NORTH AMERICAN FRESHWATER SNAILS

Species List, Ranges and Illustrations

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IV. SPECIES LIST, RANGES AND ILLUSTRATIONS*

Family NERITINIDAE[1]

Genus *Neritina* Lamarck 1816

Neritina reclivata reclivata (Say 1822) [Figs. 21, 22][2]
Florida to Mississippi. Also Cuba, northern Mexico and Venezuela (H. B. Baker, 1923).
Neritina reclivata sphaera Pilsbry 1931
Drainage canal draining Lake Okechobee, a few miles from the Atlantic, Ojus, Florida (Pilsbry, 1931).
Neritina reclivata palmae Dall 1885
Brook near Palma Sola, Florida (Dall, 1885)

Family VALVATIDAE†

Genus *Valvata* Müller 1774

Valvata bicarinata bicarinata Lea 1841 [Fig. 23]
Of discontinuous distribution: New Jersey and Pennsylvania; and Iowa, Illinois, Tennessee, Alabama, Georgia and North Carolina.
Valvata bicarinata morph *normalis* Walker 1902 [Fig. 24]
Distribution nearly as for *V. bicarinata* s.s., but not in Georgia and North Carolina.
Valvata humeralis Say 1829 [Fig. 25]
Known from Montana south to Colorado, and west to British Columbia and California.
Valvata lewisi lewisi Currier 1868 [Fig. 26]
Southern Canada from Quebec west to British Columbia, and northern U.S.A. from New York west to Minnesota.
Valvata lewisi morph *ontarioensis* F.C. Baker 1931 [Fig. 27]
Northwestern Ontario in the region of Lake Superior drained by the headwaters of the Attawapiskat, Albany and Severn river systems (Clarke, 1973).
Valvata mergella Westerlund 1883 [Fig. 28]
Northwestern North America: Alaska to Washington.

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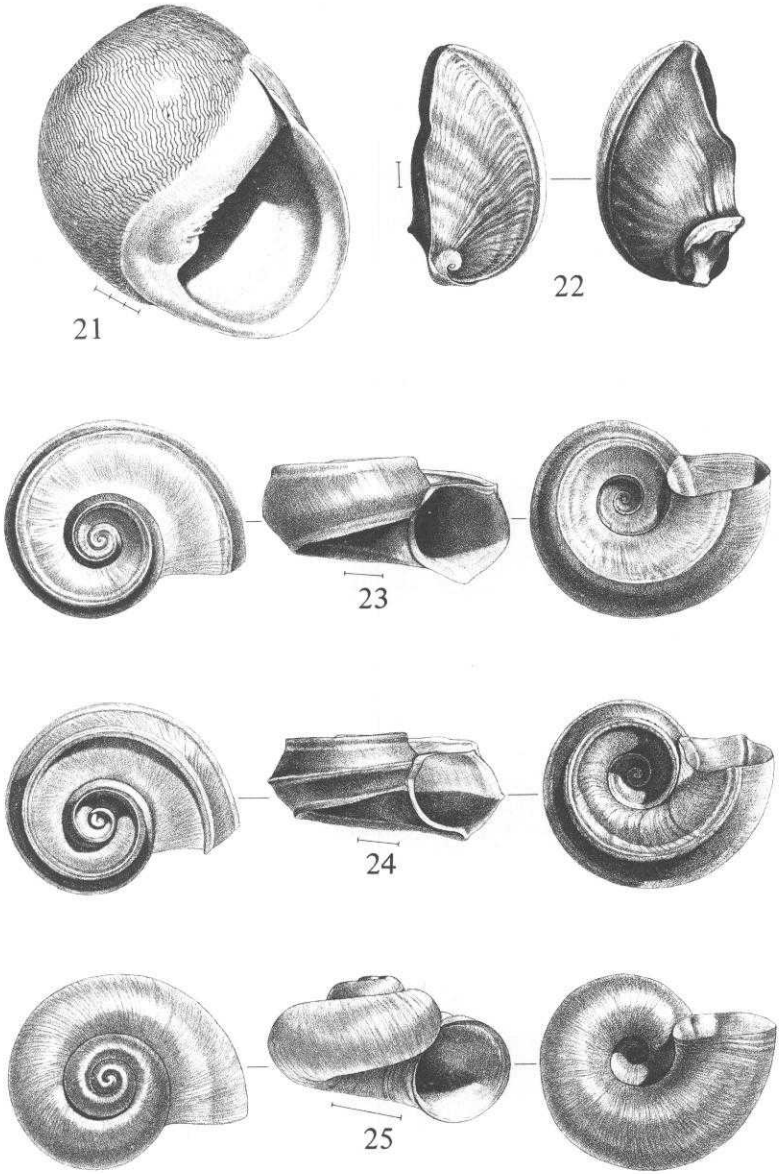
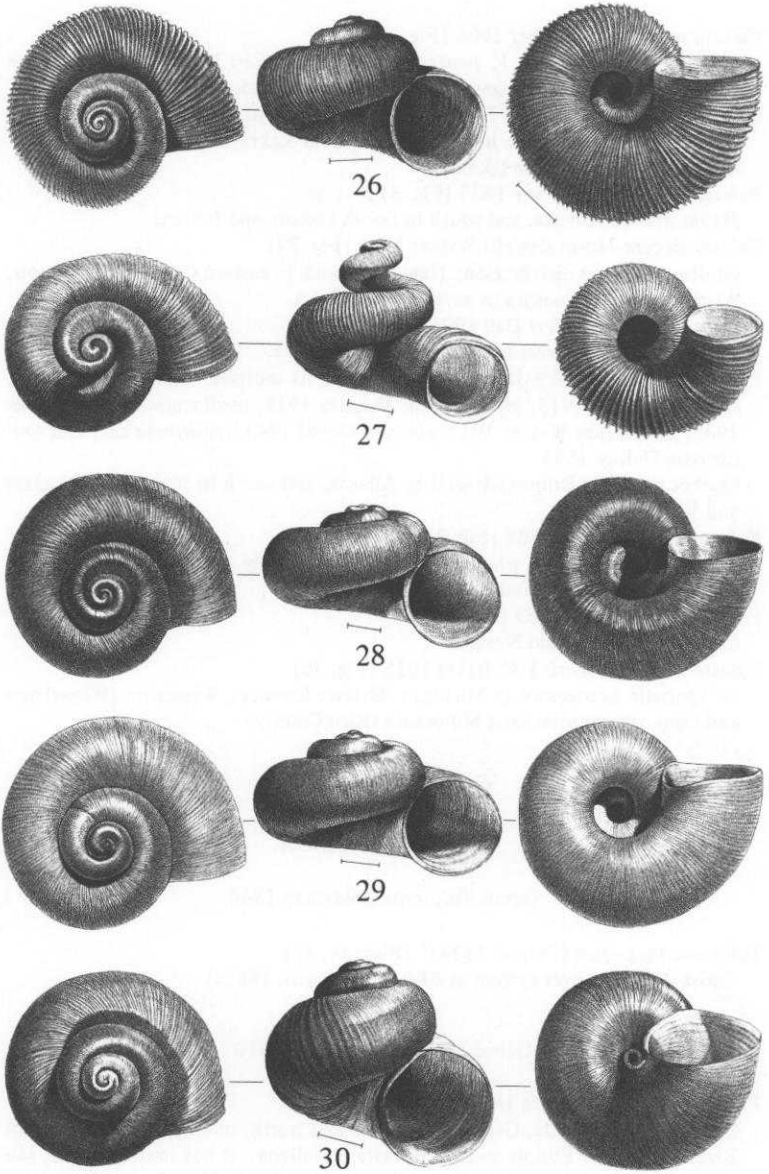
*Additional illustrations of many of the species listed here will also be found in the identification keys, which follow in Section V.

[1] Superscript numbers throughout the text refer to corresponding comments under Supplemental Notes, which appear in Section VII.

† The list of species for the Valvatidae is by William H. Heard (personal communication).



FIGS. 21-25. Shells of Neritinidae (Figs. 21, 22) and Valvatidae (Figs. 23-25). FIG. 21. *Neritina reclivata reclivata*, shell. FIG. 22. *N. reclivata reclivata*, operculum; external view (on left) and internal view (on right). FIG. 23. *Valvata bicarinata*, spire, apertural and umbilical views (left to right). FIG. 24. *V. bicarinata* morph *normalis*. FIG. 25. *V. humeralis*. Measurement lines = 1 mm or are divided into millimeters.



FIGS. 26-30. Shells of Valvatidae. FIG. 26. *Valvata lewisi*, spire, apertural and umbilical views (left to right). FIG. 27. *V. lewisi* morph *ontarioensis*. FIG. 28. *V. mergella*. FIG. 29. *V. perdepressa*. FIG. 30. *V. piscinalis* ?form *obtusa*. Measurement lines = 1 mm.

Valvata perdepressa Walker 1906 [Fig. 29]
V. perdepressa s.s. and *V. perdepressa* ?form *walkeri* F.C. Baker 1930: the Great Lakes (Lakes Michigan, Huron, Erie and Ontario).
Valvata piscinalis (Müller 1774) (?form *obtusa* Draparnaud 1801) [Fig. 30]
Introduced from Europe into the lower Great Lakes (Lake Ontario, and perhaps tributaries near the lake).
Valvata sincera sincera Say 1824 [Fig. 31]
Maine west to Alberta, and south to South Dakota and Indiana.
Valvata sincera ?form *danielsi* Walker 1906 [Fig. 32]
Of discontinuous distribution: New Brunswick in eastern Canada, and Illinois, Wisconsin and Minnesota in north central U.S.A.
Valvata sincera nylanderi Dall 1905
Quebec and Maine west to Ontario and Minnesota.
Valvata tricarinata (Say 1817) [Fig. 33] and its morphs: *bakeri* Fluck 1932, *basalis* Vanatta 1915, *infracarinata* Vanatta 1915, *mediocarinata* F.C. Baker 1932, *perconfusa* Walker 1917, *simplex* Gould 1841, *tricarinata* s.s., and *unicarinata* DeKay 1843
Quebec and New Brunswick west to Alberta, and south to Wyoming, Arkansas and Virginia.
Valvata utahensis Call 1884 [Fig. 34]
V. utahensis s.s. and *V. utahensis* morph *horatii* Baily & Baily 1951 are known only from Idaho and Utah.
Valvata virens Tryon 1863 [Fig. 35]
California, Oregon and Nevada.
Valvata winnebagoensis F.C. Baker 1928 [Fig. 36]
Of sporadic occurrence in Michigan (Ottawa County), Wisconsin (Winnebago and Oshkosh counties) and Minnesota (Rice County).

Family VIVIPARIDAE

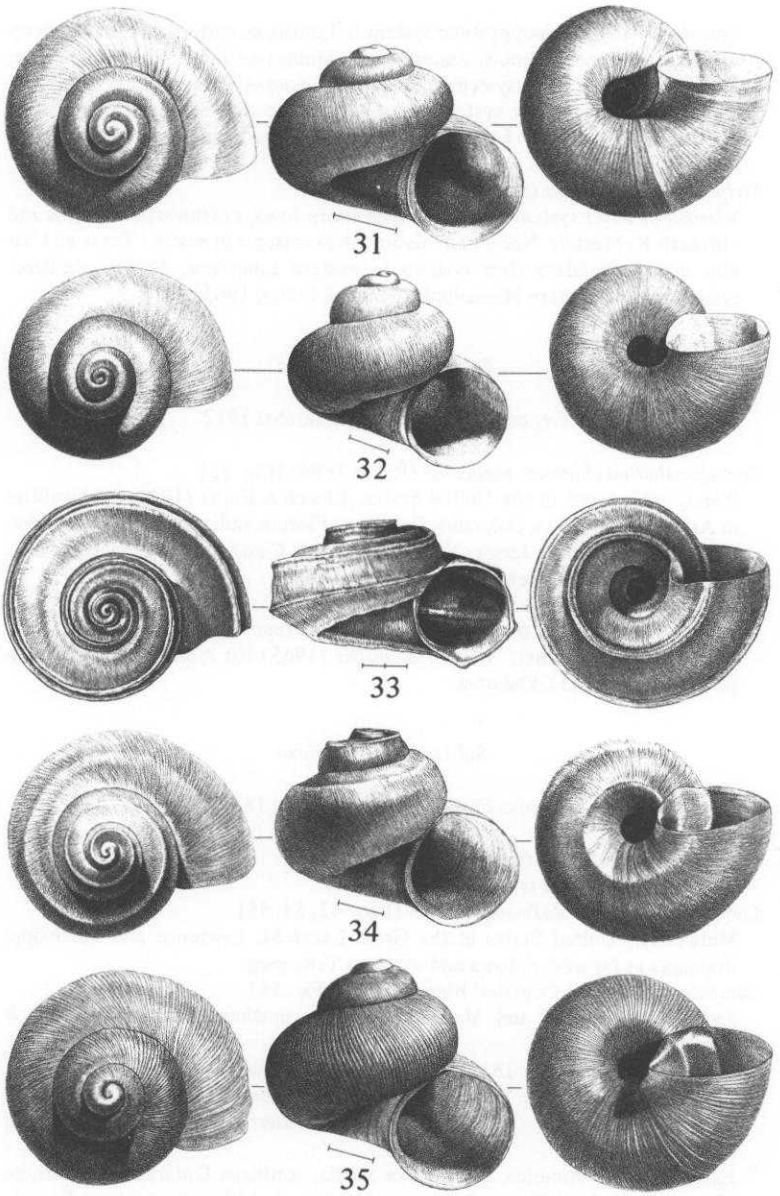
Subfamily Viviparinae

Genus *Tulotoma* Haldeman 1840

Tulotoma magnifica (Conrad 1834)[3] [Figs. 44, 45]
Coosa-Alabama river system in Alabama (Clench, 1962a).

Genus *Viviparus* Montfort 1810

Viviparus georgianus (Lea 1834) [Figs. 46, 47]
South central Florida, Georgia, Alabama and north, mainly in the Mississippi River system, to Illinois and northwestern Indiana; it has invaded Ohio, Michigan, Wisconsin, Virginia, Pennsylvania, New York, New Jersey, New England and Quebec since 1867 (Clench, 1962a; Clench & Fuller, 1965).
Viviparus intertextus (Say 1829) [Fig. 48]
The Houston ship channel system west of Houston, Harris County, and the San Jacinto, Liberty and Neches river systems, Texas; the Bayou Teche system in



FIGS. 31-35. Shells of Valvatidae. FIG. 31. *Valvata sincera sincera*, spire, apertural and umbilical views (left to right). FIG. 32. *V. sincera* ?form *danielsi*. FIG. 33. *V. tricarinata*. FIG. 34. *V. utahensis*. FIG. 35. *V. virens*. Measurement lines = 1 mm or are divided into millimeters.

Louisiana; the Mississippi River system in Louisiana, eastern Arkansas, northwestern Tennessee, Illinois, eastern Iowa, Minneapolis and White Bear Lake, Minnesota; Pearl River system, Mississippi; Coosa-Alabama river system, Alabama; Altamaha River system, Georgia; Edisto and Santee river systems, South Carolina; Rainy Lake, Koochiching County, Minnesota (Clench & Fuller, 1965).

Viviparus subpurpureus (Say 1829) [Figs. 49-51]
Mississippi River system north to southeastern Iowa, northwestern Illinois and northern Kentucky; Neches and Sabine river systems in eastern Texas and Sabine and Atchafalaya river systems in western Louisiana; Pascagoula River system in southeastern Mississippi (Clench & Fuller, 1965).

Subfamily Bellamyinae

Genus *Cipangopaludina* Hannibal 1912

Cipangopaludina chinensis malleatus (Reeve 1863) [Fig. 52]
Widely introduced in the United States. Clench & Fuller (1965) list localities in Arizona, California, Colorado, Delaware, Florida, Indiana, Maine, Massachusetts, Michigan, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, Utah, Vermont and Washington.

Cipangopaludina japonicus (Martens 1861) [Fig. 53]
Widely introduced in the United States (some reports may be confused with *C. chinensis malleatus*). Clench & Fuller (1965) list localities in Massachusetts, Michigan and Oklahoma.

Subfamily Lioplacinae

Genus *Campeloma* Rafinesque 1819[4]

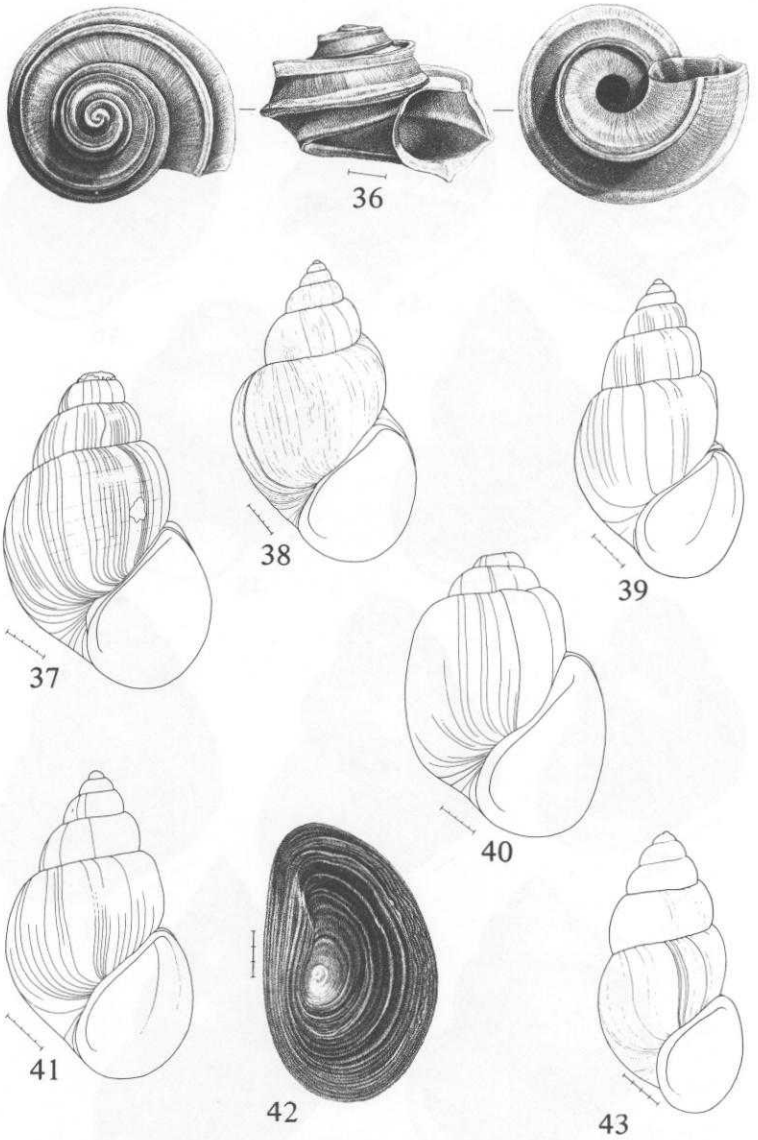
Campeloma coarctatum (Lea 1844) [Figs. 40, 66]
Alabama-Coosa river system, Alabama.

Campeloma crassula Rafinesque 1819 [Figs. 42, 54, 55]
Midwestern United States in the Great Lakes-St. Lawrence and Mississippi drainages as far west as Iowa and south to Tennessee.

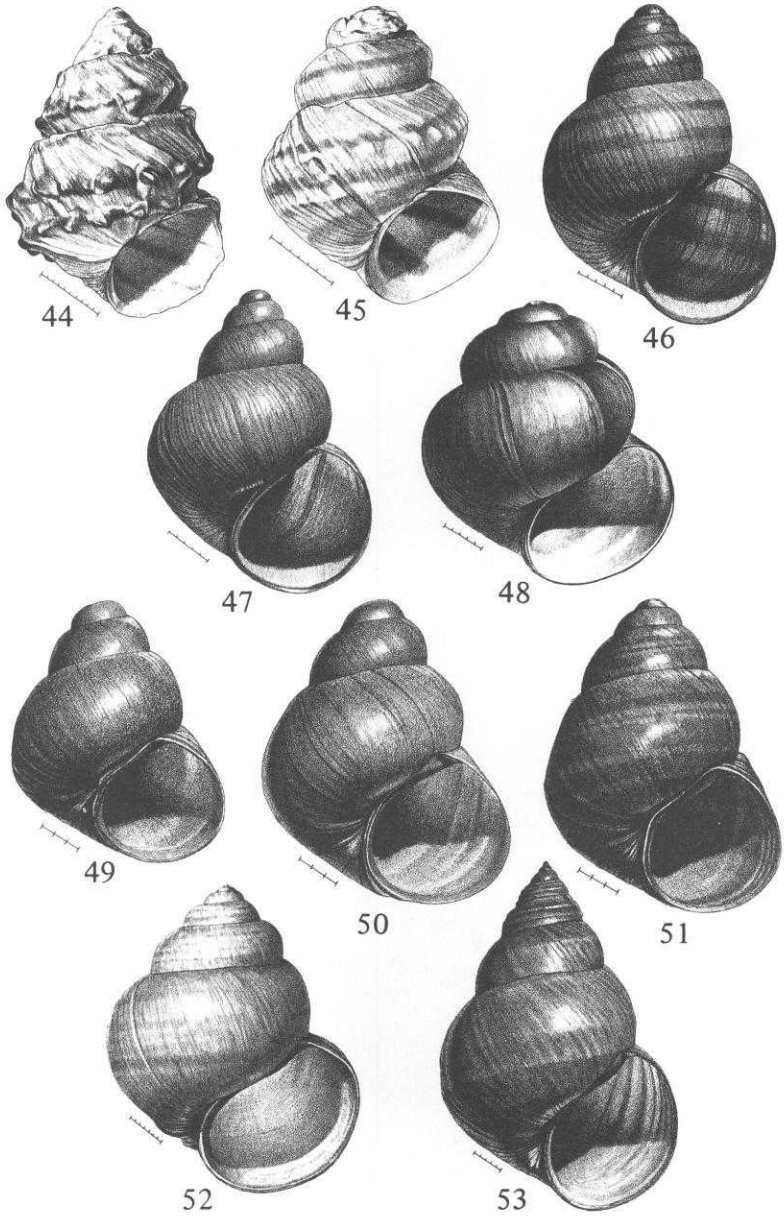
Campeloma decampi ('Currier' Binney 1865) [Fig. 56]
Jackson, Limestone and Madison counties, northern Alabama (Clench & Turner, 1955).

Campeloma decisum (Say 1816) s.l. (includes forms such as *C. brevispirum* [Figs. 58, 59], *C. decisum* s.s. [Fig. 57], *C. exilis, C. gibbum* [Fig. 60], *C. integrum*[5] [Fig. 38], *C. leptum, C. lewisi* [Fig. 37], *C. milesi* [Fig. 39] and *C. tannum* [Fig. 61]
Eastern North America, from Nova Scotia, southern Ontario and southern Manitoba south to Texas, Louisiana, Mississippi, Alabama, northern Georgia and Virginia.

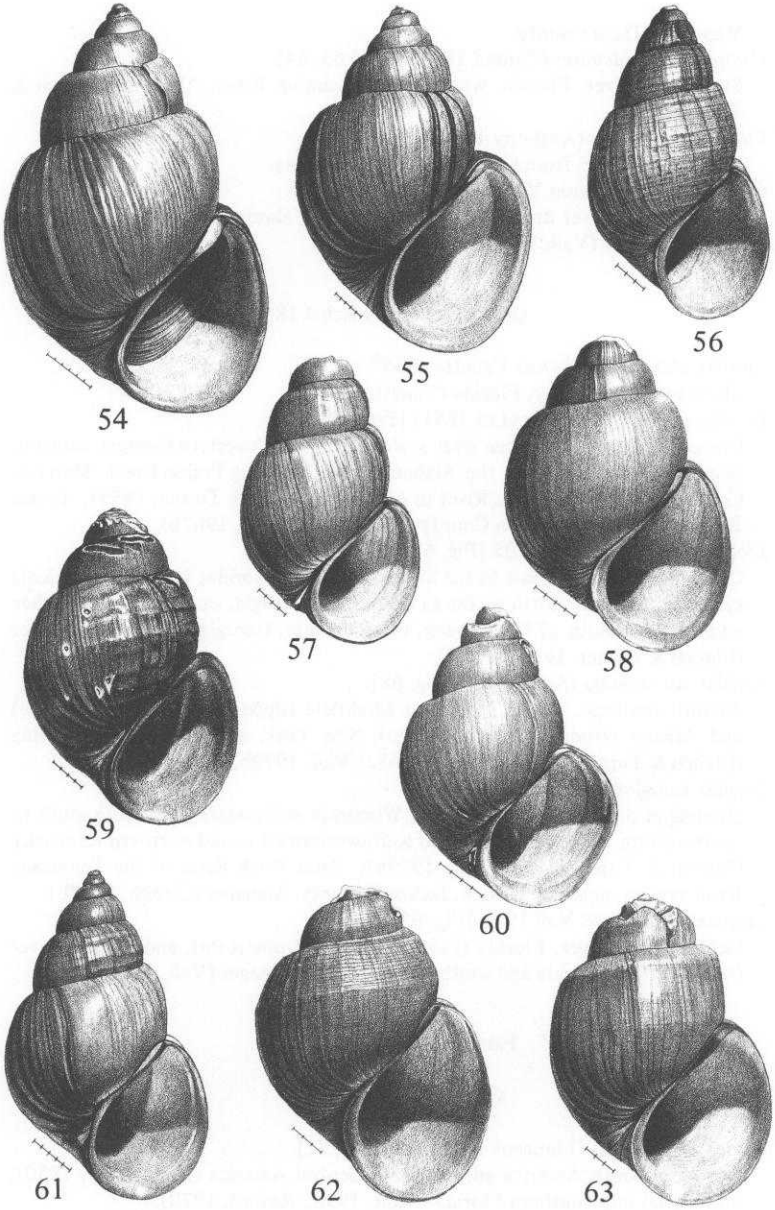
Campeloma floridense Call 1886 [Fig. 62]
Eastern Florida: the upper St. John's River and its tributaries; Lake Jessup;



FIGS. 36-43. Shells of Valvatidae (Fig. 36) and Viviparidae (Lioplacinae) (Figs. 37-43). FIG. 36. *Valvata winnebagoensis*, spire, apertural and umbilical views (left to right). FIG. 37. *Campeloma lewisi* = *C. decisum*. FIG. 38. *C. integrum* = *C. decisum*. FIG. 39. *C. milesi* = *C. decisum*. FIG. 40. *C. coarctatum*. FIG. 41. *C. limum*. FIG. 42. *C. crassula*, operculum. FIG. 43. *Lioplax cyclostomaformis*. Measurement lines = 1 mm or are divided into millimeters.



FIGS. 44-53. Shells of Viviparidae (Viviparinae and Bellamyinae). FIG. 44. *Tulotoma magnifica*. FIG. 45. *T. angulata* ? = *T. magnifica*. FIG. 46. *Viviparus georgianus*. FIG. 47. *V. georgianus*. FIG. 48. *V. intertextus*. FIG. 49. *V. subpurpureus*. FIG. 50. *V. subpurpureus*. FIG. 51. *V. subpurpureus*. FIG. 52. *Cipangopaludina chinensis malleatus*. FIG. 53. *C. japonicus*. Measurement lines are divided into millimeters.



FIGS. 54-63. Shells of Viviparidae (Lioplacinae). FIG. 54. *Campeloma subsolidum* = *C. crassula*. FIG. 55. *C. obesum* = *C. crassula*. FIG. 56. *C. decampi*. FIG. 57. *C. decisum*. FIGS. 58, 59. *C. brevispirum* = *C. decisum*. FIG. 60. *C. gibbum* = *C. decisum*. FIG. 61. *C. tannum* = *C. decisum*. FIG. 62. *C. floridense*. FIG. 63. *C. geniculum*. Measurement lines are divided into millimeters.

Miami (?), Dade County.

Campeloma geniculum (Conrad 1834) [Figs. 63, 64]
Suwannee River, Florida, west to the Escambia River, Alabama (Clench & Turner, 1956).

Campeloma limum (Anthony 1860) [Fig. 41]
Atlantic drainage, from Georgia to North Carolina.

Campeloma parthenum Vail 1979 [Fig. 65]
Ochlockonee River drainage in Florida: Lake Talquin and the Little and Ochlockonee rivers (Vail, 1979a).

Genus *Lioplax* Troschel 1857

Lioplax choctawhatchensis Vanatta 1935[6]
Choctawhatchee River, Florida (Vanatta, 1935).

Lioplax cyclostomaformis (Lea 1841) [Fig. 43]
Coosa-Alabama-Tombigbee river system from northwestern Georgia, south to Selma, Dallas County, on the Alabama River, and Big Prairie Creek, Marengo County, on the Tombigbee River in Alabama (Clench & Turner, 1955); Tensas River, near Delhi, Madison County, Louisiana (Clench, 1962b).

Lioplax pilsbryi Walker 1905 [Fig. 67]
Chattahoochee River east to the Suwannee River, Florida; in the Apalachicola system it extends north as far as Columbus, Georgia, on the Chattahoochee and to the mouth of Gum Creek, Crisp County, Georgia, on the Flint River (Clench & Turner, 1955, in part).

Lioplax subcarinata (Say 1816)[7] [Fig. 68]
Atlantic drainage. Cedar Lake near Litchfield (upper Susquehanna drainage) and Albany (Hudson River drainage), New York, south to South Carolina (Clench & Turner, 1955; Clench, 1965c; Vail, 1979b).

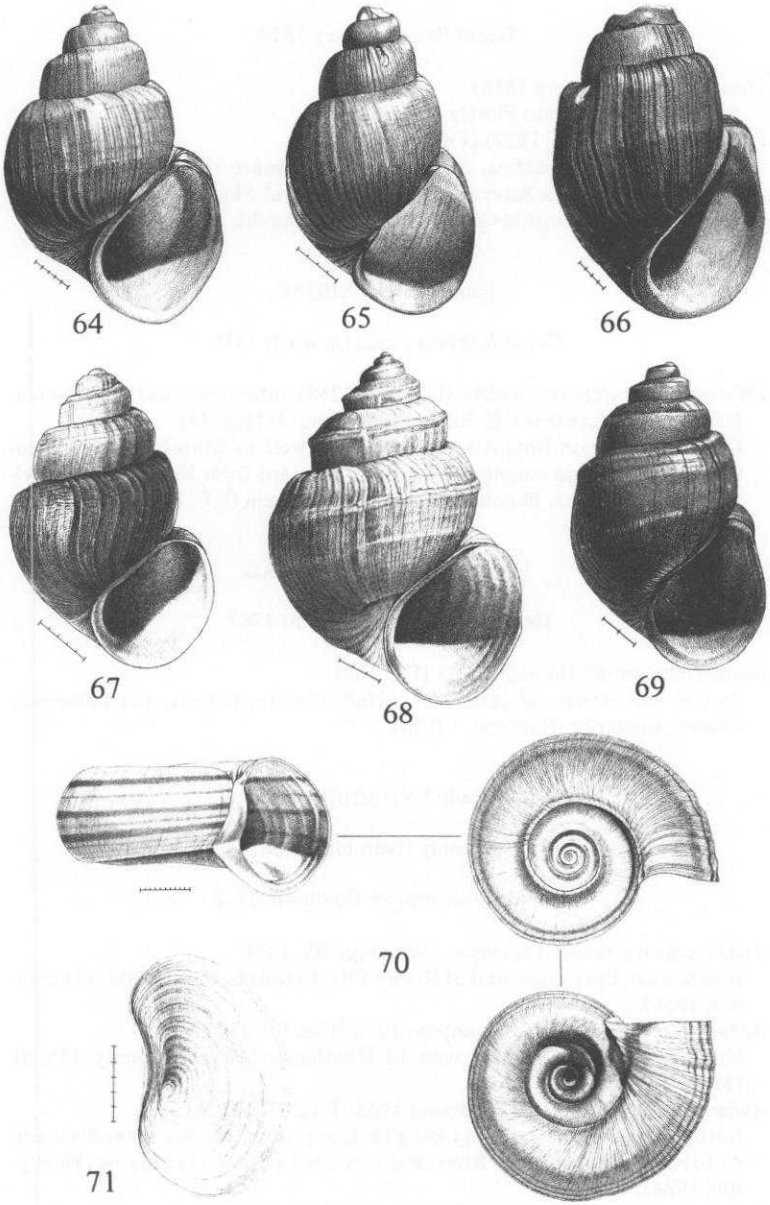
Lioplax sulculosa (Menke 1828)[7]
Mississippi drainage. Northwestern Wisconsin and eastern Minnesota south to northwestern Arkansas and east to southwestern Ohio and northern Kentucky (Clench & Turner, 1955; Vail, 1979b); Paint Rock River of the Tennessee River system, near Paint Rock, Jackson County, Alabama (Clench, 1962b).

Lioplax talquinensis Vail 1979 [Fig. 69]
Ochlockonee River, Florida (Lake Talquin and upstream), and Yellow River (northwestern Florida and southern Alabama) drainages (Vail, 1979b).

Family AMPULLARIIDAE

Genus *Marisa* Gray 1824

Marisa cornuarietis (Linnaeus 1758) [Figs. 70, 71]
Northern South America and southern Central America (H.B. Baker, 1930); introduced into southern Florida (Hunt, 1958; Robins, 1970).



FIGS. 64-71. Shells of Viviparidae (Lioplacinae) (Figs. 64-69) and Ampullariidae (Figs. 70, 71). FIG. 64. *Campeloma geniculum*. FIG. 65. *C. parthenum*. FIG. 66. *C. coarctatum*. FIG. 67. *Lioplax pilsbryi*. FIG. 68. *L. subcarinata*. FIG. 69. *L. talquinensis*. FIG. 70. *Marisa cornuarietis*, apertural (left figure), spire (right top figure) and umbilical (right bottom figure) views. FIG. 71. *M. cornuarietis*, operculum. Measurement lines are divided into millimeters.

Genus *Pomacea* Perry 1810

Pomacea bridgesi (Reeve 1856)
Brazil; introduced into Florida (Clench, 1966).

Pomacea paludosa (Say 1829) [Figs. 72, 73]
Choctawhatchee, Econfina, St. Marks and Suwannee river systems, Florida, and the Apalachicola River system in Georgia and Florida (Clench & Turner, 1956); Gantt, Covington County, Alabama (Hubricht, 1962).

Family BITHYNIIDAE

Genus *Bithynia* Leach (in Abel) 1818

Bithynia tentaculata tentaculata (Linnaeus 1758), introduced, and *Bithynia tentaculata magnalacustris* F.C. Baker 1928, native(?) [Fig. 74]
Great Lakes region from Albany, New York, west to Winnebago Lake, Calumet and Winnebago counties, Wisconsin; recorded from New York, Pennsylvania, Ohio, Indiana, Illinois, Michigan and Wisconsin (F.C. Baker, 1928a,c).

Family MICROMELANIIDAE

Genus *Antroselates* Hubricht 1963

Antroselates spiralis Hubricht 1963 [Fig. 108]
Springs and streams in caves in Crawford County, Indiana, and Edmonson County, Kentucky (Hubricht, 1963b).

Family HYDROBIIDAE

Subfamily Hydrobiinae s.s.

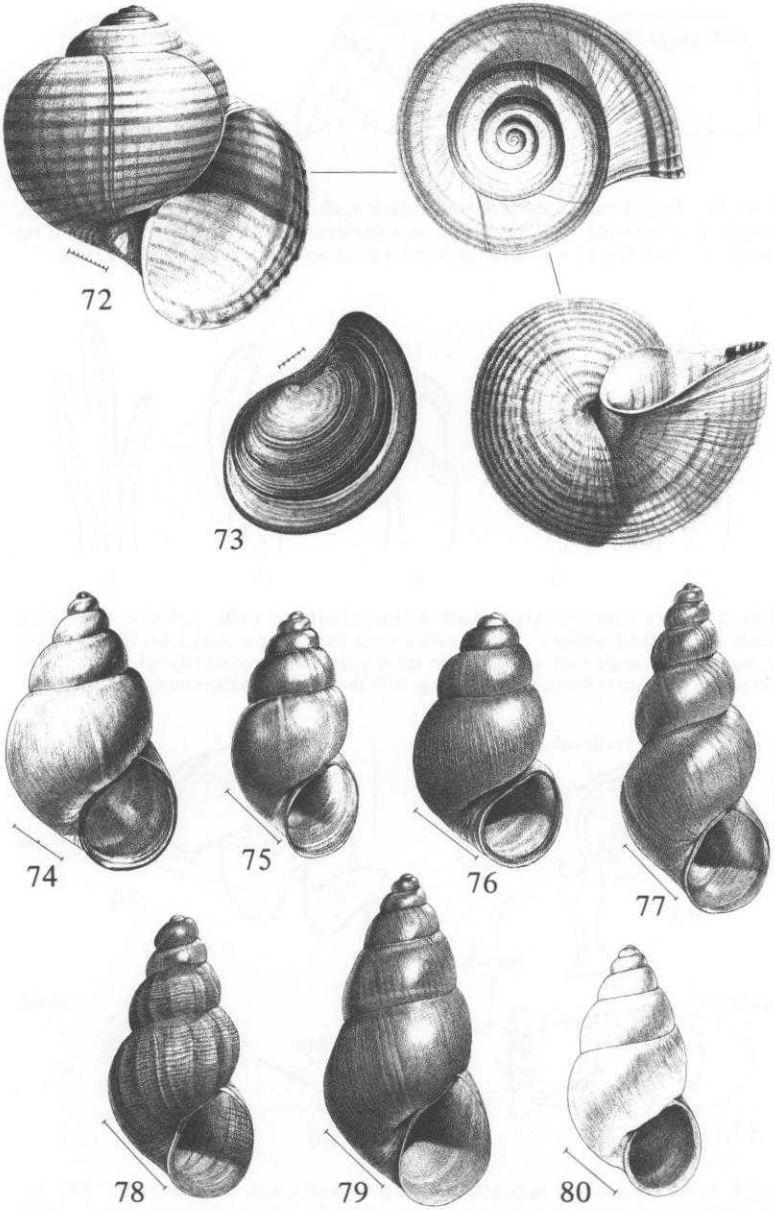
Genus *Aphaostracon* Thompson 1968

Aphaostracon asthenes Thompson 1968 [Figs. 95, 109]
Blue Springs, three miles west of Orange City, Volusia County, Florida (Thompson, 1968).

Aphaostracon chalarogyrus Thompson 1968 [Figs. 96, 110]
Magnesia Springs, 3.7 miles west of Hawthorne, Alachua County, Florida (Thompson, 1968).

Aphaostracon hypohyalina Thompson 1968 [Figs. 97, 111, 112]
North central Florida in springs along the lower half of the Suwannee River and its tributary, the Santa Fe River, and in a nearby landlocked spring (Thompson, 1968).

Aphaostracon monas (Pilsbry 1899) [Figs. 98, 113, 114]
Wekiwa Springs, Florida, and the Wekiva River for about one mile below the springs (Thompson, 1968).



FIGS. 72-80. Shells of Ampullaridae (Figs. 72, 73) and Hydrobiidae (Hydrobiinae) (Figs. 74-80). FIG. 72. *Pomacea paludosa*, apertural (left figure), spire (right top figure) and umbilical (right bottom figure) views. FIG. 73. *P. paludosa*, operculum. FIG. 74. *Bithynia tentaculata magnalacustris*. FIG. 75. *Aphaostracon rhadinus*. FIG. 76. *Hoyia sheldoni*. FIG. 77. *Hyalopyrgus aequicostatus*, female. FIG. 78. *H. aequicostatus*, male. FIG. 79. *Littoridinops tenuipes*. FIG. 80. *L. monroensis*. Measurement lines = 1 mm or are divided into millimeters.

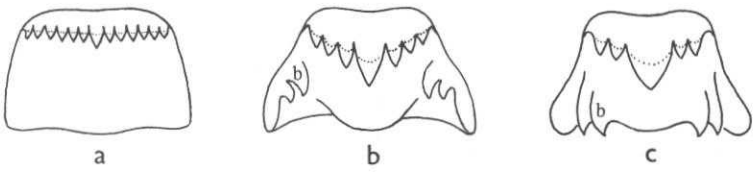


FIG. 81. Central radular tooth of truncatelloid snails. a, A micromelaniid, without basal cusps; b, a hydrobiid, with basal cusps on a thickened ridge along the lateral angle of the tooth; c, a pomatiopsid, with basal cusps on the anterio-posterior ridges. b = basal cusp.

