEW SPECIES OF *FLUMINICOLA* WITH NOTES  
ON "COLORADO DESERT" SHELLS, AND  
ON THE GENUS *CLAPPIA*

BY J. P. E. MORRISON<sup>1</sup>

*Tryonia clathrata* Stimpson, collected by Blake (U.S.N.M. No. 27893 and U.S.N.M. No. 170786) and by Gen. Carlton (1861–1862) from the "Colorado Desert" (U.S.N.M. No. 30596), and by Merriam from the Pahrnagat Valley, Nevada (1891) (U.S.N.M. No. 107735 and U.S.N.M. No. 123621), is probably limited to the Nevada locality as hinted by Stearns.<sup>2</sup>

*Fluminicola merriami* Pilsbry & Beecher, described from specimens collected by Merriam in the Pahrnagat Valley<sup>3</sup> (U.S.N.M. No. 123626), was also collected in company with *T. clathrata* by Gen. Carlton (1861–1862) from the "Colorado Desert" (U.S.N.M. No. 30631).

*Fluminicola avernalis* Pilsbry, and *F. a. carinifera* Pilsbry<sup>4</sup> are also from the Pahrnagat Valley, Nevada, if association is any indication of habitat. Stearns' 1893 record of *F. nuttalliana*<sup>5</sup> was based on a mixture of several forms: *F. fusca* (Hald.) collected by Merriam from Shoshone Falls, Idaho (U.S.N.M. No. 58596), and the three smaller forms from the "Colorado Desert." Stearns' statement: "A dwarfed but characteristic aspect of this species occurs among the surface shells in the Colorado Desert," evidently refers to the mixed lot collected by General Carlton in 1861–1862.

This lot included *F. merriami* referred to above, and also a few specimens of *F. avernalis* and of *F. a. carinifera*, now re-catalogued as U.S.N.M. No. 535694 and U.S.N.M. No. 535695, respectively.

Thus it is evident that all four forms, *T. clathrata*, *F. merriami*, *F. avernalis*, and *F. a. carinifera*, are really from the Pahrnagat Valley of Nevada. It is also evident that the term "Colorado

<sup>1</sup> Published by permission of the Secretary of the Smithsonian Institution.

<sup>2</sup> N. Am. Fauna, No. 7, Pt. 2, p. 281, 1893.

<sup>3</sup> NAUTILUS 5: 143, 1892.

<sup>4</sup> NAUTILUS 48: 92–93, 1935.

<sup>5</sup> N. Am. Fauna, No. 7, Pt. 2, p. 282, 1893.

Desert" of the Blake and Carlton survey collections was not incorrect, but all-inclusive, equivalent to the more modern term of "Great Basin Area."

The wide distribution of *Tryonia protea* (Gould), definitely known to be from the Colorado Desert, California ("Cienaga Grande"), and from Sevier and Great Salt lakes and western Tooele Co., Utah, may be explained by the supposition that these Utah localities were at one time actually tributary to the Colorado River. This previous stream continuity is also attested by the distribution of *Fluminicola coloradoense* in the present headwaters of the Colorado River and in various discontinuous stream localities in Utah. According to all specimens seen, the geographic boundary between *F. fusca* and *F. coloradoense* is the present divide between the Snake and the Utah-Colorado Drainages.

#### FLUMINICOLA COLORADOENSE, new species.

Shell: large (for the genus), subglobose-conic, smooth; spire moderate, the whorls well rounded, separated by a deep suture; the body whorl is voluminous, rapidly enlarged, in some specimens producing almost a neritiform appearance. Aperture narrowly rounded above; widely, evenly rounded below. The umbilical chink is distinct, being wider and more prominent than in *F. fusca*. The color is lighter than that of *F. fusca*; apex pinkish, the remainder of the shell a dirty white, not reddish or purplish throughout.

The type (U.S.N.M. No. 526631) and several paratypes (U.S.N.M. No. 526576) were collected by H. F. Wickham from the Green River, Wyoming. The holotype measures: Height 9.0 mm.; diameter 8.3 mm.; aperture height 6.0 mm.; aperture diameter 5.0 mm.; whorls  $4\frac{1}{2}$ .

This, the common large *Fluminicola* of Utah and Wyoming (in the headwaters of the Colorado River), has remained unnamed because it was previously confused with *F. hindsi* from the Kootanie, *F. columbiana* from the Columbia, *F. nuttalliana* from the Wahlamette, *F. fusca* from the Snake, and *F. seminalis* from the Sacramento, all of which are superficially similar, but nevertheless quite distinct.

The United States National Museum collections also include specimens of *Fluminicola coloradoense* from:

- Bear River, Soda Springs, Idaho (L. Bruner) (U.S.N.M. No. 526730)  
 Malad River, Eagle Rock, Oneida Co., Idaho (Bruner) (U.S.N.M. No. 526354)  
 Malad River, Utah (Hemphill) (U.S.N.M. No. 47873)  
 Shores of Utah Lake (Capt. Burton) (U.S.N.M. No. 9222)  
 Utah Lake, Utah (Stearns Coll.) (U.S.N.M. No. 31270 and No. 75452)  
 Kelton, Utah (V. Bailey) (U.S.N.M. No. 123623)  
 Salt Lake City, Utah (E. Lawrence) (U.S.N.M. No. 519988)  
 Willow Creek, Camp 22 (Dr. Curtis) (U.S.N.M. No. 28537)  
 Head of Green River, Utah (Malloney) (U.S.N.M. No. 28103 and No. 120462)  
 Harris Fork of Green River, Wyoming (Bruner) (U.S.N.M. No. 526754)  
 Bell's Fish Cliff, Horn's Pk., Wyoming (Bruner) (U.S.N.M. No. 539160)

*Notes on the genus Clappia*

*Clappia*, originally monotypic,<sup>6</sup> is now known to be more inclusive, and not confined to the Coosa River drainage.

The anatomy of *Somatogyrus tryoni* Pilsbry & F. C. Baker<sup>7</sup> was well worked out in the Wisconsin Monograph,<sup>8</sup> where Dr. Baker pointed out the great similarity of its radula to that of *Clappia*, namely the prominent central cusp, flanked by an equal number of smaller cusps on each side, on the cutting edge of the lateral tooth.

Recent examination of paratype males of the genotype, *Clappia clappi* Walker (U.S.N.M. No. 451821), has shown that the verge of this species is identical with that described and figured for *S. tryoni*.

Although the verge of the genotype of *Somatogyrus*, *S. depressus* Tryon,<sup>9</sup> is still unknown, the radular differences will easily distinguish it from *Clappia*.

A third species that must be transferred to *Clappia*, is *Somatogyrus virginicus* Walker,<sup>10</sup> material of which, personally collected in Occoquan Creek, in the gorge 1½ miles upstream from Occo-

<sup>6</sup> Walker, NAUTILUS 22: 89, 1909.

<sup>7</sup> Pilsbry & F. C. Baker, NAUTILUS 41: 24, 1927.

<sup>8</sup> F. C. Baker, F. W. Moll, Wisconsin I: 150-154, 1928.

<sup>9</sup> Stimpson, Researches, etc., p. 21, 1865.

<sup>10</sup> Walker, NAUTILUS 17: 141, 1904.

quan, Prince Wm. Co., Virginia (U.S.N.M. No. 484806) has been recently examined anatomically. The verge of *C. virginicus* is identical with that of *C. clappi*.

*Clappia* therefore includes *C. clappi* from the Coosa River, *C. virginica* from the Potomac drainage, and *C. tryoni*, which ranges as far north as the headwaters of the Wisconsin River.<sup>11</sup> Further knowledge of the range of the genus must await critical examination of other species at present included in *Somatogyrus*.

---

### LAND MOLLUSCS COLLECTED AT HEBRON, LABRADOR, AND LAKE HARBOUR, SOUTH BAFFIN ISLAND

BY JOHN OUGHTON

Royal Ontario Museum of Zoology, Toronto

The land and freshwater molluscs of the eastern Arctic of Canada are poorly known. A few collections have been made at Ungava Bay, Labrador, and examined by Dall or Whiteaves. Dall (1905) presented all that has been recorded to date on the subject. Altogether, in his treatise, there are mentioned 13 species and one doubtful occurrence (*Vertigo hoppii* Möller) for Ungava Bay, Labrador, and two species for Labrador without more detailed locality, and finally *Gyraulus vermicularis* Gould is listed for Labrador in his table, but is omitted in the text.

In the present paper, five species of land molluscs are recorded. No freshwater species were found at all. There appears to be a much greater variety of non-marine molluscs in Ungava. This may be attributed perhaps to climatic differences, as the Ungava collections came from a sparsely forested or sub-Arctic region. In contrast, the specimens herein described came from the treeless regions or the Arctic proper. The species found at Lake Harbour constitute, I believe, the first record of any non-marine molluscs from Baffin Island. The localities in question are:

Hebron, northern Labrador. Lat. 58° 20' N., long. 62° 30' W., roughly 200 miles east of Fort Chimo, Ungava Bay.

Lake Harbour, southern Baffin Island. Lat. 62° 50' N., long. 69° 52' W.

<sup>11</sup> Morrison, Trans. Wis. Acad. Sci. 27: 369, 1932.