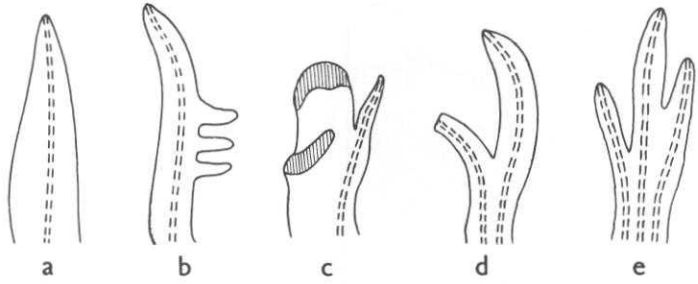
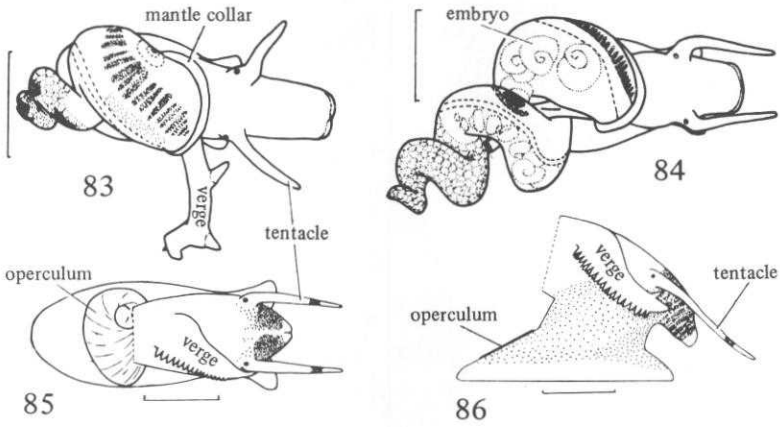
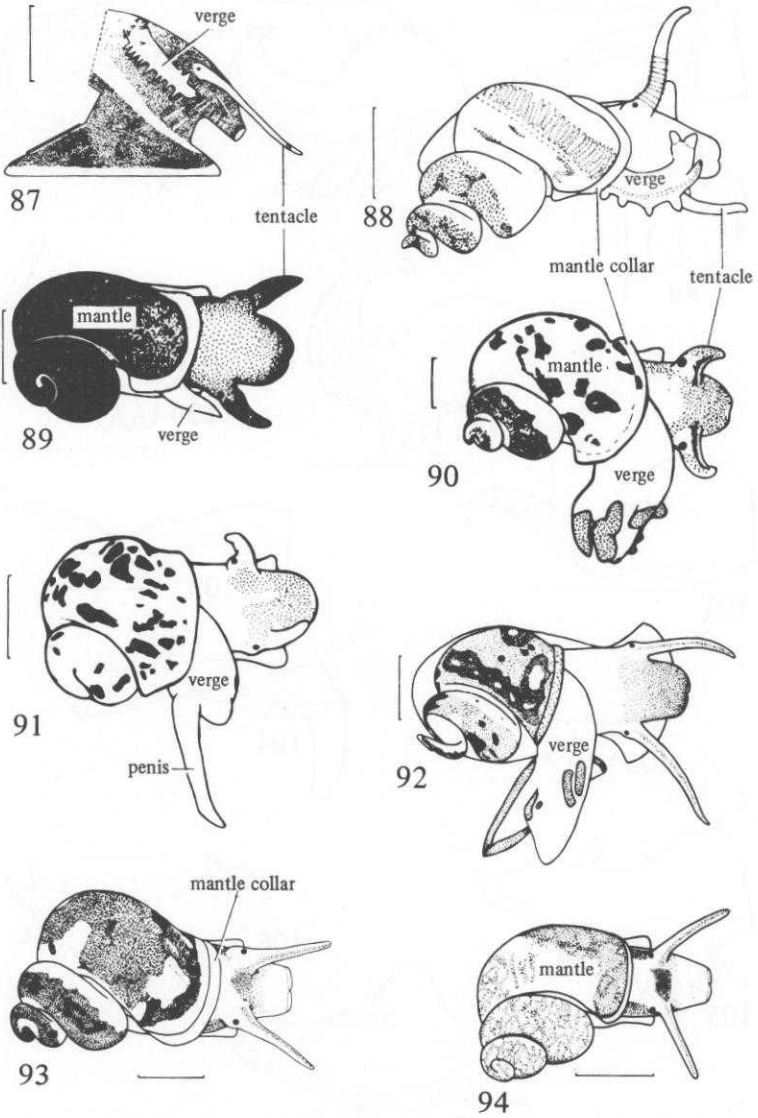


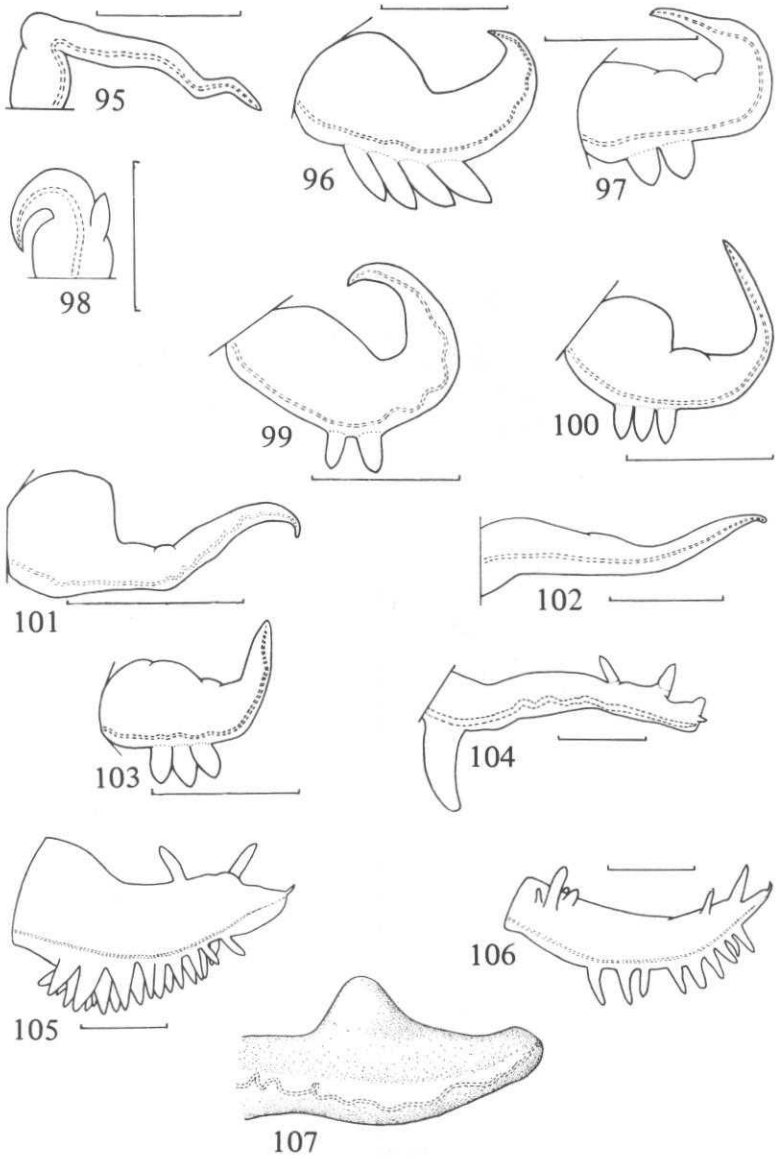
FIG. 82. Basic types of verges of North American hydrobiid snails. a, Simple verge with a single duct (Lithoglyphinae); b, verge with a single duct and accessory lobes (Hydrobiinae); c, verge with a single duct and glandular apical and subapical crests (Nymphophilinae); d, verge with two ducts (Amnicolinae); e, verge with three ducts (Fontigentinae).



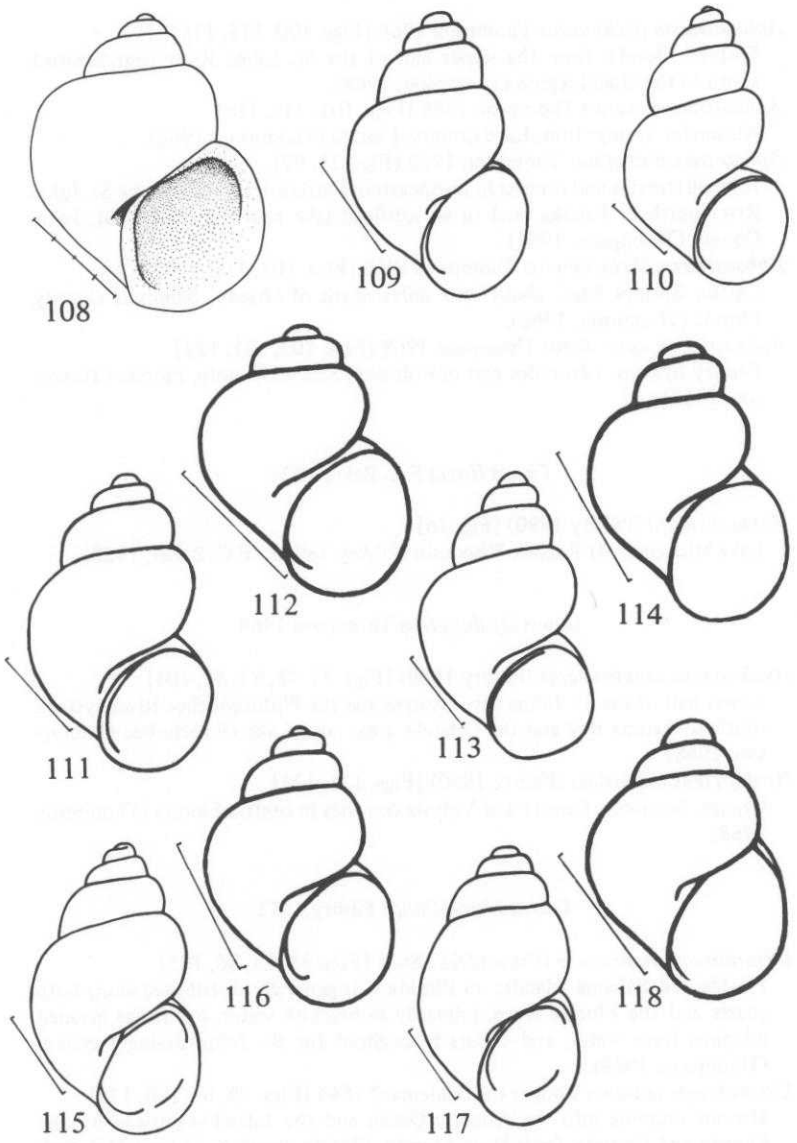
FIGS. 83-86. Animals of hydrobiid snails (Hydrobiinae), with shells removed. FIG. 83. *Hyalopyrgus aequicostatus*, male, dorsal view. FIG. 84. *H. aequicostatus*, female, dorsal view. FIG. 85. *Littoridinops monroensis*, male, dorsal view with mantle and viscera removed. FIG. 86. *L. monroensis*, male, right lateral view. Measurement lines = 1 mm. Figs. 83-86 are from Thompson (1968).



FIGS. 87-94. Animals of hydrobiid snails (Hydrobiinae, Lithoglyphinae, Nymphophilinae and Amnicolinae), with shells removed. FIG. 87. *Littoridinops tenuipes*, male, right lateral view. FIG. 88. *Pyrgophorus platyrachis*, male, dorsal view. FIG. 89. *Somatogyrus (Walkerilla) tenax*, male. FIG. 90. *Notogillia sathon*, male. FIG. 91. *Rhapinema dacryon*, male. FIG. 92. *Spilochlamys conica*, male. FIG. 93. *Amnicola dalli johnsoni*, female. FIG. 94. *Amnicola (Lyogyrus) retromargo*, female. Measurement lines = 1 mm. Figs. 87-94 are from Thompson (1968, 1969).



FIGS. 95-107. Verges of hydrobiid snails (Hydrobiinae). FIG. 95. *Aphaostracon asthenes*. FIG. 96. *A. chalarogyrus*. FIG. 97. *A. hypohyalina*. FIG. 98. *A. monas*. FIG. 99. *A. rhadinus*. FIG. 100. *A. pachynotus*. FIG. 101. *A. pycnus*. FIG. 102. *A. theiocrenetus*. FIG. 103. *A. xynoelictus*. FIG. 104. *Hyalopyrgus aequicostatus*. FIG. 105. *Littoridinops monroensis*. FIG. 106. *L. tenuipes*. FIG. 107. *Probythinella lacustris*. Measurement lines = ½ mm. Figs. 95-106 are from Thompson (1968); Fig. 107 is from E.G. Berry (1943).



FIGS. 108-118. Shells of Micromelaniidae (Fig. 108) and Hydrobiidae (Figs. 109-118). FIG. 108. *Antroselates spiralis*. FIG. 109. *Aphaostracon asthenes*. FIG. 110. *A. chalarogyrus*. FIG. 111. *A. hypohyalina*, female. FIG. 112. *A. hypohyalina*, male. FIG. 113. *A. monas*, female. FIG. 114. *A. monas*, male. FIG. 115. *A. pachynotus*, female. FIG. 116. *A. pachynotus*, male. FIG. 117. *A. pycnus*, female. FIG. 118. *A. pycnus*, male. Measurement lines = ½ mm. Fig. 108 is after Hubricht (1963b); Figs. 109-118 are from Thompson (1968).

Aphaostracon pachynotus Thompson 1968 [Figs. 100, 115, 116]
Eastern Florida, from the upper half of the St. Johns River near Sanford, south to the Miami region (Thompson, 1968).

Aphaostracon pycnus Thompson 1968 [Figs. 101, 117, 118]
Alexander Springs Run, Lake County, Florida (Thompson, 1968).

Aphaostracon rhadinus Thompson 1968 [Figs. 75, 99]
In small streams and sloughs in northeastern Florida draining into the St. Johns River north of Palatka, and in an artificial lake near the coast in St. Johns County (Thompson, 1968).

Aphaostracon theiocrenetus Thompson 1968 [Figs. 102, 119, 120]
Clifton Springs Run, about two miles north of Oviedo, Seminole County, Florida (Thompson, 1968).

Aphaostracon xynoelictus Thompson 1968 [Figs. 103, 121, 122]
Fenney Springs, two miles east of Coleman, Sumter County, Florida (Thompson, 1968).

Genus *Hoyia* F.C. Baker 1926

Hoyia sheldoni (Pilsbry 1890) [Fig. 76]
Lake Michigan, off Racine, Wisconsin (Pilsbry 1890d; F.C. Baker, 1928c).

Genus *Hyalopyrgus* Thompson 1968

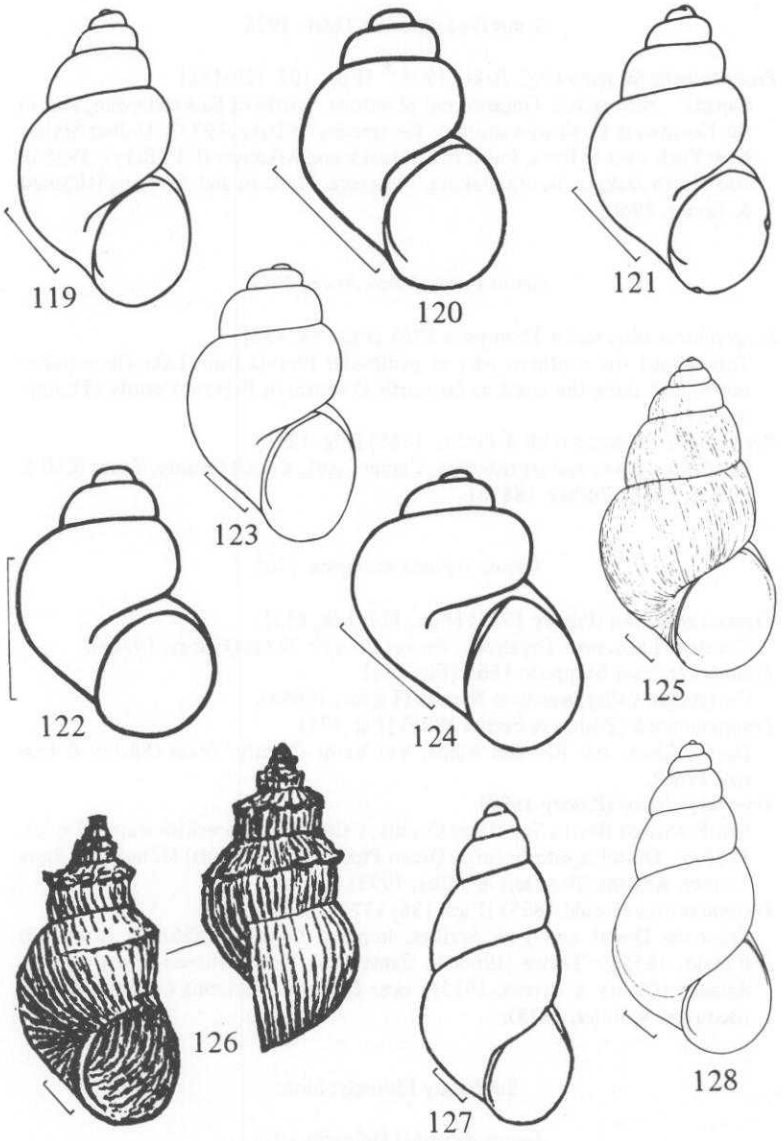
Hyalopyrgus aequicostatus (Pilsbry 1889) [Figs. 77, 78, 83, 84, 104]
Lower half of the St. Johns River system and the Withlacoochee River system, south to Tampa Bay and the Orlando area; also Lake Okeechobee (Thompson, 1968).

Hyalopyrgus brevissima (Pilsbry 1890) [Figs. 123, 124]
Orange, Seminole, Sumter and Volusia counties in central Florida (Thompson, 1968).

Genus *Littoridinops* Pilsbry 1952

Littoridinops monroensis (Frauenfeld 1863) [Figs. 80, 85, 86, 105]
Florida and Bahama Islands; in Florida it is generally distributed along both coasts and the Florida Keys, primarily in brackish water, but it has invaded marginal fresh water, and occurs throughout the St. Johns drainage system (Thompson, 1968).

Littoridinops tenuipes Couper (in Haldeman) 1844 [Figs. 79, 87, 106, 125]
Streams draining into the Atlantic Ocean and the Inland waterway of east Florida and Georgia, from Dade County, Florida, north to at least McIntosh County, Georgia (Thompson, 1968).



FIGS. 119-128. Shells of Hydrobiidae (Hydrobiinae). FIG. 119. *Aphaostracon theiocrenetus*, female. FIG. 120. *A. theiocrenetus*, male. FIG. 121. *A. xynoelictus*, female. FIG. 122. *A. xynoelictus*, male. FIG. 123. *Hyalopyrgus brevissimus*, female. FIG. 124. *H. brevissimus*, male. FIG. 125. *Littoridinops tenuipes*. FIG. 126. *Pyrgophorus spinosus*. FIG. 127. *Tryonia cheatumi*. FIG. 128. *T. cheatumi*. Measurement lines = ½ mm. Figs. 119-124 are from Thompson (1968); Fig. 126 is from Call & Pilsbry (1886); Fig. 127 is from Pilsbry (1935a).

Genus *Probythinella* Thiele 1928

Probythinella lacustris (F.C. Baker 1928)[8] [Figs. 107, 129-131]
Canada: throughout Ontario and Manitoba, northern Saskatchewan, and in the Northwest Territories south of the tree-line (Clarke, 1973); United States: New York west to Iowa, south to Kentucky and Arkansas (F.C. Baker, 1928c); also North Dakota, South Dakota, Nebraska, Missouri and Alabama (Hibbard & Taylor, 1960).

Genus *Pyrgophorus* Ancey 1888

Pyrgophorus platyrachis Thompson 1968 [Figs. 88, 132]
Throughout the southern part of peninsular Florida from Lake Okeechobee south, and along the coast as far north as southern Brevard County (Thompson, 1968).
Pyrgophorus spinosus (Call & Pilsbry 1886) [Fig. 126]
Guadalupe River and its tributary, Comal Creek, Comal County, Texas (Call & Pilsbry, 1886; Pilsbry, 1887b).

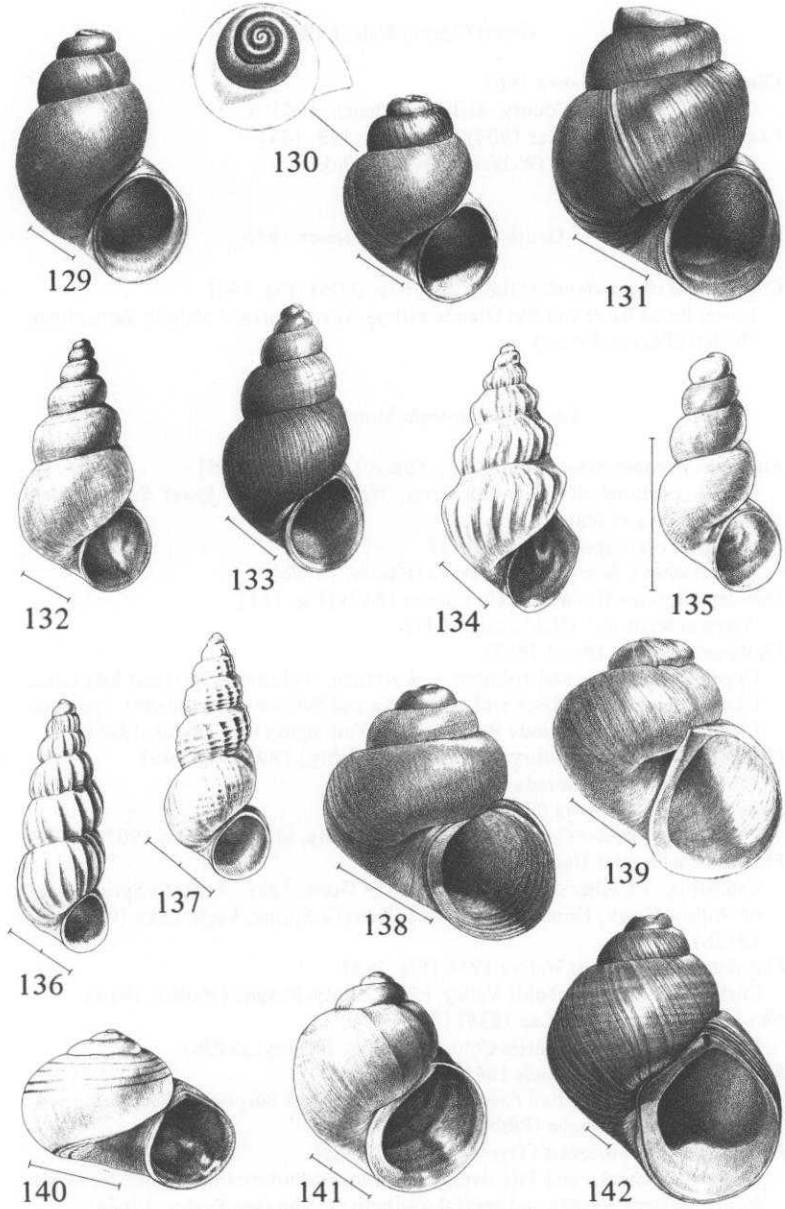
Genus *Tryonia* Stimpson 1865

Tryonia cheatumi (Pilsbry 1935) [Figs. 127, 128, 133]
Phantom Lake, near Toyahvale, Reeves County, Texas (Pilsbry, 1935a).
Tryonia clathrata Stimpson 1865 [Fig. 134]
Pahranagat Valley, southern Nevada (Taylor, 1966b).
Tryonia diaboli (Pilsbry & Ferriss 1906) [Fig. 135]
Devil's River, and Rio San Filipe, Val Verde County, Texas (Pilsbry & Ferriss, 1906).
Tryonia imitator (Pilsbry 1899)
San Francisco Bay to San Diego County, California, in brackish water (Taylor, 1966b); Quitobaquito Springs, Organ Pipe Cactus National Monument, Pima County, Arizona (Bequaert & Miller, 1973).
Tryonia protea (Gould 1855) [Figs. 136, 137]
Colorado Desert and Fish Springs, Imperial County, California (subfossil) (Gould, 1855a; Taylor, 1966b); Santa Cruz River, Tucson, Pima County, Arizona (Pilsbry & Ferriss, 1915); near Buckeye, Maricopa County, Arizona (Bequaert & Miller, 1973).

Subfamily Lithoglyphinae

Genus *Antrobia* Hubricht 1971

Antrobia culveri Hubricht 1972 [Fig. 138]
Stream in Tumbling Creek Cave, near Protem, Taney County, Missouri (Hubricht, 1971).



FIGS. 129-142. Shells of Hydrobiidae (Hydrobiinae and Lithoglyphinae). FIG. 129. *Probythinella lacustris*. FIG. 130. *Pr. lacustris*. FIG. 131. *Pr. lacustris*. FIG. 132. *Pyrgophorus platyrachis*. FIG. 133. *Tryonia cheatumi*. FIG. 134. *T. clathrata*. FIG. 135. *T. diaboli*. FIG. 136. *T. protea*. FIG. 137. *T. protea*. FIG. 138. *Antrobia culveri*. FIG. 139. *Clappia clappi* = *C. umbilicata*. FIG. 140. *Cochliopina riograndensis*. FIG. 141. *Fluminicola fusca*. FIG. 142. *F. nuttalliana*. Measurement lines = 1 mm or are divided into millimeters.

Genus *Clappia* Walker 1909[9]

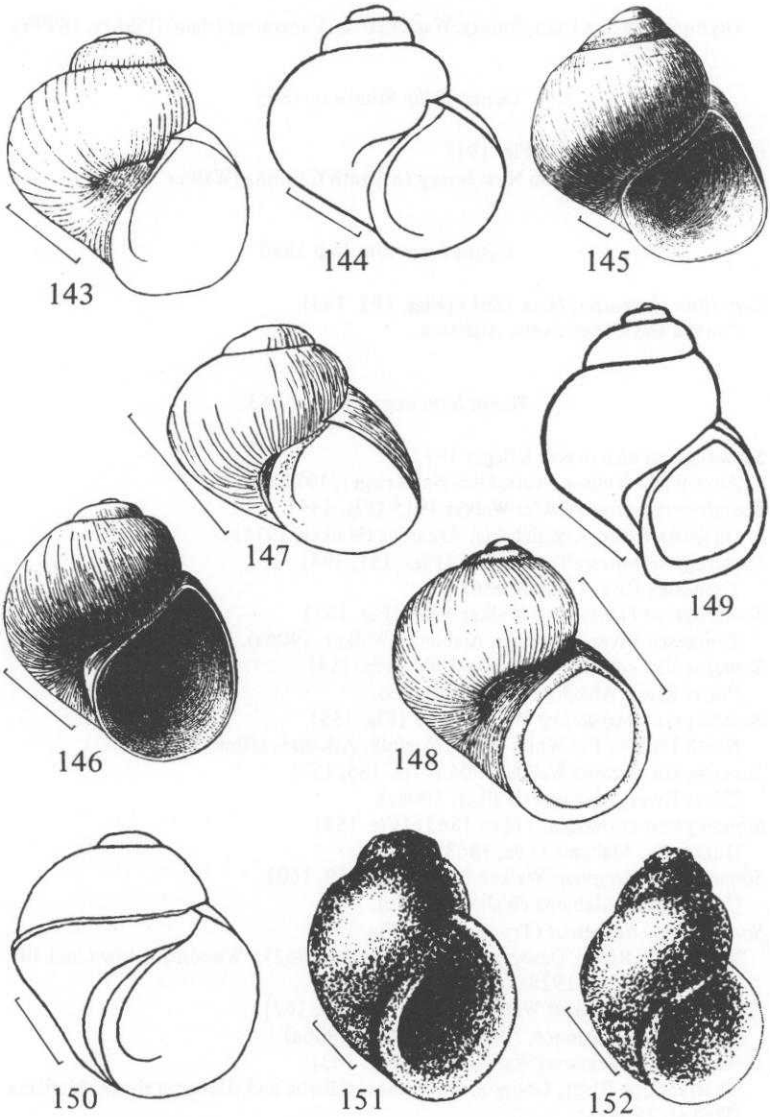
Clappia cahabensis Clench 1965
Cahaba River, Bibb County, Alabama (Clench, 1965b).
Clappia umbilicata (Walker 1904) [Figs. 139, 143, 144]
Coosa River, Alabama (Walker, 1904a, 1909c).

Genus *Cochliopina* Morrison 1946

Cochliopina riograndensis (Pilsbry & Ferriss 1906) [Fig. 140]
Lower Pecos River and Rio Grande valleys, Texas; coastal plain in Tamaulipas, Mexico (Taylor, 1966b).

Genus *Fluminicola* Stimpson 1865[10]

Fluminicola columbiana Hemphill (in Pilsbry) 1899 [Fig. 145]
Middle portions of Columbia River, Washington, and lower Snake River, Washington and Idaho.
Fluminicola erythopoma Pilsbry 1899
Ash Meadows, Nye County, Nevada (Pilsbry, 1899b).
Fluminicola fusca (Haldeman (in Chenu) 1847) [Fig. 141]
"Oregon territory" (Haldeman, 1847).
Fluminicola hindsi (Baird 1863)
Upper Green River and tributaries, Wyoming; tributaries of Great Salt Lake, Utah; upper Snake River and tributaries and Salmon River, Idaho; Spokane, Little Spokane and Grande Ronde rivers, Washington (see Taylor, 1966a).
Fluminicola merriami Pilsbry & Beecher (in Pilsbry) 1892 [Fig. 146]
Pahranagat Valley, Nevada (Pilsbry, 1892a).
Fluminicola minutissima Pilsbry 1907 [Fig. 147]
Price Valley, Weiser Canyon, Washington County, Idaho (Pilsbry, 1907).
Fluminicola modoci Hannibal 1912
California: Fletcher's Spring, south end of Goose Lake; Fritter's Spring, head of Willow Creek, Honey Lake basin; Troxel's Spring, Eagle Lake (Hannibal, 1912b).
Fluminicola nevadensis Walker 1916 [Fig. 148]
Cortez foothills, Humboldt Valley, Elko County, Nevada (Walker, 1916).
Fluminicola nuttalliana (Lea 1838) [Fig. 142]
Probably inhabits the entire Columbia Valley (Pilsbry, 1899b).
Fluminicola seminalis (Hinds 1842)
Sacramento, Pitt and Fall rivers and tributaries, and Surprise Valley, California; Klamath River, Oregon (Pilsbry, 1899b).
Fluminicola turbiniformis (Tryon 1865) [Fig 152]
Upper Sacramento and Pitt rivers and various tributaries in northeastern California, western Nevada and central southern Oregon (see Taylor, 1966a).
Fluminicola virens (Lea 1838)
Willamette, lower Columbia, upper Deschutes and Umpqua rivers, Oregon;



FIGS. 143-152. Shells of Hydrobiidae (Lithoglyphinae). FIG. 143. *Clappia clappi* = *C. umbilicata*. FIG. 144. *C. umbilicata*. FIG. 145. *Fluminicola columbiana*. FIG. 146. *F. merriami*. FIG. 147. *F. minutissima*. FIG. 148. *F. nevadensis*. FIG. 149. *Somatogyrus amnicoloides*. FIG. 150. *S. aldrichi* = *S. (Walkerilla) coosaensis*. FIG. 151. *S. aureus*. FIG. 152. *F. turbiniformis*. Measurement lines = 1 mm. Figs. 143, 144 and 148-150 are from Walker (1904a, 1906a, 1909c, 1915c, 1916); Figs. 145 and 146 are from Stearns (1901b); Fig. 147 is from Pilsbry (1908a); Figs. 151 and 152 are from Tryon (1865i).

Olympia and San Juan County, Washington; Vancouver Island (Pilsbry, 1899b).

Genus *Gillia* Stimpson 1865

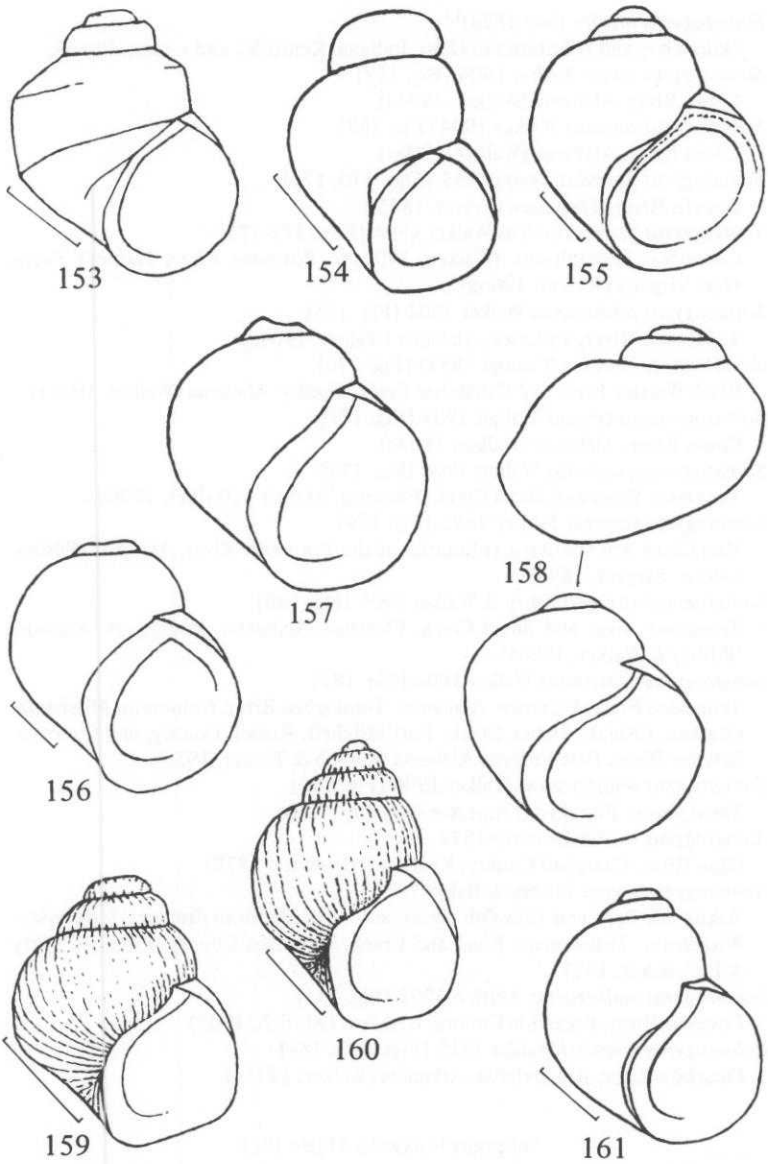
Gillia altilis (Lea 1841) [Fig. 191]
Atlantic drainage from New Jersey to South Carolina (Walker, 1918a).

Genus *Lepyrium* Dall 1896

Lepyrium showalteri (Lea 1861) [Figs. 192, 193]
Cahaba and Coosa rivers, Alabama.

Genus *Somatogyrus* Gill 1863

Somatogyrus alcoviensis Krieger 1972
Alcovy and Yellow rivers, Georgia (Krieger, 1972).
Somatogyrus amnicoloides Walker 1915 [Fig. 149]
Ouachita River, Arkadelphia, Arkansas (Walker, 1915c).
Somatogyrus aureus Tryon 1865 [Figs. 151, 194]
Tennessee River (Tryon, 1865i).
Somatogyrus biangulatus Walker 1906 [Fig. 153]
Tennessee River, Florence, Alabama (Walker, 1906a).
Somatogyrus constrictus Walker 1904 [Fig. 154]
Coosa River, Alabama (Walker, 1904a).
Somatogyrus crassilabris Walker 1915 [Fig. 155]
North Fork of the White River, Norfolk, Arkansas (Hinkley, 1915).
Somatogyrus crassus Walker 1904 [Figs. 156, 157]
Coosa River, Alabama (Walker, 1904a).
Somatogyrus currierianus (Lea 1863) [Fig. 158]
Huntsville, Alabama (Lea, 1863).
Somatogyrus decipiens Walker 1909 [Figs. 159, 160]
Coosa River, Alabama (Walker, 1909c).
Somatogyrus depressus (Tryon 1862) [Fig. 195]
Mississippi River, Davenport, Iowa (Tryon, 1862); Wisconsin, Iowa and Illinois (F.C. Baker, 1928c).
Somatogyrus excavatus Walker 1906 [Figs. 161, 162]
Shoal Creek, Florence, Alabama (Walker, 1906a).
Somatogyrus georgianus Walker 1904 [Fig. 163]
Chattanooga River, Georgia; Tennessee, Cahaba and Alabama rivers, Alabama (Walker, 1904a).
Somatogyrus hendersoni Walker 1909 [Fig. 164]
Coosa River, Alabama (Walker, 1909c).
Somatogyrus hinkleyi Walker 1904 [Figs. 165, 166]
Coosa and Tallapoosa rivers, Alabama (Walker, 1904a).
Somatogyrus humerosus Walker 1906 [Fig. 167]
Tennessee River, Florence, Alabama (Walker, 1906a).

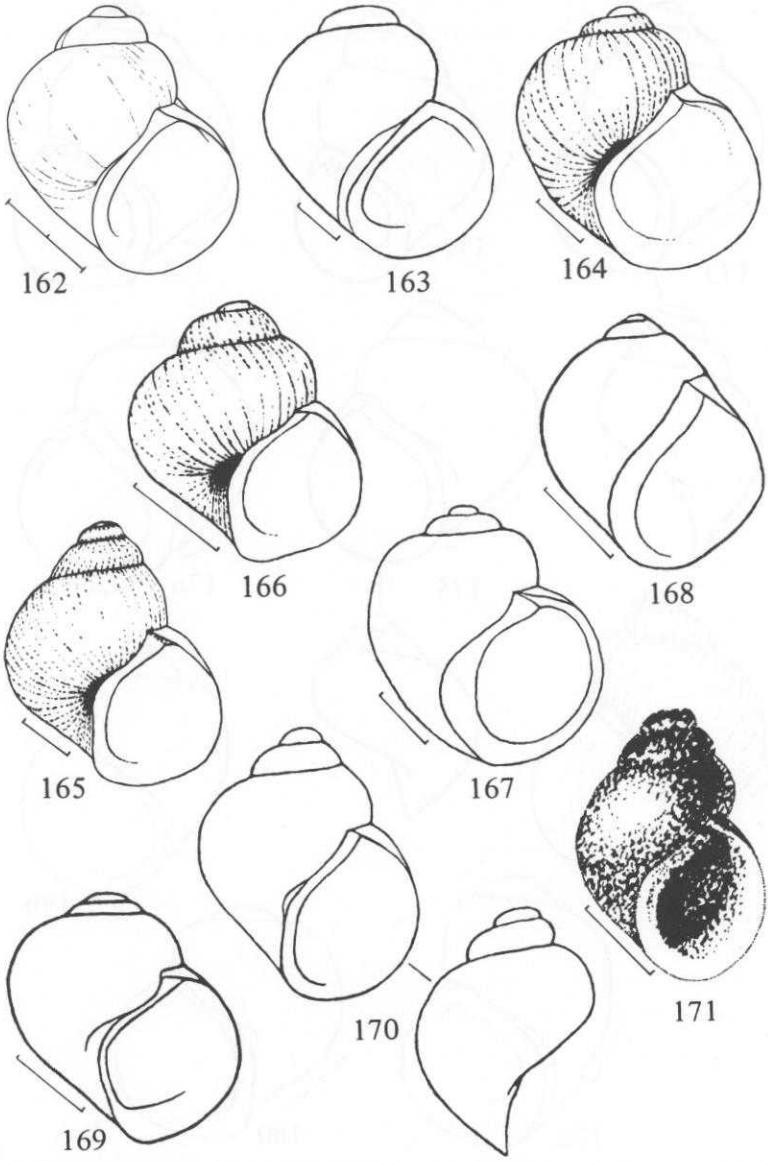


FIGS. 153-161. Shells of Hydrobiidae (Lithoglyphinae). FIG. 153. *Somatogyrus biangulatus*. FIG. 154. *S. constrictus*. FIG. 155. *S. crassilabris*. FIG. 156. *S. crassus*. FIG. 157. *S. crassus*, immature. FIG. 158. *S. currierianus*. FIG. 159. *S. decipiens*, immature. FIG. 160. *S. decipiens*. FIG. 161. *S. excavatus*. Measurement lines = 1 mm. Figs. 153-161 are from Walker (1904a, 1906a, 1909c, 1915c).

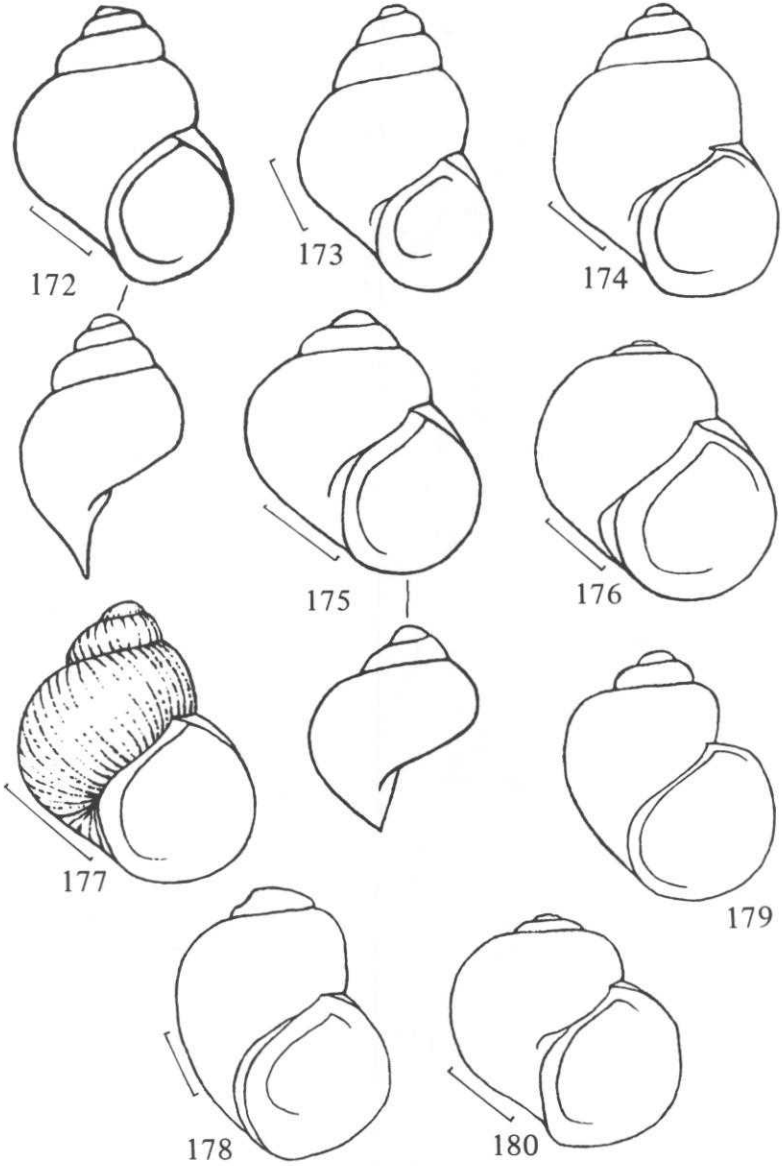
Somatogyrus integra (Say 1829)[11]
Ohio River and tributaries in Ohio, Indiana, Kentucky and eastern Illinois.
Somatogyrus nanus Walker 1904 [Fig. 168]
Coosa River, Alabama (Walker, 1904a).
Somatogyrus obtusus Walker 1904 [Fig. 169]
Coosa River, Alabama (Walker, 1904a).
Somatogyrus parvulus Tryon 1865 [Figs. 170, 171]
Powells River, Tennessee (Tryon, 1865i).
Somatogyrus pennsylvanicus Walker 1904 [Figs. 172-174]
Columbia, Pennsylvania (Walker, 1904a); Potomac River, Harper's Ferry, West Virginia (Walker, 1906a).
Somatogyrus pilsbryanus Walker 1904 [Fig. 175]
Tallapoosa River, Tallassee, Alabama (Walker, 1904a).
Somatogyrus pumilus (Conrad 1834) [Fig. 176]
Black Warrior River and Cahatchee Creek, Shelby, Alabama (Walker, 1906a).
Somatogyrus pygmaeus Walker 1909 [Fig. 177]
Coosa River, Alabama (Walker, 1909c).
Somatogyrus quadratus Walker 1906 [Fig. 178]
Tennessee River and Shoal Creek, Florence, Alabama (Walker, 1906a).
Somatogyrus sargenti Pilsbry 1895 [Fig. 179]
Mud Creek and tributary, tributaries of the Tennessee River, Alabama (Pilsbry, 1895a; Sargent, 1895).
Somatogyrus strengi Pilsbry & Walker 1906 [Fig. 180]
Tennessee River and Shoal Creek, Florence, Alabama; Bridgeport, Alabama (Pilsbry & Walker, 1906a).
Somatogyrus substriatus Walker 1906 [Fig. 181]
Tennessee River, Florence, Alabama; Tombigbee River, Columbus, Mississippi (Walker, 1906a); Uchee Creek, Fort Mitchell, Russell County, and Choctawhatchee River, Dale County, Alabama (Clench & Turner, 1956).
Somatogyrus tennesseensis Walker 1906 [Fig. 182]
Shoal Creek, Florence, Tennessee (Walker, 1906a).
Somatogyrus trothis Doherty 1878
Ohio River, Campbell County, Kentucky (Doherty, 1878).
Somatogyrus tryoni Pilsbry & Baker 1927[9]
Ashippun, Bark and Crawfish rivers, and Lake Michigan drainage, Milwaukee, Wisconsin; Mukwonago River and Creek, Waukesha County, Illinois (Pilsbry & F.C. Baker, 1927).
Somatogyrus walkerianus Aldrich 1905 [Fig. 185]
Conecut River, Escambia County, Alabama (Aldrich, 1905).
Somatogyrus wheeleri Walker 1915 [Figs. 183, 184]
Ouachita River, Arkadelphia, Arkansas (Walker, 1915c).