Dr. H. A. Pilsbry has very kindly examined a sample and has corroborated the determinations.

*Columella alticola* (Ingersoll). Small var? While this is a rather surprising record, yet my specimens are distinctly more cylindrical than any North American or European lots of *C. edentula* which I have seen. Whorls 6 to  $6\frac{3}{4}$ ; dimensions of the largest shells (=mature): length 2.4–3.0 mm., average 2.6; diameter 1.1–1.3 mm., average 1.2; colour cinnamon brown which is often obscured by opaque white. In some shells, the surface striae are much reduced. "While your shells have the shape of *C. alticola*, they are smaller and I am rather uncertain whether it is *alticola* or a narrow race of *edentula* such as some which have been defined in Europe." H. A. P.

Hebron: none. Lake Harbour: about 200 shells from a boggy upland flat; in crevices at edge of temporary stream; under rocks beside a small brook.

*Vertigo alpestris* Alder var. This is the first or second record of this species for the continent. Whorls  $4\frac{1}{4}$  to  $4\frac{3}{4}$ ; length 1.8 to 2.2 mm., average 2.0; diameter 1.1 to 1.2 mm., average 1.2; colour light buff to amber brown; the striae usually faint, teeth variable, mostly having but one tooth (a parietal) or a parietal and palatal; no crest behind the lip. The aperture of these specimens varies somewhat in size. The Lake Harbour specimens resemble very closely the single European lot at hand from Boros, Sweden, in the character of the lip, but differ in having a darker brown colour, less distinct striation and much more reduced teeth.

Hebron: none. Lake Harbour: 2 lots containing 217 adults from a boggy upland flat where it was associated with *Vertigo modesta* (Say) and *Columella alticola* (Ingersoll). This bog is probably a filled-in lake basin, at one end of which a small body of water remains.

*Vertigo arctica* (Wallenb.) Whorls  $4\frac{3}{4}$  to 5; length 2.2 to 2.4 mm., average 2.3; diameter 1.3 to 1.4, average 1.3; crest behind lip very slight, less than that of *modesta* Say; in most cases the teeth are 1 columellar, 1 parietal and 0 or 1 palatal; palatal tooth when present very small.

Hebron: none. Lake Harbour: a single colony of 133 specimens, of which 75 were adults, was found at the edge of a temporary pond in the hills, associated with no other snails.

I interpret this one colony of *Vertigos* to represent this puzzling boreal species, as no individual in the lot possessed two palatal teeth. Otherwise, there is little to distinguish it from *V. modesta* Say of the same region. A three-toothed shell of *arctica* differs from a three-toothed *modesta* of the same locality in two particulars, (1) noticeably in the much smaller lower palatal tooth and (2) slightly in a smaller crest behind the lip. This second feature is admittedly a minute difference and is not constant. It was observed that even four-toothed shells of *modesta* seemed to have a more pronounced crest than three-toothed shells of the same species. As far as I could see, the shells of *V. arctica* and *V. modesta* at Lake Harbour were identical in colour, size, shape and degree of striation. By North American standards, *arctica* probably would not be ranked higher than a *form* or *variety*. The *modesta* group would make an interesting study, as these snails often may form colonies of one strain, more or less pure.

*Vertigo modesta* Say vars. Whorls  $4\frac{3}{4}$  to 5; length 2.1 to 2.5 mm., average 2.3; diameter 1.2 to 1.4; average 1.3; teeth chiefly 1 columellar, 1 parietal and either 1 or 2 palatals. This species was readily distinguished from *V. alpestris* which was associated with it in the boggy flat by the greater length and diameter, more ventricose shape, larger and more numerous teeth as well as the presence of a crest behind the lip.

Hebron: 2 lots, 14 adult shells, of which 7 had no teeth at all; under stones on tundra, under stones at edge of small lake. Lake Harbour: 4 lots, 103 adults; in crannies at edge of small brook, in crevices beside temporary creek and pond, in boggy upland flat.

While speaking of boreal *Vertigos*, it is not amiss to notice that Latchford (1884) recorded "*Vertigo hoppii* (Möller) from Anticosti Island. His collection is now in the possession of the Royal Ontario Museum of Zoology. It contains 2 shells labelled *hoppii* from Anticosti which probably formed the basis for his record. One shell is a typical *V. modesta* (Say). The other, although it differs from typical *alpestris* in possessing a slight crest behind the lip, has the shape and size of that species. Like many of the Baffin Island specimens of *alpestris*, the Anticosti shell has two teeth—one parietal and one palatal.

*Deroceras laeve* (Müller). Length of drowned specimens up to 12.5 mm. This is, I presume, the same slug that Dall recorded from Fort Chimo as "*Limax hyperboreus* West."

Hebron: 6 specimens, under stones at edge of small lake, under stones on tundra. Field notes indicate that these were "a dull dark brown: no pattern visible." Lake Harbour: 2 specimens, under rocks beside a brook. Slugs are apparently rare in this region, as I found none associated with pupillids at three other stations.

I am indebted to Messrs. Calvin Goodrich and Henry Van der Schalie of Ann Arbor and S. T. Brooks of Pittsburgh for favours shown me.

Variations in the apertural teeth of *Vertigos* collected at Hebron and Lake Harbour

Number of specimens			Teeth		
<i>alpestris</i>	<i>modesta</i>	<i>arctica</i>	col.	par.	pal.
7	7	0	0	0	0
94	0	0	0	1	0
2	0	0	0	0	1
6	0	43	1	1	0
87	0	0	0	1	1
0	1	1	1	0	1
5	0	0	0	1	2
1	0	0	0	2	1
15	54	31	1	1	1
0	54	0	1	1	2
0	1	0	1	2	2
<hr/>					
Total	217	117			

*Remarks*

1. The collections were made during a voyage on the R. M. S. "Nascopie" in 1939, on the following dates:

Hebron, July 17 and 18.

Lake Harbour, July 24 to Aug. 15.

2. I did not find any freshwater molluscs at any part of my trip, although I searched ponds, lakes and streams for them. They are apparently rare or local, if they are present at all on Baffin Island. Mr. John G. Cormack, who had been stationed at

Frobisher Bay, south-eastern Baffin Island, as manager for the Hudson Bay Company, informed me that he had seen fresh-water snails in that vicinity.

3. I did not find any terrestrial species at Port Burwell (Cape Chidley) just off the northeastern tip of Labrador, or any of the more northerly ports of call, viz., Fort Ross, the most northerly tip of Boothia peninsula; Craig Harbour, south-east corner of Ellesmere Island; and Arctic Bay, Pond Inlet, River Clyde, Panguirtung, all on the northern and eastern coasts of Baffin Island. The few ground samples I took from these northern localities yielded no shells. However, the short period permitted ashore, combined with snow, in some cases, prevented an exhaustive search.

#### BIBLIOGRAPHY

- Dall, W. H. 1905. Land and Fresh Water Mollusks of Alaska and Adjoining Regions, Harriman Alaska Exp.  
Latchford, F. R. 1884. Shells of Anticosti. Amer. Nat., 1051-1052.

---

### FURTHER NOTES ON LAND SHELLS FROM KODIAK AND NEARBY ISLANDS

BY WALTER J. EYERDAM

On June 1st of this year, I returned from a 25,000-mile excursion to South America, collecting plants for the University of California at Berkeley. This journey covered parts of twelve Latin republics, including about 12,000 miles of travel in the Gran Chaco and Patagonia. Only twelve days after arriving at my home in Seattle, I was on my way to Alaska again, where I spent three and a half months.

While collecting plants in the Kodiak islands, I managed to make a few more locality records. At Alitak, on the S.W. coast of Kodiak, I found, in abundance under wild rhubarb, fine specimens of *Succinea chrysis* Westerlund. Under broad leaves at the base of the stalks of three plants were found about 200 specimens. *Discus cronkhitei* Newcomb and *Vitrina alaskana* Dall were also quite common.

Conditions of vegetal habitat are quite different around Alitak than around Uganik Bay, where I collected some land shells in 1924. Only the above species of land shells were found in this district.

On Raspberry Island, I also collected in September many *Succinea chrysis* in the same habitat as at Alitak. *Vitrina alaskana* was also rather common in this situation. None of the very small species of shells were found, although careful search was made for them. Raspberry Island is in Raspberry Strait, which lies between Kodiak and Afognak islands.

In 1931 I collected plants on Sitkalidak Island but found no snails the whole summer. This island is on the S.W. coast of Kodiak Island.

The principal habitat of land snails on Kodiak, and on some of the larger islands of the Aleutian chain, is at the base of the wild rhubarb, *Heracleum lanatum*. Similar conditions prevail in Kamchatka and adjacent parts of Siberia.

Many of the same species found on Kodiak Island are found on both sides of the Bering Sea. Too little is known about the distribution of the scant molluscan fauna to determine just which species migrated from Asia to America or from America to Asia. The trend of the plant migrations across the Bering Sea by the way of the Aleutian Islands is more definitely known through the exhaustive studies of plants of Kamchatka and the Flora of the Aleutian Islands by Dr. Eric Hultén of Sweden. As indicated by plant migrations there seem to be many more species that have migrated from Asia to Alaska by way of the Aleutians than have migrated from Alaska to Asia. Sufficient reason for this would be found in the influence of distribution from west to east by the Kuro Siwa or Japan current which sweeps along the south side of the Aleutians and across the Gulf of Alaska.