Subgenus *Walkerilla* Thiele 1928

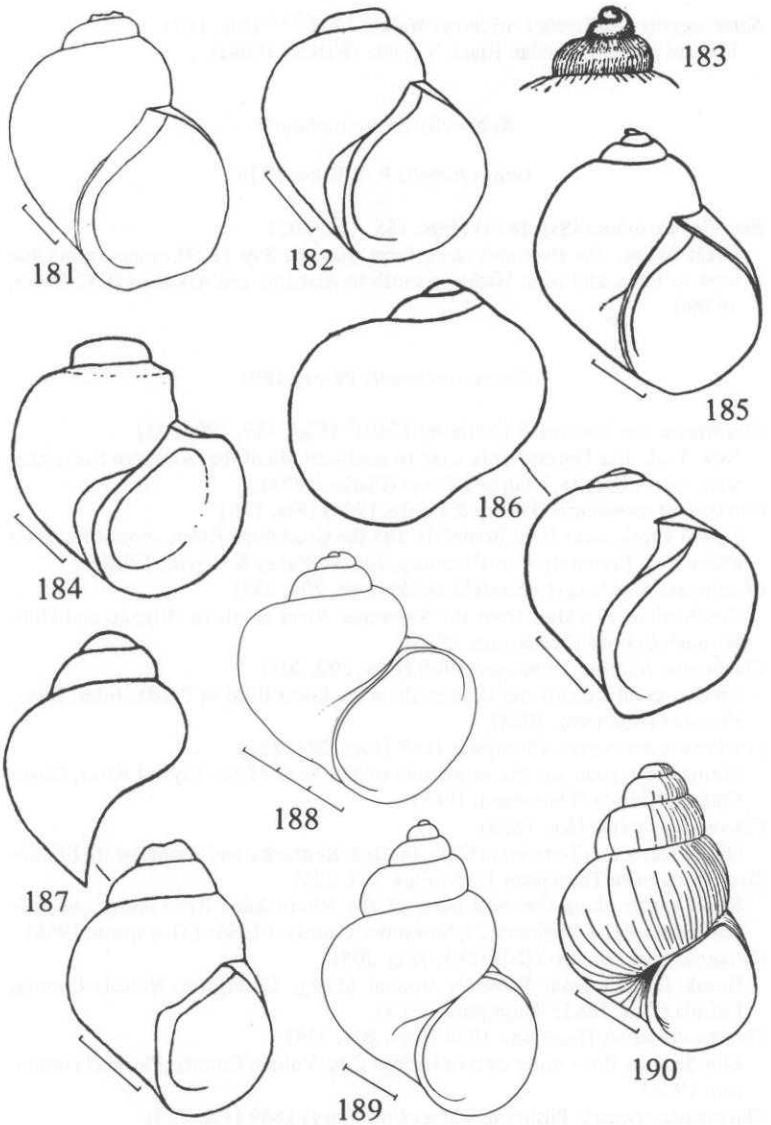
Somatogyrus (Walkerilla) coosaensis Walker 1904 [Figs. 150, 186, 196]
Coosa and Catawba rivers, Alabama (Walker, 1904a, 1906a).
Somatogyrus (Walkerilla) tenax Thompson 1969 [Figs. 89, 197, 201]
Broad River, Elbert County, Georgia (Thompson, 1969).



FIGS. 162-171. Shells of Hydrobiidae (Lithoglyphinae). FIG. 162. *Somatogyrus excavatus*. FIG. 163. *S. georgianus*. FIG. 164. *S. hendersoni*. FIG. 165. *S. hinkleyi*. FIG. 166. *S. hinkleyi*, immature. FIG. 167. *S. humerosa*. FIG. 168. *S. nanus*. FIG. 169. *S. obtusus*. FIG. 170. *S. parvulus*. FIG. 171. *S. parvulus*. Measurement lines = 1 mm. Figs. 163-170 are from Walker (1904a, 1906a, 1909c); Fig. 171 is from Tryon (1865i).



FIGS. 172-180. Shells of Hydrobiidae (Lithoglyphinae). FIG. 172. *Somatogyrus pennsylvanicus*. FIG. 173. *S. pennsylvanicus*. FIG. 174. *S. pennsylvanicus*. FIG. 175. *S. pilsbryanus*. FIG. 176. *S. pumilus*. FIG. 177. *S. pygmaeus*. FIG. 178. *S. quadratus*. FIG. 179. *S. sargenti*. FIG. 180. *S. strengi*. Measurement lines = 1 mm. Figs. 172-180 are from Walker (1904a, 1906a, 1909c).



FIGS. 181-190. Shells of Hydrobiidae (Lithoglyphinae and Nymphophilinae). FIG. 181. *Somatogyrus substriatus*. FIG. 182. *S. tennesseensis*. FIG. 183. *S. wheeleri*, apex. FIG. 184. *S. wheeleri*. FIG. 185. *S. walkerianus*. FIG. 186. *S. (Walkerilla) coosaensis*. FIG. 187. *S. (W.) virginicus*. FIG. 188. *Birgella subglobosa*. FIG. 189. *Cincinnatia judayi* = *C. cincinnatiensis*. FIG. 190. *C. comalensis*. Measurement lines = 1 mm or are divided into millimeters. Figs. 181-184, 186 and 187 are from Walker (1904a, 1906a, 1915c); Fig. 185 is from Aldrich (1905); Fig. 190 is from Pilsbry & Ferriss (1906).

Somatogyrus (Walkerilla) virginicus Walker 1904[9, 12] [Fig. 187]
Barnard's Ford, Rapidan River, Virginia (Walker, 1904a).

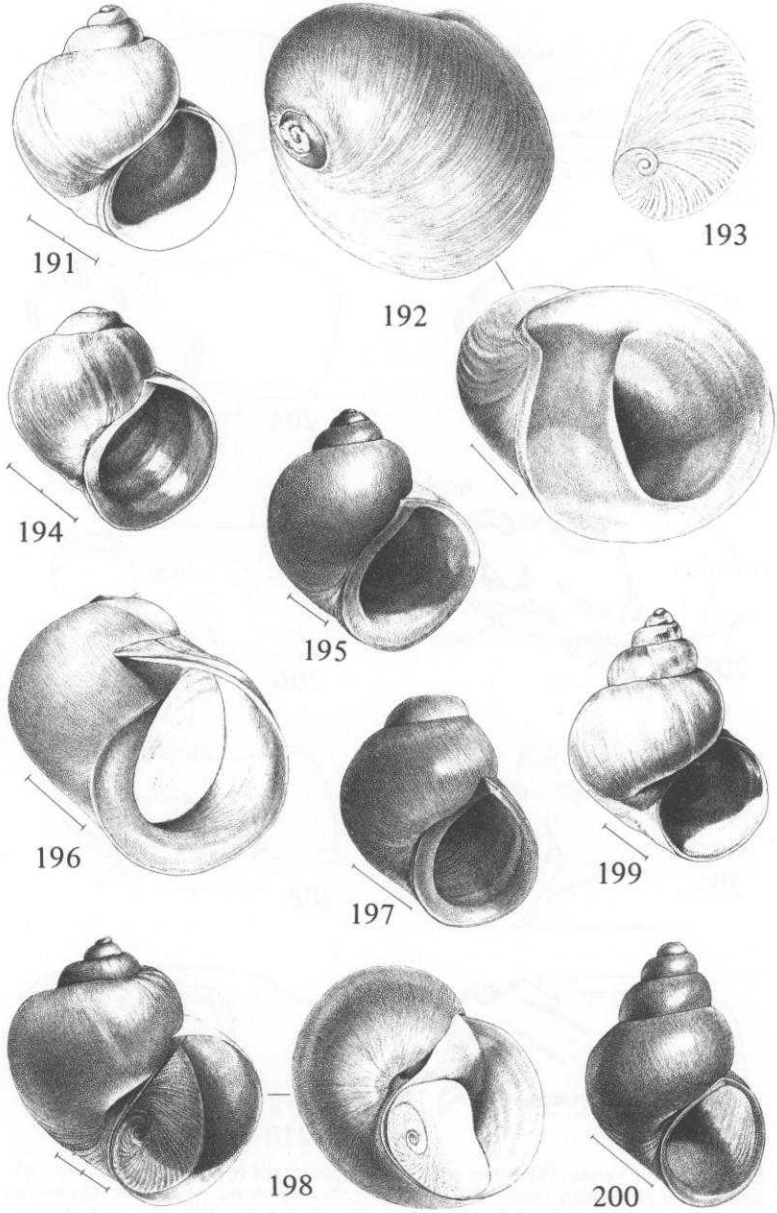
Subfamily Nymphophilinae

Genus *Birgella* F.C. Baker 1926

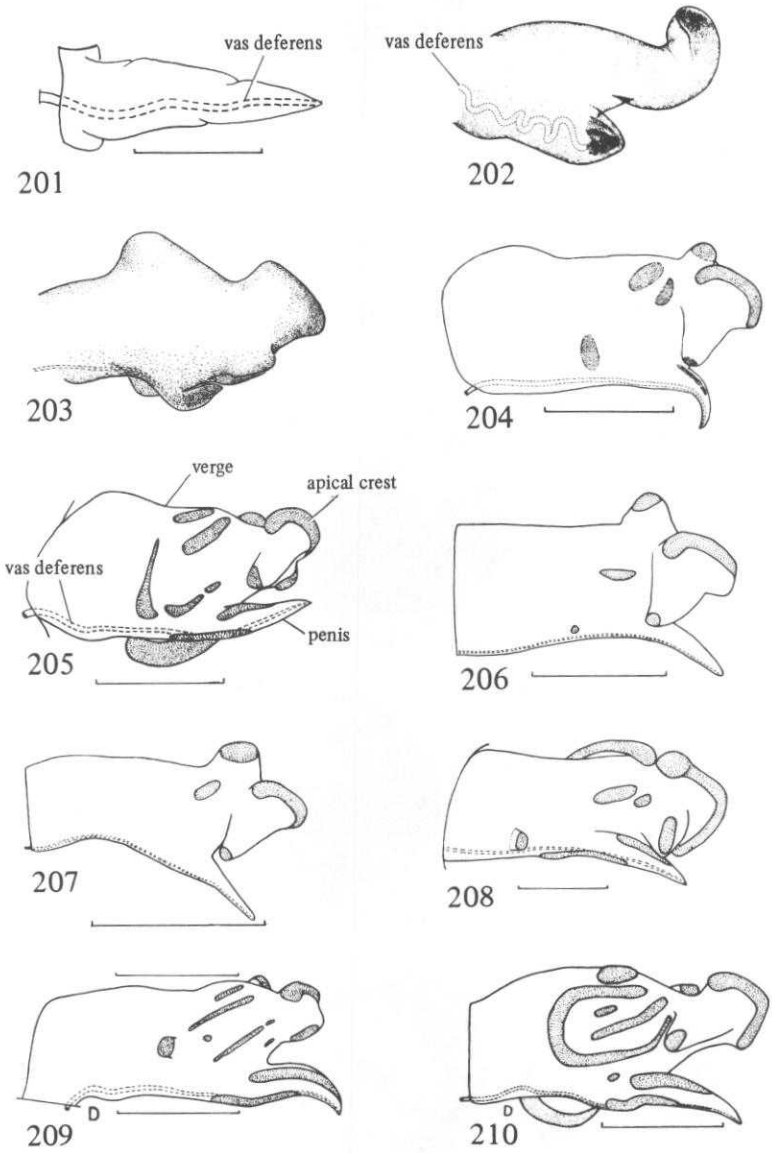
Birgella subglobosa (Say 1825) [Figs. 188, 198, 202]
Great Lakes; the river and creek form (*isogona* Say 1829) ranges from Ohio west to Iowa, and from Michigan south to Alabama and Arkansas (F.C. Baker, 1928c).

Genus *Cincinnatia* Pilsbry 1891

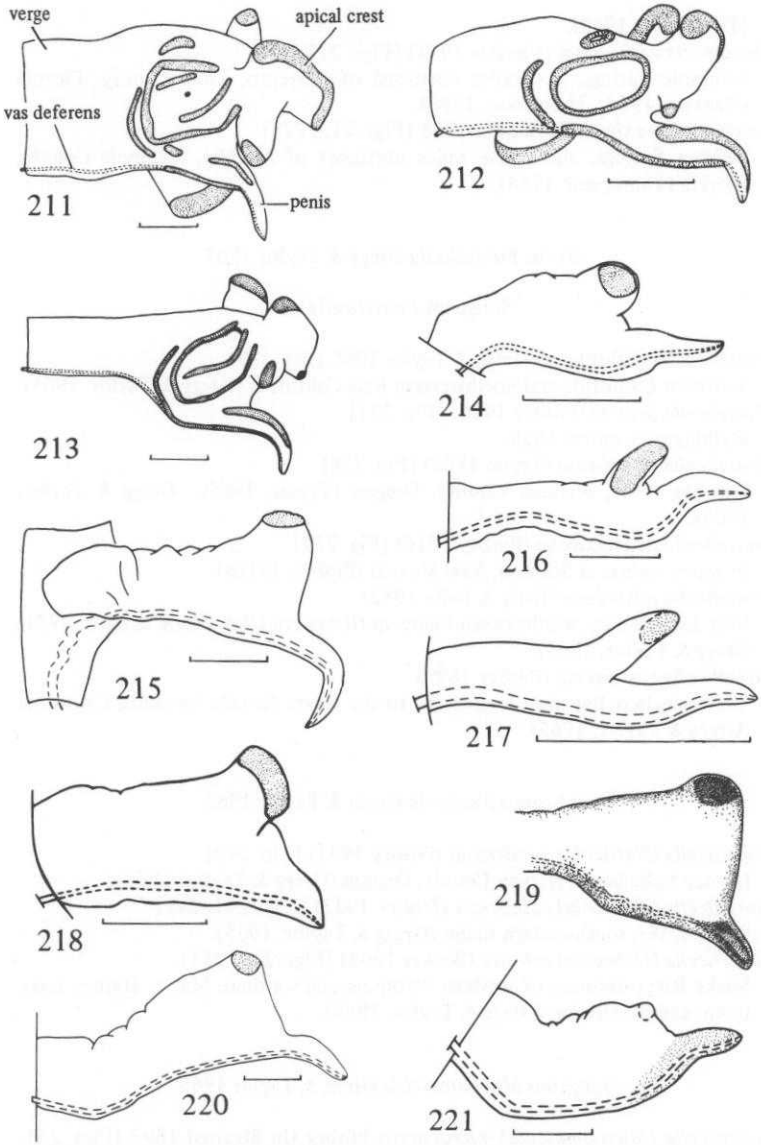
Cincinnatia cincinnatiensis (Anthony 1840)[5] [Figs. 189, 199, 203]
New York and Pennsylvania west to southern Manitoba, southern Saskatchewan, North Dakota, Utah and Texas (Clarke, 1973).
Cincinnatia comalensis (Pilsbry & Ferriss 1906) [Fig. 190]
Comal Creek, near New Braunfels, and the Guadelupe River, about four miles above New Braunfels, Comal County, Texas (Pilsbry & Ferriss, 1906).
Cincinnatia floridana (Frauenfeld 1863) [Figs. 204, 235]
Confined to Florida: from the Suwannee River south to Orlando and Hillsborough County (Thompson, 1968).
Cincinnatia fraterna Thompson 1968 [Figs. 200, 205]
Creeks, small streams and sloughs along the lower third of the St. Johns River, Florida (Thompson, 1968).
Cincinnatia helicogyra Thompson 1968 [Figs. 206, 222]
Spring-fed lagoon on the south side of the head of the Crystal River, Citrus County, Florida (Thompson, 1968).
Cincinnatia integra (Say 1829)
Ohio River and tributaries in Ohio, Indiana, Kentucky and southeastern Illinois.
Cincinnatia mica Thompson 1968 [Figs. 207, 223]
Small spring along the west bank of the Ichetucknee River about one mile northeast of U.S. Highway 27, Suwannee County, Florida (Thompson, 1968).
Cincinnatia monroensis (Dall 1885) [Fig. 208]
Brook flowing from Benson's Mineral Spring, Enterprise, Volusia County, Florida (Dall, 1885; Thompson, 1968).
Cincinnatia parva Thompson 1968 [Figs. 209, 224]
Blue Springs, three miles west of Orange City, Volusia County, Florida (Thompson, 1968).
Cincinnatia peracuta Pilsbry & Walker (in Pilsbry) 1889 [Fig. 225]
Spivey's Lake, Navarro County, Texas (Pilsbry, 1889).
Cincinnatia petrifons Thompson 1968 [Figs. 210, 226]
Rock Springs, 6.5 miles north of Apopka, Orange County, Florida (Thompson, 1968).
Cincinnatia ponderosa Thompson 1968 [Figs. 211, 227]
Sanlando Springs, 3.1 miles west of Longwood, Seminole County, Florida



FIGS. 191-200. Shells of Hydrobiidae (Lithoglyphinae and Nymphophilinae). FIG. 191. *Gillia altilis*. FIG. 192. *Lepyrium showalteri*. FIG. 193. *L. showalteri*, operculum. FIG. 194. *Somatogyrus aureus*. FIG. 195. *S. depressus*. FIG. 196. *S. (Walkerilla) coosaensis*. FIG. 197. *S. (W.) tenax*. FIG. 198. *Birgella subglobosa*. FIG. 199. *Cincinnatia cincinnatiensis*. FIG. 200. *C. fraterna*. Measurement lines = 1 mm.



FIGS. 201-210. Verges of hydrobiid snails (Lithoglyphinae and Nymphophilinae). FIG. 201. *Somatogyrus (Walkerilla) tenax*. FIG. 202. *Birgella subglobosus*. FIG. 203. *Cincinnatia cincinnatiensis*. FIG. 204. *C. floridana*. FIG. 205. *C. fraterna*. FIG. 206. *C. helicogyra*. FIG. 207. *C. mica*. FIG. 208. *C. monroensis*. FIG. 209. *C. parva*. FIG. 210. *C. petrifons*. Measurement lines = 1 mm. Figs. 201 and 204-210 are from Thompson (1968); Figs. 202 and 203 are from E.G. Berry (1943).



FIGS. 211-221. Verges of hydrobiid snails (Nymphophilinae). FIG. 211. *Cincinnatia ponderosa*. FIG. 212. *C. vanhyningi*. FIG. 213. *C. wekiwae*. FIG. 214. *Marstonia agarhecta*. FIG. 215. *M. arga*. FIG. 216. *M. castor*. FIG. 217. *M. halcyon*. FIG. 218. *M. lustrica*. FIG. 219. *M. lustrica*. FIG. 220. *M. ogmorphaphe*. FIG. 221. *M. pachyta*. Measurement lines = ½ mm. Figs. 211-218, 220 and 221 are from Thompson (1968, 1969, 1977); Fig. 219 is from E.G. Berry (1943).

(Thompson, 1968).

Cincinnatia vanhyningi (Vanatta 1934) [Figs. 212, 236]
Seminole Springs, 3.4 miles northeast of Sorrento, Lake County, Florida (Vanatta, 1934; Thompson, 1968).

Cincinnatia wekiwae Thompson 1968 [Figs. 213, 228]
Wekiwa Springs, about five miles northeast of Apopka, Seminole County, Florida (Thompson, 1968).

Genus *Fontelicella* Gregg & Taylor 1965

Subgenus *Fontelicella* s.s.

Fontelicella californiensis Gregg & Taylor 1965 [Fig. 229]
Southern California and northwestern Baja California (Gregg & Taylor, 1965).

Fontelicella deserta (Pilsbry 1916) [Fig. 237]
Washington County, Utah.

Fontelicella intermedia (Tryon 1865) [Fig. 238]
Owyhee River, Malheur County, Oregon (Tryon, 1865i; Gregg & Taylor, 1965).

Fontelicella neomexicana (Pilsbry 1916) [Fig. 239]
In warm springs at Socorro, New Mexico (Pilsbry, 1916a).

Fontelicella pilsbryana (Baily & Baily 1952)
Bear Lake Valley, southeastern Idaho-northeastern Utah (Baily & Baily, 1951; Gregg & Taylor, 1965).

Fontelicella stearnsiana (Pilsbry 1899)
San Francisco Bay region eastward to the Sierra Nevada foothills, California (Gregg & Taylor, 1965).

Subgenus *Natricola* Gregg & Taylor 1965

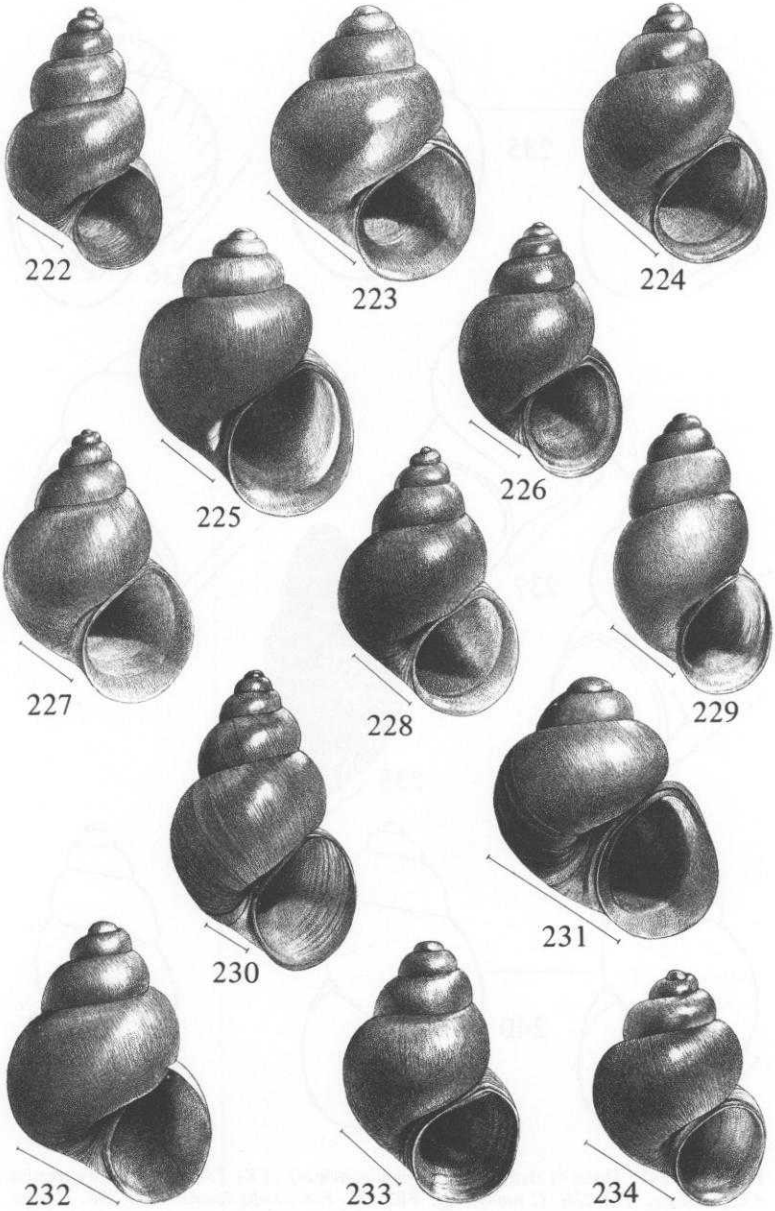
Fontelicella (Natricola) hendersoni (Pilsbry 1933) [Fig. 240]
Harney Lake basin, Harney County, Oregon (Gregg & Taylor, 1965).

Fontelicella (Natricola) idahoensis (Pilsbry 1933) [Figs. 241, 242]
Snake River, southwestern Idaho (Gregg & Taylor, 1965).

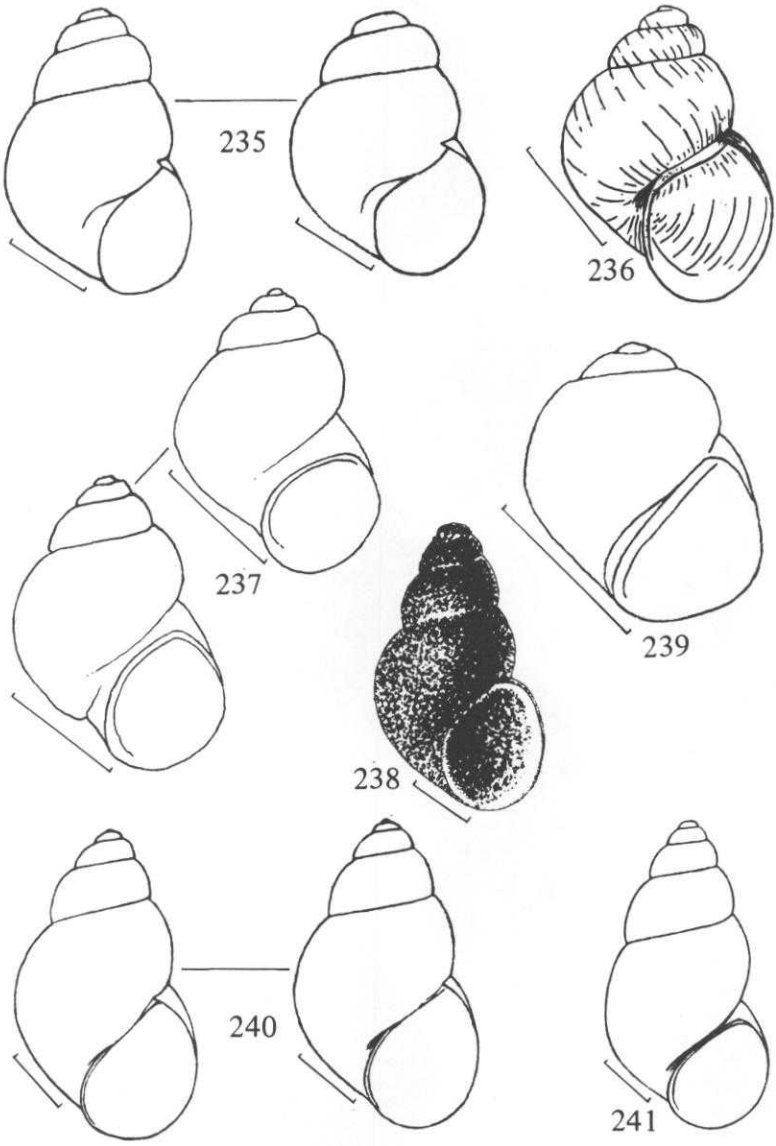
Fontelicella (Natricola) robusta (Walker 1908) [Figs. 230, 243]
Snake River drainage of western Wyoming and southern Idaho; Harney Lake basin, eastern Oregon (Gregg & Taylor, 1965).

Subgenus *Microamnicola* Gregg & Taylor 1965

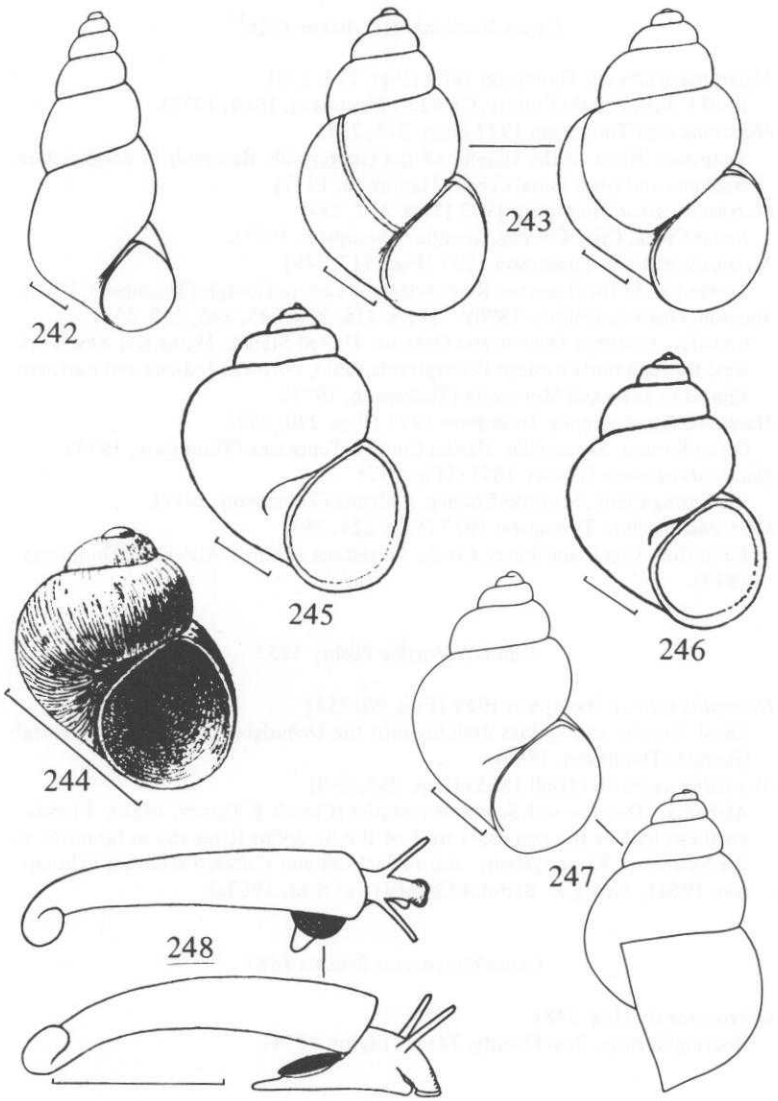
Fontelicella (Microamnicola) micrococcus Pilsbry (in Stearns) 1893 [Figs. 231, 244]
Amargosa River drainage, in southern Nye County, Nevada; eastern Inyo County and northern San Bernardino County, California (Gregg & Taylor, 1965).



FIGS. 222-234. Shells of Hydrobiidae (Nymphophilinae). FIG. 222. *Cincinnatia helicogyra*. FIG. 223. *C. mica*. FIG. 224. *C. parva*. FIG. 225. *C. peracuta*. FIG. 226. *C. petrifons*. FIG. 227. *C. ponderosa*. FIG. 228. *C. wekiwae*. FIG. 229. *Fontelicella californiensis*. FIG. 230. *F. (Natricola) robusta*. FIG. 231. *F. (Microamnicola) micrococcus*. FIG. 232. *Marstonia agarhecta*. FIG. 233. *M. arga*. FIG. 234. *M. castor*. Measurement lines = 1 mm.



FIGS. 235-241. Shells of Hydrobiidae (Nymphophilinae). FIG. 235. *Cincinnatia augustina* = *C. floridana*. FIG. 236. *C. vanhyningi*. FIG. 237. *Fontelicella deserta*. FIG. 238. *F. intermedia*. FIG. 239. *F. neomexicana*. FIG. 240. *F. (Natricola) hendersoni*. FIG. 241. *F. (N.) idahoensis*. Measurement lines = 1 mm. Fig. 235 is from Walker (1906a); Fig. 236 is from Vanatta (1934); Figs. 237 and 239-241 are from Pilsbry (1916a); Fig. 238 is from Tryon (1865i).



FIGS. 242-248. Shells of Hydrobiidae (Nymphophilinae). FIG. 242. *Fontelicella (Natricola) idahoensis*. FIG. 243. *F. (N.) robusta*. FIG. 244. *F. (Microamnicola) micrococcus*. FIG. 245. *Marstonia winkleyi mozleyi* = *M. lustrica*, female. FIG. 246. *M. winkleyi mozleyi* = *M. lustrica*, male. FIG. 247. *M. olivacea*. FIG. 248. *Orygoceras* sp., dorsal and lateral views. Measurement lines = 1 mm. Figs. 242 and 243 are from Pilsbry (1933); Fig. 244 is from Stearns (1893); Figs. 245 and 246 are from Walker (1925a); Fig. 247 is from Thompson (1977); Fig. 248 is after Taylor (1974).

Genus *Marstonia* F.C. Baker 1926[13]

Marstonia agarhecta Thompson 1969 [Figs. 214, 232]
Bluff Creek, Pulaski County, Georgia (Thompson, 1969, 1977).
Marstonia arga Thompson 1977 [Figs. 215, 233]
Tennessee River in the vicinity of the Guntersville Reservoir in northeastern Alabama and from Shoal Creek (Thompson, 1977).
Marstonia castor Thompson 1977 [Figs. 216, 234]
Cedar Creek, Crisp County, Georgia (Thompson, 1977).
Marstonia halcyon Thompson 1977 [Figs. 217, 249]
Lower half of the Ogeechee River system in eastern Georgia (Thompson, 1977).
Marstonia lustrica (Pilsbry 1890)[14] [Figs. 218, 219, 245, 246, 250, 251]
Canada: southern Quebec and Ontario; United States: Maine and New York west through northwestern Pennsylvania, Ohio, northern Indiana and northern Illinois to Iowa and Minnesota (Thompson, 1977).
Marstonia ogmorphaphe Thompson 1977 [Figs. 220, 252]
Owen Springs, Sequatchie, Marion County, Tennessee (Thompson, 1977).
Marstonia olivacea (Pilsbry 1895) [Fig. 247]
Big Spring Creek, Madison County, Alabama (Thompson, 1977).
Marstonia pachyta Thompson 1977 [Figs. 221, 253]
Limestone Creek and Piney Creek, Limestone County, Alabama (Thompson, 1977).

Genus *Notogillia* Pilsbry 1953

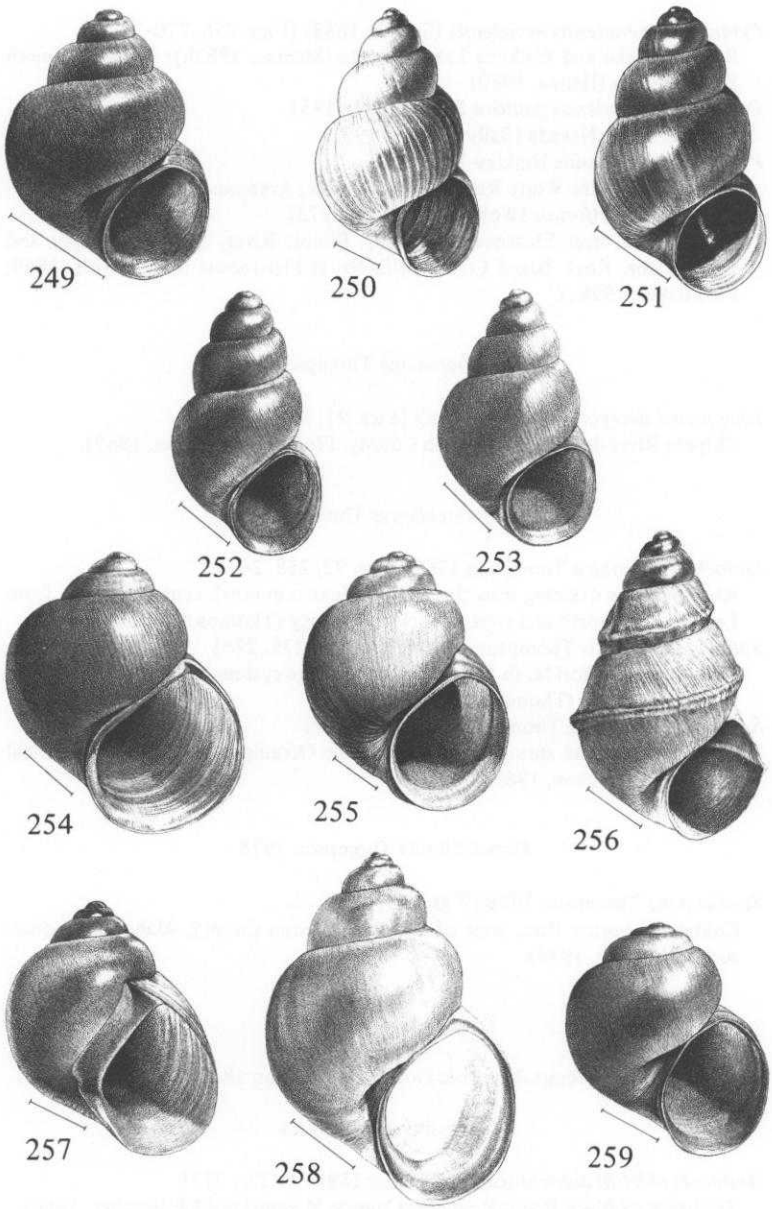
Notogillia sathon Thompson 1969 [Figs. 90, 254]
Small streams and springs draining into the Ocmulgee River in south central Georgia (Thompson, 1969).
Notogillia wetherbyi (Dall 1885) [Figs. 255, 260]
Alabama: Decatur and Seminole counties (Clench & Turner, 1956); Florida: northern half of the peninsula west of the St. Johns River and as far north as the Suwannee River system; also in Jackson and Calhoun counties (Thompson, 1968); Georgia: Barbour County (Hubricht, 1963c).

Genus *Orygoceras* Brusina 1882

Orygoceras sp. [Fig. 248]
Roaring Springs, Real County, Texas (Taylor, 1974).

Genus *Pyrgulopsis* Call & Pilsbry 1886

Pyrgulopsis archimedis S.S. Berry 1947 [Fig. 274]
Upper Klamath Lake, near Algoma, Oregon (S.S. Berry, 1947).
Pyrgulopsis letsoni (Walker 1901)[13] [Fig. 261]
Ontario, New York, Ohio and Michigan (F.C. Baker, 1928c; LaRocque, 1968).



FIGS. 249-259. Shells of Hydrobiidae (Nymphophilinae). FIG. 249. *Marstonia halcyon*. FIG. 250. *M. lustrica*. FIG. 251. *M. lustrica*. FIG. 252. *M. ogmorphaphe*. FIG. 253. *M. pachyta*. FIG. 254. *Notogillia sathon*. FIG. 255. *N. wetherbyi*. FIG. 256. *Pyrgulopsis nevadensis*. FIG. 257. *Rhapinema dacryon*. FIG. 258. *Spilochlamys conica*. FIG. 259. *S. turgida*. Measurement lines = 1 mm.

Pyrgulopsis nevadensis nevadensis (Stearns 1883) [Figs. 256, 270-272]
Pyramid Lake and Walker's Lake, Nevada (Stearns, 1883b); Upper Klamath Lake, Oregon (Hanna, 1930).
Pyrgulopsis nevadensis paiutica Baily & Baily 1951
Pyramid Lake, Nevada (Baily & Baily, 1951).
Pyrgulopsis ozarkensis Hinkley 1915[13]
North Fork of the White River, above Norfolk, Arkansas (Hinkley, 1915).
Pyrgulopsis scalariformis (Wolf 1869)[13] [Fig. 273]
Shoal Creek, near Florence, Alabama; Illinois River, Tazewell County, and Rock River, Rock Island County, Illinois, as Pleistocene fossils (Wolf, 1869; F.C. Baker, 1928c).

Genus *Rhapinema* Thompson 1969

Rhapinema dacryon Thompson 1969 [Figs. 91, 257, 262]
Chipola River drainage in Jackson County, Florida (Thompson, 1969).

Genus *Spilochlamys* Thompson 1968

Spilochlamys conica Thompson 1968 [Figs. 92, 258, 263]
River systems draining into the Gulf of Mexico in north central Florida, from Levy County north and west to Jackson County (Thompson, 1968).
Spilochlamys gravis Thompson 1968 [Figs. 264, 275, 276]
North central Florida, in the St. Johns drainage system from Palatka south to the Wekiva River (Thompson, 1968).
Spilochlamys turgida Thompson 1969 [Fig. 259]
Small streams and springs draining into the Ocmulgee River in south central Georgia (Thompson, 1969).

Genus *Stiobia* Thompson 1978

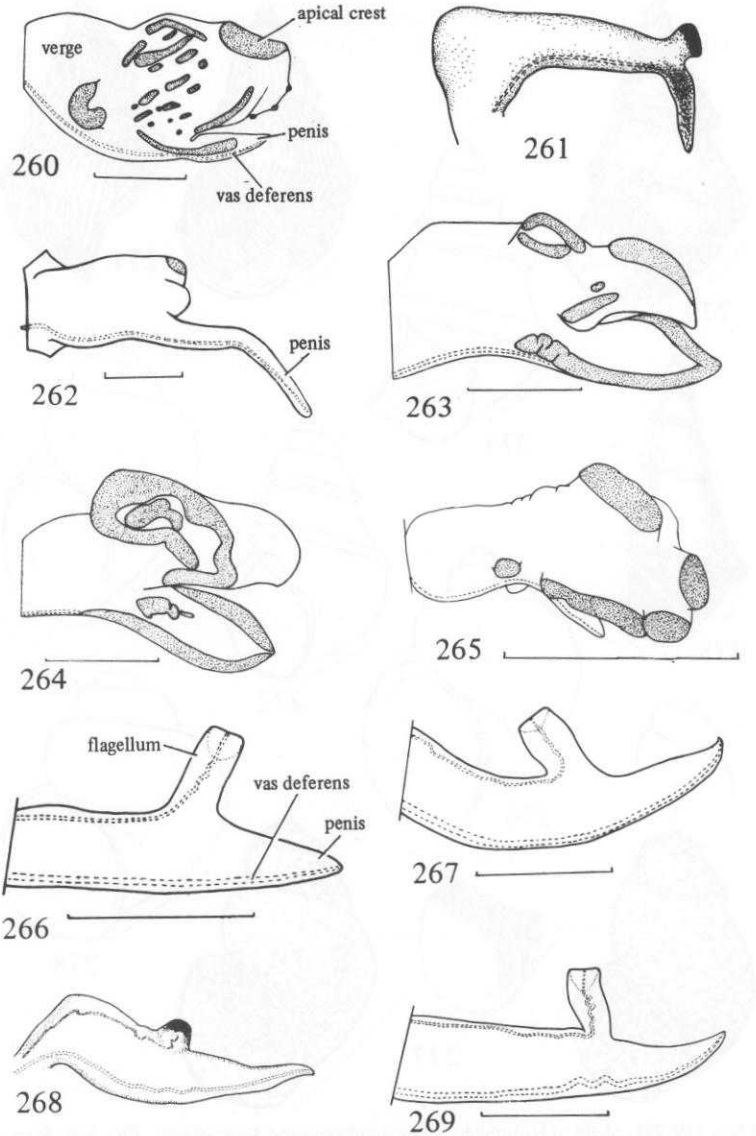
Stiobia nana Thompson 1978 [Figs. 265, 297]
Coldwater Spring Run, west of Oxford, Calhoun County, Alabama (Thompson & McCaleb, 1978).

Subfamily Amnicolinae

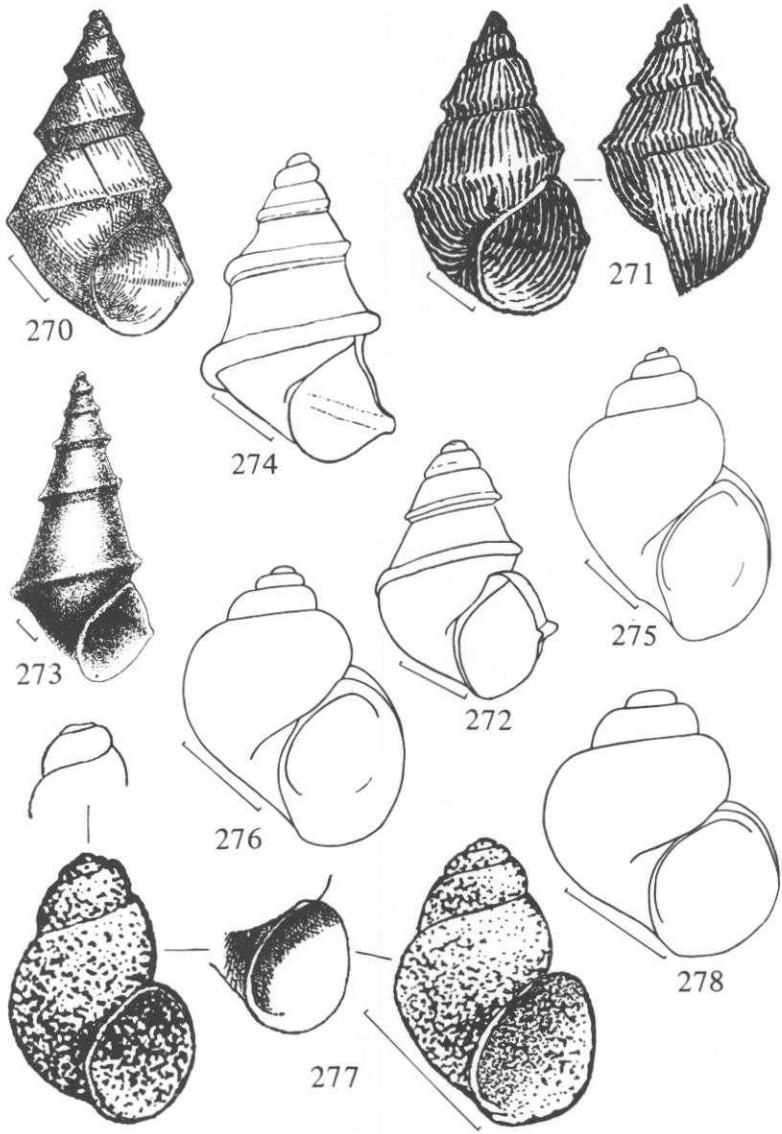
Genus *Amnicola* Gould & Haldeman 1840[15]

Subgenus *Amnicola* s.s.

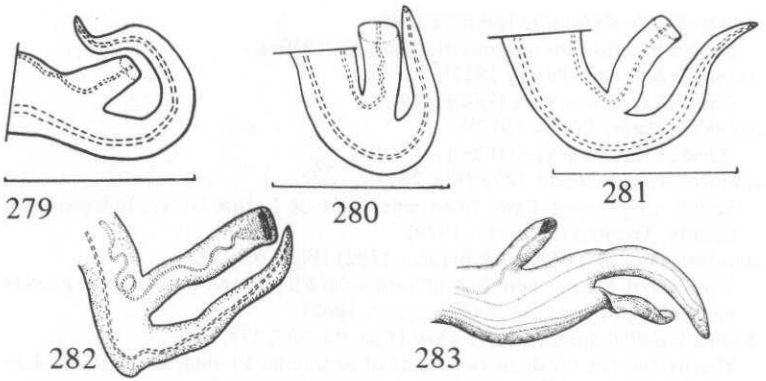
Amnicola aldrichi aldrichi (Call & Beecher 1886)[16] [Fig. 277]
Tributary of Black River, Reynolds County, Missouri (Call & Beecher, 1886).
Amnicola aldrichi antroecetes Hubricht 1940
Caves in southwestern Illinois and in eastern and southeastern Missouri (Hubricht, 1940a).



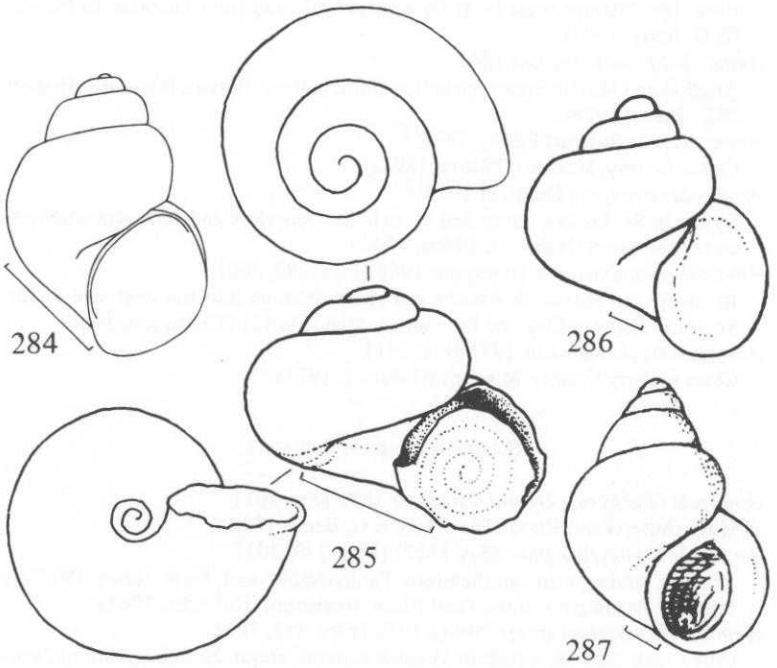
FIGS. 260-269. Verges of hydrobiid snails (Nymphophilinae and Amnicolinae). FIG. 260. *Notogillia wetherbyi*. FIG. 261. *Pyrgulopsis letsoni*. FIG. 262. *Rhapinema dacryon*. FIG. 263. *Spilochlamys conica*. FIG. 264. *Sp. gravis*. FIG. 265. *Stiobia nana*. FIG. 266. *Amnicola dalli dalli*. FIG. 267. *A. dalli johnsoni*. FIG. 268. *A. limosa*. FIG. 269. *A. rhombostoma*. Measurement lines = 1 mm. Figs. 260, 262-267 and 269 are from Thompson (1968, 1969) and Thompson & McCaleb (1978); Figs. 261 and 268 are from E.G. Berry (1943).



FIGS. 270-278. Shells of Hydrobiidae (Nymphophilinae and Amnicolinae). FIG. 270. *Pyrgulopsis nevadensis nevadensis*. FIG. 271. *P. nevadensis nevadensis*. FIG. 272. *P. nevadensis nevadensis*. FIG. 273. *P. scalariformis*. FIG. 274. *P. archimedis*. FIG. 275. *Spilochlamys gravis*. FIG. 276. *S. gravis*. FIG. 277. *Amnicola aldrichi aldrichi*. FIG. 278. *A. dalli johnsoni*. Measurement lines = 1 mm. Fig. 270 is from Stearns (1883b); Fig. 271 is from Call & Pilsbry (1886); Figs. 272 and 274 are from S.S. Berry (1947); Fig. 273 is from Wolf (1869); Figs. 275, 276 and 278 are from Thompson (1968); Fig. 277 is from Call & Beecher (1886).



FIGS. 279-283. Verges of hydrobiid snails (Amnicolinae and Fontigentinae). FIG. 279. *Amnicola (Lyogyrus) grana*. FIG. 280. *A. (L.) pupoidea*. FIG. 281. *A. (L.) retromargo*. FIG. 282. *A. (L.) walkeri*. FIG. 283. *Fontigens nickliniana*. Measurement lines = 1 mm. Figs. 279-281 are from Thompson (1968); Figs. 282 and 283 are from E.G. Berry (1943).

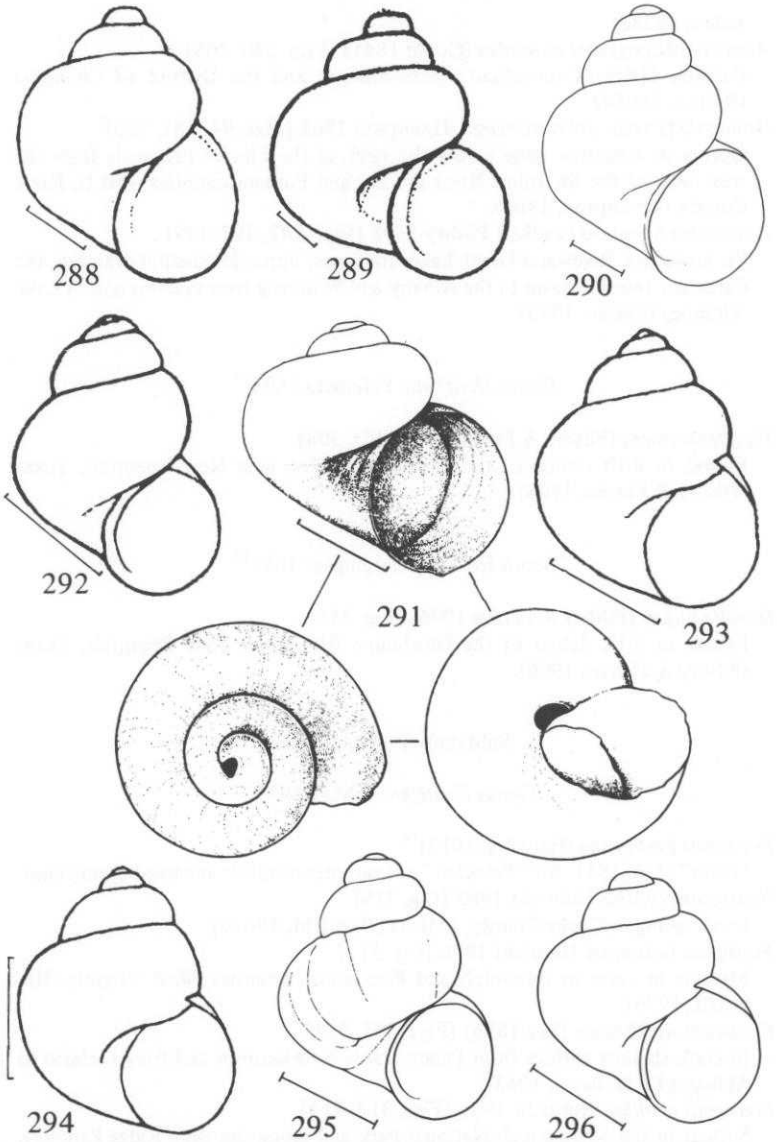


FIGS. 284-287. Shells of Hydrobiidae (Amnicolinae). FIG. 284. *Amnicola dalli johnsoni*. FIG. 285. *A. cora*. FIG. 286. *A. limosa*. FIG. 287. *A. decisa*. Measurement lines = 1 mm. Fig. 284 is from Thompson (1968); Fig. 285 is from Hubricht (1979); Figs. 286 and 287 are from Haldeman (1845).

Amnicola aldrichi insolita Hubricht 1940
Springs in southeastern Missouri (Hubricht, 1940a).
Amnicola bakeriana Pilsbry 1917[16]
Oneida Lake, New York (Pilsbry, 1917c).
Amnicola clarkei Pilsbry 1917[16]
Oneida Lake, New York (Pilsbry, 1917c).
Amnicola cora Hubricht 1979 [Fig. 285]
Stream in Foushee Case, three miles west of Locust Grove, Independence County, Arkansas (Hubricht, 1979).
Amnicola dalli dalli (Pilsbry & Beecher 1892) [Figs. 266, 298]
Throughout the northern half of peninsular Florida and west into the Florida panhandle to Leon County (Thompson, 1968).
Amnicola dalli johnsoni Pilsbry 1899 [Figs. 93, 267, 278, 284]
Throughout the northern two-thirds of peninsular Florida, and near Tallahassee (Thompson, 1968).
Amnicola decisa Haldeman 1845[16] [Fig. 287]
Tributaries of the Susquehanna River and in the Schuylkill River (Haldeman, 1845).
Amnicola limosa limosa (Say 1817) [Fig. 268, 286, 288-290, 299]
From the Atlantic coast to as far west as Utah, and from Labrador to Florida (E.G. Berry, 1943).
Amnicola limosa parva Lea 1841
Atlantic and Middle States, including Ohio, Indiana, Illinois, Iowa and Missouri (F.C. Baker, 1928c).
Amnicola missouriensis Pilsbry 1898[16]
Carter County, Missouri (Pilsbry, 1898a).
Amnicola proserpina Hubricht 1940[16]
Spring in St. Louis County and caves in St. Genevieve and Jefferson counties, eastern Missouri (Hubricht, 1940a, 1942).
Amnicola rhombostoma Thompson 1968 [Figs. 269, 300]
In small sand-bottomed streams and rivers draining into the west side of the St. Johns River in Clay and Putnam counties, Florida (Thompson, 1968).
Amnicola stygia Hubricht 1971 [Fig. 291]
Caves in Perry County, Missouri (Hubricht, 1971).

Subgenus *Lyogyrus* Gill 1863

Amnicola (Lyogyrus) browni Carpenter 1872 [Fig. 301]
Massachusetts and Rhode Island (see E.G. Berry, 1943).
Amnicola (Lyogyrus) grana (Say 1822) [Figs. 279, 302]
Atlantic drainage in southeastern Pennsylvania and New Jersey (Walker, 1918b); headwaters of the Pearl River, Mississippi (Hubricht, 1963a).
Amnicola (Lyogyrus) greggi Pilsbry 1935 [Figs. 292, 303]
Cliff Creek canyon, a fork of Hoback canyon, about 29 miles south of Jackson, Wyoming, in the Snake River drainage (Pilsbry, 1935a); also in western Montana and southeastern Idaho (Taylor, 1966b).
Amnicola (Lyogyrus) pilsbryi Walker 1906 [Figs. 293-296, 304]
Wisconsin east to New Philadelphia, Ohio, and south to northern Illinois (F.C.



FIGS. 288-296. Shells of Hydrobiidae (Amnicolidae). FIG. 288. *Amnicola pallida* = *A. limosa*. FIG. 289. *A. porata* = *A. limosa*. FIG. 290. *A. porata* = *A. limosa*. FIG. 291. *A. stygia*. FIG. 292. *A. (Lyogyrus) greggi*. FIG. 293. *A. (L.) pilsbryi*. FIG. 294. *A. (L.) pilsbryi*. FIG. 295. *A. (L.) pilsbryi*. FIG. 296. *A. (L.) pilsbryi*. Measurement lines = 1 mm. Figs. 288 and 289 are from Haldeman (1845); Fig. 291 is from Hubricht (1971); Fig. 292 is from Pilsbry (1935a); Figs. 293 and 294 are from Walker (1906a).

Baker, 1928c).

Amnicola (Lyogyrus) pupoidea (Gould 1841) [Figs. 280, 305]
Canada, Maine, Connecticut, Massachusetts and the District of Columbia (Binney, 1865d).

Amnicola (Lyogyrus) retromargo Thompson 1968 [Figs. 94, 281, 306]
Occurs in a narrow zone across the neck of the Florida peninsula from the west side of the St. Johns River in Clay and Putnam counties west to Dixie County (Thompson, 1968).

Amnicola (Lyogyrus) walkeri Pilsbry 1898 [Figs. 282, 307, 309]
St. Lawrence River and Great Lake drainages, upper Mississippi drainage, the Canadian Interior basin in the Albany and Winnipeg river systems and in Lake Winnipeg (Clarke, 1973).

Genus *Hauffenia* Pollonera 1898[17]

Hauffenia micra (Pilsbry & Ferriss 1906 [Fig. 308]
Found in drift debris of the Guadalupe River, near New Braunfels, Texas (Pilsbry & Ferriss, 1906).

Genus *Horatia* Bourguignat 1887[17]

Horatia nugax (Pilsbry & Ferriss 1906) [Fig. 316]
Found in drift debris of the Guadalupe River, near New Braunfels, Texas (Pilsbry & Ferriss, 1906).

Subfamily Fontigentinae

Genus *Fontigens* Pilsbry 1933

Fontigens binneyana (Hannibal 1912)[18]
"Ohio" (Lea, 1841, for *"Paludina" obtusa*, preoccupied; renamed *binneyana*).

Fontigens cryptica Hubricht 1963 [Fig. 315]
Small spring in Clarke County, Indiana (Hubricht, 1963b).

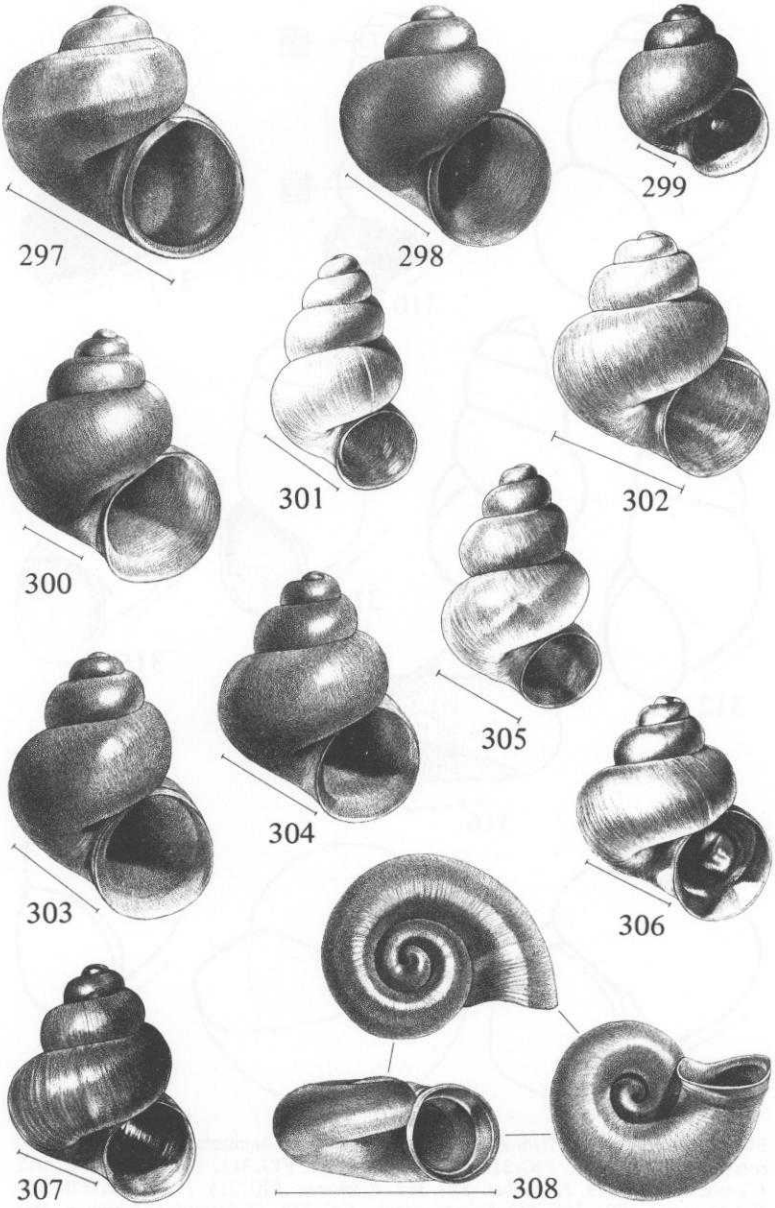
Fontigens holsingeri Hubricht 1976 [Fig. 311]
Streams in caves in Randolph and Pocahontas counties, West Virginia (Hubricht, 1976).

Fontigens nickliniana (Lea 1838) [Figs. 283, 319]
In cool, shallow springs from Pennsylvania to Wisconsin and from Ontario to Alabama (E.G. Berry, 1943).

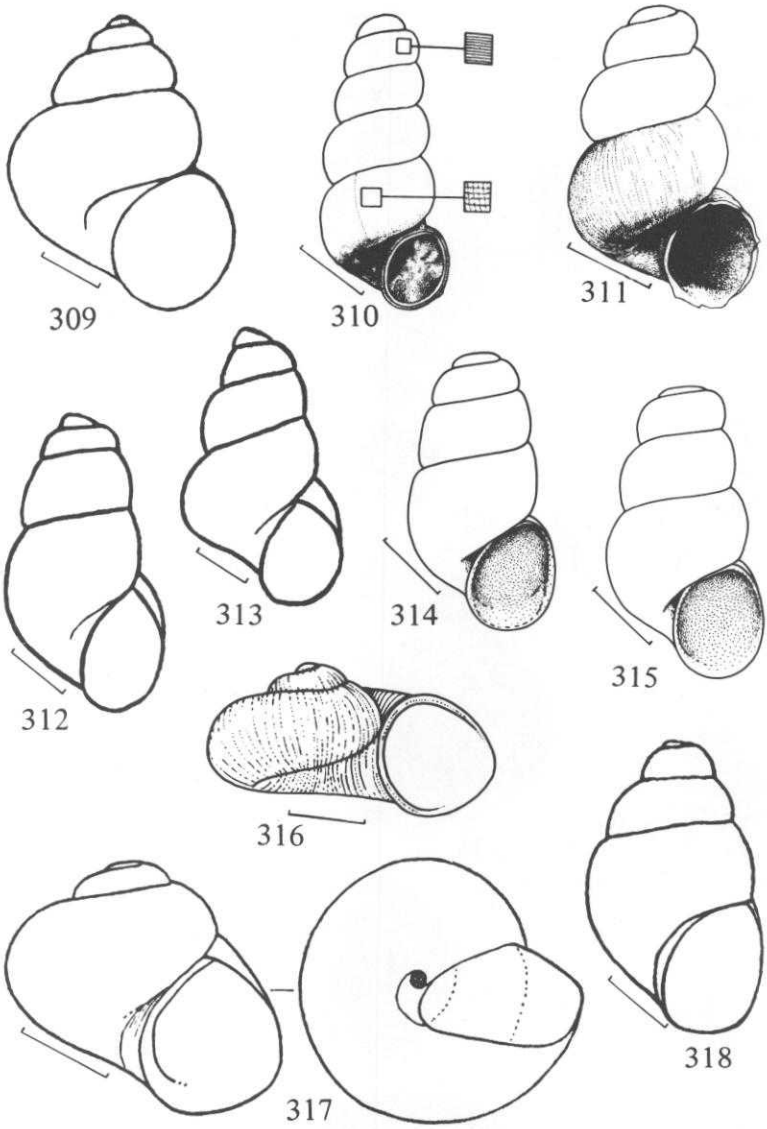
Fontigens orolibas Hubricht 1957 [Figs. 312, 313]
Springs in the Shenandoah National Park and along the Blue Ridge Parkway, Virginia (Hubricht, 1957).

Fontigens tartarea Hubricht 1963 [Fig. 314]
Stream in Organ Cave, Greenbrier County, West Virginia (Hubricht, 1963b).

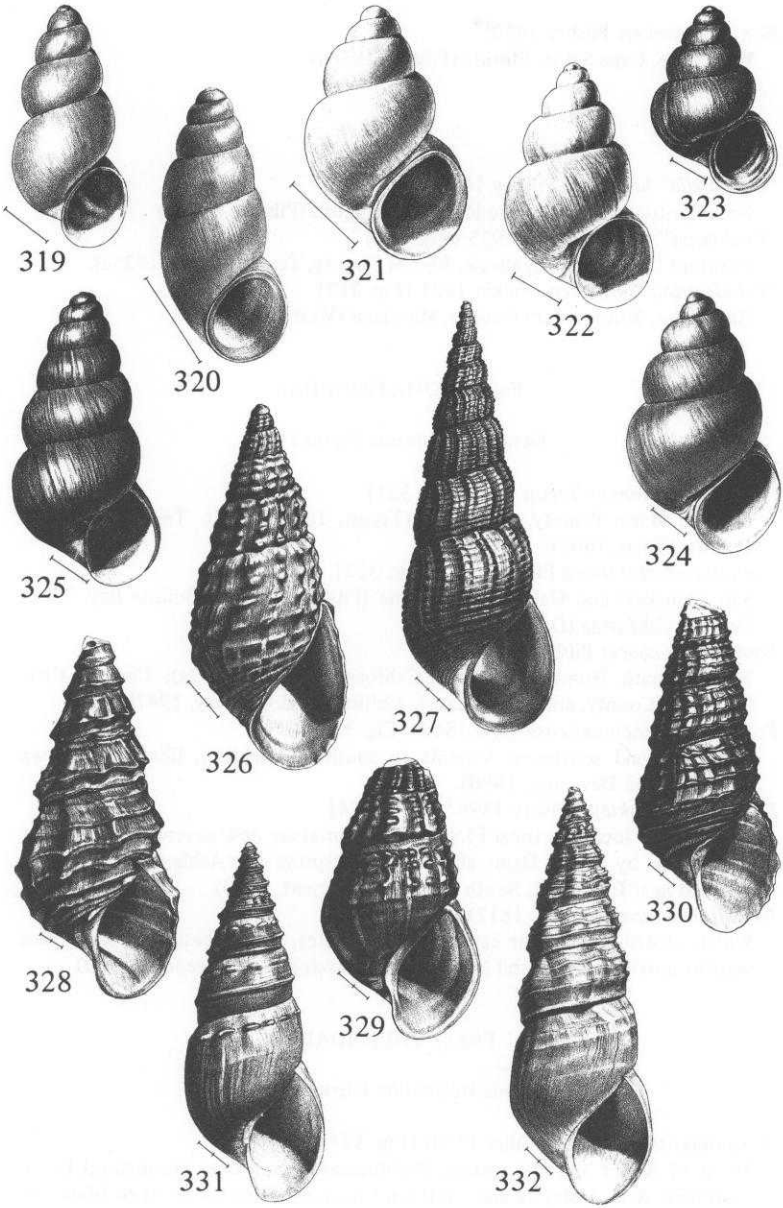
Fontigens turritella Hubricht 1976 [Fig. 310]
Caves in Greenbrier County, West Virginia (Hubricht, 1976).



FIGS. 297-308. Shells of Hydrobiidae (Nymphophilinae and Amnicolinae). FIG. 297. *Stiobia nana*. FIG. 298. *Amnicola dalli dalli*. FIG. 299. *A. limosa limosa*. FIG. 300. *A. rhombostoma*. FIG. 301. *A. (Lyogyrus) browni*. FIG. 302. *A. (L.) grana*. FIG. 303. *A. (L.) greggi*. FIG. 304. *A. (L.) pilsbryi*. FIG. 305. *A. (L.) pupoidea*. FIG. 306. *A. (L.) retromargo*. FIG. 307. *A. (L.) walkeri*. FIG. 308. *Hauffenia micra*. Measurement lines = 1 mm.



FIGS. 309-318. Shells of Hydrobiidae (Nymphophilinae and Amnicolinae). FIG. 309. *Amnicola (Lyogyrus) walkeri*. FIG. 310. *Fontigens turritella*. FIG. 311. *F. holsingeri*. FIG. 312. *F. orolibas*. FIG. 313. *F. orolibas*. FIG. 314. *F. tartarea*. FIG. 315. *F. cryptica*. FIG. 316. *Horatia nugax*. FIG. 317. *"Cochliopa" texana*. FIG. 318. *"Paludestrina" bottimeri*. Measurement lines = ½ mm. Fig. 309 is from Walker (1906a); Figs. 310-315 are from or after Hubricht (1957, 1963b, 1976); Fig. 316 is after Pilsbry & Ferriss (1906); Fig. 317 is from Pilsbry (1935a); Fig. 318 is from Walker (1925a).



FIGS. 319-332. Shells of Hydrobiidae (Figs. 319, 320), Pomatiopsidae (Figs. 321-325), Thiaridae (Figs. 326, 327) and Pleuroceridae (Figs. 328-332). FIG. 319. *Fontigens nicklini-ana*. FIG. 320. *"Bythinella" hemphilli*. FIG. 321. *Pomatiopsis binneyi*. FIG. 322. *P. cali-fornica*. FIG. 323. *P. cincinnatiensis*. FIG. 324. *P. hinkleyi*. FIG. 325. *P. lapidaria*. FIG. 326. *Thiara granifera*. FIG. 327. *Melanoides tuberculata*. FIG. 328. *Elimia boykiniana boy-kiniana*. FIG. 329. *E. boykiniana viennaensis*. FIG. 330. *E. clenchi*. FIG. 331. *E. carinifera*. FIG. 332. *E. arachnoidea arachnoidea*. Measurement lines = 1 mm or are divided into milli-meters.

Fontigens weberi Pilsbry 1950[19]
West Lake, Cape Sable, Florida (Pilsbry, 1950a).

Incertae Sedis

"Bythinella" hemphilli Pilsbry 1890 [Fig. 320]
Near Kentucky Ferry, Snake River, Washington (Pilsbry, 1890e)
"Cochliopa" texana Pilsbry 1935 [Fig. 317]
Phantom Lake, near Toyahvale, Reeves County, Texas (Pilsbry, 1935a).
"Paludestrina" bottimeri Walker 1925 [Fig. 318]
Glen Echo, Montgomery County, Maryland (Walker, 1925a).

Family POMATIOPSIDAE

Genus *Pomatiopsis* Tryon 1862

Pomatiopsis binneyi Tryon 1863 [Fig. 321]
Bolinas, Marin County, California (Tryon, 1863a); Mt. Tamalpais, Marin County (Davis, 1967).
Pomatiopsis californica Pilsbry 1899 [Fig. 322]
San Francisco and Oakland, California (Pilsbry, 1899); Bolinas Bay, Marin County, California (Davis, 1967).
Pomatiopsis chacei Pilsbry 1937
Near Klamath, Humboldt County, California (Pilsbry, 1937a); Crescent City, Del Norte County, and Wilson Creek, California (E.G. Berry, 1947b).
Pomatiopsis cincinnatiensis (Lea 1840) [Fig. 323]
Tennessee and southwest Virginia to southern Michigan, Illinois and Iowa (Burch & Van Devender, 1980).
Pomatiopsis hinkleyi Pilsbry 1896[20] [Fig. 324]
The original localities (near Florence, Alabama) are now covered by the water impounded by Wilson Dam; also found at a spring near Ashland City, Tennessee, and near Eberhardt, South Carolina (Hubricht, 1960).
Pomatiopsis lapidaria (Say 1817) [Fig. 325]
Widely distributed in the eastern United States, with occasional occurrences west to northern Texas and New Mexico (Burch & Van Devender, 1980).

Family THIARIDAE

Genus *Melanoides* Olivier 1904

Melanoides tuberculata (Müller 1774) [Fig. 327]
Much of Africa and the eastern Mediterranean countries, throughout India, Southeast Asia, Malaysia and southern China, north to the Ryukyu Islands of Japan, south and east through many of the Pacific islands to northern Australia and the New Hebrides (Pace, 1973); introduced into Florida, Texas and Arizona (see Dundee, 1974).

Genus *Thiara* Röding 1798

Thiara granifera (Lamarck 1822) [Fig. 326]
Madagascar and India eastward throughout Malaysia and the Philippines to the Society Islands and north to the Ryukyu Islands and Hawaii (Pace, 1973); introduced into Florida (Abbott, 1952) and Texas (Murray, 1964).

Family PLEUROCERIDAE[21, 22]

Genus *Elimia* H. & A. Adams 1854[23]

Elimia acuta group

Elimia acuta acuta (Lea 1831)
Tributaries of the Tennessee River in southern Tennessee and northern Alabama (Goodrich, 1930a, 1941b).
Elimia acuta clavula (Lea 1868)
Tributaries of the Tennessee River in Madison County, Tennessee, and Jackson County, Alabama (Goodrich, 1940d).
Elimia comma (Conrad 1834)
Springs and spring branches of the Black Warrior River in Jefferson and Blount counties, Alabama (Goodrich, 1941b).

Elimia boykiniana group

Elimia boykiniana boykiniana (Lea 1840) [Fig. 328]
Chattahoochee and Flint rivers, Georgia (Goodrich, 1942b).
Elimia boykiniana albanyensis (Lea 1864)
Flint River, Georgia, and tributaries; Uchee Creek, Russell County, Alabama (Goodrich, 1942b).
Elimia boykiniana viennaensis (Lea 1862) [Fig. 329]
Flint River and creeks of western Georgia; Uchee Creek, Russell County, Alabama (Goodrich, 1942b).
Elimia clenchi (Goodrich 1924) [Fig. 330]
Tributaries of Choctawhatchee and Chipola rivers, Alabama and Florida; branches of Conecuh River, Covington County, Alabama (Goodrich, 1942b).
Elimia ucheensis (Lea 1862) [Fig. 346]
Uchee and Little Uchee creeks, Russell County, Alabama (Goodrich, 1942b).

Elimia carinifera group

Elimia bellacrenata (Haldeman 1841) [Fig. 345]
Tributary springs, spring-fed brooks and creeks of the Cahaba River (Goodrich, 1941c).
Elimia carinifera (Lamarck 1822) [Fig. 331]
Springs, brooks, creeks and occasionally rivers of the Alabama River drainage

basin, from north Georgia to Monroe County, Alabama; parts of the Tennessee River system in the vicinity of Chattanooga, Hamilton County, Tennessee (Goodrich, 1941b,c).

Elimia catenaria group

Elimia arachnoidea arachnoidea (Anthony 1854) [Fig. 332]
Small streams of East Tennessee (Goodrich, 1940d).

Elimia arachnoidea spinella (Lea 1862) [Fig. 333]
Small streams of Lee and Scott counties, Virginia, and Claiborne County, Tennessee (Goodrich, 1940d).

Elimia athearni (Clench & Turner 1956)
Central part of the Chipola River system (Clench & Turner, 1956).

Elimia brevis (Reeve 1860) [Figs. 347, 348]
Middle and lower reaches of the Coosa River, Alabama (Goodrich, 1944d).

Elimia capillaris (Lea 1861) [Fig. 334]
Coosa River, Floyd County, Georgia, to shoals of Chilton and Coosa counties, Alabama; in the Etowah River, at Rome, Georgia, and creeks to Talladega County, Alabama (Goodrich, 1944d).

Elimia catenaria catenaria (Say 1822) [Fig. 335]
Springs of eastern South Carolina, possibly in streams southward to the Savannah River (Goodrich, 1942b).

Elimia catenaria dislocata (Reeve 1861) [Figs. 336, 349]
Streams of Durham, Burke, Franklin, Madison and Mecklenburg counties, North Carolina; headstreams in South Carolina; Greenville County, Virginia (Goodrich, 1942b).

Elimia catenaria inclinans (Lea 1862)
Flint River and tributaries, Georgia (Goodrich, 1942b).

Elimia catenaria postelli (Lea 1858) [Fig. 337]
Altamaha, Ogeechee and Canoochee rivers, and possibly Savannah River, Georgia (Goodrich, 1942b).

Elimia catenaria vanhyningiana (Goodrich 1921) [Fig. 338]
Lake, Marion and Orange counties, Florida (Goodrich, 1942b).

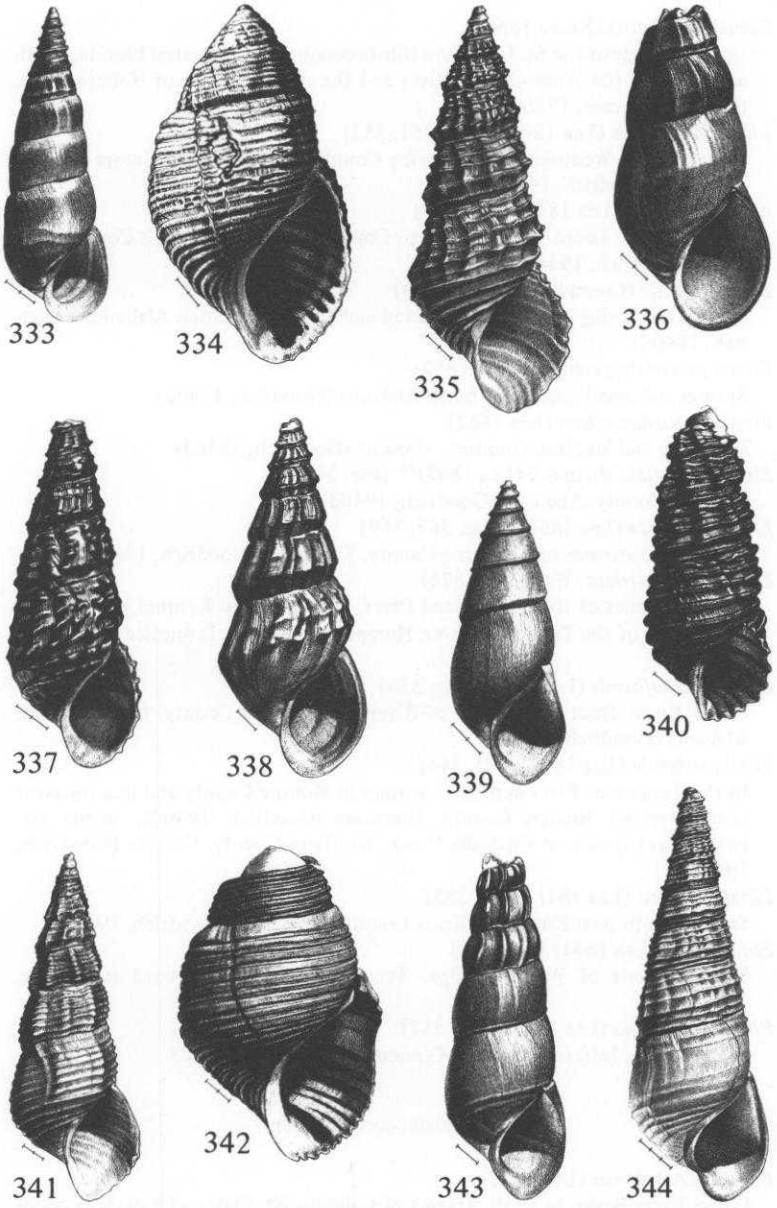
Elimia cochilaris (Lea 1868)
Found in springs and spring brooks of the Little Cahaba River in Bibb, Jefferson and Tuscaloosa counties, Alabama (Goodrich, 1941c).

Elimia comalensis comalensis (Pilsbry 1890) [Fig. 339]
Drainage of Guadeloupe River, Texas; ? basin of Brazos River (Goodrich, 1942b).

Elimia comalensis fontinalis (Pilsbry & Ferriss 1906) [Fig. 350]
Comal Creek and its springs, New Braunfels, Comal County, Texas (Goodrich, 1942b).

Elimia crenatella (Lea 1860) [Fig. 340]
Coosa River Basin: in the Coosa River from St. Clair to Chilton County, Alabama, and in creeks of St. Clair, Etowah and Talladega counties (Goodrich, 1944d).

Elimia edgariana (Lea 1841) [Fig. 341]
Streams of Cumberland, Duck and Elk rivers, Tennessee (Goodrich, 1940d).



FIGS. 333-344. Shells of Pleuroceridae. FIG. 333. *Elimia arachnoidea spinella*. FIG. 334. *E. capillaris*. FIG. 335. *E. catenaria catenaria*. FIG. 336. *E. catenaria dislocata*. FIG. 337. *E. catenaria postelli*. FIG. 338. *E. catenaria vanhyningiana*. FIG. 339. *E. comalensis comalensis*. FIG. 340. *E. crenatella*. FIG. 341. *E. edgariana*. FIG. 342. *E. impressa*. FIG. 343. *E. perstriata decampi*. FIG. 344. *E. striatula*. Measurement lines are divided into millimeters.

Elimia floridensis (Reeve 1860)
Upper reaches of the St. Johns and Hillsborough rivers in central Florida, north and west to the Apalachicola River and the upper reaches of Holmes Creek (Clench & Turner, 1956).

Elimia fusiformis (Lea 1841) [Figs. 351, 352]
Coosa River: Weduska Shoals, Shelby County, to Wetumpka, Elmore County, Alabama (Goodrich, 1944d).

Elimia impressa (Lea 1841) [Fig. 342]
Coosa River: Leoto Shoals, St. Clair County, to rapids of Coosa County, Alabama (Goodrich, 1944d).

Elimia nassula (Conrad 1834) [Fig. 353]
Springs and spring branches of Madison and Colbert counties, Alabama (Goodrich, 1940d).

Elimia perstriata perstriata (Lea 1852)
Springs and small streams of north Alabama (Goodrich, 1940d).

Elimia perstriata crispa (Lea 1862)
Lawrence and Madison counties, Alabama (Goodrich, 1940d).

Elimia perstriata decampii (Lea 1863)[24] [Fig. 343]
Madison County, Alabama (Goodrich, 1940d).

Elimia porrecta (Lea 1863) [Figs. 368, 369]
Springs and streams of Claiborne County, Tennessee (Goodrich, 1940d).

Elimia plicatastriata (Wetherby 1876)
Small branches of the Cumberland River, Tennessee and Kentucky; Big Richland Creek of the Tennessee River, Humphreys County, Tennessee (Goodrich, 1940d).

Elimia pupaeformis (Lea 1864) [Fig. 354]
Coosa River, from the vicinity of Riverside, St. Clair County, to Wetumpka, Alabama (Goodrich, 1944d).

Elimia striatula (Lea 1842) [Fig. 344]
In the Tennessee River system at springs in Monroe County and in a reservoir near Cleveland, Bradley County, Tennessee (Goodrich, 1940d); in the Alabama River system at Coahulla Creek, Whitfield County, Georgia (Goodrich, 1941b).

Elimia strigosa (Lea 1841) [Fig. 355]
Small streams near Knoxville, Knox County, Tennessee (Goodrich, 1940d).

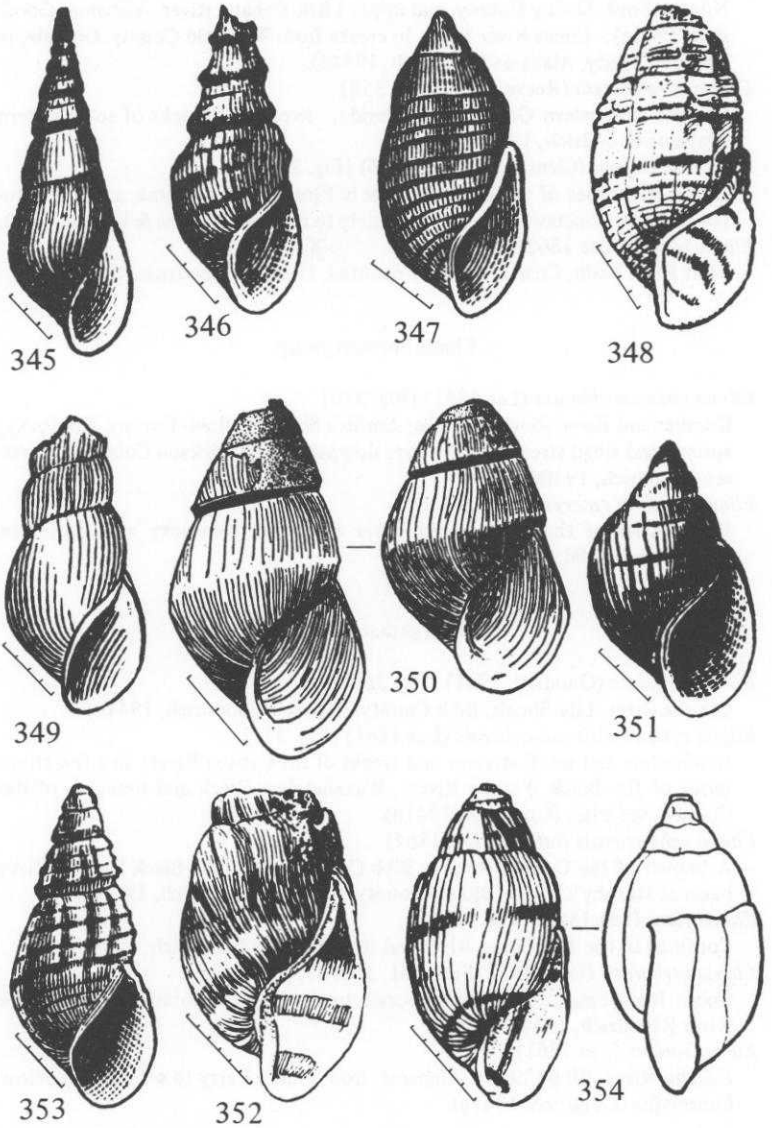
Elimia teres (Lea 1841) [Fig. 356]
Small streams of Walden Ridge, Tennessee, flowing eastward (Goodrich, 1940d).