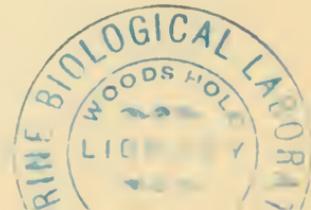
The following list of shells found on Kodiak and Unalaska islands and Kamchatka peninsula were collected by the author except seven species marked with a star. All species except the three Kamchatkan succineas occur on Kodiak Island or can be expected to be there.

I have collected all other species in the above list except the three Kamchatkan *Succinea*. *Cochlicopa lubrica*, *Zoogenites*

Kodiak I.	Unalaska I.	Kamchatka
<i>Prophysaon andersoni</i> J. G. Cooper	+	...
<i>Succinea chrysis</i> Westerlund	+	...
<i>Succinea grosvenori</i> Lea	+	...
...	...	* <i>Succinea putris</i> L.
...	...	* <i>Succinea pfeifferi</i> Rossm.
...	...	* <i>Succinea arenaria</i> Bouch
<i>Discus cronkhitei</i> Newcomb	+	+
<i>Vitrina alaskana</i> Dall	+	+
<i>Vitrea radiatula</i> Alder	...	...
<i>Punctum conspectum</i> Bland	+	...
<i>Pristiloma arctica</i> Lehnert	+	...
* <i>Haplotrema vancouverense</i> Lea	+	...
...	...	<i>Cochlicopa lubrica</i> Müll.
...	<i>Polygyra columbiana</i> Lea	...
<i>Euconulus fulvus</i> Müll.	...	+
<i>Euconulus fulvus alaskensis</i> Pilsbry	+	+
* <i>Retinella binneyana occidentalis</i> H.B.B.	...	...
<i>Vertigo modesta</i> Say	+	+
* <i>Vertigo modesta ultima</i> Pilsbry	...	...
<i>Columella alticola</i> Ingersoll	+	...
...	+	<i>Zoogenites harpa</i> Say
...	...	<i>Retinella hammonis</i> Ström
...	* <i>Haplotrema vancouverensis</i> Lea	...

*harpa* Say and *Retinella hammonis* Ström have also a wide distribution in Canada and U. S. A., but have never been recorded from Kodiak or adjacent islands.

Nearly all of the shells reported on the Kodiak islands also occur on the Aleutian islands. *Haplotrema vancouverense* and *Polygyra columbiana* have not yet been reported from Kodiak Island, so it is strongly suspected that their occurrence in two or three spots on Unalaska Island may have been accidental. They are not uncommon in the region of Prince William Sound and in southeastern Alaska.



## AESTIVATION OF *LYMNAEA LANCEATA* (GOULD)

BY HENRY VAN DER SCHALIE

Through a grant in aid from the H. H. Rackham fund, intensive collecting of land and fresh-water mollusks in the Green Bay region of Wisconsin was made possible during the summer of 1939. In the course of this work an interesting observation was made on the aestivation of a colony of *Lymnaea lanceata*. This colony was found aestivating on tree trunks. So far as can be determined, this behavior is different from that of any other species of aquatic pulmonates living in temporary woods-pools.

It is now common knowledge that several species of aquatic pulmonates, such as *Aplexa hypnorum*, *Lymnaea palustris*, *L. caperata*, *L. stagnalis*, and *Gyraulus parvus*, among others, during periods of drought bury themselves in the mud at the bottom of the pools they normally inhabit. One naturally assumes that most aquatic pulmonates inhabiting temporary pools behave in this manner. However, *Lymnaea lanceata* may be an exception to this generalization. The suggested difference in its behavior is emphasized by the fact that Sterki<sup>1</sup> reported a somewhat similar observation for *L. lanceata*. He found this species in a marsh near Hudson, Ohio, aestivating "on stems and leaves of sedges, several inches above the ground."

The colony of *L. lanceata* in Wisconsin inhabited a swamp about six miles west of Oconto Falls. Hundreds of them were found aestivating on the trunks of the elms that formed the border around a dense growth of cedar trees. They were attached to the bark by an epiphragm. A collecting bag could be filled with specimens by merely running a hand downward along the bark, catching the specimens as they fell. Many specimens were orientated with the apex of the shell pointed upward, but this situation was by no means common to all of them. Several were seen as high as five feet above the ground. Among the leaves, soil and dried vegetation surrounding the base of the trees, the following additional species were collected (given in the order of their abundance):

<sup>1</sup> NAUTILUS, 26, 1912, pp. 64-65.

*Aplexa hypnorum* (Linneus)

*Physa gyrina elliptica* (Lea)

*Lymnaea caperata* Say

*Sphaerium occidentale* (Prime)

Since *Lymnaea lanceata* is often confused with *L. kirklandiana* and *L. exilis*, it would be interesting if this unusual habit of aestivation should prove to be an adaptation not shared by the species to which *L. lanceata* is so closely related. Additional information on the seasonal habits of *L. lanceata* must be obtained before the significance of its characteristic form of aestivation can be appreciated fully.

---

#### NOTES AND NEWS

REMARKABLE CALCIUM DEPOSITS IN *EUNATICINA OLDROYDII* (DALL).—During a gross anatomical study of the anatomy of the gastropod, *Eunaticina oldroydii* (Dall), a large female of this species was found whose body contained abnormal calcium deposits. One of the principal deposits was situated at the mouth of the gonoduct in such a manner as to completely occlude it, thus preventing the successful completion of the copulatory act. Two such other deposits were firmly fixed between the lamellae of the gill which is normally situated on the left side of the mantle cavity and the large intestine which rests in close proximity to the right side of this cavity. The leverage provided by these two calcium deposits pulled the gill from its normal position over to the right side of the mantle cavity. Another deposit was attached between the posterior face of the head just behind the right tentacle and to the muscular covering of the crop which excludes this structure from the mantle cavity. Thus the head which normally occupies a position forward to the above named cavity was drawn posteriorly and dorsad into this cavity. The final deposit of note was embedded in the left wall of the pericardial cavity over the auricle. When this deposit was dissected away it was found that its inner surface, which was perfectly smooth, was attached directly to the wall of the auricle. The side of the mass which was attached to the auricle wall was triangular in outline and measured 3 mm. across its long axis. Numerous other smaller

deposits than the above mentioned were embedded in the substance of the digestive gland internal to the membrane covering the visceral dome; some of them extended for a millimeter or two into its substance. All of the deposits possessed the characteristic structure common to the mother of pearl layer of the shell.

The specimen dealt with here was dredged from the drag-net boat *Zozel* in approximately 20 fathoms of water in Monterey Bay, California. It was obtained with 19 others of both sexes which were normal in every respect.—WILLIAM MARCUS INGRAM.

A METHOD FOR HOLDING MOLLUSKS TO BE DISSECTED.—During studies on the anatomy of *Polinices draconis* (Gould), *Polinices lewisii* (Gould), and *Eunaticina oldroydii* (Dall) certain difficulty was encountered in holding specimens to be dissected firmly in place. The following method was devised and is cited here in hope that it might prove of some use to others engaged in the study of molluscan anatomy.

In the above species which possess a well-developed foot the propodium and metapodium were folded against each other so that the ventral surface of each of these foot divisions was in firm contact. A heavy piece of string was then tied tightly around them. Thus a loop of string surrounded the foot. Two dissecting pins were then thrust between this noose and foot on opposite sides and into the wax on the bottom of the dissecting pan, thus holding the mollusk firmly in place. By pushing the pins obliquely into the wax a better purchase may be had than if they are thrust into this substance at a direct angle. If the pins slip, each may be twisted so that a cinch surrounds each of them.

This method of "noose attachment" proved much more efficient than that of attaching the animal to be dissected directly to the pan. When this latter method is employed it has been found that nerve commissures and ganglia are often injured or destroyed by inserting pins through the substance of the foot. Too, dissection is not hindered by numerous pins which are necessary if direct attachment is employed. By noose attachment the animal may be freely rotated so as to present the various planes of the visceral mass; something that cannot be done when the animal is held in place by numerous dissecting pins.—WILLIAM MARCUS INGRAM.

PHLYCTICONCHA, NEW NAME FOR A SUBGENUS OF LYONSIA.—By an unfortunate oversight, we failed to take cognizance of the fact that Dr. Dall had employed *Phlyctiderma* in 1899 as a subgeneric designation in *Diplodonta*, prior to our use of the word for our subgenus of *Lyonsia* (Smiths. Misc. Coll., vol. 98, no. 10, p. 12, June 13, 1939). We now suggest that the name **Phlycticoncha** to replace our homonym.—BARTSCH & REHDER.

PYRGULOPSIS NEVADENSIS STEARNS IN OREGON.<sup>1</sup>—Henderson (Univ. of Colorado Studies 17, p. 170, 1929) questions the occurrence of this species in the Oregon fauna. Nothing relative to this species was included in his supplement (*ibid.*, 23, 1936). Recently, Colonel Paul D. Bunker, of Los Angeles, submitted for naming a series of five species of fresh-water shells collected on the southeast shore of Upper Klamath Lake, Oregon. *Pyrgulopsis nevadensis*, along with *Carinifex ponsonbyi* Sm., *Pompholyx effusa* Lea, *Valvata humeralis californica* Pils., and *Flumini-cola seminalis* Hinds were collected at this locality.—W. J. CLENCII.