Elimia troostiana (Lea 1838) [Fig. 357]
Mossy Creek, Jefferson County, Tennessee (Goodrich, 1940d).

Elimia carinocostata group

Elimia bentoniensis (Lea 1862)
Coosa River Basin, in small streams of Calhoun, St. Clair and Talladega counties, Alabama (Goodrich, 1941b, 1944d).

Elimia carinocostata (Lea 1845)
Tributaries of Black Warrior River (Goodrich, 1941b); upper Cahaba River to



FIGS. 345-354. Shells of Pleuroceridae. FIG. 345. *Elimia bellacrenata*. FIG. 346. *E. ucheensis*. FIG. 347. *E. brevis*. FIG. 348. *E. brevis*. FIG. 349. *E. catenaria dislocata*. FIG. 350. *E. comalensis fontinalis*. FIG. 351. *E. fusiformis*. FIG. 352. *E. fusiformis*. FIG. 353. *E. nassula*. FIG. 354. *E. pupaeformis*. Measurement lines are divided into millimeters. Figs. 345-347, 349, 351 and 353 are from Tryon (1865-66, 1873b); Figs. 348, 352 and 354 are from Goodrich (1936); Fig. 350 is from Pilsbry & Ferriss (1906).

Nunley Ford, Shelby County, and upper Little Cahaba River, Alabama (Goodrich, 1941c); Coosa River Basin, in creeks from Whitfield County, Georgia, to Elmore County, Alabama (Goodrich, 1944d).

Elimia curvicostata (Reeve 1861) [Fig. 358]
Streams of western Georgia and Florida; rivers and creeks of southeastern Alabama (Goodrich, 1942b).

Elimia dickinsoni (Clench & Turner 1956) [Fig. 359]
Upper tributaries of the Chipola River in Florida and Alabama, and the tributaries of the Choctawhatchee immediately to the west (Clench & Turner, 1956).

Elimia induta (Lea 1862)
Flint River basin, Crisp and Dooly counties, Georgia (Goodrich, 1942b).

Elimia ebenum group

Elimia ebenum ebenum (Lea 1841) [Fig. 370]
Cumberland River above the Falls; Smith's Shoals, Pulaski County, Kentucky; springs and small streams of the river downstream to Dickson County, Tennessee (Goodrich, 1940d).

Elimia ebenum emeryensis (Lea 1864)
In branches of the Cumberland River in eastern Kentucky and Tennessee (Goodrich, 1940d).

Elimia gerhardtii group

Elimia annettae (Goodrich 1941) [Fig. 360]
Cahaba River, Lily Shoals, Bibb County, Alabama (Goodrich, 1941a).

Elimia cahawbensis cahawbensis (Lea 1861) [Fig. 371]
Headwaters and small streams and creeks of the Cahaba River; in a few tributaries of the Black Warrior River; Waxahatchee Creek and branches of the Coosa River basin (Goodrich, 1941b).

Elimia cahawbensis fraterna (Lea 1864)
A branch of the Cahaba River in Bibb County, and in the Black Warrior River basin at Murphy's Creek, Blount County, Alabama (Goodrich, 1941c).

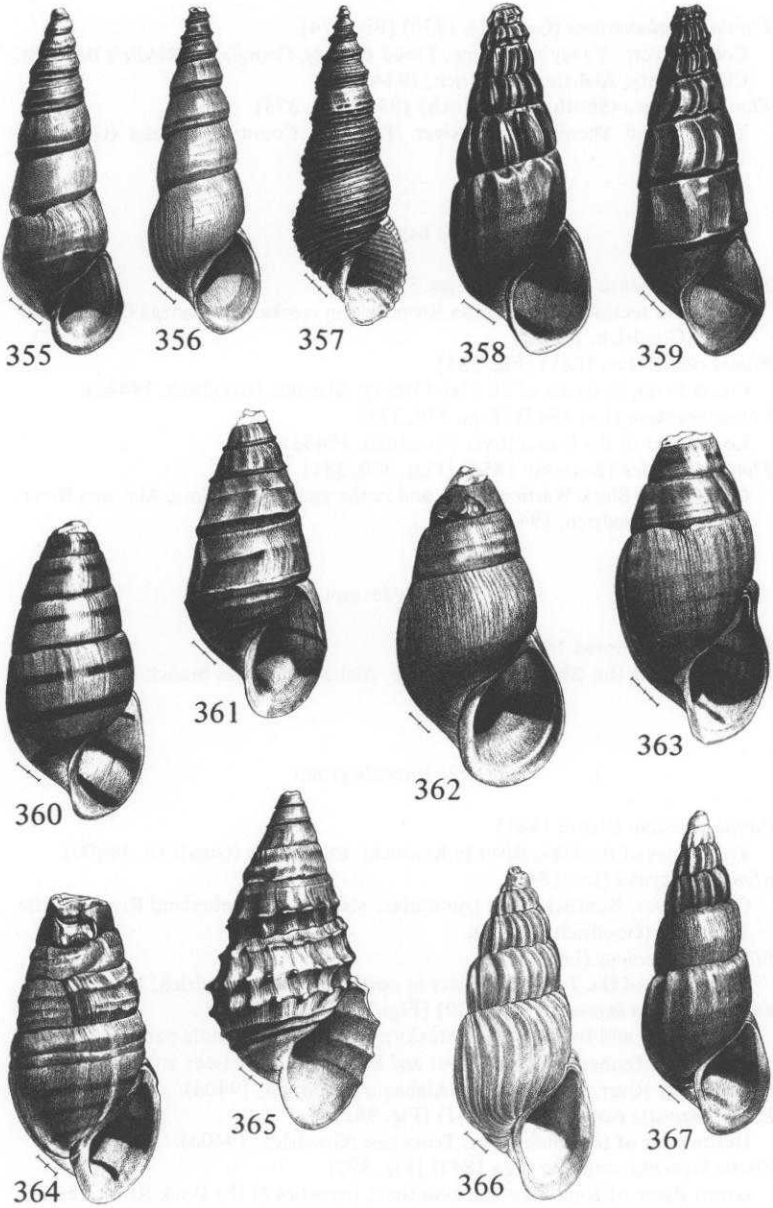
Elimia flava (Lea 1862) [Fig. 372]
Confined to the Tallapoosa River and its tributaries (Goodrich, 1941b).

Elimia gerhardtii (Lea 1862) [Figs. 361, 362, 373]
Coosa River basin, from north Georgia to the lower tributaries of the Coosa River (Goodrich, 1944d).

Elimia varians (Lea 1861)
Cahaba River, Bibb County, Alabama, from Pratt's Ferry to seven miles below Centerville (Goodrich, 1941c).

Elimia hartmaniana group

Elimia hartmaniana (Lea 1861) [Fig. 363]
Coosa River: St. Clair to Elmore County, Alabama (Goodrich, 1944d).



FIGS. 355-367. Shells of Pleuroceridae. FIG. 355. *Elimia strigosa*. FIG. 356. *E. teres*. FIG. 357. *E. troostiana*. FIG. 358. *E. curvicostata*. FIG. 359. *E. dickinsoni*. FIG. 360. *E. annettae*. FIG. 361. *E. gerhardti*. FIG. 362. *E. murrayensis* = *E. gerhardti*. FIG. 363. *E. hartmaniana*. FIG. 364. *E. clausa*. FIG. 365. *E. hydei*. FIG. 366. *E. laqueata laqueata*. FIG. 367. *E. laqueata laqueata*. Measurement lines are divided into millimeters.

Elimia macglameriana (Goodrich 1936) [Fig. 374]
Coosa River: Yancy's Landing, Floyd County, Georgia, to Riddle's Bend, St. Clair County, Alabama (Goodrich, 1944d).
Elimia pygmaea (Smith (in Goodrich) 1936) [Fig. 375]
Three Island Shoals, Coosa River, Talladega County, Alabama (Goodrich, 1944d).

Elimia haysiana group

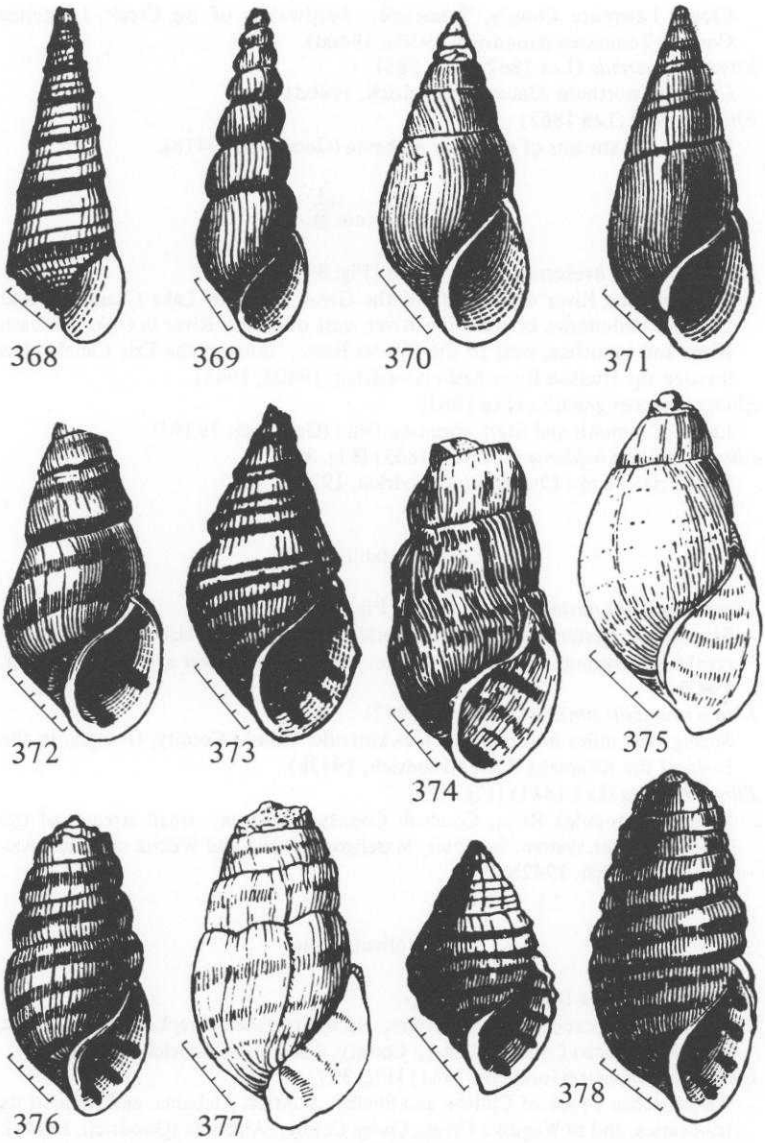
Elimia alabamensis (Lea 1861) [Figs. 376, 377]
In middle sections of the Coosa River, and in creeks of Talladega County, Alabama (Goodrich, 1944d).
Elimia clausa (Lea 1861) [Fig. 364]
Coosa River, in shoals of St. Clair County, Alabama (Goodrich, 1944d).
Elimia haysiana (Lea 1843) [Figs. 378, 379]
Lower part of the Coosa River (Goodrich, 1944d).
Elimia pupoidea (Anthony 1854) [Figs. 380, 381]
Cahaba and Black Warrior rivers, and in the vicinity of Selma, Alabama River, Alabama (Goodrich, 1941c).

Elimia hydei group

Elimia hydei (Conrad 1834) [Fig. 365]
Confined to the Black Warrior River, Alabama, and its branches (Goodrich, 1941b).

Elimia laqueata group

Elimia costifera (Reeve 1861)
Tributaries of the Ohio River in Kentucky and Illinois (Goodrich, 1940d).
Elimia curreyana (Lea 1841)
Green River, Kentucky, and tributaries; streams of Cumberland River, middle Tennessee (Goodrich, 1940d).
Elimia interveniens (Lea 1862)
Tributaries of the Tennessee River in north Alabama (Goodrich, 1940d).
Elimia laqueata laqueata (Say 1829) [Figs. 366, 367, 391]
Green River and tributaries, Kentucky; tributaries of middle parts of Cumberland River, Tennessee; Duck River and branches, Tennessee; tributaries of the Tennessee River, Tennessee and Alabama (Goodrich, 1940d).
Elimia laqueata castanea (Lea 1841) [Fig. 382]
Headwaters of the Duck River, Tennessee (Goodrich, 1940d).
Elimia laqueata costulata (Lea 1841) [Fig. 392]
Green River of Kentucky and branches; branches of the Duck River, Tennessee (Goodrich, 1940d).
Elimia laqueata tortum (Lea 1845)
Elk River drainage in Lynn Creek, Giles County, Tennessee, and Richland



FIGS. 368-378. Shells of Pleuroceridae. FIG. 368. *Elimia porrecta*. FIG. 369. *E. rubella* = ?*E. porrecta*. FIG. 370. *E. ebenum ebenum*. FIG. 371. *E. cahawbensis cahawbensis*. FIG. 372. *E. flava*. FIG. 373. *E. gerhardti*. FIG. 374. *E. macglameriana*. FIG. 375. *E. pygmaea*. FIG. 376. *E. alabamensis*. FIG. 377. *E. alabamensis*. FIG. 378. *E. haysiana*. Measurement lines are divided into millimeters. Figs. 368-373, 376 and 378 are from Tryon (1865-66); Figs. 374, 375 and 377 are from Goodrich (1936).

Creek, Lawrence County, Tennessee; headwaters of Big Creek, Lawrence County, Tennessee (Goodrich, 1930a, 1940d).

Elimia paupercula (Lea 1862) [Fig. 383]
Creeks of northern Alabama (Goodrich, 1940d).

Elimia pybasi (Lea 1862)
Springs and streams of northern Alabama (Goodrich, 1941b).

Elimia livescens group

Elimia livescens livescens (Menke 1830) [Fig. 393]
St. Lawrence River drainage from the Great Lakes to Lake Champlain and Quebec; tributaries of the Ohio River, east of Scioto River in Ohio; Wabash River and branches, west to the Illinois River; through the Erie Canal it has invaded the Hudson River basin (Goodrich, 1940d, 1945).

Elimia livescens gracilior (Lea 1861)
Lakes of Summit and Stark counties, Ohio (Goodrich, 1939d).

Elimia livescens haldemani (Tryon 1865) [Fig. 384]
Lake Erie; ? Lake Champlain (Goodrich, 1939d).

Elimia mutabilis group

Elimia mutabilis mutabilis (Lea 1862) [Fig. 394]
Streams of western Georgia and Florida, and southern Alabama; also a few creeks and springs of Alabama within the Alabama River system (Goodrich, 1942b).

Elimia mutabilis timidus (Goodrich 1942)
Spring two miles northwest of Hawkinsville, Pulaski County, Georgia, in the basin of the Altamaha River (Goodrich, 1942b).

Elimia taitiana (Lea 1841) [Fig. 395]
Branch of Sepulga River, Conecuh County, Alabama; small streams of the Alabama River system, Sumpter, Marengo, Monroe and Wilcox counties, Alabama (Goodrich, 1942b).

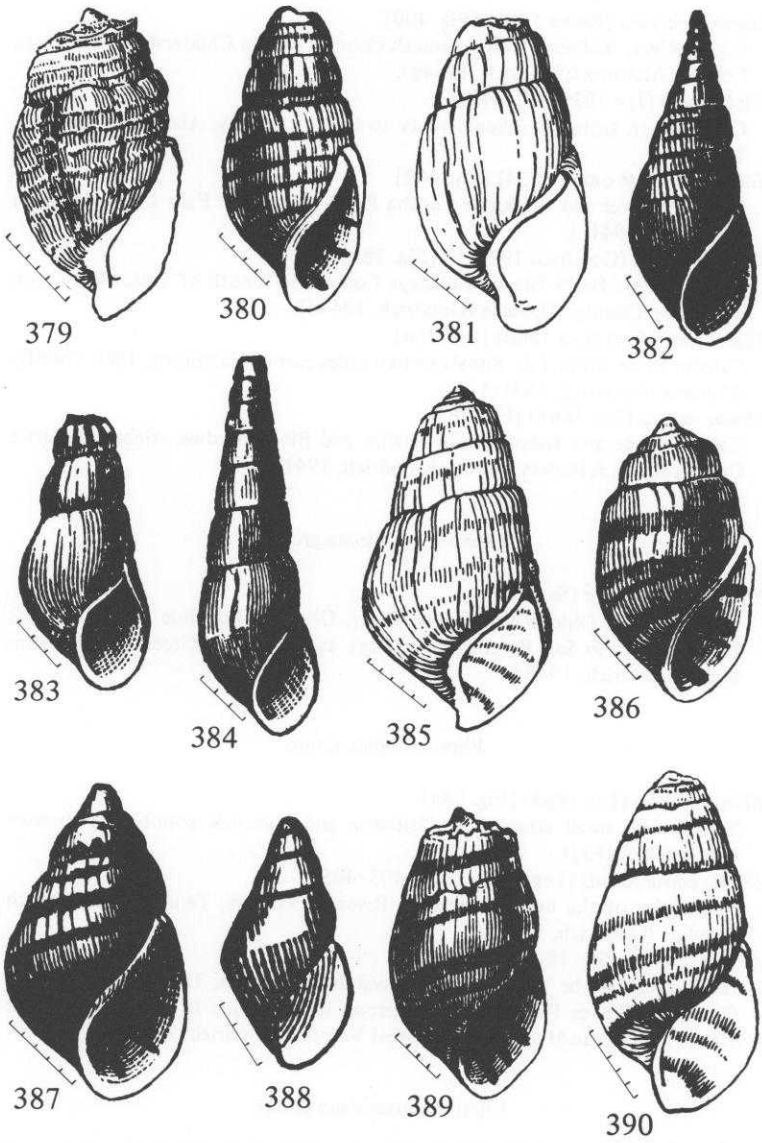
Elimia olivula group

Elimia bellula (Lea 1861) [Fig. 396]
In the middle part of the Coosa River, and in Yellowleaf Creek, Shelby County, and Choccolocco Creek, Talladega County, Alabama (Goodrich, 1944d).

Elimia chiltonensis (Goodrich, 1941) [Fig. 397]
Waxahatchee Creek of Chilton and Shelby counties, Alabama, and three of its tributaries, and in Weguska Creek, Coosa County, Alabama (Goodrich, 1941a).

Elimia cylindracea (Conrad 1834) [Fig. 398]
Tombigbee River from Columbus, Mississippi, to near its mouth, and in the lower part of the Black Warrior River, Alabama (Goodrich, 1936).

Elimia gibbera (Smith 1936) [Fig. 399]
Coosa River, shoals of St. Clair County, Alabama (Goodrich, 1944d).



FIGS. 379-390. Shells of Pleuroceridae. FIG. 379. *Elimia haysiana*. FIG. 380. *E. pupoidea*. FIG. 381. *E. pupoidea*. FIG. 382. *E. laqueata castanea*. FIG. 383. *E. paupercula*. FIG. 384. *E. livescens haldemani*. FIG. 385. *E. pilsbryi*. FIG. 386. *E. showalteri*. FIG. 387. *E. variata*. FIG. 388. *E. aterina*. FIG. 389. *E. bullula*. FIG. 390. *E. bullula*. Measurement lines are divided into millimeters. Figs. 379, 380, 382-384, 386-389 are from Tryon (1865-66, 1873b); Figs. 381, 385 and 390 are from Goodrich (1936).

Elimia lachryma (Reeve 1861) [Fig. 400]
Coosa River: Gilbert's Ferry, Etowah County, to near Childersburg, Talladega County, Alabama (Goodrich, 1944d).
Elimia laeta (Jay 1839) [Fig. 401]
Coosa River, from Cherokee County to Elmore County, Alabama (Goodrich, 1944d).
Elimia olivula (Conrad 1834) [Fig. 402]
Alabama River and the lower Cahaba River (below the Falls Line), Alabama (Goodrich, 1941c).
Elimia pilsbryi (Goodrich 1927)[25] [Fig. 385]
Coosa River: Hall's Island, Talladega County, to mouth of Yellowleaf Creek of Chilton County, Alabama (Goodrich, 1944d).
Elimia showalteri (Lea 1860) [Fig. 386]
Cahaba River, from Lily Shoals to two miles east of Harrisburg, Bibb County, Alabama (Goodrich, 1941c).
Elimia variata (Lea 1861) [Fig. 387]
Cahaba River and tributaries in Shelby and Bibb counties, Alabama; Little Cahaba River, Jefferson County (Goodrich, 1941c).

Elimia semicarinata group

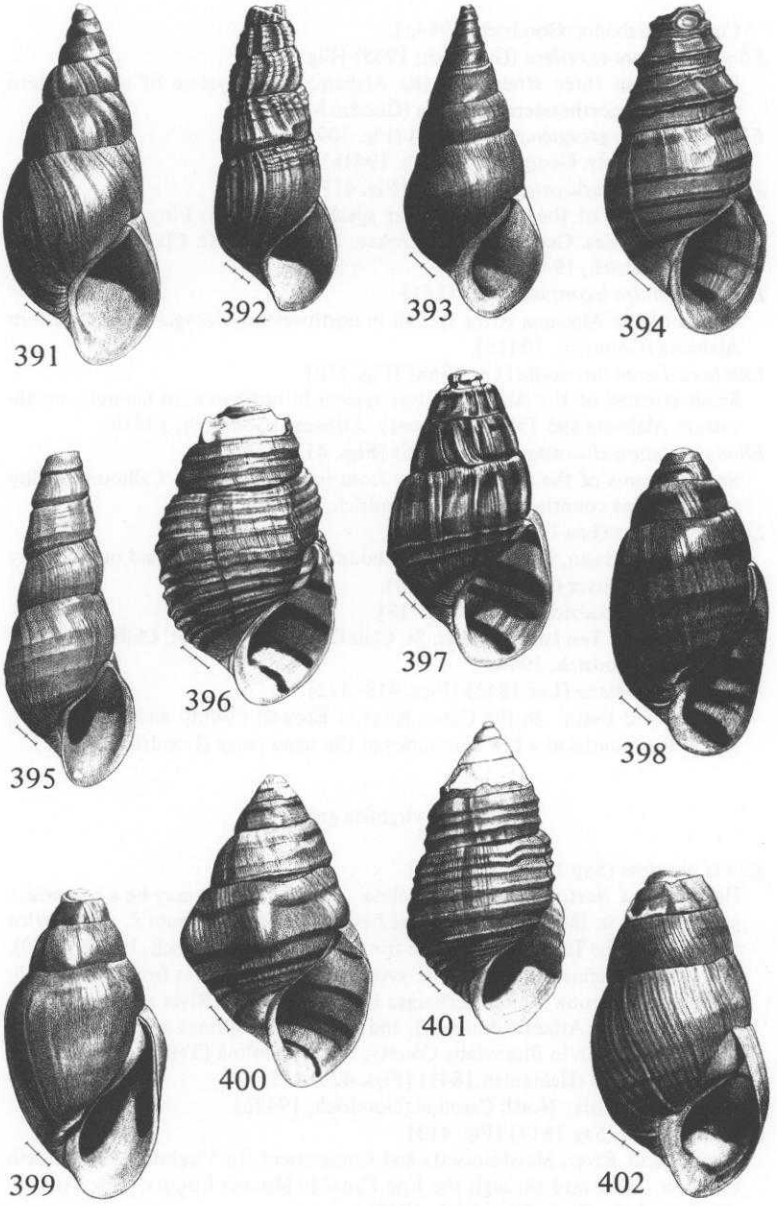
Elimia semicarinata (Say 1829)
Tributaries of Ohio River, Scioto River, Ohio, to Big Blue River, Indiana; Licking River to Salt River in Kentucky; two creeks of Green River of Kentucky (Goodrich, 1940d).

Elimia simplex group

Elimia aterina (Lea 1863) [Fig. 388]
Springs and small streams of Claiborne and Hancock counties, Tennessee (Goodrich, 1940d).
Elimia clavaeformis (Lea 1841) [Figs. 403-405]
Tributaries of the upper Tennessee River in Virginia, Tennessee and North Carolina (Goodrich, 1940d).
Elimia simplex (Say 1825) [Fig. 406]
Headwaters of the Tennessee River system in Virginia, Tennessee and North Carolina; Beaver Fork of the Bluestone River, which is a tributary of the Kanawha River in Mercer County, West Virginia (Goodrich, 1940d).

Elimia vanuxemiana group

Elimia bullula (Lea 1861) [Figs. 389, 390]
Coosa River, Cherokee County, Alabama, to near the Narrows, Coosa County, and in five tributaries between these points (Goodrich, 1944d).
Elimia caelatura caelatura (Reeve 1860) [Fig. 407]
Coosa River Basin, from Georgia headwaters to side streams of Talladega



FIGS. 391-402. Shells of Pleuroceridae. FIG. 391. *Elimia mutata* = *E. laqueata laqueata*. FIG. 392. *E. laqueata costulata*. FIG. 393. *E. livescens livescens*. FIG. 394. *E. mutabilis mutabilis*. FIG. 395. *E. taitiana*. FIG. 396. *E. bellula*. FIG. 397. *E. chiltonensis*. FIG. 398. *E. cylindracea*. FIG. 399. *E. gibbera*. FIG. 400. *E. lachryma*. FIG. 401. *E. laeta*. FIG. 402. *E. olivula*. Measurement lines are divided into millimeters.

County, Alabama (Goodrich, 1944d).

Elimia caelatura excellens (Goodrich, 1935) [Fig. 408]
Known from three streams in the Alabama River system of northwestern Georgia and northeastern Alabama (Goodrich, 1941b).

Elimia caelatura georgiana (Lea 1862) [Fig. 409]
Chattooga River, Georgia (Goodrich, 1941b).

Elimia caelatura infuscata (Lea 1862) [Fig. 415]
Small streams of the Alabama River system in Bartow, Floyd, Gordon and Murray counties, Georgia, and Cherokee, Etowah and St. Clair counties, Alabama (Goodrich, 1941b).

Elimia caelatura lecontiana (Lea 1841)
Creeks of the Alabama River system in northwestern Georgia to northeastern Alabama (Goodrich, 1941b).

Elimia caelatura luteocella (Lea 1868) [Fig. 410]
Small streams of the Alabama River system in northwestern Georgia, northeastern Alabama and Talladega County, Alabama (Goodrich, 1941b).

Elimia caelatura stearnsiana (Call 1886) [Figs. 411, 416]
Small streams of the Alabama River from north Georgia to Calhoun, Shelby and Talladega counties, Alabama (Goodrich, 1941b).

Elimia fascinans (Lea 1861) [Fig. 417]
Coosa River Basin, in creeks from Calhoun to Coosa County, and occasionally in the Coosa River (Goodrich, 1944d).

Elimia jonesi (Goodrich 1936) [Fig. 418]
Coosa River: Ten Island Shoals, St. Clair County, to the Bar, Chilton County, Alabama (Goodrich, 1944d).

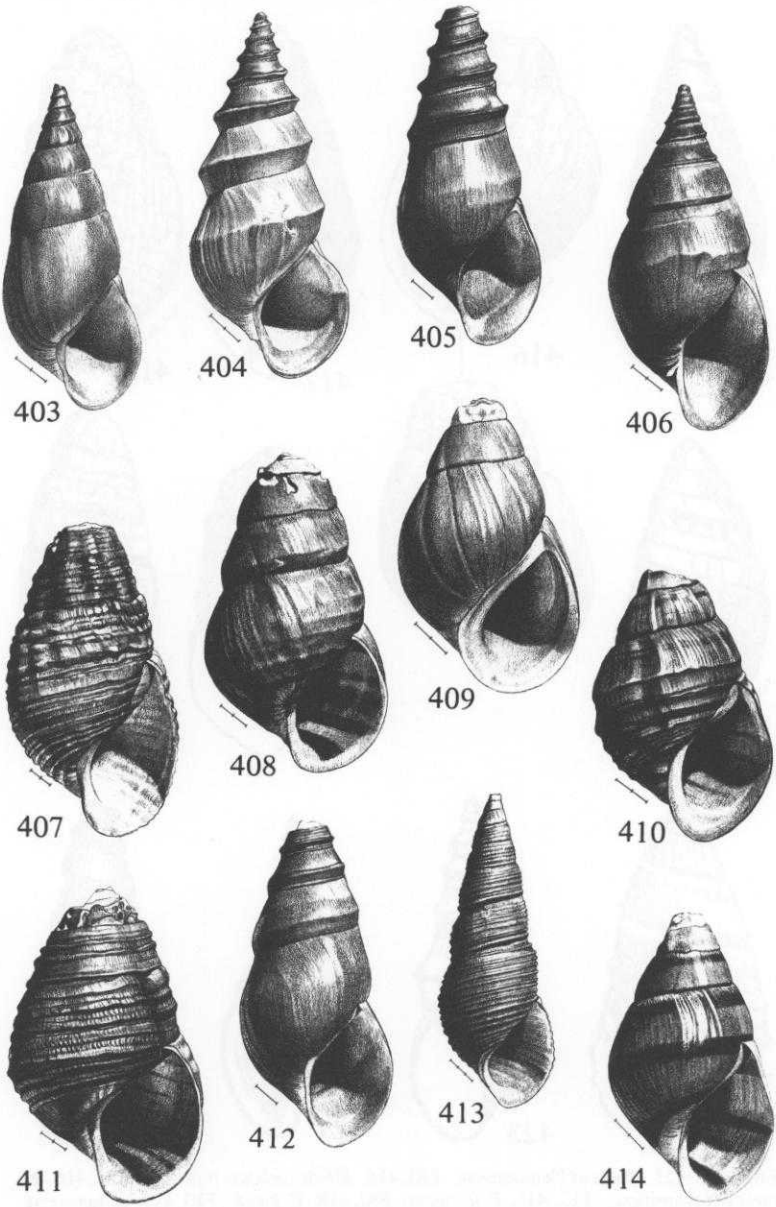
Elimia vanuxemiana (Lea 1843) [Figs. 419-422]
Coosa River Basin: in the Coosa River at Etowah County and downstream, and in the mouths of a few tributaries of the same range (Goodrich, 1944d).

Elimia virginica group

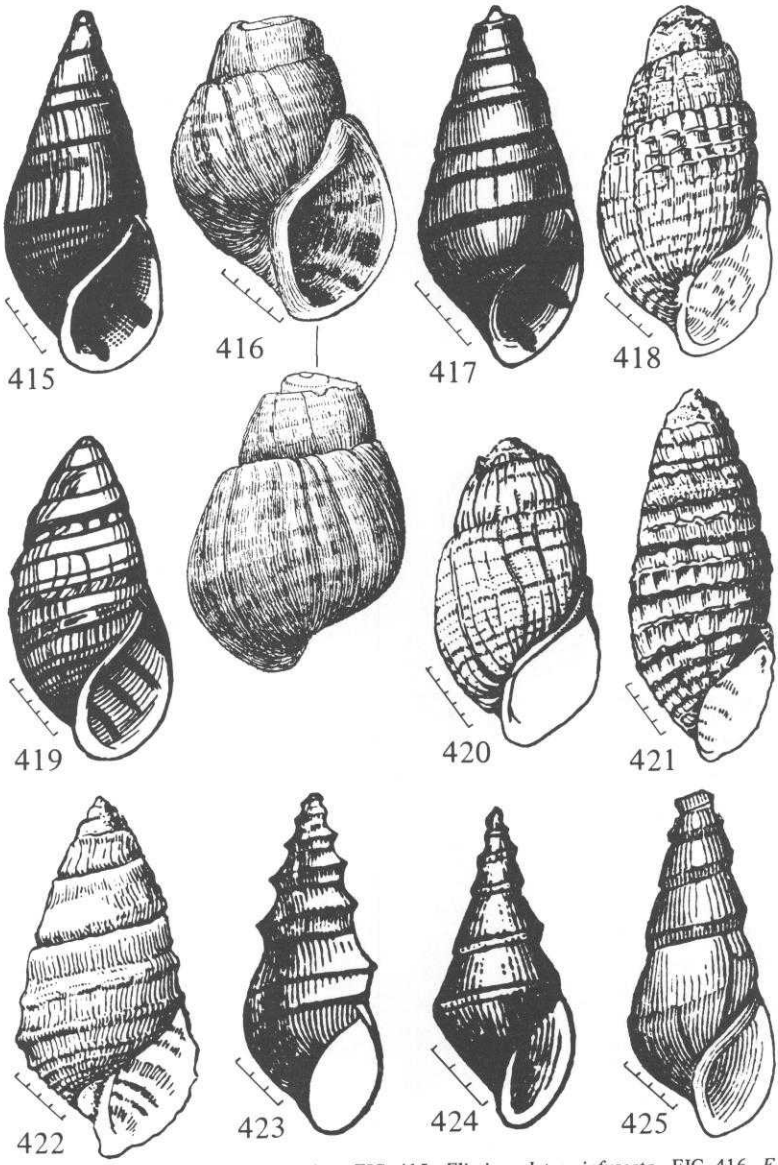
Elimia proxima (Say 1825) [Fig. 412]
Highlands of North and South Carolina. *Elimia proxima* may be a composite group, those in the Atlantic drainage having been derived from *E. symmetrica* and those in the Tennessee drainage from *E. simplex* (Goodrich, 1942b, 1950). Say (1825) originally described *E. proxima* from specimens from three localities: a small brook which discharges into the Catawba River near Landsford, South Carolina [Atlantic drainage], and in the warm springs and in the French Broad River, both in Buncombe County, North Carolina [Tennessee drainage].

Elimia symmetrica (Haldeman 1841) [Figs. 423-425]
Southern Virginia; North Carolina (Goodrich, 1942b).

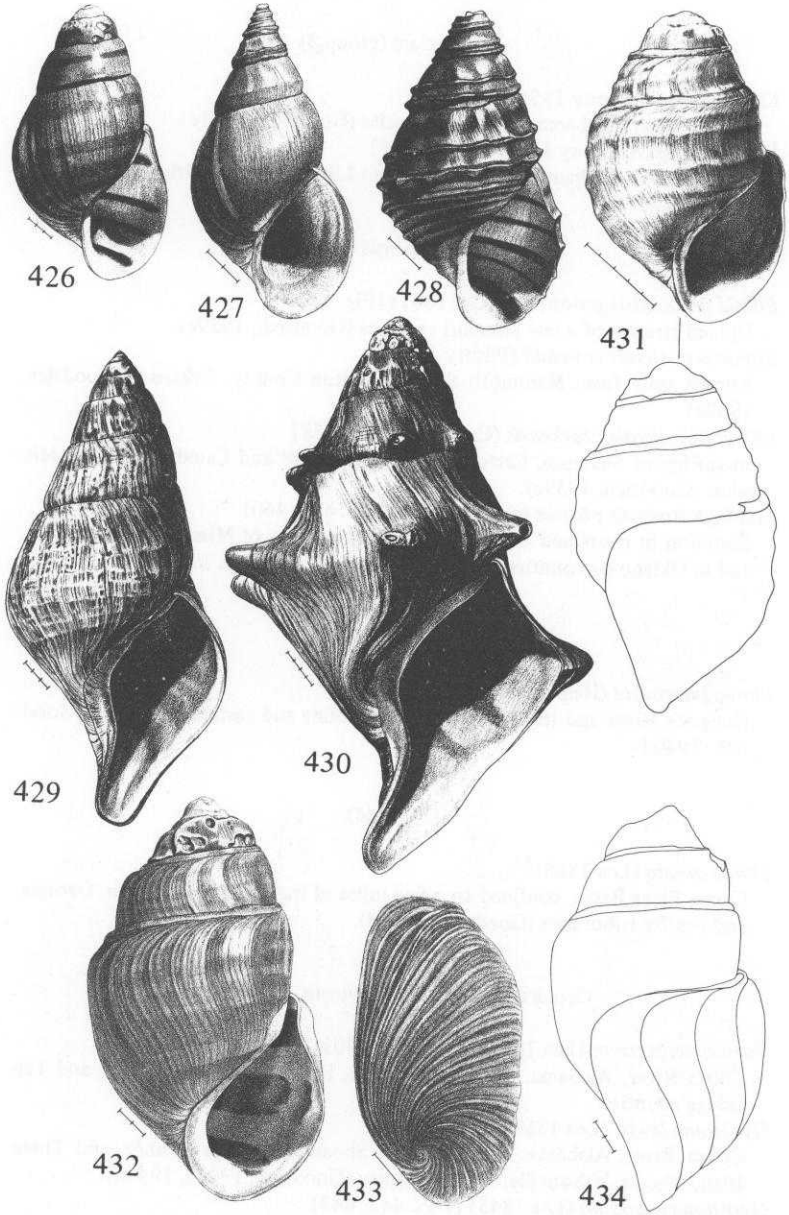
Elimia virginica (Say 1817) [Fig. 413]
Connecticut River, Massachusetts and Connecticut, to Virginia; ? also North Carolina; westward through the Erie Canal to Monroe County, New York, in the Great Lakes basin (Goodrich, 1942b).



FIGS. 403-414. Shells of Pleuroceridae. FIG. 403. *Elimia clavaeformis*. FIG. 404. *E. acutocarinata* = ?*E. clavaeformis*. FIG. 405. *E. acutocarinata* = ?*E. clavaeformis*. FIG. 406. *E. simplex*. FIG. 407. *E. caelatura caelatura*. FIG. 408. *E. caelatura excellens*. FIG. 409. *E. caelatura georgiana*. FIG. 410. *E. caelatura luteocella*. FIG. 411. *E. stearnsiana*. FIG. 412. *E. proxima*. FIG. 413. *E. virginica*. FIG. 414. *E. clara*. Measurement lines are divided into millimeters.



FIGS. 415-425. Shells of Pleuroceridae. FIG. 415. *Elimia caelatura infuscata*. FIG. 416. *E. caelatura stearnsiana*. FIG. 417. *E. fascinans*. FIG. 418. *E. jonesi*. FIG. 419. *E. vanuxemiana*. FIG. 420. *E. vanuxemiana*. FIG. 421. *E. vanuxemiana*. FIG. 422. *E. vanuxemiana*. FIG. 423. *E. symmetrica*. FIG. 424. *E. symmetrica*. FIG. 425. *E. symmetrica*. Measurement lines are divided into millimeters. Figs. 415, 417, 419, 423-425 are from Tryon (1865-66, 1873b); Fig. 416 is from Call (1886c); Figs. 418 and 420-422 are from Goodrich (1936).



FIGS. 426-434. Shells of Pleuroceridae. FIG. 426. *Elimia ampla*. FIG. 427. *E. potosiensis potosiensis*. FIG. 428. *E. interrupta*. FIG. 429. *Io fluvialis*. FIG. 430. *I. fluvialis* form *angitremoides*. FIG. 431. *Gyrotoma excisum*, apertural and right lateral views. FIG. 432. *G. excisum*. FIG. 433. *G. excisum*, operculum. FIG. 434. *G. excisum*, right lateral view of the shell in Fig. 432. Measurement lines = 1 mm or are divided into millimeters.

Elimia clara (group ?)

Elimia clara (Anthony 1854) [Fig. 414]
Cahaba River, Alabama, and its tributaries (Goodrich, 1941c).
Elimia ampla (Anthony 1854)[26] [Fig. 426]
Cahaba River, Alabama, at Centerville and Lily Shoals (Goodrich, 1941c).

Elimia potosiensis (group ?)

Elimia potosiensis potosiensis (Lea 1841) [Fig. 427]
Upland streams of a few Missouri counties (Goodrich, 1939e).
Elimia potosiensis crandalli (Pilsbry 1890)
Known only from Mammoth Springs, Fulton County, Arkansas (Goodrich, 1939e).
Elimia potosiensis ozarkensis (Call 1886) [Fig. 458]
In springs of Shannon, Carter, Washington; Dent and Camden counties, Missouri (Goodrich, 1939e).
Elimia potosiensis plebius (Gould 1850) [Figs. 459, 460]
Common in rivers and creeks of the Ozarkian area of Missouri and Arkansas, and in Oklahoma counties bordering Missouri (Goodrich, 1939e).

group ?

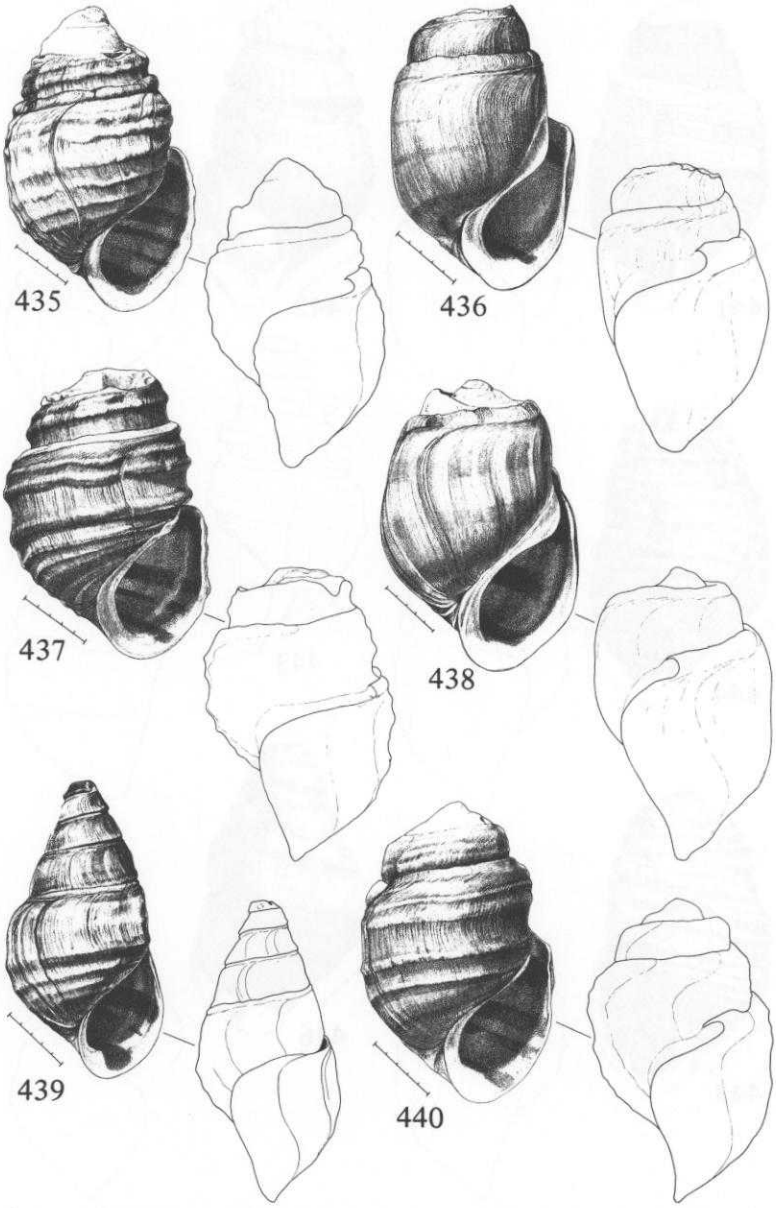
Elimia interrupta (Haldeman 1840) [Fig. 428]
Hiwassee River and its streams, North Carolina and eastern Tennessee (Goodrich, 1940d).

(? hybrid)

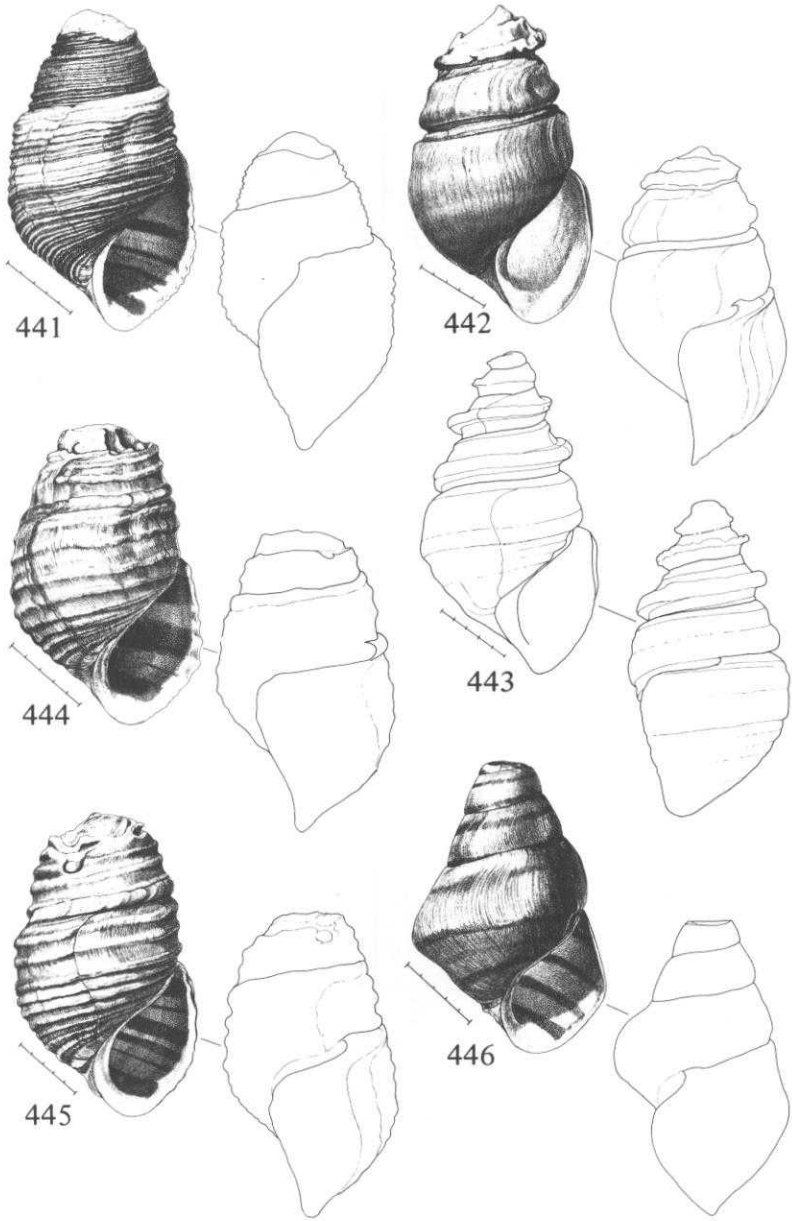
Elimia ornata (Lea 1868)[27]
Coosa River Basin, confined to a few miles of the Connesauga River, Georgia, and nearby tributaries (Goodrich, 1944d).

Genus *Gyrotoma* Shuttleworth 1845[28, 29]

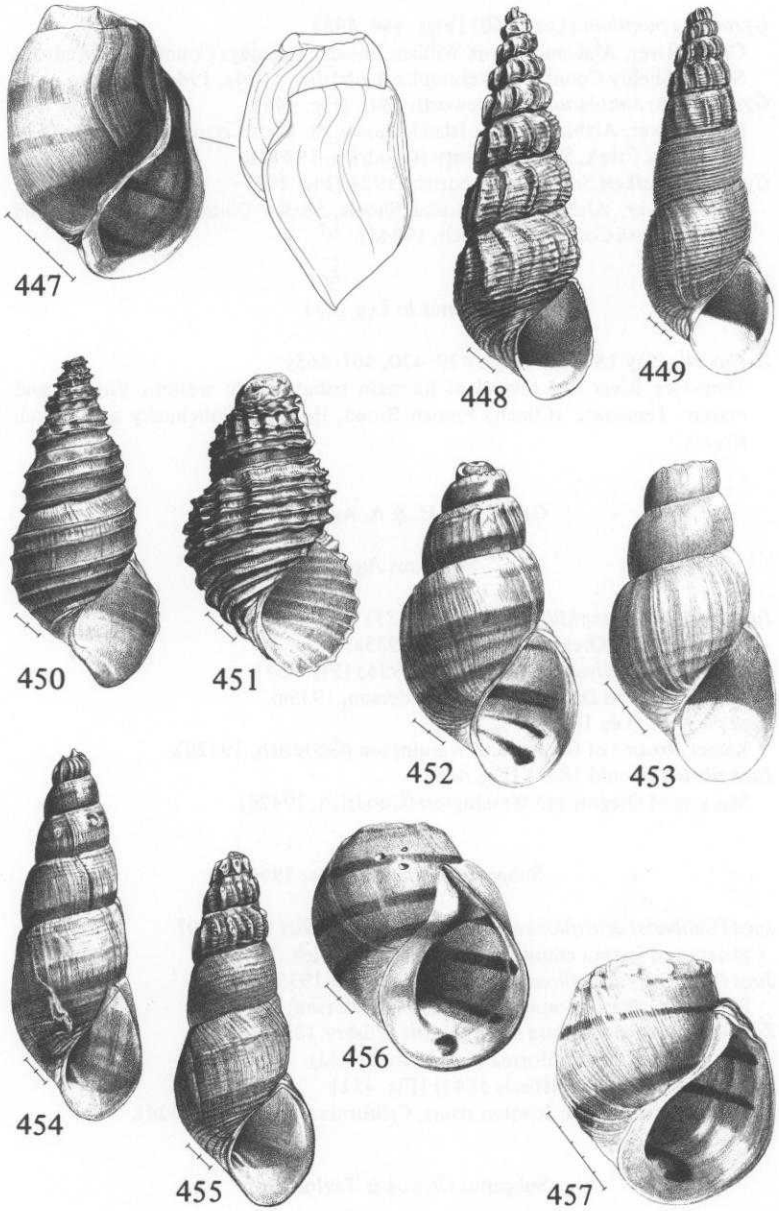
Gyrotoma excisum (Lea 1843) [Figs. 431-440]
Coosa River, Alabama, in Chilton, Coosa, Elmore, Shelby, St. Clair and Talladega counties.
Gyrotoma lewisi (Lea 1869) [Fig. 441]
Coosa River, Alabama: Fort William Shoals, Talladega County, and Three Island Shoals, Wilsonville, Shelby County (Goodrich, 1924a, 1944d).
Gyrotoma pagodum (Lea 1845) [Figs. 442, 443]
Coosa River, Alabama: The Bar, Chilton County, to Wetumpka, Elmore County (Goodrich, 1944d).



FIGS. 435-440. Shells of Pleuroceridae, apertural and right lateral views. FIG. 435. *Gyrotoma alabamensis* = ? *G. excisum*. FIG. 436. *G. ampla* = ? *G. excisum*. FIG. 437. *G. carinifera* = ? *G. excisum*. FIG. 438. *G. incisa* = ? *G. excisum*. FIG. 439. *G. laciniatum* = ? *G. excisum*. FIG. 440. *G. spillmani* = ? *G. excisum*. Measurement lines are divided into millimeters.



FIGS. 441-446. Shells of Pleuroceridae, apertural and right lateral views. FIG. 441. *Gyrotoma lewisi*. FIG. 442. *G. pagodum*. FIG. 443. *G. pagodum*. FIG. 444. *G. pumilum*. FIG. 445. *G. hendersoni* = ?*G. pumilum*. FIG. 446. *G. pyramidatum*. Measurement lines are divided into millimeters.



FIGS. 447-457. Shells of Pleuroceridae. FIG. 447. *Gyrotoma walkeri*, apertural and right lateral views. FIG. 448. *Juga plicifera*. FIG. 449. *J. silicula*. FIG. 450. *J. (Calibasis) acutifilosa*. FIG. 451. *J. (C.) occata*. FIG. 452. *J. (Oreobasis) bulbosa*. FIG. 453. *J. (O.) nigrina*. FIG. 454. *J. hemphilli hemphilli*. FIG. 455. *J. hemphilli dallesensis*. FIG. 456. *Leptoxis ampla*. FIG. 457. *L. ampla*. Measurement lines are divided into millimeters.

Gyrotoma pumilum (Lea 1860) [Figs. 444, 445]
Coosa River, Alabama: Fort William Shoals, Talladega County, and Weduska Shoals, Shelby County, to Wetumpka (Goodrich, 1924a, 1944d).
Gyrotoma pyramidatum Shuttleworth 1845 [Fig. 446]
Coosa River, Alabama: Ten Island Shoals, St. Clair County, to the mouth of Yellowleaf Creek, Shelby County (Goodrich, 1944d).
Gyrotoma walkeri Smith (in Goodrich) 1924 [Fig. 447]
Coosa River, Alabama: Weduska Shoals, Shelby County, to Butting Ram Shoals, Coosa County (Goodrich, 1944d).

Genus *Io* Lea 1831

Io fluvialis (Say 1825)[30] [Figs. 429, 430, 461-465]
Tennessee River and several of its main tributaries in western Virginia and eastern Tennessee (Clinch, French Broad, Holston, Nolichucky and Powell rivers).

Genus *Juga* H. & A. Adams 1854

Subgenus *Juga* s.s.

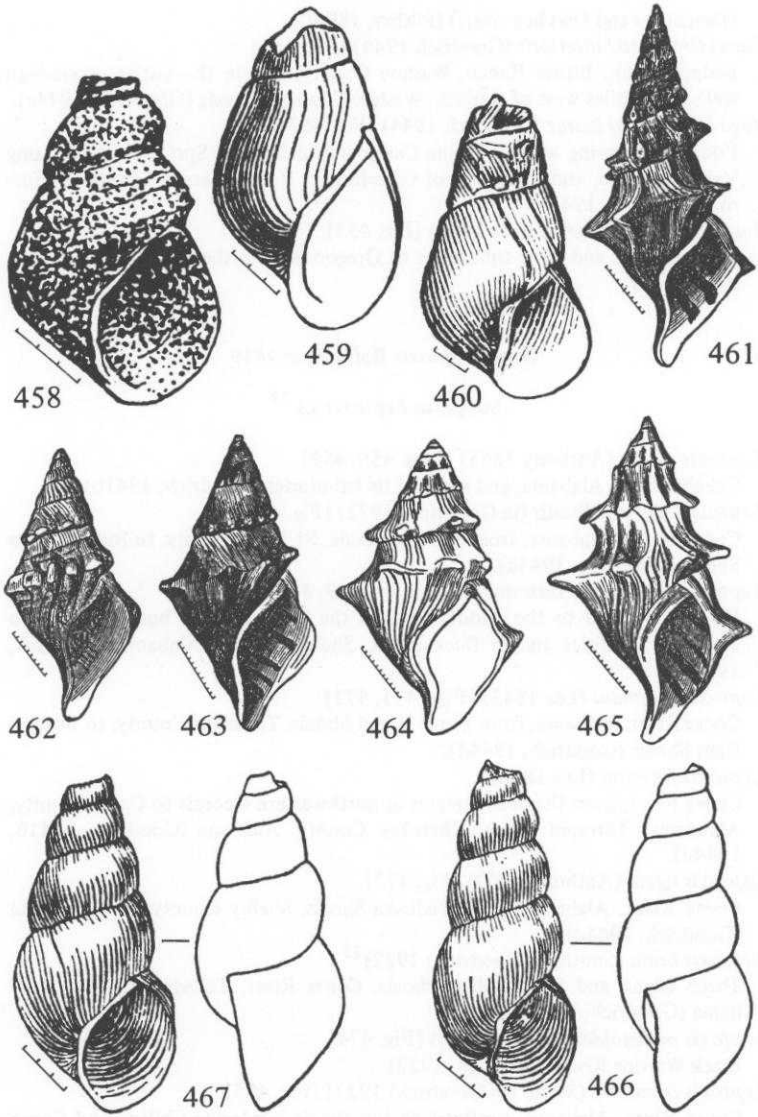
Juga hemphilli hemphilli (Henderson 1935) [Fig. 454]
Near Portland, Oregon (Henderson, 1935a).
Juga hemphilli dallesensis (Henderson 1935) [Fig. 455]
Mill Creek, The Dalles, Oregon (Henderson, 1935a).
Juga plicifera (Lea 1838) [Fig. 448]
Larger streams of Oregon and Washington (Goodrich, 1942d).
Juga silicula (Gould 1847) [Fig. 449]
Streams of Oregon and Washington (Goodrich, 1942d).

Subgenus *Calibasis* Taylor 1966

Juga (Calibasis) acutifilosa acutifilosa (Stearns 1890) [Fig. 450]
Shasta and Lassen counties, California (Goodrich, 1942d).
Juga (Calibasis) acutifilosa pittensis (Henderson 1935)
Fall River, Shasta County, California (Henderson, 1935a).
Juga (Calibasis) acutifilosa siskiyouensis (Pilsbry 1899)
Siskiyou County, California (Goodrich, 1942d).
Juga (Calibasis) occata (Hinds 1844) [Fig. 451]
Sacramento and San Joaquin rivers, California (Goodrich, 1942d).

Subgenus *Oreobasis* Taylor 1966

Juga (Oreobasis) bulbosa (Gould 1847) [Fig. 452]
Lower Columbia River in Oregon and Washington and several of its tributaries



FIGS. 458-467. Shells of Pleuroceridae. FIG. 458. *Elimia potosiensis ozarkensis*. FIG. 459. *E. potosiensis plebius*. FIG. 460. *E. potosiensis plebius*. FIG. 461. *Io fluvialis* form *turrita*. FIG. 462. *I. fluvialis* form *verrucosa*. FIG. 463. *I. fluvialis* form *recta*. FIG. 464. *I. fluvialis* form *brevis*. FIG. 465. *I. fluvialis* form *spinosa*. FIG. 466. *Juga (Oreobasis) interioris*. FIG. 467. *J. (O.) laurae*. Measurement lines are divided into millimeters. Fig. 458 is from Call (1886b); Figs. 459-465 are from Tryon (1873b); Figs. 466 and 467 are from Goodrich (1944a).

(Deschutes and Owyhee rivers) (Pilsbry, 1899f).

Juga (Oreobasis) interioris (Goodrich 1944) [Fig. 466]
Badger Creek, Bitner Ranch, Washoe County, and in the outlet of artesian wells, nine miles west of Gerlach, Washoe County, Nevada (Goodrich, 1944a).

Juga (Oreobasis) laurae (Goodrich 1944) [Fig. 467]
Found in a spring west of Home Camp and in Boulder Springs, both in Long Valley, Nevada, and in springs of Grasshopper Valley, Lassen County, California (Goodrich, 1944a).

Juga (Oreobasis) nigrina (Lea 1856) [Fig. 453]
Head streams and river tributaries of Oregon and northern California (Goodrich, 1942d).

Genus *Leptoxis* Rafinesque 1819

Subgenus *Leptoxis* s.s.[32]

Leptoxis ampla (Anthony 1855) [Figs. 456, 457]
Cahaba River, Alabama, and some of its tributaries (Goodrich, 1941b).

Leptoxis clipeata (Smith (in Goodrich) 1922) [Fig. 468]
Coosa River, Alabama, from near Riverside, St. Clair County, to Butting Ram Shoals (Goodrich, 1944d).

Leptoxis compacta (Anthony 1854) [Figs. 469, 470]
Mostly confined to the middle parts of the Cahaba River, but taken at two upstream localities and in Buck Creek, Shelby County, Alabama (Goodrich, 1941b).

Leptoxis foremani (Lea 1843) [Figs. 471, 472]
Coosa River, Alabama, from Three Island Shoals, Talladega County, to Butting Ram Shoals (Goodrich, 1944d).

Leptoxis formosa (Lea 1860)
Coosa River, from the head streams in northwestern Georgia to Coosa County, Alabama; Terrapin Creek, Cherokee County, Alabama (Goodrich, 1941b, 1944d).

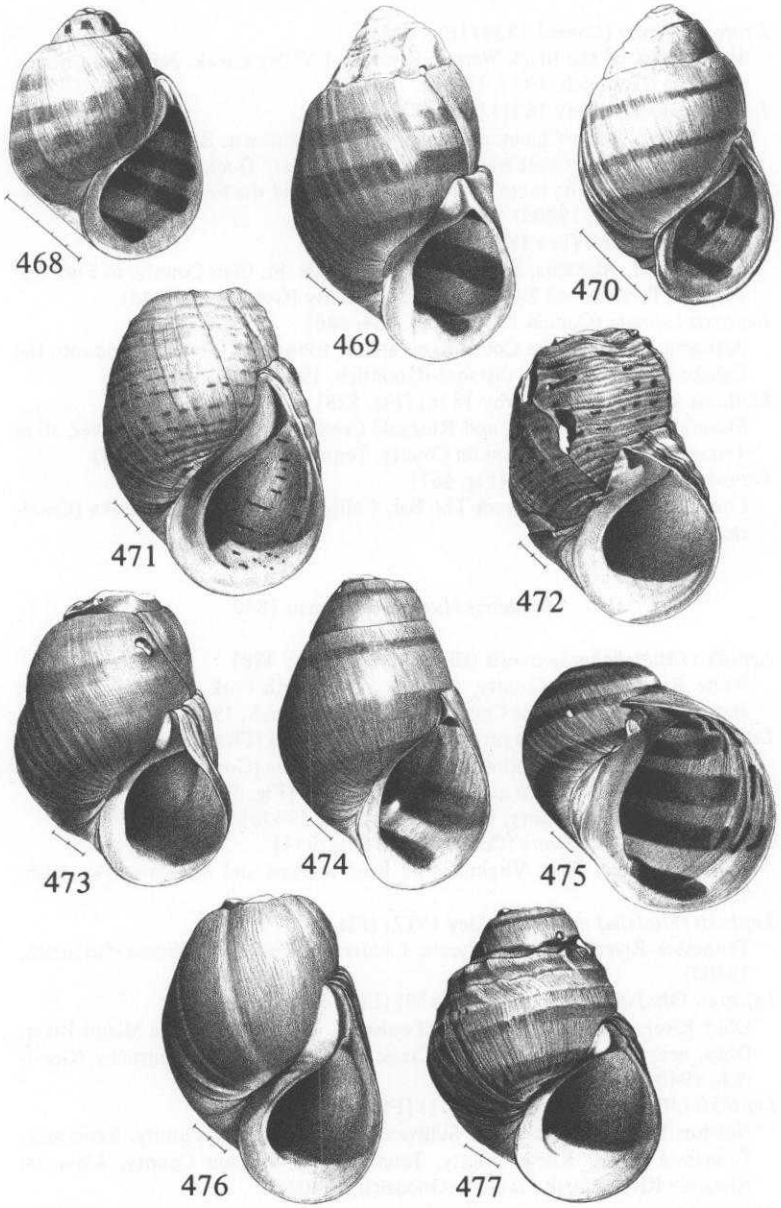
Leptoxis ligata (Anthony 1860) [Fig. 473]
Coosa River, Alabama, from Weduska Shoals, Shelby County, to Wetumpka (Goodrich, 1944d).

Leptoxis lirata (Smith (in Goodrich) 1922)[33]
Three Island and Fort William shoals, Coosa River, Talladega County, Alabama (Goodrich, 1922).

Leptoxis melanoides (Conrad 1834) [Fig. 474]
Black Warrior River (Goodrich, 1922).

Leptoxis occultata (Smith (in Goodrich) 1922) [Fig. 475]
Coosa River, Alabama, confined to the shoals bordering Chilton and Coosa counties (Goodrich, 1944d).

Leptoxis picta (Conrad 1834) [Fig. 476]
Alabama River from the Coosa River to Clairborne, Monroe County, Alabama; in the Coosa River only as far up as the gravel bars below the last series of rapids below Wetumpka (Goodrich, 1922, 1944d).



FIGS. 468-477. Shells of Pleuroceridae. FIG. 468. *Leptoxis clipeata*. FIG. 469. *L. compacta*. FIG. 470. *L. compacta*. FIG. 471. *L. foremani*. FIG. 472. *L. downiei* = *L. foremani*. FIG. 473. *L. ligata*. FIG. 474. *L. melanoides*. FIG. 475. *L. occultata*. FIG. 476. *L. picta*. FIG. 477. *L. plicata*. Measurement lines = 1 mm or are divided into millimeters.

Leptoxis plicata (Conrad 1834) [Fig. 477]
Headwaters of the Black Warrior River, and Valley Creek, Jefferson County, Alabama (Goodrich, 1922, 1941b).

Leptoxis praerosa (Say 1821) [Figs. 478-482]
Ohio River, below Cincinnati, Ohio, to Elizabethtown, Illinois, together with a few tributaries; Cumberland River and branches; Duck River, Coffee County, Tennessee, to its mouth; Tennessee River and the lower parts of its tributaries (Goodrich, 1940d).

Leptoxis showalteri (Lea 1860) [Fig. 483]
Coosa River, Alabama, from Ten Island Shoals, St. Clair County, to Fort William and Peckerwood Shoals, Talladega County (Goodrich, 1944d).

Leptoxis taeniata (Conrad 1834) [Figs. 484-486]
Alabama River and the Coosa River and its tributaries, Alabama, and into the Cahaba River for a short distance (Goodrich, 1922, 1944d).

Leptoxis umbilicata (Wetherby 1876) [Fig. 528]
Stone's River, Red River, and Ringgold Creek of the Cumberland River, all in Tennessee; Elk River, Franklin County, Tennessee (Goodrich, 1940d).

Leptoxis vittata (Lea 1860) [Fig. 487]
Coosa River, Alabama, from The Bar, Chilton County, to Wetumpka (Goodrich, 1922).

Subgenus *Mudalia* Haldeman 1840

Leptoxis (Mudalia) arkansensis (Hinkley 1915) [Fig. 488]
White River, Baxter County, Arkansas, and North Fork of the White River, east of Richville, Douglas County, Missouri (Goodrich, 1939e).

Leptoxis (Mudalia) carinata carinata (Bruguière 1792) [Figs. 489-492]
New York to North Carolina; ? also South Carolina (Goodrich, 1942b).

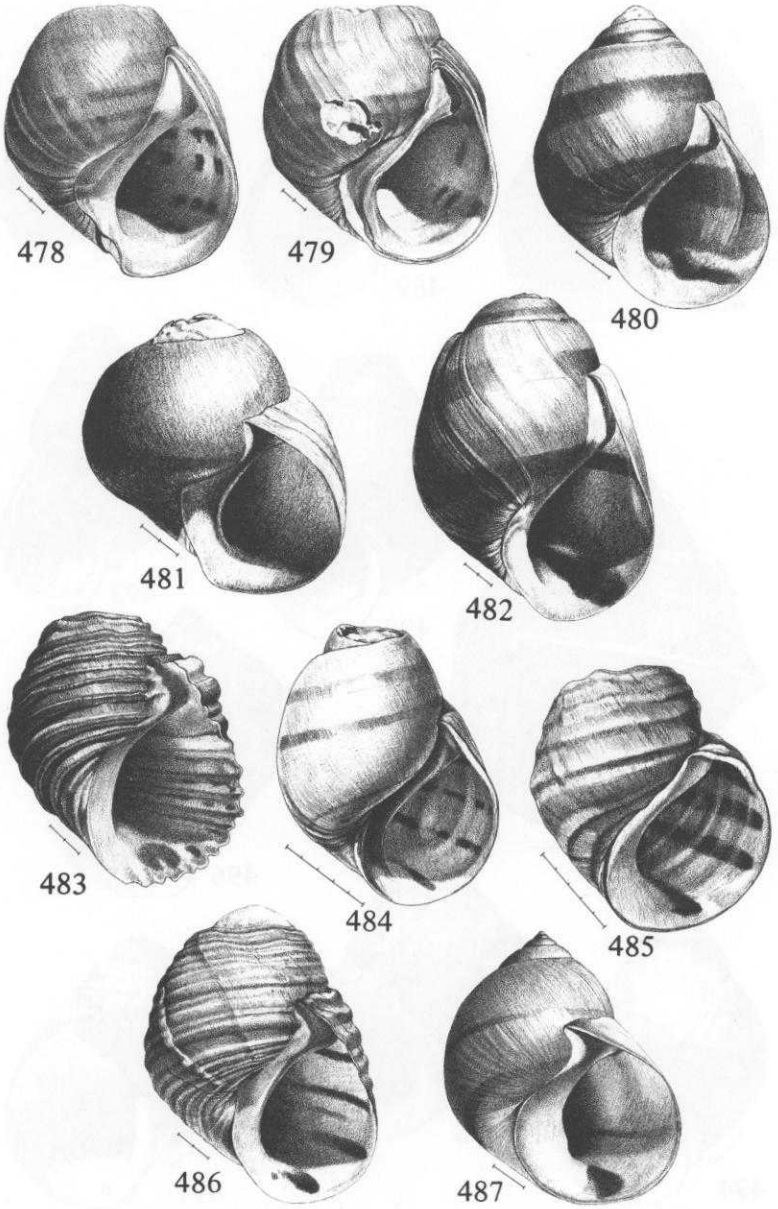
Leptoxis (Mudalia) carinata nickliniata (Lea 1841) [Fig. 493]
Hot Springs, Bath County, Virginia (Goodrich, 1942b).

Leptoxis (Mudalia) dilatata (Conrad 1835) [Fig. 494]
Kanawha River, West Virginia; its head streams and branches (Goodrich, 1940d).

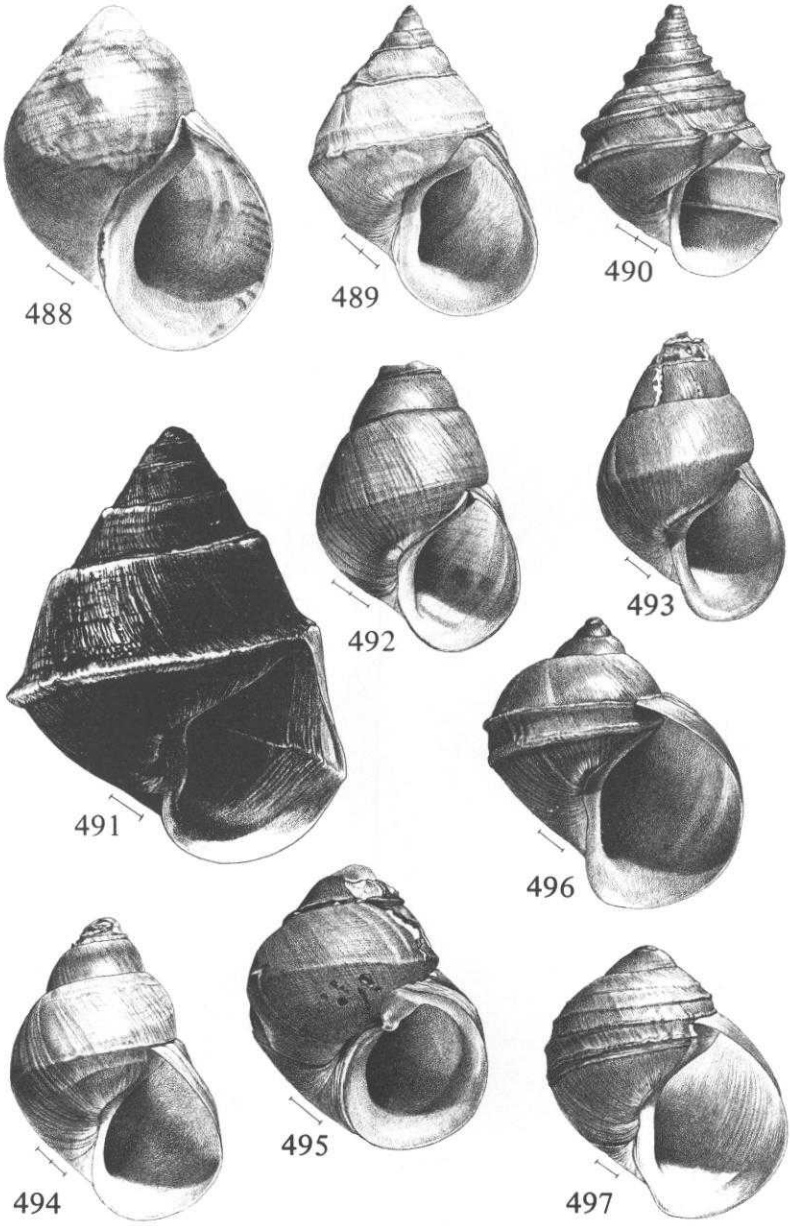
Leptoxis (Mudalia) minor (Hinkley 1912) [Fig. 495]
Tennessee River at Muscle Shoals, Lauderdale County, Alabama (Goodrich, 1940d).

Leptoxis (Mudalia) trilineata (Say 1829) [Figs. 496, 497]
Ohio River, Cincinnati, Ohio, to Louisville, Kentucky; Little Miami River, Ohio, near its mouth; Five-mile Creek, Campbell County, Kentucky (Goodrich, 1940d).

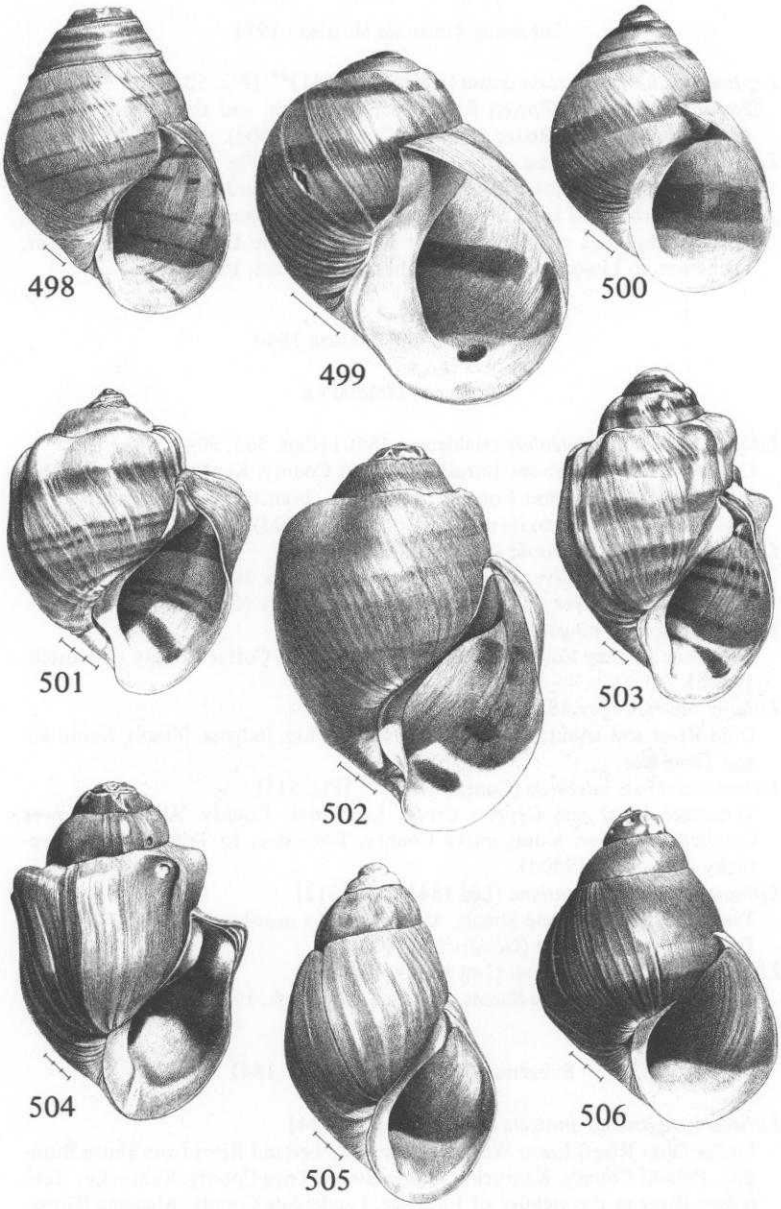
Leptoxis (Mudalia) virgata (Lea 1841) [Figs. 498-500]
Holston River and its forks, Sullivan County to Knox County, Tennessee; Tennessee River, Knox County, Tennessee, to Jackson County, Alabama; Hiwassee River, North Carolina (Goodrich, 1940d).



FIGS. 478-487. Shells of Pleuroceridae. FIG. 478. *Leptoxis praerosa*. FIG. 479. *L. praerosa*. FIG. 480. *L. subglobosa* = *L. praerosa*. FIG. 481. *L. gibbosa* = *L. praerosa*. FIG. 482. *L. tintinabulum* = *L. praerosa*. FIG. 483. *L. showalteri*. FIG. 484. *L. coosaensis* = *L. taeniata*. FIG. 485. *L. brevispira* = *L. taeniata*. FIG. 486. *L. taeniata*. FIG. 487. *L. vittata*. Measurement lines = 1 mm or are divided into millimeters.



FIGS. 488-497. Shells of Pleuroceridae. FIG. 488. *Leptoxis (Mudalia) arkansensis*. FIG. 489. *L. (M.) carinata carinata*. FIG. 490. *L. (M.) carinata carinata*. FIG. 491. *L. (M.) carinata carinata*. FIG. 492. *L. (M.) corpulenta* = *L. (M.) carinata*. FIG. 493. *L. (M.) carinata nickliniata*. FIG. 494. *L. (M.) dilatata*. FIG. 495. *L. (M.) minor*. FIG. 496. *L. (M.) trilineata*. FIG. 497. *L. (M.) trilineata*. Measurement lines = 1 mm or are divided into millimeters.



FIGS. 498-506. Shells of Pleuroceridae. FIG. 498. *Leptoxis (Mudalia) virgata*. FIG. 499. *Le. (M.) virgata*. FIG. 500. *Le. (M.) virgata*. FIG. 501. *Le. (Athearnia) crassa crassa*. FIG. 502. *Le. (A.) crassa anthonyi*. FIG. 503. *Lithasia geniculata geniculata*. FIG. 504. *Li. geniculata geniculata*. FIG. 505. *Li. geniculata fuliginosa*. FIG. 506. *Li. geniculata pinguis*. Measurement lines = 1 mm or are divided into millimeters.

Subgenus *Athearnia* Morrison 1971

Leptoxis (Athearnia) crassa crassa (Haldeman 1841)[34] [Fig. 501]
Eastern Tennessee: Powell River, near its mouth, and the Clinch River in Anderson, Knox and Roane counties (Goodrich, 1940d).
Leptoxis (Athearnia) crassa anthonyi (Redfield 1854) [Fig. 502]
Tennessee River, Knox County, Tennessee, to Lauderdale County, Alabama; lower French Broad and Clinch rivers, eastern Tennessee; Elk River, Alabama; smaller tributaries of the Tennessee River from the Little Tennessee River, Tennessee, to Limestone County, Alabama (Goodrich, 1940d).

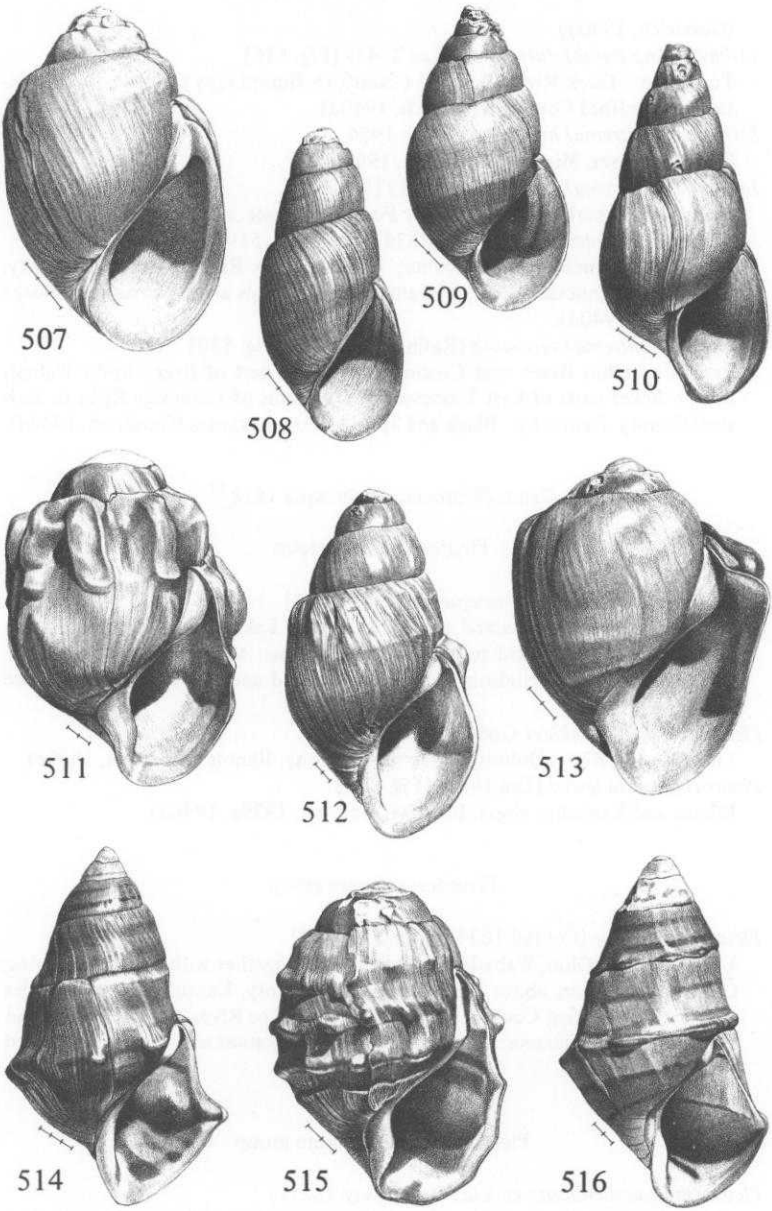
Genus *Lithasia* Haldeman 1840

Subgenus *Lithasia* s.s.

Lithasia geniculata geniculata (Haldeman 1840) [Figs. 503, 504]
Cumberland River, above Burnside, Pulaski County, Kentucky, to points below Nashville, Davidson County, Tennessee; branches in Tennessee; Duck River, Maury County to its mouth (Goodrich, 1940d).
Lithasia geniculata fuliginosa (Lea 1841) [Fig. 505]
Tennessee: Duck River, Bedford County, to below Maury County; Buffalo River; Harpeth River; Red River, Robertson County (Goodrich, 1940d).
Lithasia geniculata pinguis (Lea 1852) [Fig. 506]
Tennessee: Caney Fork and branches; Duck River, Coffee County (Goodrich, 1940d).
Lithasia obovata (Say 1829)[35] [Figs. 507-510)
Ohio River and tributaries, in Pennsylvania, Ohio, Indiana, Illinois, Kentucky and Tennessee.
Lithasia salebrosa salebrosa (Conrad 1834)[36] [Fig. 511]
Tennessee River and Cypress Creek, Lauderdale County, Alabama; lower Cumberland River, Montgomery County, Tennessee, to Trigg County, Kentucky (Goodrich, 1940d).
Lithasia salebrosa florentiana (Lea 1841) [Fig. 512]
Tennessee River, Muscle Shoals, Alabama, and a near-by tributary; Elk River, Tennessee and Alabama (Goodrich, 1940d).
Lithasia salebrosa subglobosa (Lea 1861) [Fig. 513]
Tennessee River, Muscle Shoals, Alabama (Goodrich, 1940d).

Subgenus *Angitrema* Haldeman 1841

Lithasia (Angitrema) armigera (Say 1821) [Fig. 514]
Lower Ohio River, lower Wabash River; Cumberland River from above Burnside, Pulaski County, Kentucky, to branches in Trigg County, Kentucky; Tennessee River in the vicinity of Florence, Lauderdale County, Alabama (Goodrich, 1940d).
Lithasia (Angitrema) curta Lea 1868 [Fig. 515]
Tennessee River, Muscle Shoals; Shoals Creek, Lauderdale County, Alabama



FIGS. 507-516. Shells of Pleuroceridae. FIG. 507. *Lithasia obovata*. FIG. 508. *L. obovata* form *depygis*. FIG. 509. *L. obovata* form *pennsylvanica*. FIG. 510. *L. obovata* form *sordida*. FIG. 511. *L. salebrosa salebrosa*. FIG. 512. *L. salebrosa florentiana*. FIG. 513. *L. salebrosa subglobosa*. FIG. 514. *L. (Angitrema) armigera*. FIG. 515. *L. (A.) curta*. FIG. 516. *L. (A.) duttoniana*. Measurement lines are divided into millimeters.

(Goodrich, 1940d).

Lithasia (Angitrema) duttoniana (Lea 1841) [Fig. 516]
Tennessee: Duck River, Bedford County to Humphreys County; two tributaries in Bedford County (Goodrich, 1940d).

Lithasia (Angitrema) hubrichti Clench 1956
Big Black River, Mississippi (Clench, 1965a).

Lithasia (Angitrema) jayana (Lea 1841) [Fig. 517]
Forks of Cumberland River; Caney Fork, Tennessee, near mouth.

Lithasia (Angitrema) lima (Conrad 1834) [Figs. 518, 519]
Elk River, Tennessee and Alabama; branch of Elk River in Franklin County, Tennessee; Tennessee River, Alabama, Muscle Shoals and three near-by creeks (Goodrich, 1940d).

Lithasia (Angitrema) verrucosa (Rafinesque 1820) [Fig. 520]
Branch of Ohio River near Cincinnati to lower part of river; lower Wabash River; lower parts of East Tennessee head streams of Tennessee River to Marshall County, Kentucky; Black and Spring rivers, Arkansas (Goodrich, 1940d).

Genus *Pleurocera* Rafinesque 1818[37]

Pleurocera acuta group

Pleurocera acuta acuta Rafinesque 1831 [Fig. 521]
Ohio River head streams and tributaries; Great Lakes and tributaries; Mississippi River and westward to Nebraska and Kansas; through the Erie Canal into the basin of the Hudson River; Cumberland and Duck rivers, Tennessee (Goodrich, 1940d).

Pleurocera acuta hinkleyi Goodrich 1921
Little Muddy River, Dubois, Washington County, Illinois (Goodrich, 1939e).