AESTIVATION OF FRESH-WATER MUSSELS.—In the October, 1939, issue of this journal, Dr. Fritz Haas reported an interesting observation on the aestivation of *Anodontites crispatus salmoncus* Marshall. This behavior is, however, not as unusual as it would seem from the following statement made by Dr. Haas: "Similar resistance to dryness on the part of fresh-water mussels has been described only once, to the best of my knowledge." At least six American authors have published similar observations:

1. C. T. Simpson (U. S. Fish. Comm. Bull. for 1898: 283) mentioned that both *Ligumia subrostrata* and *Unio merus tetralasmus*, "under certain circumstances live buried in dried mud for a long time. Hon. J. D. Mitchell, of Victoria, Tex., kept specimens of *tetralasmus* alive in a dry room for many months."

2. L. S. Frierson (NAUTILUS, 1903, 17: 50; 1917, 31: 49; 1923, 36: 128) has reported both *Unio merus tetralasmus* and *Carunculina texensis* from various localities where these species were found aestivating in mud.

<sup>1</sup> Cf. NAUTILUS, 43 (3): 103.—H. B. B.

3. John K. Strecker, Jr. (NAUTILUS, 1908, 22: 64) stated that *Unio merus tetralasmus* can live in localities where there is absolutely no water for a period of three to six months.

4. F. B. Isely (Bur. Fish. Doc., 1914, 792: 18; Univ. Okla. Studies, 1925, 21: 100) reported that *Unio merus tetralasmus* was "plowed up in the Browne pond three months after the pond had gone dry." He suggested that other naiades may aestivate in similar situations.

5. Coker, Shira, Clark and Howard (Bull. Bur. Fish. (1919-20), 37: 100) stated that *Unio merus tetralasmus* will survive in ponds that dry up in the summer.

6. A. D. Howard (Bur. Fish. Doc., 1914, 801: 28) found a specimen of *Amblema peruviana* in a dry pond at Fairport, Iowa. The animal, buried in "barely moist mud," was still alive.

From these accounts, and there probably are others, observations concerning the aestivation of fresh-water mussels in mud seem to be common, particularly in southwestern United States where streams and ponds are apt to dry in summer and fall. At least four species, *Unio merus tetralasmus*, *Carunculina texasensis*, *Ligumia subrostrata*, and *Amblema peruviana*, have been observed living through dry periods by aestivating. *Unio merus tetralasmus*, perhaps largely because of its ecology, has been found most commonly in aestivation. There is also evidence that other naiades can survive dry periods in the same way. Further authentic records, such as that given by Dr. Haas, would aid greatly in extending our knowledge of this behavior as it is related to various species of naiades.—HENRY VAN DER SCHALIE.

ANOTHER CASE.—*Anodontites infossus* H. B. B., Occ. Papers Mus. Zool. Univ. Mich. 210: 67, was found "living and dead, deeply buried in parts of the [stream] bed that were superficially dry at the time visited."—H. B. B.

THE CASE OF *Limnaeus sordidus* KUESTER.—In 1862, Kuester published the description of a *Limnaeus sordidus* which was said to have come from Central America (Conch. Cab., Abt. 17b, 58, pl. 12, figs. 15-16). Binney (L. & F. W. Shells N. A.) does not mention it. Von Martens (Biol. Centr. Amer., Moll. 379, 1899) remarks that it is probably a form of *elodes* and is doubtful about

the Central American origin, although quoting a specimen in the Dunker collection in the Berlin Museum as having a Central American habitat. This specimen resembled Haldeman's figure of *umbrosa* on plate 7, figs. 4-5 (Freshwater Univ. Moll., Limnea, 24). In *The Lymnaeidae of North and Middle America* (p. 313) the writer placed it under the American *palustris*, believing that the locality "Central America" might have been the result of a mixing of labels, since of the many thousand specimens of this family examined during the preparation of that work not a single limnaeid of the *palustris* type, excepting *attenuata*, had been authentically reported from south of the United States.

Recently, Dr. F. Haas (Zool. Ser. Field Mus. N. H., 24, 99, 1939) has taken up the name and concludes that Kuester's *L. sordidus* is the large lymnaeid found in Lake Chalco near the City of Mexico. This, however, is the *Limnaea attenuata* of Say (New. Harm. Diss., II, 244, 1829) of which the *Limnaeus subulatus* of Dunker is a synonym. This species is common on the Mexican plateau, particularly in lakes and canals near the City of Mexico. The specimens cited by Dr. Haas belong to this species, and not to *sordidus*. Specimens from Lake Chalco have been personally examined.

Now the question is, what is *Limnaeus sordidus*? Until a few years ago no specimen of the *palustris* group had been seen by the writer from Mexico or Central America. Recently, Dr. Wendell C. Gregg sent the writer several specimens of a lymnaeid from Colon, Panama. These are of the *palustris* type, near the variety called *nutalliana* by Lea. One specimen is fenestrated or malleated as in the figures of Kuester's *sordidus*. The Gregg specimens are 28 to 30 mm. long and 15 mm. wide, the spire longer than the aperture, the color dark horn. They resemble closely some forms of *clodes* and also some elongated forms of *nutalliana*. Since Colon is on the Panama Canal and there is great possibility of the introduction of mollusks, the question naturally arises as to whether this was the case with the Gregg specimens. A form of *nutalliana* occurs in southern California which strongly resembles the fenestrated *sordidus*, but these vary into typical *nutalliana*.

The facts seem to be that *Limnaeus sordidus* is still in the

problematical class, and until specimens have been found in Central America or Mexico, away from the possibility of introduction, it must be considered a doubtful form. That it was founded upon a member of the *palustris* group is beyond dispute, but the locality is still in question.—FRANK C. BAKER.

NOTES ON THE SUBGENERA OF *Valvata*.—The opinion of Dall (Alaska, p. 120) and of F. C. Baker (F. W. Moll. Wis. I, p. 10) that the proposed subgenera of American *Valvata* are of little taxonomic value is borne out by an examination of the types of *Valvata utahensis* Call. In that species, the nuclear sculpture is spirally striate (*cf.* Baker's figure 5, p. 11); the next two whorls have the spiral keels characteristic of the *V. tricarinata* group (*Tropidina*); on the later whorls the keels become obsolete and disappear, while the growth lines are strengthened, becoming the radial striations that are characteristics of the subgenus *Pleurovalvata* Haas (Field Mus. Zool. 24; p. 101, 1939). The shell is markedly turbinate, resembling in that respect *V. virens* Tryon and *V. piscinalis* (subgenus *Cincinna*).

Should our specimens of *V. utahensis* be distributed in thirds to the "subgenera" *Cincinna*, *Pleurovalvata*, and *Tropidina*? or should one disregard these names as long as they are based on superficial characters only? Haas' observations on the generally lacustrine habitats of his proposed subgenus *Pleurovalvata* are well founded, but does this also explain the relative smoothness of *V. perdepressa* and *V. p. walkeri* from Lake Michigan, or the extreme carination of *V. winnebagoense* from Lake Winnebago?—J. P. E. MORRISON.

TWO NEW MEXICAN SPECIES OF HUMBOLDTIANA.—*Humboldtiana fortis*, n. sp. The shell is narrowly rimate, rather solid and thick for the genus, globose with short, conic spire. Surface matt, vinaceous-pink between white wrinkles, and with three dusky bands (often faint or wanting). Sculpture of quite irregular coarse, low wrinkles. Aperture russet-vinaceous within. Peristome blunt, whitish, the columellar margin reflected. Height 38 mm., diameter 37 mm.; 4½ whorls. Sierra Potosi, at about 10,000 ft. Nuevo Leon, Mexico. Type 164045 A.N.S.P.

*Humboldtiana montezuma*, n. sp. The shell is narrowly umbilicate, thin, somewhat depressed globose, dark vinaceous brown

with a profusion of thread-like white striae. Last whorl with close but somewhat unevenly spaced, thread-like striae, with many small granules between and on their edges. Aperture rotund, as high as wide, vinaceous brown within, the peristome white-edged. Height 44 mm., diameter 48 mm.;  $4\frac{1}{2}$  whorls. Summit of El Infernillo, Sierra Madra Oriental, Nuevo Leon at 10,000 ft. Type 164062 A.N.S.P.

There are various smaller subspecies of this fine snail at lower elevations in Nuevo Leon and Coahuila, which will be described later.—H. A. P.

THE AMERICAN MALACOLOGICAL UNION will hold its annual meeting at Philadelphia during the week of June 18th to 21st.

---

### PUBLICATIONS RECEIVED

A TENTATIVE CLASSIFICATION OF THE PALEARCTIC UNIONIDS. By Fritz Haas. Zool. Series Field Mus. of Nat. Hist., vol. 24, no. 11. This list of 9 genera, 19 species and 61 subspecies (together with their huge synonymy) is preceded by an interesting summary of the views of former naturalists, from the time of Dupuy and Rossmassler on.

It may be mentioned that all of the palearctic anodontas (except the Persian *A. vescoiana*) are included under *A. cygnea* L. It probably has the most extensive synonymy of any mollusk. The genus *Psilunio* (*U. littoralis* Lam. and its allies) is interesting as representing the mainly American subfamily Quadru-lineae.—H. A. P.

A PROPOSED DICHOTOMY OF THE SNAIL GENUS *Monadenia*. By S. S. Berry. Bull. Southern Cal. Acad. Sci., vol. 38, pt. 3, pp. 203–205, Feb. 10, 1940. Dr. Berry divides *Monadenia* into two subgenera, *Monadenia* proper, based on *M. fidelis*, and *Corynadenia* new subgenus for *M. hillebrandi*. No other species are mentioned as belonging to either, but the distribution is discussed. Curiously it happened that Pilsbry published exactly the same division, anatomic and geographic, over two months earlier, in Land Moll. N. A., I, p. 33. The second or *hillebrandi* group was not named then because its characters seem too trivial for a subgenus. Dr. Berry's paper gives no evidence that he ever dis-

sected a *Monadenia*, the data given being derivable from the publications of Binney, Hanna and Pilsbry.—H. A. P.

LAND MOLLUSCA OF NORTH AMERICA (NORTH OF MEXICO), vol. 1, pt. 1. By Henry A. Pilsbry. Monogr. 3, Acad. Nat. Sci. Philadelphia, 1939. Systematic zoology is an attempt to arrange animals in natural groups: species, genera and larger assemblages. The law, that such taxonomic units must be based on all the characteristics of the organisms included, is commonly accepted as an ideal but rarely so thoroughly practiced as in this monograph. Here, Dr. Pilsbry brings together the accumulated knowledge of his predecessors, collates with it his patient personal research of over half a century, and culminates with the inductive, almost intuitive grasp of relationships, that arrives only when memory is replete with objective data. To his fellow amateurs (*i.e.*, lovers), he offers an authoritative arrangement of the land shells, illustrated so generously and beautifully that they might identify a majority of the forms from the keys and figures. For his student colleagues, he presents not only careful descriptions of the shells of synonyms and forms as well as species, but contributes a wealth of data on the infinitely more complex soft parts of the animals. Only by similarly detailed studies of all the penetralia, as well as the facets of each snail's make-up will any true comprehension of the relationships between them be ever attained.

The published part covers four more advanced families of the Helicacea. With the probable exception of *Cepaea hortensis*, two of these, the Helicidae and Helicellidae, are only represented by species accidentally or purposely introduced from Europe. The other two have never successfully crossed east of the Great Plains, although one subspecies, *Oreohelix strigosa cooperi*, did live in eastern Iowa during the Pleistocene.

The name Helminthoglyptidae is proposed for the American groups, which are most nearly related to the restricted Helicidae. Four subfamilies are named: the "Cepoliniinae" (better Cepoliniinae), with one living Floridan species of the Antillean genus *Cepolis*, the typical Helminthoglyptinae, with the genera *Monadenia*, *Helminthoglypta* and *Micrarionta*, and the Sonorellinae

and Humboldtianinae, each with a single genus. Both the definition of this family, and the somewhat tentative inclusion of *Sonorella*, call attention to the necessity of a still broader basis for pulmonate systematics; unfortunately, present knowledge only permits satisfactory evaluation between characters of the shell, radula, jaw and genitalia.

The inclusion of nearctic genera in the Camaenidae throws new light on the path by which the West Indian and Oriental members must have attained their present range. The discontinuous distribution of both *Oreohelix* and the Ammonitellinae suggests that they are being supplanted by the more advanced Helminthoglyptidae of the Pacific coast. Only a master could have brought together such superficially divergent genera as *Glyptostoma*, *Ammonitella*, *Polygyroides* and *Polygyrella*; Dr. Pilsbry's courage can only be contrasted with the vacillant treatment in Thiele's "Handbuch," where *Glyptostoma* appears in two divergent superfamilies.

The legal intricacies of nomenclature are also accurately traced. Although I doubt if the names *Helminthoglypta cuyamacensis* and *Oreohelix strigosa depressa* are correctly employed, both are cases where discretion is far wiser than valor. The few misprints will doubtlessly be rectified in later parts; specific mention here would be superfluous, when Dr. Pilsbry's courteous, almost gleeful acceptance of corrections is so well known. My principal criticism would be that, although Dr. Pilsbry has not hesitated to reduce the status of many of his own names, even to synonyms, he has, on the whole, been much more soft-hearted with those of other authors.—H. B. B.

---

DISCUS PATULUS ANGULATUS KUTCHKA (Naut. 52: 13), being preoccupied by *Discus macclintocki angulatus* (F. C. Baker), Naut. 41: 143, will henceforth be known as *Discus patulus carinatus*.—G. K. MACMILLAN.

Dr. Pilsbry is spending March and part of April in Florida, his P.O. address being Lantana.

A SOLOMON ISLAND BATISSA LIVING IN DRY HOT SAND.—In August 1929, while collecting birds on Bougainville Island, I found near the village of Kieta some fine large specimens of a species of *Batissa*, living entirely out of water and exposed to the severe heat of the torrid zone.

In sandy depressions on the margin of a mangrove swamp near the mouth of a small river, but only subject to overflow at rare intervals and then only of brief duration, these clams were thriving, completely exposed to the sunlight and heat. I scarcely believed at first that the shells contained live clams so unlikely seemed their habitat to me. I took several specimens back to camp and deliberately laid them out in the sun for three days, after which they seemed to be as fresh and lively as ever and without any seeming discomfiture. I ate a boiled specimen but it tasted quite insipid, not unlike a piece of boiled clay.

The shells were nearly white or pale yellowish white on the outside and plain white inside. The largest specimen was about 3 inches wide and 3.5 inches long. This is apparently a rare species because I never found the kind again although I collected shells at hundreds of localities for more than a year thereafter in the Solomon Islands and New Guinea. I often found two or three other species of this genus in the mangrove swamps, generally living out of water but with sufficient moisture. These species were all of deep purple color inside and rounder periphery.

The dry ground species of *Batissa* evidently derives a sufficient amount of moisture to sustain its xerophytic habit of living from the direct rain, but which quickly filters through the porous sand of its peculiar habitat. No other forms of animal life were noted in this situation.

Specimens of this clam with exact data are still picked up in the large collection of marine shells that I made while a member of the Whitney South Sea Expedition.

These shells are in the care of Dr. Pilsbry but belong to the American Museum of Natural History in New York City.—WALTER J. EYERDAM.





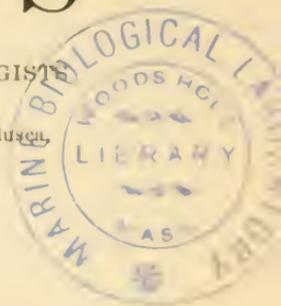
# THE NAUTILUS

A QUARTERLY  
DEVOTED TO THE INTERESTS OF CONCHOLOGISTS

EDITORS AND PUBLISHERS

HENRY A. PILSBRY, Curator of the Department of Mollusca,  
Academy of Natural Sciences, Philadelphia

H. BURREINGTON BAKER, Professor of Zoology,  
University of Pennsylvania



## CONTENTS

The Genus <i>Cyphoma</i> in Florida. By <i>H. A. Pilsbry</i> and <i>Tom L. McGinty</i> .....	1
<i>Oxystyla</i> from Western Mexico. By <i>Thomas L. McGinty</i> .....	4
Additional Notes on <i>Terebra Flammea Lamarek.</i> By <i>William J. Clench</i> .....	7
A Revision of <i>Spiraxis</i> C. B. Adams. By <i>H. Burrington Baker</i> .....	8
New Marine Mollusks from the West Atlantic. By <i>Harald A. Rehder</i> .....	16
Pleistocene Shells from San Clemente Island, California. By <i>T. D. A. Cockerell</i> .....	22
Type Specimen of <i>Busycon perversum</i> ( <i>Murex perversus</i> Linné). By <i>Burnett Smith</i> .....	23
A New Mexican <i>Coelocentrum.</i> By <i>H. A. Pilsbry</i> .....	27
<i>Leiostraens Webberi</i> , a New <i>Bulimulid</i> Snail from Ecuador. By <i>H. A. Pilsbry</i> .....	28
A New Subgenus and Species of West Coast "Alvania." By <i>Mackenzie Gordon, Jr.</i> .....	29
Notes and News .....	33
Publications Received .....	35

\$2.00 per year (\$2.15 to Foreign Countries) 50 cents a copy

HORACE B. BAKER, *Business Manager*  
Zoological Laboratory, University of Pennsylvania,  
38th and Woodland Avenue, Philadelphia, Pa.

---

## THE NAUTILUS:

A Quarterly Journal devoted to the study of Mollusks, edited and published by HENRY A. PILSBRY and H. BURRINGTON BAKER.

Matter for publication should reach the senior editor by the first of the month preceding the month of issue (January, April, July and October). *Typescript should be double spaced.*

REPRINTS are furnished at printer's rates. Orders should be written on or attached to first page of manuscript.

	4 pp.	8 pp.	16 pp.
50 copies .....	\$3.70	5.40	7.60
100 copies .....	4.10	6.00	8.50
Additional 100s .....	.75	1.20	1.80

Covers: 50 for \$2.50; additional covers at the rate of \$1.50 per hundred.