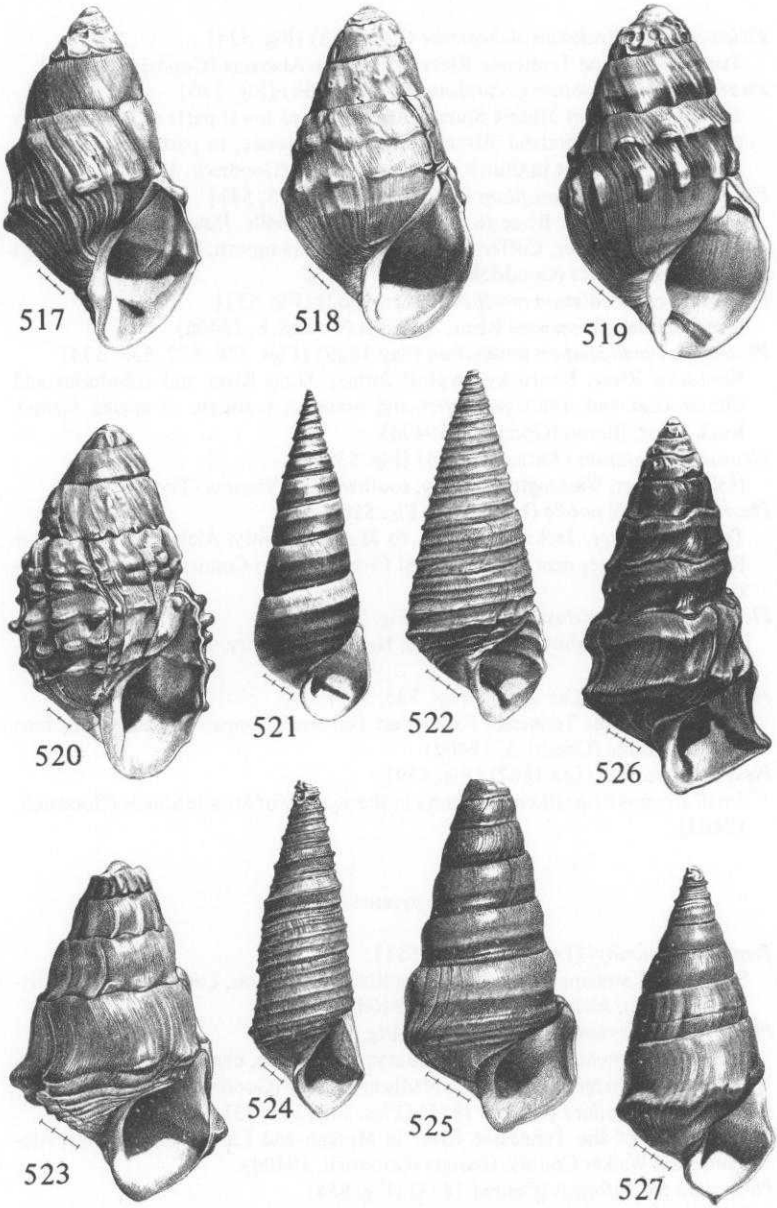
Pleurocera acuta lewisi (Lea 1862) [Fig. 522]
Illinois and Kankakee rivers, Illinois (Goodrich, 1939e, 1940d).

Pleurocera alveare group

Pleurocera alveare (Conrad 1834) [Figs. 523, 529]
Lower parts of Ohio, Wabash and Green rivers, together with a few tributaries; Cumberland River, above Burnside, Pulaski County, Kentucky, to tributaries of the river in Trigg County, Kentucky; Tennessee River, Muscle Shoals, and near-by creeks, Alabama; streams of northern Arkansas and southern Missouri (Goodrich, 1940d).

Pleurocera canaliculatum group

Pleurocera canaliculatum canaliculatum (Say 1821)
Ohio River from vicinity of Pittsburgh, Pennsylvania, to Illinois; Wabash River and its tributaries; aberrantly in the Tennessee River system; Omaha, Nebraska (Goodrich, 1940d).

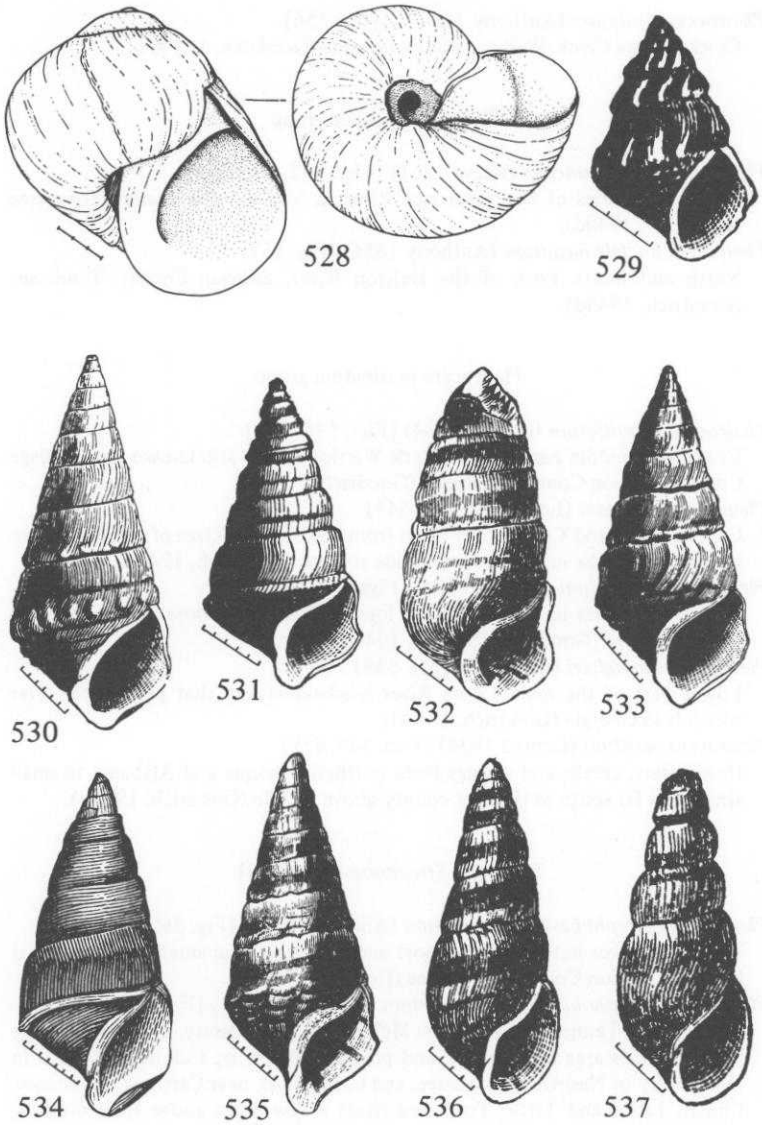


FIGS. 517-527. Shells of Pleuroceridae. FIG. 517. *Lithasia (Angitrema) jayana*. FIG. 518. *L. (A.) lima*. FIG. 519. *L. (A.) lima* form. FIG. 520. *L. (A.) verrucosa*. FIG. 521. *Pleurocera acuta acuta*. FIG. 522. *P. acuta lewisi*. FIG. 523. *P. alveare*. FIG. 524. *P. striatum* = *P. canaliculatum alabamense*. FIG. 525. *P. canaliculatum filum*. FIG. 526. *P. canaliculatum undulatum*. FIG. 527. *P. canaliculatum undulatum*. Measurement lines are divided into millimeters.

Pleurocera canaliculatum alabamense (Lea 1862) [Fig. 524]
Tributaries of the Tennessee River in northern Alabama (Goodrich, 1940d).
Pleurocera canaliculatum excuratum (Conrad 1834) [Fig. 530]
Tennessee River at Muscle Shoals, Alabama, and lower parts of a few near-by tributaries; Cumberland River, Nashville, Tennessee, to parts of the river in Kentucky; aberrant in Clinch and Wabash rivers (Goodrich, 1940d).
Pleurocera canaliculatum filum (Lea 1845) [Figs. 525, 531]
Upper Cumberland River to a point above Nashville, Davidson County, Tennessee; Duck River, Coffee County, to near the mouth, Tennessee; aberrant in Tennessee River (Goodrich, 1940d).
Pleurocera canaliculatum moriforme (Lea 1862) [Fig. 532]
Muscle Shoals, Tennessee River, Alabama (Goodrich, 1940d).
Pleurocera canaliculatum undulatum (Say 1829) [Figs. 526, 527, 533, 534]
Kentucky River, Kentucky (typical form); Ohio River and tributaries and Cumberland and Tennessee rivers and branches (carinate or angled forms); Rock River, Illinois (Goodrich, 1940d).
Pleurocera gradatum (Anthony 1854) [Fig. 538]
Holston River, Washington County, southwestern Virginia (Tryon, 1873b).
Pleurocera nobile nobile (Lea 1845) [Fig. 550]
Tennessee River, Jackson County, to Marion County, Alabama; Sequatchie River, Tennessee, near mouth; Flint Creek, Morgan County, Alabama (Goodrich, 1940d).
Pleurocera nobile nodosa (Lea 1861) [Fig. 535]
Tennessee River above Chattanooga, Hamilton County, Tennessee (Goodrich, 1940d).
Pleurocera parvum (Lea 1862) [Figs. 536, 537]
Tributaries of the Tennessee River, East Tennessee; apparently extending into South Carolina (Goodrich, 1940d).
Pleurocera postelli (Lea 1862) [Fig. 539]
Small streams of northern Alabama in the vicinity of Muscle Shoals (Goodrich, 1940d).

Pleurocera pyrenellum group

Pleurocera brumbyi (Lea 1852) [Fig. 551]
Springs and streams of the Tennessee River in Madison, Limestone and Courtland counties, Alabama (Goodrich, 1940d).
Pleurocera currierianum (Lea 1863)[38] [Fig. 552]
Alabama: Florence, Lauderdale County; Swan Lake, near Decatur, Limestone County; discharge of a spring in Madison County (Goodrich, 1940d).
Pleurocera pyrenellum (Conrad 1834) [Figs. 540, 541, 553]
Tributaries of the Tennessee River in Morgan and Limestone counties, Alabama, and Walker County, Georgia (Goodrich, 1940d).
Pleurocera trochiformis (Conrad 1834) [Fig. 554]
Tennessee River, Bridgeport, Jackson County, to Florence, Lauderdale County, Alabama; tributaries in Walker County, Georgia, to those near Muscle Shoals, Alabama (Goodrich, 1940d).



FIGS. 528-537. Shells of Pleuroceridae. FIG. 528. *Leptoxis umbilicata*. FIG. 529. *Pleurocera alveare*. FIG. 530. *P. canaliculatum excuratum*. FIG. 531. *P. canaliculatum filum*. FIG. 532. *P. canaliculatum moriforme*. FIG. 533. *P. canaliculatum undulatum*. FIG. 534. *P. ponderosum* = *P. canaliculatum undulatum*. FIG. 535. *P. moniliferum* = *P. nobile nodosa*. FIG. 536. *P. parvum*. FIG. 537. *P. modestum* = *P. parvum*. Measurement lines are divided into millimeters. Figs. 529-537 are from Tryon (1865-66).

Pleurocera viridulum (Anthony 1854)[39] [Fig. 556]
Chickamauga Creek, Walker County, Georgia (Goodrich, 1940d).

Pleurocera unciale group

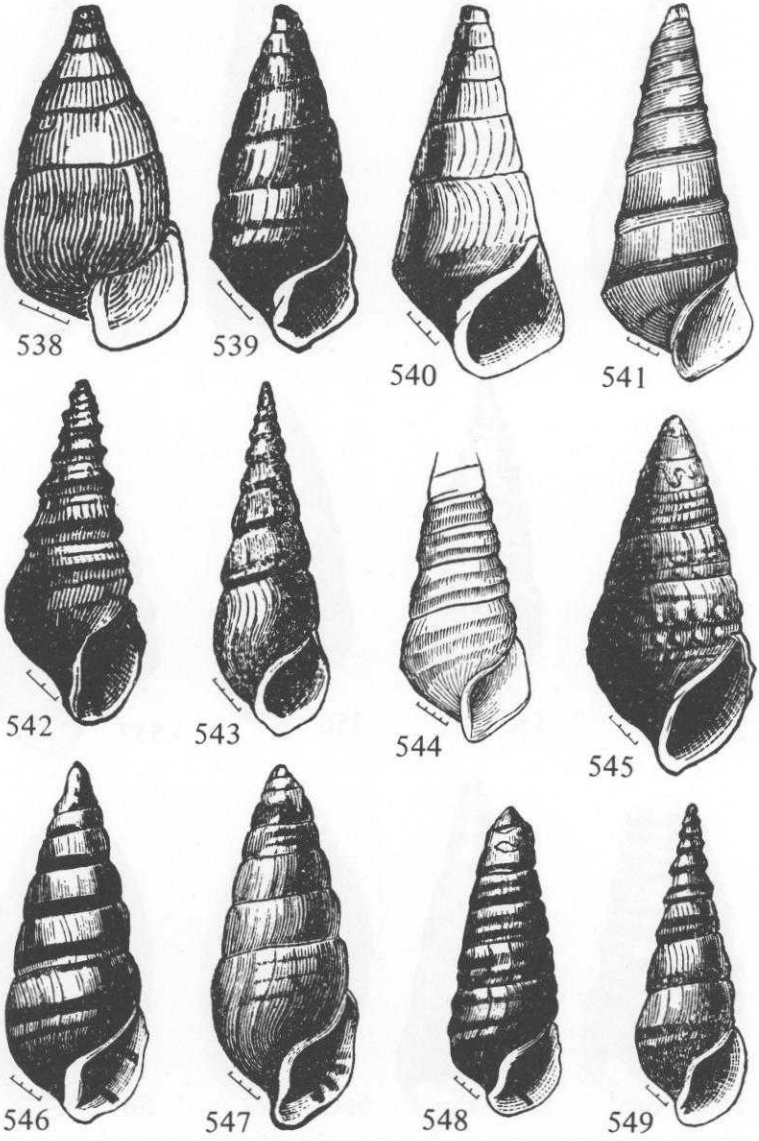
Pleurocera unciale unciale (Reeve 1861) [Figs. 542, 543, 555]
Upper tributaries of the Tennessee River in Virginia and eastern Tennessee (Goodrich, 1940d).
Pleurocera unciale hastatum (Anthony 1854) [Fig. 557]
North and South Fork of the Holston River, Sullivan County, Tennessee (Goodrich, 1940d).

Pleurocera prasinatum group

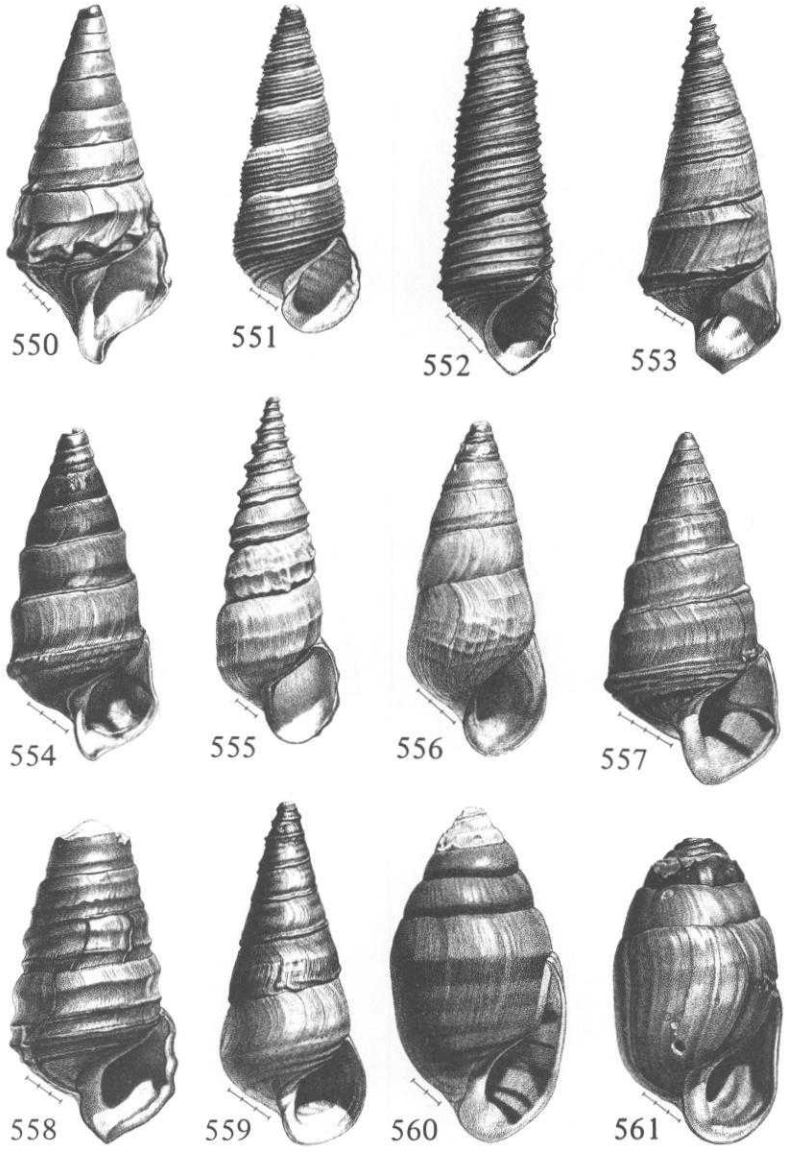
Pleurocera annuliferum (Conrad 1834) [Figs. 544, 558]
Upper and middle parts of the Black Warrior River; also known from Village Creek, Jefferson County, Alabama (Goodrich, 1941b).
Pleurocera foremani (Lea 1843) [Fig. 545]
Cahaba River and Coosa River basin from the Etowah River of Georgia downstream, and at the mouths of a few side streams (Goodrich, 1944d).
Pleurocera prasinatum (Conrad 1834) [Figs. 546, 547]
In quiet stretches in the middle and lower Cahaba and Coosa rivers and in the Alabama River (Goodrich, 1941b,c, 1944d).
Pleurocera showalteri (Lea 1862) [Fig. 548]
Lower part of the main Coosa River headwaters and that part of the river which is in Georgia (Goodrich, 1944d).
Pleurocera vestitum (Conrad 1834) [Figs. 549, 559]
Headwaters, creeks and springs from northern Georgia and Alabama to small streams as far south as the first county above Mobile (Goodrich, 1941b).

Subgenus *Strephobasis* Lea 1861

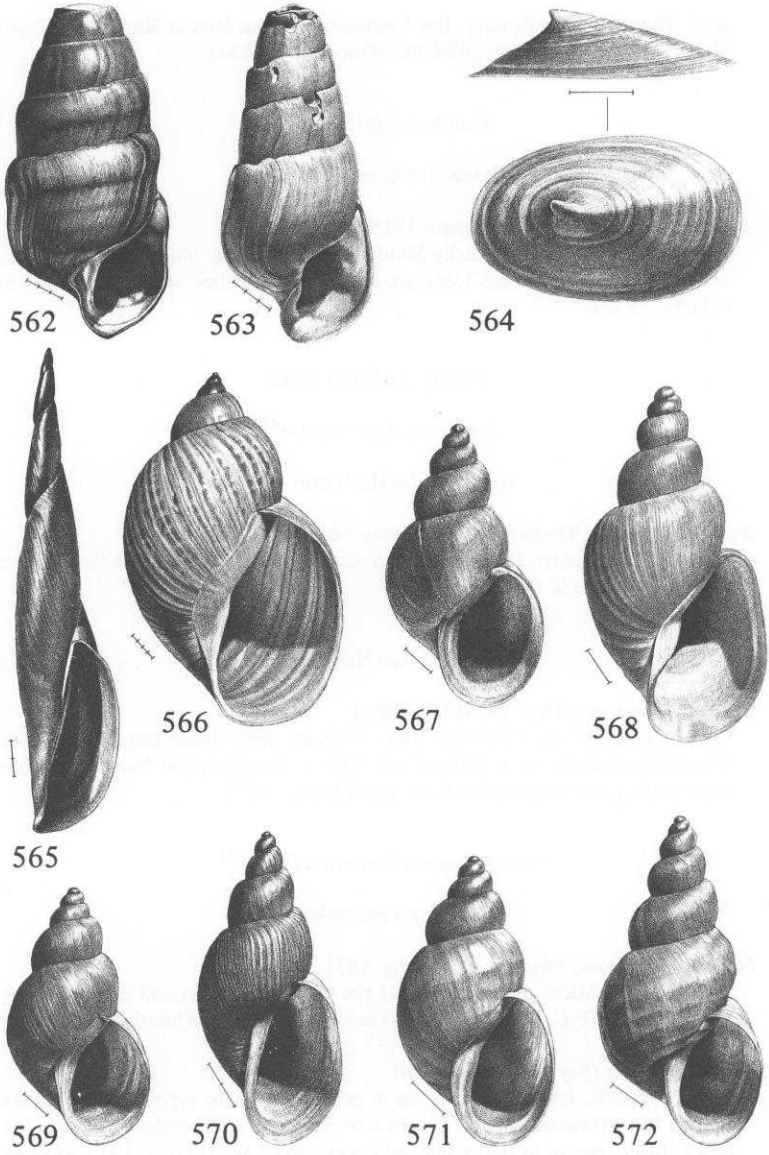
Pleurocera (Strephobasis) corpulentum (Anthony 1854) [Fig. 560]
Tennessee River between Bridgeport and Florence, Alabama; Battle Creek at Ketchall, Marion County, Tennessee (Goodrich, 1928a).
Pleurocera (Strephobasis) curtum curtum (Haldeman 1841) [Fig. 561]
Holston and Tennessee rivers from McMillan, Knox County, Tennessee, to the Muscle Shoals area in Alabama, and probably below it; Cumberland River in the vicinity of Nashville, Tennessee, and Caney Fork near Carthage, Tennessee; Clinch, Little and Little Tennessee rivers a few miles above their mouths; Paint Rock and Flint rivers, Alabama (Goodrich, 1928a).
Pleurocera (Strephobasis) curtum roanense (Lea 1864) [Fig. 562]
Emory River, Roane and Morgan counties, and the Little River, Blount County, Tennessee (Goodrich, 1928a).
Pleurocera (Strephobasis) walkeri Goodrich 1928 [Fig. 563]
Sequatchie and Little Sequatchie rivers, Marion County, Tennessee; Cumber-



FIGS. 538-549. Shells of Pleuroceridae. FIG. 538. *Pleurocera gradatum*. FIG. 539. *P. postelli*. FIG. 540. *P. pyrenellum*. FIG. 541. *P. planogyrum* = *P. pyrenellum*. FIG. 542. *P. unciale unciale*. FIG. 543. *P. esterbrooki* = *P. unciale*. FIG. 544. *P. annuliferum*. FIG. 545. *P. foremani*. FIG. 546. *P. prasinatum*. FIG. 547. *P. prasinatum*. FIG. 548. *P. showalteri*. FIG. 549. *P. vestitum*. Measurement lines are divided into millimeters. Figs. 538-549 are from Tryon (1865-66).



FIGS. 550-561. Shells of Pleuroceridae. FIG. 550. *Pleurocera nobile nobile*. FIG. 551. *P. brumbyi*. FIG. 552. *P. currierianum*. FIG. 553. *P. pyrenellum*. FIG. 554. *P. trochiformis*. FIG. 555. *P. unciale unciale*. FIG. 556. *P. viridulum*. FIG. 557. *P. unciale hastatum*. FIG. 558. *P. annuliferum*. FIG. 559. *P. vestitum*. FIG. 560. *P. (Strephobasis) corpulentum*. FIG. 561. *P. (S.) curtum curtum*. Measurement lines are divided into millimeters.



FIGS. 562-572. Shells of Pleuroceridae (Figs. 562, 563), Acroloxidae (Fig. 564) and Lymnaeidae (Lymnaeinae) (Figs. 565-572). FIG. 562. *Pleurocera (Strephobasis) curtum roanense*. FIG. 563. *P. (S.) walkeri*. FIG. 564. *Acroloxus coloradensis*. FIG. 565. *Acella haldemani*. FIG. 566. *Bulimnea megasoma*. FIG. 567. *Fossaria cyclostoma*. FIG. 568. *F. galbana*. FIG. 569. *F. humilis*. FIG. 570. *F. obrussa*. FIG. 571. *F. parva*. FIG. 572. *F. tazewelliana*. Measurement lines = 1 mm or are divided into millimeters.

land River, Jackson County, the Tennessee River at Muscle Shoals and Shoals Creek, Lauderdale County, Alabama (Goodrich, 1928a).

Family ACROLOXIDAE

Genus *Acroloxus* Beck 1837

Acroloxus coloradensis (Henderson 1930) [Fig. 564]
Isolated lakes high in the Rocky Mountains in Colorado, Montana and Alberta, and a few pond and lake localities in northern Quebec and eastern Ontario (Clarke, 1973).

Family LYMNAEIDAE

Subfamily Lymnaeinae[40]

Genus *Acella* Haldeman 1841

Acella haldemani ('Deshayes' W.G. Binney 1867) [Fig. 565]
Vermont and eastern Ontario west to northern Minnesota, south to northern Illinois and Ohio (F.C. Baker, 1928c).

Genus *Bulimnea* Haldeman 1841

Bulimnea megasoma (Say 1824) [Fig. 566]
Great Lakes and St. Lawrence River drainage area, upper tributaries of the Mississippi drainage area, parts of the Albany, Winnipeg and Nelson river systems in the Canadian Interior Basin (see Clarke, 1973).

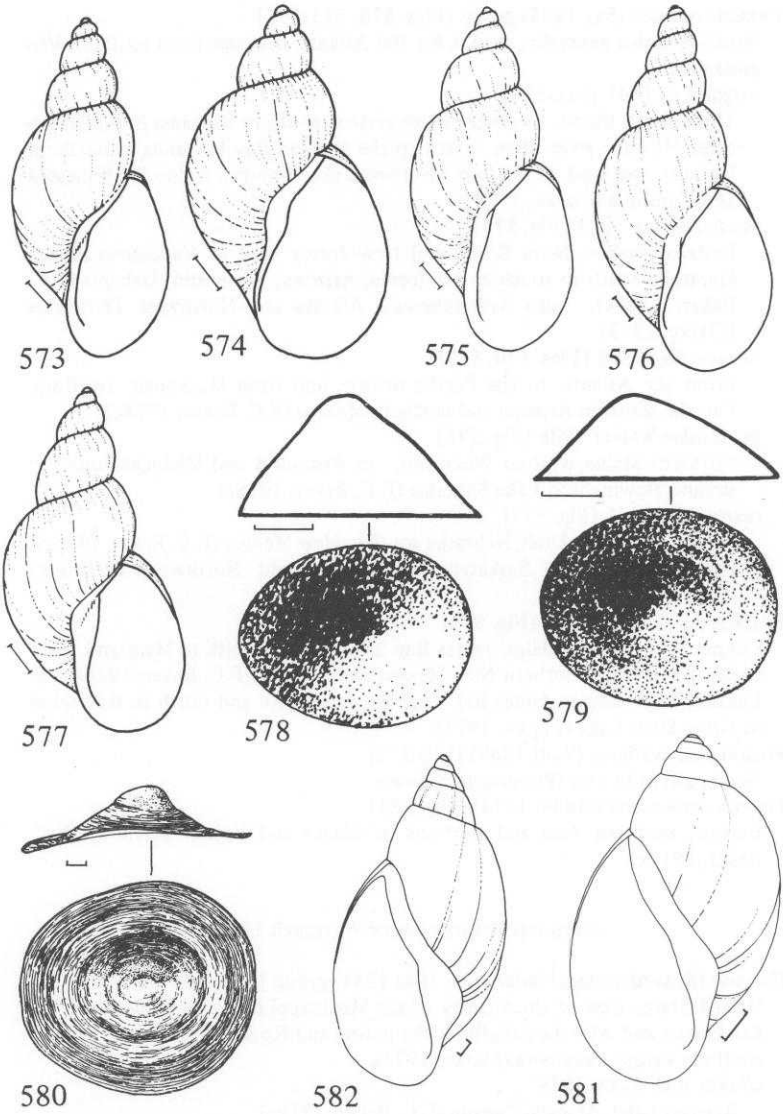
Genus *Fossaria* Westerlund 1885[41]

Subgenus *Fossaria* s.s.

Fossaria cyclostoma (Walker 1908) [Fig. 567]
New York to Michigan; a species of the Canadian region and of the Transition life zone (F.C. Baker, 1911a); Great Lakes region; Ontario (F.C. Baker, 1928c).

Fossaria galbana (Say 1825) [Fig. 568]
Great Lakes-St. Lawrence River basin northward in the region west of James Bay to the Attawapiskat and Severn river systems, and northwestward in the boreal forest region to the vicinity of Great Slave Lake (Clarke, 1973, as given for *F. decampi*, here considered a synonym of *F. galbana*).

Fossaria humilis (Say 1822) [Fig. 569]
Atlantic drainage area from southern New Jersey south to South Carolina (see F.C. Baker, 1911a).



FIGS. 573-582. Shells of Lymnaeidae (Lymnaeinae and Lancinae) (Figs. 573-580) and Physidae (Figs. 581, 582). FIG. 573. *Fossaria exigua*. FIG. 574. *F. modicella*. FIG. 575. *F. obrussa*. FIG. 576. *F. peninsulae*. FIG. 577. *F. rustica*. FIG. 578. *Lanx alta*. FIG. 579. *L. subrotunda*. FIG. 580. *Lanx hanni* = ? *L. patelloides*. FIG. 581. *Physella boucardi*. FIG. 582. *P. (Costatella) conoidea*. Measurement lines = 1 mm. Figs. 578 and 579 are from Tryon (1865i). Fig. 580 is from Walker (1925b).

Fossaria obrussa (Say 1825) group [Figs. 570, 573-577]

North America generally, except for the Atlantic drainage from southern Virginia south.

exigua Lea 1841 [Fig. 573]

Throughout the St. Lawrence River system, south to Alabama in the Mississippi-Missouri river basin, north to the Hudson Bay lowlands in northern Ontario, and west to the Red River and Lake Winnipeg region in Minnesota and Manitoba (Clarke, 1973).

modicella Say 1825 [Fig. 574]

Eastern Quebec, Nova Scotia and New Jersey west to Vancouver Island, Manitoba south to southern California, Arizona, Texas and Alabama (F.C. Baker, 1928c); also Saskatchewan, Alberta and Northwest Territories (Clarke, 1973).

obrussa Say 1825 [Figs. 570, 575]

From the Atlantic to the Pacific oceans, and from Mackenzie Territory, Canada, south to Arizona and northern Mexico (F.C. Baker, 1928c).

peninsulae Walker 1908 [Fig. 576]

Northern Maine west to Wisconsin; in Wisconsin and Michigan found in streams flowing into Lake Superior (F.C. Baker, 1928c).

rustica Lea 1841 [Fig. 577]

New York west to Utah, Nebraska south to New Mexico (F.C. Baker, 1928c); Ontario, Manitoba, Saskatchewan, Alberta and Northwest Territories (Clarke, 1973).

Fossaria parva (Lea 1841) [Fig. 571]

Connecticut west to Idaho, James Bay and Montana south to Maryland, Kentucky, Oklahoma, southern New Mexico and Arizona (F.C. Baker, 1928c); in Canada, from eastern James Bay drainage to Alberta and north to the region of Great Slave Lake (Clarke, 1973).

Fossaria tazewelliana (Wolf 1869) [Fig. 572]

Northeastern Illinois (Pleistocene); Iowa.

Fossaria truncatula (Müller 1774) [Fig. 583]

Europe, northern Asia and portions of Alaska and Yukon Territory (F.C. Baker, 1911a).

Subgenus *Bakerilymnaea* Weyrauch 1964

Fossaria (Bakerilymnaea) bulimoides (Lea 1841) group [Figs. 584-586]

United States west of the vicinity of the Mississippi River; also southern Saskatchewan and Alberta (chiefly in the prairie and Rocky foothill regions) and southern British Columbia (Clarke, 1973).

alberta F.C. Baker 1919

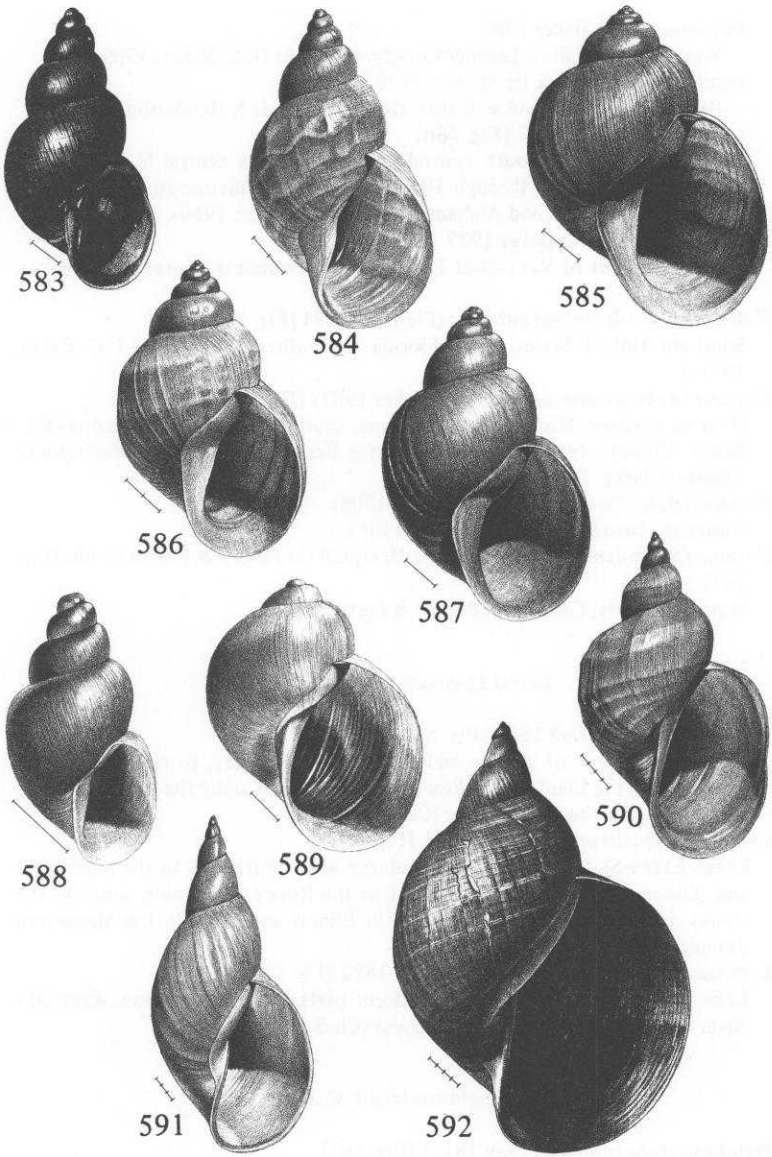
Brazean Lake, Alberta, Canada (F.C. Baker, 1919e).

bulimoides Lea 1841 [Fig. 584]

Pacific Coast, from Vancouver Island south to southern California (F.C. Baker, 1911a).

cockerelli Pilsbry & Ferriss 1906 [Fig. 585]

Sporadic over most of the United States west of the Mississippi River (Hibbard & Taylor, 1960).



FIGS. 583-592. Shells of Lymnaeidae (Lymnaeinae). FIG. 583. *Fossaria truncatula*. FIG. 584. *F. (Bakerilymnaea) bulimoides*. FIG. 585. *F. (B.) cockerelli*. FIG. 586. *F. (B.) techella*. FIG. 587. *F. (B.) cubensis*. FIG. 588. *F. (B.) dalli*. FIG. 589. *F. (B.) sonomaensis*. FIG. 590. *Lymnaea atkaensis*. FIG. 591. *L. stagnalis appressa*. FIG. 592. *L. stagnalis sanctaemariae*. Measurement lines = 1 mm or are divided into millimeters.

hendersoni F.C. Baker 1909

West of Fort Collins, Larimer County, Colorado (F.C. Baker, 1909a).

perplexa F.C. Baker & Henderson 1929

Park Lake, Grand Coulee, Washington (F.C. Baker & Henderson, 1929).

techella Haldeman 1867 [Fig. 586]

Southwestern and south central United States to central Mexico; from southern California through Utah, Colorado, southernmost Nebraska and Kansas to Missouri and Alabama (Hibbard & Taylor, 1960).

vancouverensis F.C. Baker 1939

Southern part of Vancouver Island, British Columbia, Canada (F.C. Baker, 1939a).

Fossaria (Bakerilymnaea) cubensis (Pfeiffer 1839) [Fig. 587]

Southern United States, from Florida to southern Texas (see F.C. Baker, 1911a).

Fossaria (Bakerilymnaea) dalli (F.C. Baker 1907) [Fig. 588]

Ohio to northern Michigan and Montana, south to Kansas and Arizona (F.C. Baker, 1928c); in the Canadian Interior Basin from southern Manitoba to Alberta (Clarke, 1973).

Fossaria (Bakerilymnaea) perpolita (Dall 1905)

Nushagak, Bristol Bay, Alaska (Dall, 1905).

Fossaria (Bakerilymnaea) sonomaensis Hemphill (in Pilsbry & Ferriss) 1906 [Fig. 589]

Sonoma County, California (Pilsbry & Ferriss, 1906).

Genus *Lymnaea* Lamarck 1799[40]

Lymnaea atkaensis Dall 1884 [Fig. 590]

Throughout most of Alaska and the Yukon Territory, in northern British Columbia in the Liard and Yukon river systems, and along the Arctic Coast to Cape Perry, Northwest Territory (Clarke, 1973).

Lymnaea stagnalis appressa Say 1821 [Fig. 591]

Great Lakes-St. Lawrence River drainage area, northwest to the Mackenzie and Yukon river drainage areas, west to the Rocky Mountains, south in the Rocky Mountains to Colorado, and in Illinois and Ohio in the Mississippi drainage (Clarke, 1973).

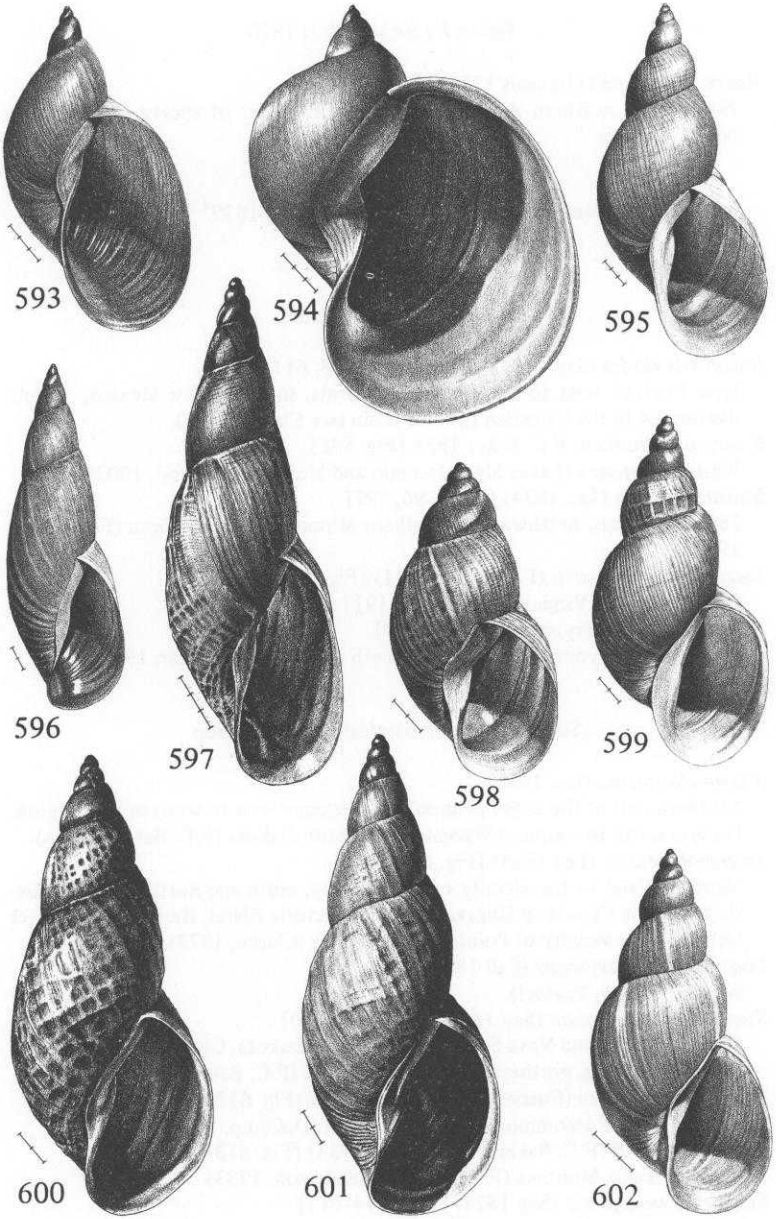
Lymnaea stagnalis sanctaemariae Walker 1892 [Fig. 592]

Lake Superior drainage area and adjacent parts of the Lake Huron, Wisconsin River and Winnipeg River drainage areas (Clarke, 1973).

Genus *Pseudosuccinea* F.C. Baker 1908

Pseudosuccinea columella (Say 1817) [Fig. 593]

Eastern North America generally. Nova Scotia and Quebec west to Manitoba, Minnesota and eastern Kansas, south to central Texas and Florida (F.C. Baker, 1911a).



FIGS. 593-602. Shells of Lymnaeidae (Lymnaeinae). FIG. 593. *Pseudosuccinea columella*. FIG. 594. *Radix auricularia*. FIG. 595. *Stagnicola elrodiana*. FIG. 596. *S. exilis*. FIG. 597. *S. exilis*. FIG. 598. *S. neopalustris*. FIG. 599. *S. traski*. FIG. 600. *S. elodes*. FIG. 601. *S. jolietensis* = *S. elodes*. FIG. 602. *S. alpenensis* = *S. elodes*. Measurement lines are divided into millimeters.

Genus *Radix* Montfort 1810

Radix auricularia (Linnaeus 1758) [Fig. 594]
Europe and northern Asia; widely introduced but of spotty occurrence in North America.

Genus *Stagnicola* Leach (in Jeffreys) 1830[42,43]

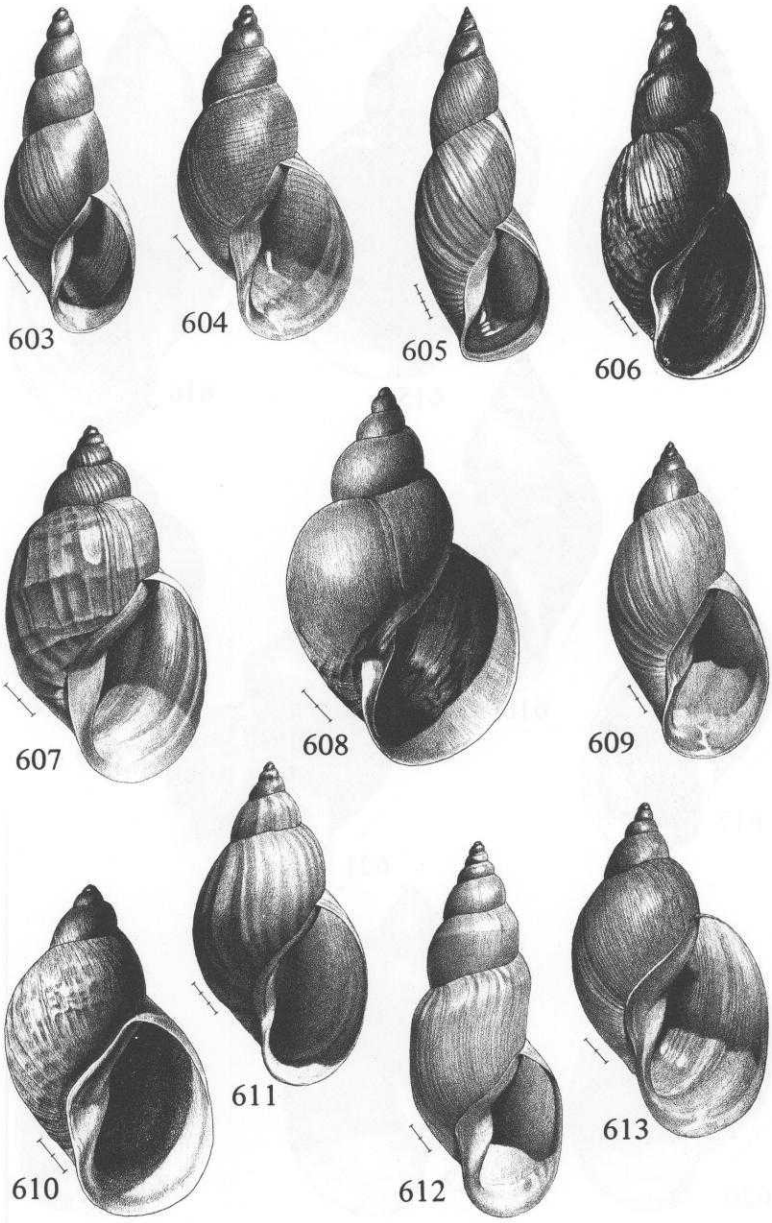
Subgenus *Stagnicola* s.s.