Plates (pasted in): 65 cents for 50; \$1.20 for 100.

THE NAUTILUS is the official organ of the American Malacological Union. Information regarding membership in the Union may be obtained from Mrs. Imogene C. Robertson, Financial Secretary, Buffalo Museum of Science, Buffalo, N. Y.

---

## EXCHANGE NOTICES

WANTED: One dollar each will be paid for July, 1938, copies of THE NAUTILUS.

HORACE B. BAKER, Zool. Lab. Univ. Penna.

FOR EXCHANGE: Fifteen varieties, Florida tree snails (*Liguus*) including three of the rare *solidus*, to exchange for *Achatinella*, *Amphidromus*, *Bulimulus*, *Cochlostyla*, *Orthalicus*, *Porphyrobaphe* and *Placostylus*. Send your list to

PAUL P. MCGINTY, Boynton, Florida.

WANTED: Back Volumes and Numbers of THE NAUTILUS. Especially Vols. 3, 4, 18, 20, 21, 22, 23 and 24. Address

HORACE B. BAKER, Zool. Lab., Univ. Pennsylvania.

WANTED: Pupillidae preserved in alcohol for dissection.

PROF. C. M. STEENBERG, University of Copenhagen,  
Nørregade 10, Denmark

FOR EXCHANGE: Key West and lower Florida Keys marine and land shells.

MRS. MARIO V. CALLEJA, 1117 Fleming Street,  
Key West, Fla.

(Continued on p. iii)

---

FOR EXCHANGE: European and Foreign shells (large number of recent and tertiary sp.) offered against sp. new to me. Apply with full list to:  
J. L. STAED, 123 Rue Clovis, Rheims, Marne, France.

West Coast Shells for sale or exchange. My list sent on request.  
TOM BURCH, 1611 South Elena Avenue,  
Redondo Beach, California

---

### HANDBOOK FOR SHELL COLLECTORS

2,200 illustrations and descriptions, prices they are usually sold for and much other valuable matter. How to properly clean shells, approximate number of species under the genera treated. Price \$2.50 prepaid. Also a special U.S.A. book covering marine shells on both coasts, some land shells, invertebrates, etc., paper bound only \$1.00.

I have 25,000 species of shells in stock properly classified and sold for the most reasonable prices. Boxes on approval and selection as often as you wish. Shells have been my hobby since 1893 and I expect I have followed it farther and spent more real cash on them than any one now living in this country. Let me hear from you if you mean business.

Walter F. Webb

202 Westminster Road

Rochester, N. Y.

---

### ANIMALS OF THE SEASHORE

by

Horace G. Richards

An illustrated guide book to the marine invertebrates of the  
Middle Atlantic States

\$3.00

New Jersey State Museum  
Trenton, N. J.

---

### EAST COAST MARINE SHELLS

Descriptions of shore mollusks occurring from Maine to Texas together with figures of practically every species including many from off shore stations. More than a thousand illustrations, including photographs and drawings.

Edition limited to one thousand copies. Cloth bound \$4.50. Orders filled in order of receipt. Address the author:

MAXWELL SMITH,  
Lantana, Florida

---

## THE MANUAL OF CONCHOLOGY

---

The volume finished in 1935 completes the monograph  
of the Pupillidae and their allies.

Issued quarterly in parts of which four form a volume.

Plain Edition, per vol., \$15.00.

Colored Edition, \$20.00.

Department of Mollusca,

ACADEMY OF NATURAL SCIENCES,

PHILADELPHIA, PA.

---

### The Largest and Finest Stock of Shells in Existence

Business established by Sowerby in 1861

**SALE**

**PURCHASE**

**EXCHANGE**

Good Adult Specimens Correctly Labelled at Moderate Prices

Our Catalogues are used by Museums and Amateurs for

Reference and as Check-Lists.

**HUGH C. FULTON**

(Late SOWERBY & FULTON)

27 Shaftesbury Road, London, W. 6, England

---

### TRIDACNA GIGAS

live collected specimens from the Sulu Sea. 30 to 40 inch widths, guaranteed to be of good shape and to reach you in good condition. U. S. \$40.00 to \$100.00 per pair C.I.F. any world seaport. Also Nautilus Pompilius in quantities, and other Philippine marine shells. Tell us your needs and we will do our utmost to supply them.

Correspondence of all kinds is solicited.

We need commercial agents in many cities and countries.

**WILLARD W. TREVOR**

**SOUTHSEAS SHELL PRODUCTS COMPANY**

P. O. Box 2410

**MANILA, Philippines**

# THE NAUTILUS

A QUARTERLY  
DEVOTED TO THE INTERESTS OF CONCHIOLOGISTS

EDITORS AND PUBLISHERS

HENRY A. PILSBRY, Curator of the Department of Mollusca,  
Academy of Natural Sciences, Philadelphia

H. BURRINGTON BAKER, Professor of Zoology,  
University of Pennsylvania

## CONTENTS

Collecting on a Coral Reef in Florida. By <i>Thomas L. McGinty</i> .....	37
<i>Conus Melvilli</i> Sowerby, and a New Species of the Lamel- lariidae. By <i>Louise M. Perry</i> .....	40
<i>Polydontes Obliteratus</i> (Férussac). By <i>H. A. Pilsbry</i> .....	42
Two New Species of <i>Sayella</i> with Notes on the Genus. By <i>J. P. E. Morrison</i> .....	43
An Unusual Cave Deposit. By <i>J. P. E. Morrison</i> .....	45
Land Snails New to the Fauna of Pennsylvania. By <i>Gordon K. MacMillan</i> .....	47
New Mexican Species of <i>Spiraxis</i> . By <i>H. Burrington Baker</i> .....	49
A New Floridan <i>Cyclostrema</i> . By <i>H. A. Pilsbry</i> .....	53
On the Life Habits of Some Tropical Fresh-Water Mussels. By <i>Fritz Haas</i> .....	53
Two New Polygyroid Helicoids from Northern California. By <i>S. Stillman Berry</i> .....	56
Land Snails Collected at Uganik Bay, Kodiak Island. By <i>Walter J. Eyerdam</i> .....	61
Wendell Clay Mansfield .....	64
John Ritchie, Jr. ....	66
Notes and News .....	66
The Ninth Annual Meeting of the American Malacological Union .....	68

\$2.00 per year (\$2.15 to Foreign Countries) 50 cents a copy

HORACE B. BAKER, *Business Manager*  
Zoological Laboratory, University of Pennsylvania,  
38th and Woodland Avenue, Philadelphia, Pa.

---

## THE NAUTILUS:

A Quarterly Journal devoted to the study of Mollusks, edited and published by HENRY A. PILSBRY and H. BURRINGTON BAKER.

Matter for publication should reach the senior editor by the first of the month preceding the month of issue (January, April, July and October). *Typescript should be double spaced.*

REPRINTS are furnished at printer's rates. Orders should be written on or attached to first page of manuscript.

	4 pp.	8 pp.	16 pp.
50 copies .....	\$3.70	5.40	7.60
100 copies .....	4.10	6.00	8.50
Additional 100s .....	.75	1.20	1.80

Covers: 50 for \$2.50; additional covers at the rate of \$1.50 per hundred.

Plates (pasted in): 65 cents for 50; \$1.20 for 100.

THE NAUTILUS is the official organ of the American Malacological Union. Information regarding membership in the Union may be obtained from Mrs. Imogene C. Robertson, Financial Secretary, Buffalo Museum of Science, Buffalo, N. Y.

---

## EXCHANGE NOTICES

WANTED: One dollar each will be paid for July, 1938, copies of THE NAUTILUS.

HORACE B. BAKER, Zool. Lab. Univ. Penna.

FOR EXCHANGE: Fifteen varieties, Florida tree snails (*Liguus*) including three of the rare *solidus*, to exchange for *Achatinella*, *Amphidromus*, *Bulimulus*, *Cochlostyla*, *Orthalicus*, *Porphyrobaphe* and *Placostylus*. Send your list to

PAUL P. MCGINTY, Boynton, Florida.

WANTED: Back Volumes and Numbers of THE NAUTILUS. Especially Vols. 3, 4, 18, 20, 21, 22, 23 and 24. Address

HORACE B. BAKER, Zool. Lab., Univ. Pennsylvania.

WANTED: Pupillidae preserved in alcohol for dissection.

PROF. C. M. STEENBERG, University of Copenhagen,  
Nørregade 10, Denmark

FOR EXCHANGE: Key West and lower Florida Keys marine and land shells.

MRS. MARIO V. CALLEJA, 1117 Fleming Street,  
Key West, Fla.

(Continued on p. iii)

---

FOR EXCHANGE: European and Foreign shells (large number of recent and tertiary sp.) offered against sp. new to me. Apply with full list to:  
J. L. STAED, 123 Rue Clovis, Rheims, Marne, France.

West Coast Shells for sale or exchange. My list sent on request.

TOM BURCH, 1611 South Elena Avenue,  
Redondo Beach, California

---

### HANDBOOK FOR SHELL COLLECTORS

2,200 illustrations and descriptions, prices they are usually sold for and much other valuable matter. How to properly clean shells, approximate number of species under the genera treated. Price \$2.50 prepaid. Also a special U.S.A. book covering marine shells on both coasts, some land shells, invertebrates, etc., paper bound only \$1.00.

I have 25,000 species of shells in stock properly classified and sold for the most reasonable prices. Boxes on approval and selection as often as you wish. Shells have been my hobby since 1893 and I expect I have followed it farther and spent more real cash on them than any one now living in this country. Let me hear from you if you mean business.

Walter F. Webb

202 Westminster Road

Rochester, N. Y.

---

### ANIMALS OF THE SEASHORE

by

Horace G. Richards

An illustrated guide book to the marine invertebrates of the  
Middle Atlantic States

\$3.00

New Jersey State Museum  
Trenton, N. J.

---

### EAST COAST MARINE SHELLS

Descriptions of shore mollusks occurring from Maine to Texas together with figures of practically every species including many from off shore stations. More than a thousand illustrations, including photographs and drawings.

Edition limited to one thousand copies. Cloth bound \$4.50. Orders filled in order of receipt. Address the author:

MAXWELL SMITH,  
Lantana, Florida

---

## THE MANUAL OF CONCHOLOGY

---

The volume finished in 1935 completes the monograph  
of the Pupillidae and their allies.

Issued quarterly in parts of which four form a volume.

Plain Edition, per vol., \$15.00.                      Colored Edition, \$20.00.

Department of Mollusca,

ACADEMY OF NATURAL SCIENCES,

PHILADELPHIA, PA.

---

### The Largest and Finest Stock of Shells in Existence

Business established by Sowerby in 1861

**SALE**

**PURCHASE**

**EXCHANGE**

Good Adult Specimens Correctly Labelled at Moderate Prices

Our Catalogues are used by Museums and Amateurs for

Reference and as Check-Lists.

**HUGH C. FULTON**

(Late SOWERBY & FULTON)

27 Shaftesbury Road, London, W. 6, England

---

### TRIDACNA GIGAS

live collected specimens from the Sulu Sea. 30 to 40 inch widths, guaranteed to be of good shape and to reach you in good condition. U. S. \$40.00 to \$100.00 per pair C.I.F. any world seaport. Also Nautilus Pompilius in quantities, and other Philippine marine shells. Tell us your needs and we will do our utmost to supply them.

Correspondence of all kinds is solicited.

We need commercial agents in many cities and countries.

**WILLARD W. TREVOR**

**SOUTHSEAS SHELL PRODUCTS COMPANY**

P. O. Box 2410

MANILA, Philippines

# THE NAUTILUS

A QUARTERLY  
DEVOTED TO THE INTERESTS OF CONCHOLOGISTS

EDITORS AND PUBLISHERS

HENRY A. PILSBRY, Curator of the Department of Mollusca,  
Academy of Natural Sciences, Philadelphia

H. BURRINGTON BAKER, Professor of Zoology,  
University of Pennsylvania

## CONTENTS

Sequence in the Distribution of Aquatic Species. By <i>Calvin Goodrich</i> .....	73
Mollusks of a Kansas Pleistocene Deposit. By <i>Calvin Goodrich</i> .....	77
A New Tellin of the Subgenus <i>Angulus</i> , a New <i>Lamellaria</i> and a New Subspecies of <i>Crassispira</i> , from Southwest Florida. By <i>Louise M. Perry</i> .....	79
New Land and Marine Tertiary Shells from Southern Florida. By <i>Thomas L. McGinty</i> .....	81
New State and County Records of Landsnails in Pennsylvania. By <i>Charles B. Wurtz</i> .....	84
Mexican Subulinidae and Spiraxinae with New Species of <i>Spiraxis</i> . By <i>H. Burrington Baker</i> .....	89
A New Urocoptid Mollusc from the State of Sonora, Mexico. By <i>Joshua L. Baily, Jr.</i> and <i>Ruth Ingersoll Baily</i> .....	94
New Gastropoda from West Virginia. By <i>Stanley T. Brooks</i> and <i>Gordon K. MacMillan</i> .....	95
A New Variety of <i>Polygyra Appressa</i> (Say). By <i>Gordon K. MacMillan</i> .....	98
Obituary .....	99
Publications Received .....	103
Notes and News .....	105

\$2.00 per year (\$2.15 to Foreign Countries) 50 cents a copy

HORACE B. BAKER, *Business Manager*  
Zoological Laboratory, University of Pennsylvania,  
38th and Woodland Avenue, Philadelphia, Pa.

---

## THE NAUTILUS:

A Quarterly Journal devoted to the study of Mollusks, edited and published by HENRY A. PILSBRY and H. BURRINGTON BAKER.

Matter for publication should reach the senior editor by the first of the month preceding the month of issue (January, April, July and October). *Typescript should be double spaced.* Proofs will not be submitted to authors unless requested.

REPRINTS are furnished at printer's rates. ORDERS SHOULD BE WRITTEN ON OR ATTACHED TO FIRST PAGE OF MANUSCRIPT.

	4 pp.	8 pp.	16 pp.
50 copies .....	\$3.70	5.40	7.60
100 copies .....	4.10	6.00	8.50
Additional 100s .....	.75	1.20	1.80

Covers: 50 for \$2.50; additional covers at the rate of \$1.50 per hundred.

Plates (pasted in): 65 cents for 50; \$1.20 for 100.

THE NAUTILUS is the official organ of the American Malacological Union. Information regarding membership in the Union may be obtained from Mrs. Imogene C. Robertson, Financial Secretary, Buffalo Museum of Science, Buffalo, N. Y.

---

## EXCHANGE NOTICES

WANTED: One dollar each will be paid for July, 1938, copies of THE NAUTILUS.

HORACE B. BAKER, Zool. Lab. Univ. Penna.

FOR EXCHANGE: Fifteen varieties, Florida tree snails (*Liguus*) including three of the rare *solidus*, to exchange for *Achatinella*, *Amphidromus*, *Bulimulus*, *Cochlostyla*, *Orthalicus*, *Porphyrobaphe* and *Placostylus*. Send your list to

PAUL P. MCGINTY, Boynton, Florida.

WANTED: Back Volumes and Numbers of THE NAUTILUS. Especially Vols. 3, 4, 18, 20, 21, 22, 23 and 24. Address

HORACE B. BAKER, Zool. Lab., Univ. Pennsylvania.

WANTED: Pupillidae preserved in alcohol for dissection.

PROF. C. M. STEENBERG, University of Copenhagen,  
Nørregade 10, Denmark

NEW ENGLAND Coast Shells for sale or exchange. List sent on request.  
List of foreign shells for sale on request.

MRS. F. K. HADLEY, 88 Oliver St., Malden, Mass.

---

**TRIDACNA GIGAS**

live collected specimens from the Sulu Sea. 30 to 40 inch widths, guaranteed to be of good shape and to reach you in good condition. U. S. \$40.00 to \$100.00 per pair C.I.F. any world seaport. Also Nautilus Pompilius in quantities, and other Philippine marine shells. Tell us your needs and we will do our utmost to supply them.

Correspondence of all kinds is solicited.

We need commercial agents in many cities and countries.

**WILLARD W. TREVOR**  
**SOUTHSEAS SHELL PRODUCTS COMPANY**  
 P. O. Box 2410  
 MANILA, Philippines

---

**HANDBOOK FOR SHELL COLLECTORS**

2,200 illustrations and descriptions, prices they are usually sold for and much other valuable matter. How to properly clean shells, approximate number of species under the genera treated. Price \$2.50 prepaid. Also a special U.S.A. book covering marine shells on both coasts, some land shells, invertebrates, etc., paper bound only \$1.00.

I have 25,000 species of shells in stock properly classified and sold for the most reasonable prices. Boxes on approval and selection as often as you wish. Shells have been my hobby since 1893 and I expect I have followed it farther and spent more real cash on them than any one now living in this country. Let me hear from you if you mean business.

Walter F. Webb

202 Westminster Road

Rochester, N. Y.

---

**ANIMALS OF THE SEASHORE**

by

Horace G. Richards

An illustrated guide book to the marine invertebrates of the  
 Middle Atlantic States

\$3.00

New Jersey State Museum  
 Trenton, N. J.

---

**EAST COAST MARINE SHELLS**

Descriptions of shore mollusks occurring from Maine to Texas together with figures of practically every species including many from off shore stations. More than a thousand illustrations, including photographs and drawings.

Edition limited to one thousand copies. Cloth bound \$4.50. Orders filled in order of receipt. Address the author:

**MAXWELL SMITH,**  
 Lantana, Florida

*123 Years of Research---***LAND MOLLUSCA OF  
NORTH AMERICA  
(NORTH OF MEXICO)**

BY HENRY A. PILSBRY

Since 1817 when Thomas Say's papers appeared in the first volume of its "Journal," the Academy has occupied an outstanding position in increasing the world's knowledge of Mollusks. As the years followed, Haldman, Conrad, Isaac Lea and Tryon carried on in Say's steps.

In 1887 Dr. Henry A. Pilsbry succeeded Tryon as Curator of Mollusks, and during the past 52 years has carried forward the Academy's traditional position as a center of conchological discoveries. During these years his researches have so broadened our knowledge of the phylogeny and classification of land mollusks that the Joseph Leidy Medal was conferred upon him in recognition of his discoveries.

Today, the Academy takes pleasure in announcing the publication of "Land Mollusca of North America (North of Mexico)" by Dr. Henry A. Pilsbry, the first comprehensive treatment of this subject in half a century. Here are presented the summarized conclusions of over fifty years of field and laboratory investigations by an outstanding authority on the subject. Previously unpublished observations, descriptions of new genera and species as well as vitally important original drawings of the soft anatomy make the volumes comprising Monograph III indispensable to students of land mollusks.

The two volumes are offered by subscription for \$25.00, payable proportionately as each section is issued.

Volume I (divided into two Parts) will treat the helicoid mollusks while Volume II will cover the remaining terrestrial groups.

Volume I, Part One (ready for delivery)—by subscription, \$7.50; if purchased separately, \$10.00. Volume I, Part Two (in press) by subscription \$7.50, if purchased separately \$8.00. Volume II (in preparation) by subscription \$10.00, if purchased separately \$12.00.

For sale by

THE ACADEMY OF NATURAL SCIENCES OF  
PHILADELPHIA

19TH STREET AND THE PARKWAY  
PHILADELPHIA, PENNA.

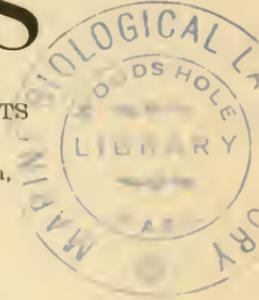
# THE NAUTILUS

A QUARTERLY  
DEVOTED TO THE INTERESTS OF CONCHOLOGISTS

EDITORS AND PUBLISHERS

HENRY A. PILSBRY, Curator of the Department of Mollusca,  
Academy of Natural Sciences, Philadelphia

H. BURRINGTON BAKER, Professor of Zoology,  
University of Pennsylvania



## CONTENTS

Two New Floridan Marine Shells. By <i>Jeanne Schwengel</i> .....	109
A New Naticoid Snail from Florida. By <i>Thomas L. McGinty</i> .....	110
New Mollusks of the Genus <i>Naesiotus</i> from Ecuador. By <i>Harald A. Rehder</i> .....	111
The Ozark Amnicolas. By <i>Leslie Hubricht</i> .....	118
Oxystyla on Sanibel Island, Florida. By <i>William J. Clench</i> ..	122
Another Pleistocene Snail is not Extinct. By <i>J. P. E. Mor-</i> <i>rison</i> .....	123
A New Species of <i>Fluminicola</i> with Notes on "Colorado Desert" Shells, and on the Genus <i>Clappia</i> . By <i>J. P. E.</i> <i>Morrison</i> .....	124
Land Mollusks collected at Hebron, Labrador, and Lake Har- bour, South Baffin Island. By <i>John Oughton</i> .....	127
Further Notes on Land Shells from Kodiak and nearby Islands. By <i>Walter J. Eyerdam</i> .....	131
Aestivation of <i>Lymnaea lanceata</i> (Gould). By <i>Henry van</i> <i>der Schalie</i> .....	134
Notes and News .....	135
Publications Received .....	141

\$2.00 per year (\$2.15 to Foreign Countries) 50 cents a copy

HORACE B. BAKER, *Business Manager*  
Zoological Laboratory, University of Pennsylvania,  
38th and Woodland Avenue, Philadelphia, Pa.

---

**THE NAUTILUS:**

A Quarterly Journal devoted to the study of Mollusks, edited and published by HENRY A. PILSBRY and H. BURRINGTON BAKER.

Matter for publication should reach the senior editor by the first of the month preceding the month of issue (January, April, July and October). *Typescript should be double spaced.* Proofs will not be submitted to authors unless requested.

REPRINTS are furnished at printer's rates. ORDERS SHOULD BE WRITTEN ON OR ATTACHED TO FIRST PAGE OF MANUSCRIPT.

	4 pp.	8 pp.	16 pp.
50 copies .....	\$3.70	5.40	7.60
100 copies .....	4.10	6.00	8.50
Additional 100s .....	.75	1.20	1.80

Covers: 50 for \$2.50; additional covers at the rate of \$1.50 per hundred.

Plates (pasted in): 65 cents for 50; \$1.20 for 100.

THE NAUTILUS is the official organ of the American Malacological Union. Information regarding membership in the Union may be obtained from Mrs. Imogene C. Robertson, Financial Secretary, Buffalo Museum of Science, Buffalo, N. Y.

---

**EXCHANGE NOTICES**

WANTED: One dollar each will be paid for July, 1938, copies of THE NAUTILUS.

HORACE B. BAKER, Zool. Lab. Univ. Penna.

FOR EXCHANGE: Fifteen varieties, Florida tree snails (*Liguus*) including three of the rare *solidus*, to exchange for *Achatinella*, *Amphidromus*, *Bulimulus*, *Cochlostyla*, *Orthalicus*, *Porphyrobaphe* and *Placostylus*. Send your list to

PAUL P. MCGINTY, Boynton, Florida.

WANTED: Back Volumes and Numbers of THE NAUTILUS. Especially Vols. 3, 4, 18, 20, 21, 22, 23 and 24. Address

HORACE B. BAKER, Zool. Lab., Univ. Pennsylvania.

WANTED: Pupillidae preserved in alcohol for dissection.

PROF. C. M. STEENBERG, University of Copenhagen,  
Nørregade 10, Denmark

NEW ENGLAND Coast Shells for sale or exchange. List sent on request.  
List of foreign shells for sale on request.

MRS. F. K. HADLEY, 88 Oliver St., Malden, Mass.

## TRIDACNA GIGAS

live collected specimens from the Sulu Sea. 30 to 40 inch widths, guaranteed to be of good shape and to reach you in good condition. U. S. \$40.00 to \$100.00 per pair C.I.F. any world seaport. Also Nautilus Pompilius in quantities, and other Philippine marine shells. Tell us your needs and we will do our utmost to supply them.

Correspondence of all kinds is solicited.

We need commercial agents in many cities and countries.

WILLARD W. TREVOR  
SOUTHSEAS SHELL PRODUCTS COMPANY  
P. O. Box 2410  
MANILA, Philippines

## HANDBOOK FOR SHELL COLLECTORS

2,200 illustrations and descriptions, prices they are usually sold for and much other valuable matter. How to properly clean shells, approximate number of species under the genera treated. Price \$2.50 prepaid. Also a special U.S.A. book covering marine shells on both coasts, some land shells, invertebrates, etc., paper bound only \$1.00.

I have 25,000 species of shells in stock properly classified and sold for the most reasonable prices. Boxes on approval and selection as often as you wish. Shells have been my hobby since 1893 and I expect I have followed it farther and spent more real cash on them than any one now living in this country. Let me hear from you if you mean business.

Walter F. Webb

202 Westminster Road

Rochester, N. Y.

## ANIMALS OF THE SEASHORE

by

Horace G. Richards

An illustrated guide book to the marine invertebrates of the  
Middle Atlantic States

\$3.00

New Jersey State Museum  
Trenton, N. J.

## EAST COAST MARINE SHELLS

Descriptions of shore mollusks occurring from Maine to Texas together with figures of practically every species including many from off shore stations. More than a thousand illustrations, including photographs and drawings.

Edition limited to one thousand copies. Cloth bound \$4.50. Orders filled in order of receipt. Address the author:

MAXWELL SMITH,  
Lantana, Florida

*123 Years of Research---*LAND MOLLUSCA OF  
NORTH AMERICA  
(NORTH OF MEXICO)

BY HENRY A. PILSBRY

Since 1817 when Thomas Say's papers appeared in the first volume of its "Journal," the Academy has occupied an outstanding position in increasing the world's knowledge of Mollusks. As the years followed, Haldman, Conrad, Isaac Lea and Tryon carried on in Say's steps.

In 1887 Dr. Henry A. Pilsbry succeeded Tryon as Curator of Mollusks, and during the past 52 years has carried forward the Academy's traditional position as a center of conchological discoveries. During these years his researches have so broadened our knowledge of the phylogeny and classification of land mollusks that the Joseph Leidy Medal was conferred upon him in recognition of his discoveries.

Today, the Academy takes pleasure in announcing the publication of "Land Mollusca of North America (North of Mexico)" by Dr. Henry A. Pilsbry, the first comprehensive treatment of this subject in half a century. Here are presented the summarized conclusions of over fifty years of field and laboratory investigations by an outstanding authority on the subject. Previously unpublished observations, descriptions of new genera and species as well as vitally important original drawings of the soft anatomy make the volumes comprising Monograph III indispensable to students of land mollusks.

The two volumes are offered by subscription for \$25.00, payable proportionately as each section is issued.

Volume I (divided into two Parts) will treat the helicoid mollusks while Volume II will cover the remaining terrestrial groups.

Volume I, Part One (ready for delivery)—by subscription, \$7.50; if purchased separately, \$10.00. Volume I, Part Two (in press) by subscription \$7.50, if purchased separately \$8.00. Volume II (in preparation) by subscription \$10.00, if purchased separately \$12.00.

For sale by

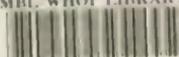
THE ACADEMY OF NATURAL SCIENCES OF  
PHILADELPHIA

19TH STREET AND THE PARKWAY  
PHILADELPHIA, PENNA.





MIL. WHOI LIBRARY



WH L7XD H