Stagnicola elodes group

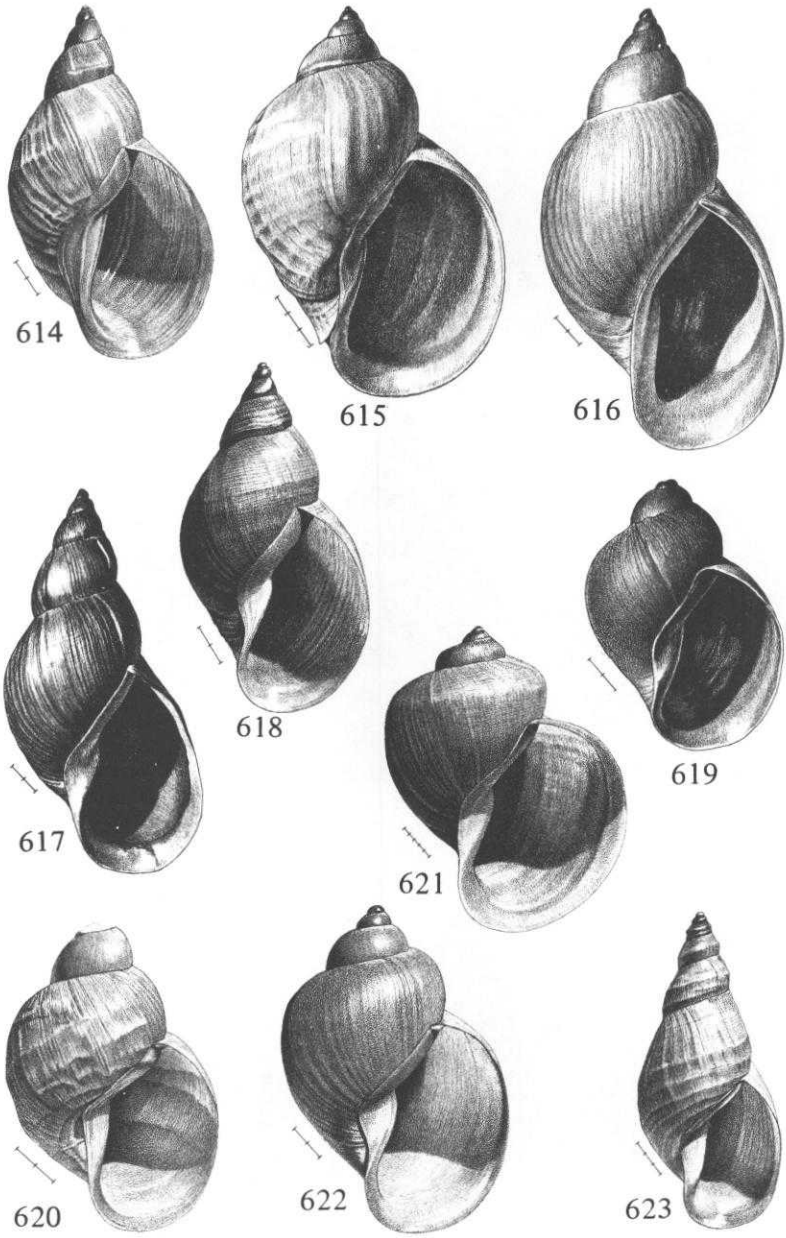
Stagnicola elodes (Say 1821)[42] [Figs. 600-606, 611]
New England west to Oregon and California, south to New Mexico; widely distributed in the Canadian Interior Basin (see Clarke, 1973).
Stagnicola elrodiana F.C. Baker 1935 [Fig. 595]
Western Montana (Lakes Sin-yale-a-min and McDonald) (Elrod, 1902).
Stagnicola exilis (Lea 1834) [Figs. 596, 597]
Ohio to Kansas, northward to northern Minnesota and Michigan (F.C. Baker, 1928c).
Stagnicola neopalustris (F.C. Baker 1911) [Fig. 598]
Orange County, Virginia (F.C. Baker, 1911a).
Stagnicola traski (Tryon 1863) [Fig. 599]
California to Wyoming, north to southern Alberta (F.C. Baker, 1911a).

Stagnicola emarginata/catascopium group

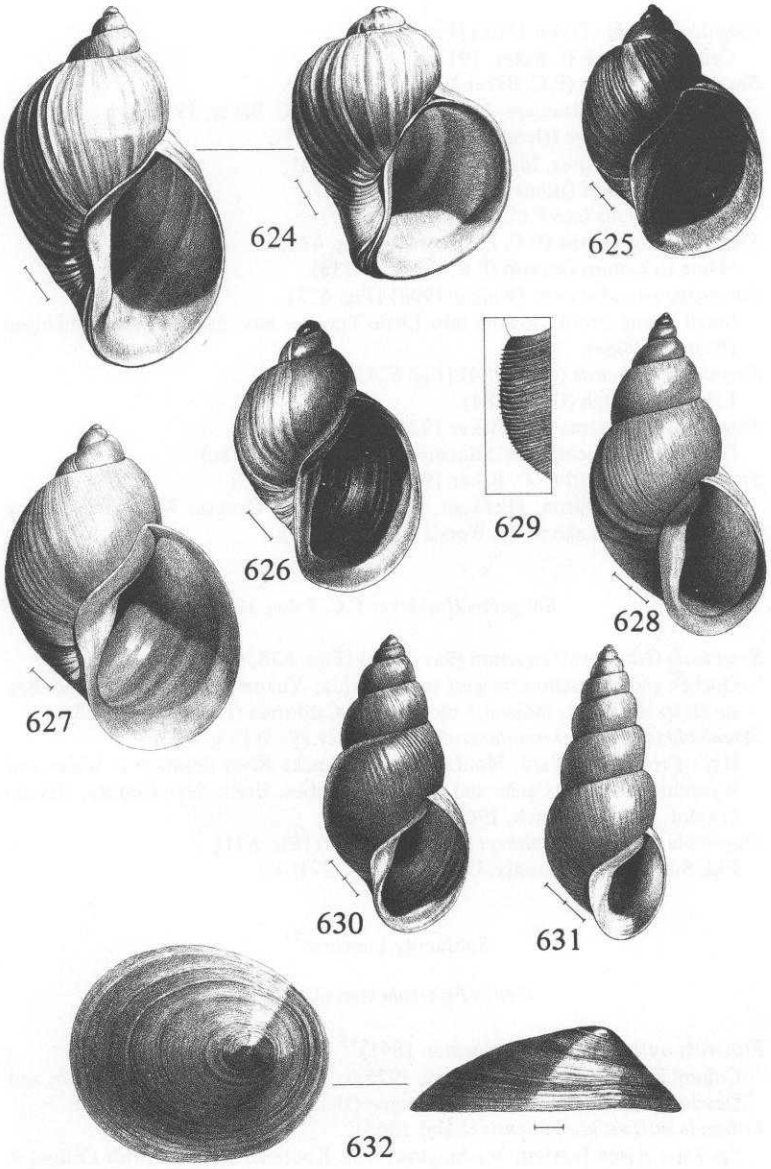
Stagnicola apicina (Lea 1838)
Northern part of the lower peninsula of Michigan west to western Washington; Ontario south to southern Wyoming and South Dakota (F.C. Baker, 1911a).
Stagnicola arctica (Lea 1864) [Fig. 607]
Newfoundland to the vicinity of Hudson Bay, north and northwest in subarctic and arctic Canada to Ungava, southern Victoria Island, the Mackenzie River Delta and the vicinity of Point Barrow, Alaska (Clarke, 1973).
Stagnicola bonnevillensis (Call 1884) [Fig. 608]
Wyoming (D.W. Taylor!).
Stagnicola catascopium (Say 1817) [Figs. 609, 610]
Eastern Canada and Nova Scotia west to North Dakota, Great Slave Lake south to northern Iowa, northern Ohio and Maryland (F.C. Baker, 1928c).
Stagnicola contracta (Currier (in DeCamp) 1881) [Fig. 612]
Higgins Lake, Roscommon County, Michigan (DeCamp, 1881).
Stagnicola elrodi (F.C. Baker & Henderson 1933) [Fig. 613]
Flathead Lake, Montana (F.C. Baker & Henderson, 1933).
Stagnicola emarginata (Say 1821) [Figs. 614-617]
Maine west to Minnesota and Wisconsin, Canadian Interior Basin south to Michigan, Pennsylvania and New York (F.C. Baker, 1928c).



FIGS. 603-613. Shells of Lymnaeidae (Lymnaeinae). FIG. 603. *Stagnicola impedita* = ?*S. elodes*. FIG. 604. *S. newfoundlandensis* = ?*S. elodes*. FIG. 605. *S. elodes* form *reflexa*. FIG. 606. *S. wyomingensis* = ?*S. elodes*. FIG. 607. *S. arctica*. FIG. 608. *S. bonnevillensis*. FIG. 609. *S. catascopium*. FIG. 610. *S.* ?*catascopium*. FIG. 611. *S. laurentiana* = ?*S. elodes*. FIG. 612. *S. contracta*. FIG. 613. *S. elrodi*. Measurement lines are divided into millimeters.



FIGS. 614-623. Shells of Lymnaeidae (Lymnaeinae). FIG. 614. *Stagnicola emarginata*. FIG. 615. *S. emarginata* form *serrata*. FIG. 616. *S. emarginata* form *canadensis*. FIG. 617. *S. emarginata* form *nashotahensis*. FIG. 618. *S. gabbi*. FIG. 619. *S. idahoense*. FIG. 620. *S. hinkleyi*. FIG. 621. *S. mighelsi*. FIG. 622. *S. oronoensis*. FIG. 623. *S. petoskeyensis*. Measurement lines are divided into millimeters.



FIGS. 624-632. Shells of Lymnaeidae (Lymnaeinae and Lancinae). FIG. 624. *Stagnicola kingi* = *S. utahensis*. FIG. 625. *S. walkeriana*. FIG. 626. *S. woodruffi*. FIG. 627. *S. nasoni* = ?*S. woodruffi*. FIG. 628. *S. (Hinkleyia) caperata*. FIG. 629. *S. (H.) caperata*, periostracal ridges on body whorl. FIG. 630. *S. (H.) montanensis*. FIG. 631. *S. (H.) pilsbryi*. FIG. 632. *Fisherola nuttalli lancides*, top (left figure) and right lateral (right figure) views. Measurement lines = 1 mm or are divided into millimeters.

Stagnicola gabbi (Tryon 1865) [Fig. 618]
California (see F.C. Baker, 1911a).
Stagnicola hinkleyi (F.C. Baker 1906) [Fig. 620]
Columbia River drainage, Idaho and Oregon (F.C. Baker, 1911a).
Stagnicola idahoense (Henderson 1931) [Fig. 619]
Little Salmon River, Idaho (Henderson, 1931a).
Stagnicola mighelsi (Binney 1865) [Fig. 621]
Lakes in Maine (see F.C. Baker, 1911a).
Stagnicola oronoensis (F.C. Baker 1904) [Fig. 622]
Maine to eastern Ontario (F.C. Baker, 1911a).
Stagnicola petoskeyensis (Walker 1908) [Fig. 623]
Small spring-brook flowing into Little Traverse Bay, near Petoskey, Michigan (Walker, 1908e).
Stagnicola utahensis (Call 1884) [Fig. 624]
Lake Utah, Utah (Call, 1884).
Stagnicola walkeriana F.C. Baker 1926 [Fig. 625]
Great Lakes (Michigan and Superior) (F.C. Baker, 1928c).
Stagnicola woodruffi (F.C. Baker 1901) [Figs. 626, 627]
Great Lakes (Huron, Michigan, Ontario); Lake Geneva, Wisconsin; Rainy River system; Lake of the Woods (Clarke, 1973).

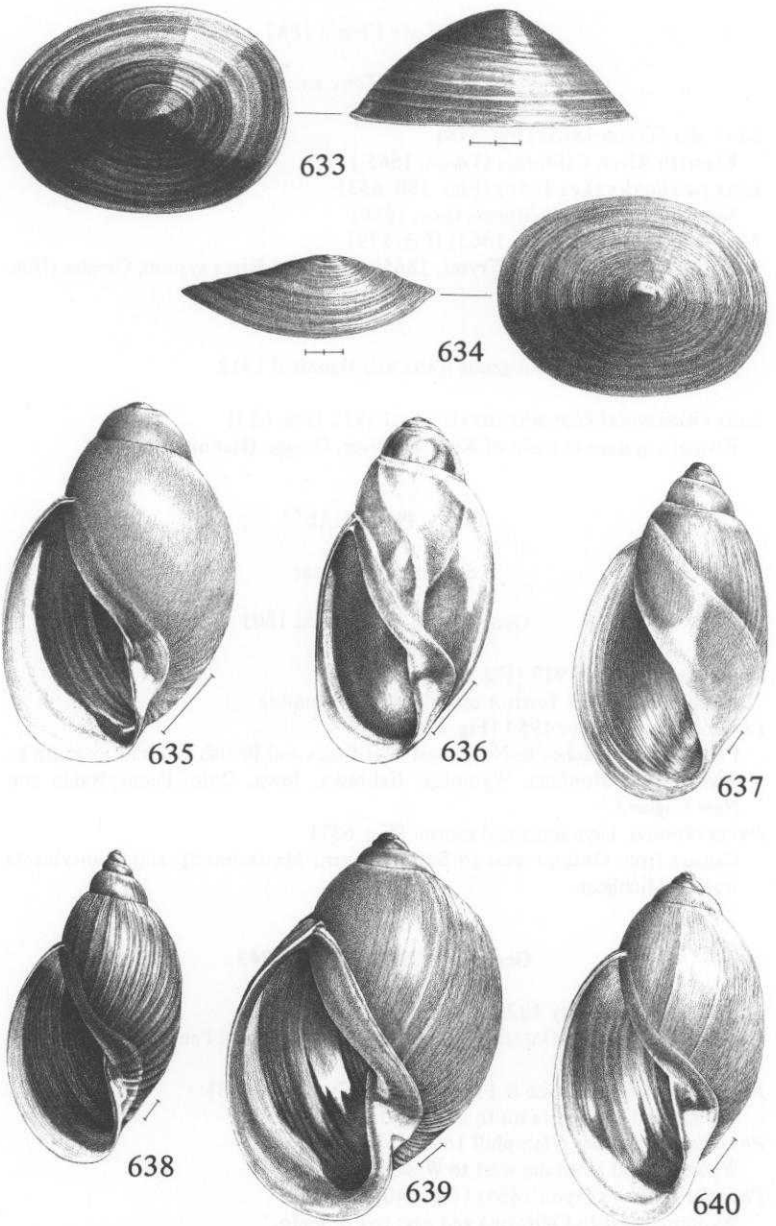
Subgenus *Hinkleyia* F.C. Baker 1928

Stagnicola (Hinkleyia) caperata (Say 1829) [Figs. 628, 629]
Quebec and Massachusetts west to California; Yukon Territory and James Bay south to Maryland, Indiana, Colorado and California (F.C. Baker, 1928c).
Stagnicola (Hinkleyia) montanensis (F.C. Baker 1913) [Fig. 630]
Hays Creek near Ward, Montana; upper Snake River drainage in Idaho and Wyoming; Beaver, Cache and Summit counties, Utah; Nye County, Nevada (Taylor, Walter & Burch, 1963).
Stagnicola (Hinkleyia) pilsbryi (Hemphill 1890) [Fig. 631]
Fish Springs, Juab County, Utah (Russell, 1971b).

Subfamily Lancinae[44]

Genus *Fisherola* Hannibal 1912

Fisherola nuttalli nuttalli (Haldeman 1841)[45]
Columbia River drainage (Pilsbry, 1925a); Snake River drainage, Idaho, and Deschutes River and The Dalles, Oregon (Henderson, 1936c).
Fisherola nuttalli kootaniensis (Baird 1863)
Spokane River [eastern Washington] and Kootenai River, British Columbia (Baird, 1863).
Fisherola nuttalli lancides Hannibal 1912 [Fig. 632]
Snake River basin (Hannibal, 1912b), = ? Spokane River (Henderson, 1936c).



FIGS. 633-640. Shells of Lymnaeidae (Lancinae) (Figs. 633, 634) and Physidae (Physinae) (Figs. 635-640). FIG. 633. *Lanx patelloides*. FIG. 634. *L. (Walkerola) klamathensis*. FIG. 635. *Physa jennessi*. FIG. 636. *Physa skinneri*. FIG. 637. *Physa skinneri*, large unnamed morph. FIG. 638. *Physella boucardi*. FIG. 639. *Physella columbiana*. FIG. 640. *Physella cooperi*. Measurement lines = 1 mm or are divided into millimeters.

Genus *Lanx* Clessin 1882

Subgenus *Lanx* s.s.

Lanx alta (Tryon 1865) [Fig. 578]
Klamath River, California (Tryon, 1865j).
Lanx patelloides (Lea 1856) [Figs. 580, 633]
Sacramento River, California (Lea, 1856).
Lanx subrotundata (Tryon 1865) [Fig. 579]
Umpqua River, Oregon (Tryon, 1865j); Umpqua River system, Oregon (Henderson, 1929c, 1936c).

Subgenus *Walkerola* Hannibal 1912

Lanx (Walkerola) klamathensis Hannibal 1912 [Fig. 634]
Klamath system in basin of Klamath River, Oregon (Hannibal, 1912b).

Family PHYSIDAE[46]

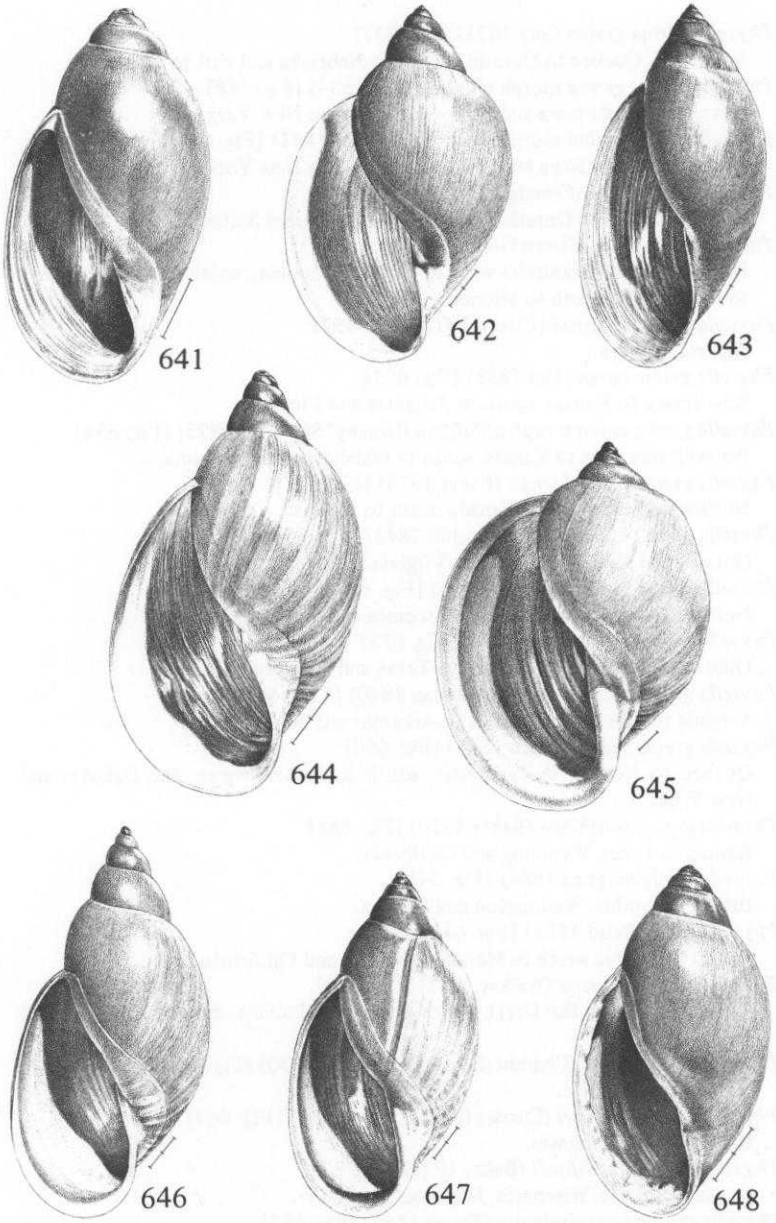
Subfamily Physinae

Genus *Physa* Draparnaud 1801

Physa jennessi Dall 1919 [Fig. 635]
Alaska, Northwest Territories and British Columbia.
Physa skinneri Taylor 1954 [Fig. 636]
Canada from Quebec to Northwest Territories and British Columbia; south to Washington, Montana, Wyoming, Nebraska, Iowa, Ohio, Pennsylvania and New England.
Physa skinneri, large unnamed morph [Fig. 637]
Canada from Ontario west to Saskatchewan; Massachusetts and Pennsylvania west to Michigan.

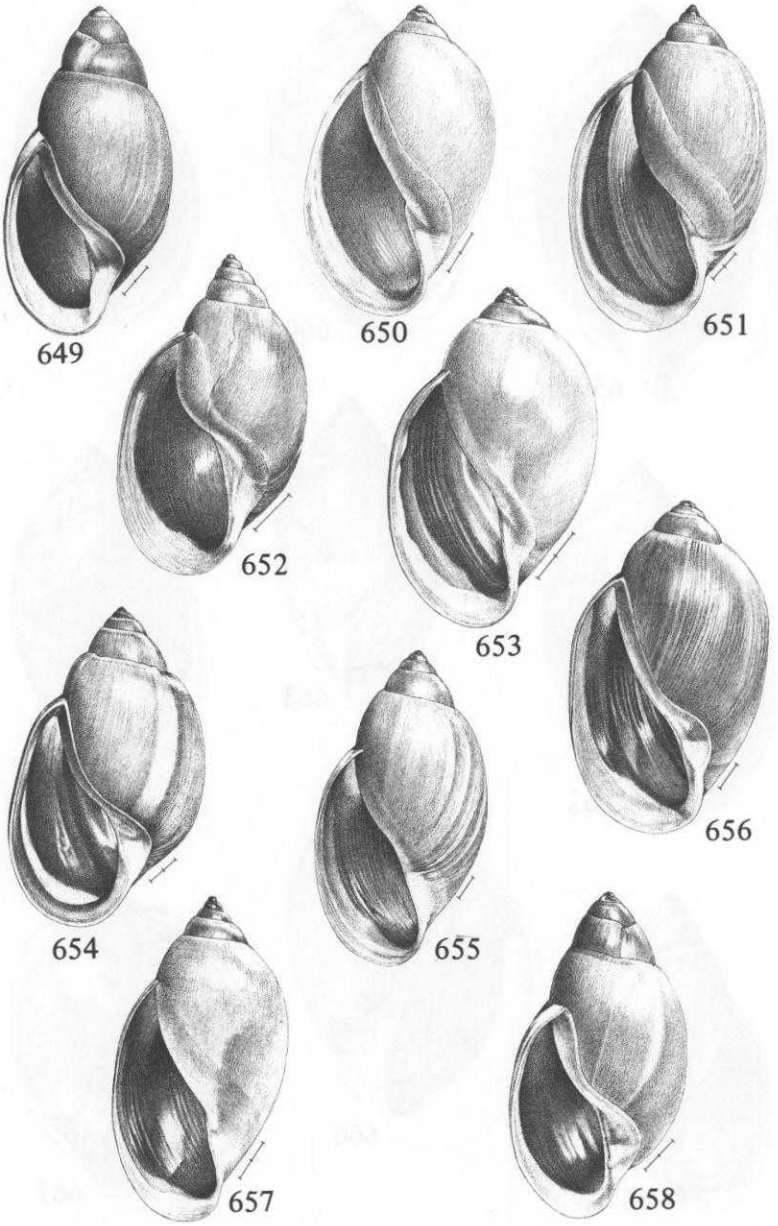
Genus *Physella* Haldeman 1843

Physella ancillaria (Say 1825) [Fig. 666]
New Brunswick to Ontario, Canada, and New York and Pennsylvania east into New England.
Physella boucardi (Crosse & Fischer 1881) [Figs. 581, 638]
Nevada and California south into Mexico.
Physella columbiana (Hemphill 1890) [Fig. 639]
Wyoming and Montana west to Washington.
Physella cooperi (Tryon 1865) [Fig. 640]
Wyoming west to California and east to Colorado.
Physella globosa (Haldeman 1841) [Fig. 667]
Kentucky, Ohio and Tennessee.

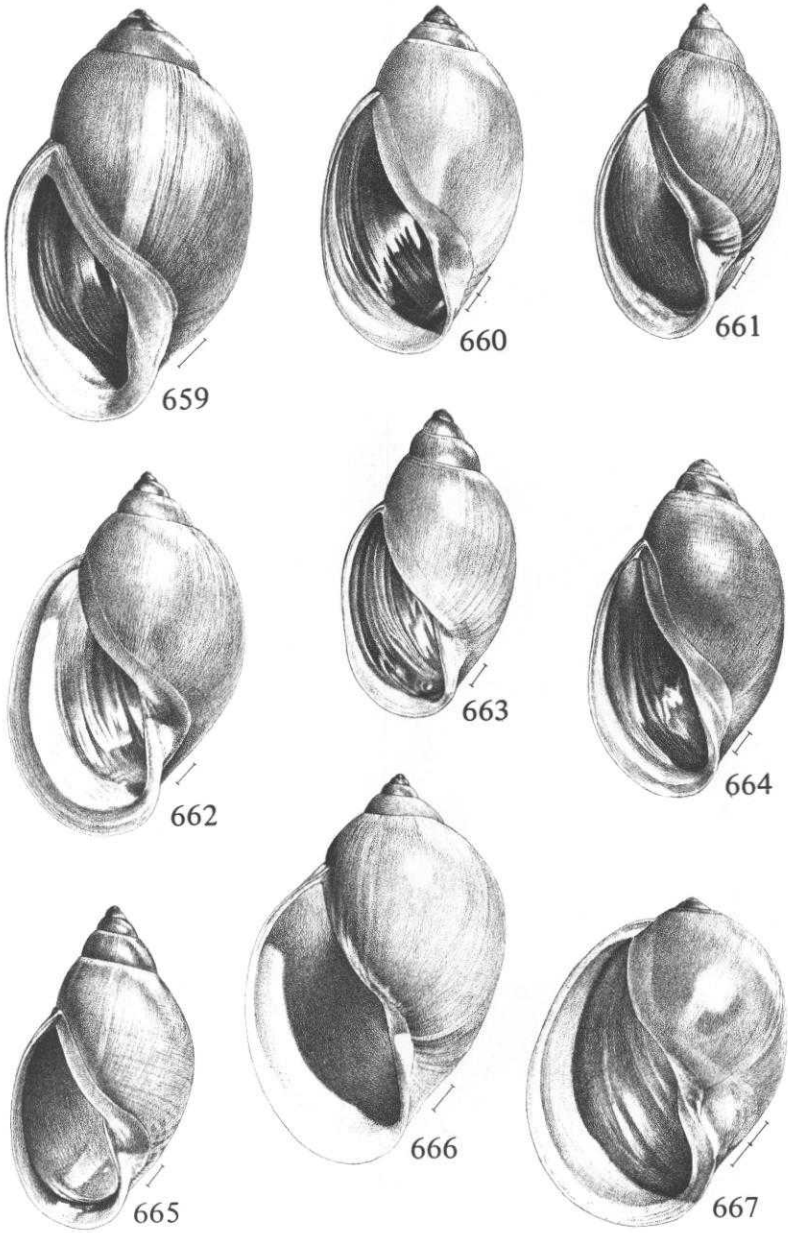


FIGS. 641-648. Shells of Physidae (Physinae). FIG. 641. *Physella hordacea*. FIG. 642. *P. lordi*. FIG. 643. *P. microstriata*. FIG. 644. *P. traski*. FIG. 645. *P. utahensis*. FIG. 646. *P. virginea*. FIG. 647. *P. gyrina gyrina*. FIG. 648. *P. gyrina gyrina* morph *elliptica*. Measurement lines = 1 mm or are divided into millimeters.

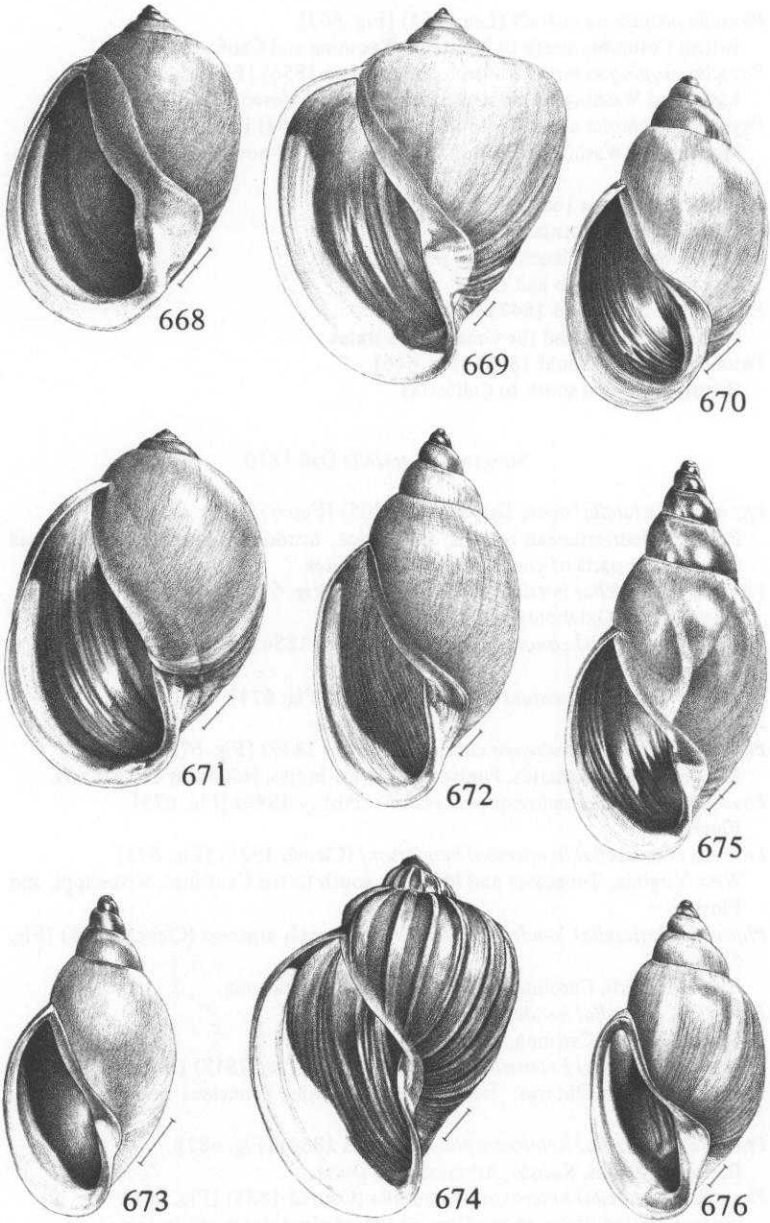
Physella gyrina gyrina (Say 1821) [Fig. 647]
In Canada, Quebec to Ontario; south to Nebraska and east to New York.
Physella gyrina gyrina morph *elliptica* (Lea 1834) [Fig. 648]
Ontario south to Iowa and Missouri and east to New York.
Physella gyrina gyrina morph *hildrethiana* (Lea 1841) [Fig. 649]
Ontario south to Iowa and Missouri and east to New York.
Physella gyrina alba (Crandall 1901) [Fig. 650]
Eastern Canada to Ontario and northeastern United States.
Physella gyrina ampullacea Gould 1855 [Fig. 651]
In Canada from Manitoba west to British Columbia; south to California, east to Arizona and north to Minnesota.
Physella gyrina athearni (Clarke 1973) [Fig. 652]
Alberta, Canada.
Physella gyrina aurea (Lea 1838) [Fig. 653]
New Jersey to Kansas, south to Arkansas and Florida.
Physella gyrina aurea morph *albofilata* ('Ancey' Sampson 1893) [Fig. 654]
Pennsylvania west to Kansas, south to Oklahoma and Alabama.
Physella gyrina bayfieldensis (Baker 1928) [Fig. 655]
Northwest Territories of Canada south to Kansas.
Physella gyrina cylindrica (Newcomb 1843) [Fig. 656]
Ontario and New York south to Virginia.
Physella gyrina gouldi (Clench 1935) [Fig. 657]
Northwest Territories south to Wisconsin and Colorado.
Physella gyrina hawni (Lea 1864) [Fig. 658]
Ohio west to Kansas and south to Texas and Alabama.
Physella gyrina microstoma (Haldeman 1840) [Fig. 659]
Virginia to Missouri and south to Arkansas and Alabama.
Physella gyrina sayi (Tappan 1838) [Fig. 660]
Quebec to Northwest Territories, south to Saskatchewan, the Dakotas and New York.
Physella gyrina smithiana (Baker 1920) [Fig. 661]
Kansas to Texas, Wyoming and California.
Physella hordacea (Lea 1864) [Fig. 641]
British Columbia, Washington and Oregon.
Physella lordi (Baird 1863) [Fig. 642]
British Columbia south to Montana, Nevada and California.
Physella magnalacustris (Walker 1901) [Fig. 668]
Ontario south to the Great Lakes states and Indiana, east to Vermont and Maine.
Physella microstriata (Chamberlain & E.G. Berry 1930) [Fig. 643]
Utah.
Physella parkeri parkeri (Currier (in DeCamp) 1881) [Fig. 669]
Michigan and Wisconsin.
Physella parkeri latchfordi (Baker 1928) [Fig. 670]
Quebec, Ontario, Wisconsin, Michigan and Maine.
Physella propinqua propinqua (Tryon 1865) [Fig. 662]
Montana and Washington south to Wyoming and California.



FIGS. 649-658. Shells of Physidae (Physinae). FIG. 649. *Physella gyrina gyrina* morph *hildrethiana*. FIG. 650. *P. gyrina alba*. FIG. 651. *P. gyrina ampullacea*. FIG. 652. *P. gyrina athearni*. FIG. 653. *P. gyrina aurea*. FIG. 654. *P. gyrina aurea* morph *albofilata*. FIG. 655. *P. gyrina bayfieldensis*. FIG. 656. *P. gyrina cylindrica*. FIG. 657. *P. gyrina gouldi*. FIG. 658. *P. gyrina hawnii*. Measurement lines = 1 mm or are divided into millimeters.



FIGS. 659-667. Shells of Physidae (Physinae). FIG. 659. *Physella gyrina microstoma*. FIG. 660. *P. gyrina sayi*. FIG. 661. *P. gyrina smithiana*. FIG. 662. *P. propinqua propinqua*. FIG. 663. *P. propinqua nuttalli*. FIG. 664. *P. propinqua nuttalli* morph *triticea*. FIG. 665. *P. propinqua nuttalli* morph *venusta*. FIG. 666. *P. ancillaria*. FIG. 667. *P. globosa*. Measurement lines = 1 mm or are divided into millimeters.

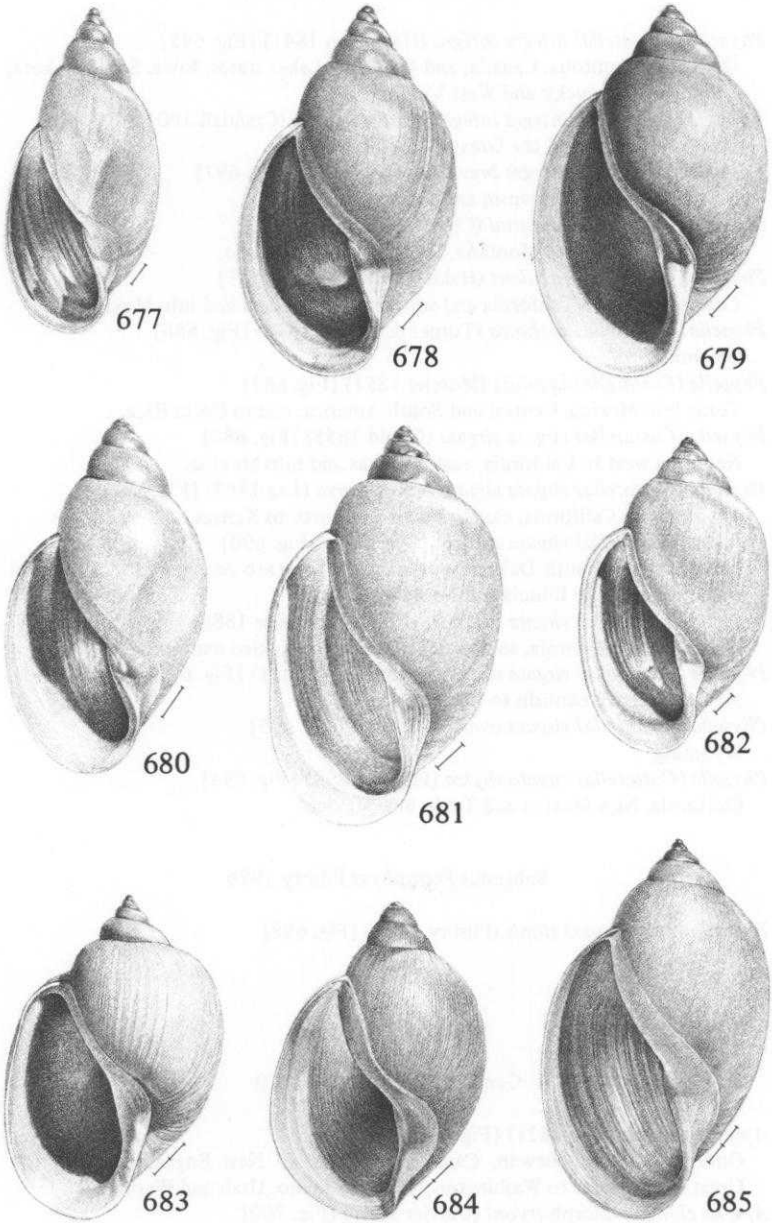


FIGS. 668-676. Shells of Physidae (Physinae). FIG. 668. *Physella magnalacustris*. FIG. 669. *P. parkeri parkeri*. FIG. 670. *P. parkeri latchfordi*. FIG. 671. *P. vinosa*. FIG. 672. *P. (Costatella) cubensis cubensis*. FIG. 673. *P. (C.) cubensis peninsularis*. FIG. 674. *P. (C.) costata*. FIG. 675. *P. (C.) hendersoni hendersoni*. FIG. 676. *P. (C.) hendersoni hendersoni* morph *ariomus*. Measurement lines = 1 mm or are divided into millimeters.

Physella propinqua nuttalli (Lea 1864) [Fig. 663]
British Columbia south to Montana, Wyoming and California.
Physella propinqua nuttalli morph *triticea* (Lea 1856) [Fig. 664]
Idaho and Washington, south to California and Nevada.
Physella propinqua nuttalli morph *venusta* (Lea 1864) [Fig. 665]
Montana to Washington, south to California and northeast to Utah and Wyoming.
Physella traski (Lea 1864) [Fig. 644]
Oregon and California.
Physella utahensis (Clench 1925) [Fig. 645]
Wyoming, Colorado and Utah.
Physella vinosa (Gould 1847) [Fig. 671]
Ontario, Canada, and the Great Lakes states.
Physella virginea (Gould 1847) [Fig. 646]
British Columbia south to California.

Subgenus *Costatella* Dall 1870

Physella (Costatella) acuta Draparnaud 1805) [Fig. 678]
Europe, Mediterranean regions, and Africa; introduced into Australia, Hawaii and perhaps parts of continental United States.
Physella (Costatella) bottimeri (Clench 1924) [Fig. 679]
New Mexico, Oklahoma and Texas.
Physella (Costatella) conoidea (Fischer & Crosse 1886) [Fig. 582]
Texas.
Physella (Costatella) costata (Newcomb 1861) [Fig. 674]
California.
Physella (Costatella) cubensis cubensis (Pfeiffer 1839) [Fig. 672]
Bahamas, Cuba, Jamaica, Puerto Rico, West Indies, Honduras and Florida.
Physella (Costatella) cubensis peninsularis (Pilsbry 1889) [Fig. 673]
Florida.
Physella (Costatella) hendersoni hendersoni (Clench 1925) [Fig. 675]
West Virginia, Tennessee and Missouri, south to the Carolinas, Mississippi, and Florida.
Physella (Costatella) hendersoni hendersoni morph *ariomus* (Clench 1925) [Fig. 676]
Virginia, South Carolina, Georgia, Florida and Alabama.
Physella (Costatella) hendersoni ssp. [Fig. 677]
Virginia, North Carolina, Florida and Alabama.
Physella (Costatella) heterostropha heterostropha (Say 1817) [Fig. 680]
Nova Scotia to Ontario; New England to Ohio, Tennessee and the Virginias; the Bahamas.
Physella (Costatella) heterostropha halei (Lea 1864) [Fig. 682]
Illinois, Missouri, Kansas, Arkansas and Texas.
Physella (Costatella) heterostropha pomila (Conrad 1834) [Fig. 681]
Eastern United States to the Ohio and Mississippi rivers and in Iowa.
Physella (Costatella) humerosa (Gould 1855) [Fig. 683]
California, Arizona and Colorado.



FIGS. 677-685. Shells of Physidae (Physinae). FIG. 677. *Physella (Costatella) hendersoni* ssp. FIG. 678. *P. (C.) acuta*. FIG. 679. *P. (C.) bottimeri*. FIG. 680. *P. (C.) heterostropha heterostropha*. FIG. 681. *P. (C.) heterostropha pomila*. FIG. 682. *P. (C.) heterostropha halei*. FIG. 683. *P. (C.) humerosa*. FIG. 684. *P. (C.) johnsoni*. FIG. 685. *P. (C.) osculans*. Measurement lines = 1 mm or are divided into millimeters.

Physella (Costatella) integra integra (Haldeman 1841) [Fig. 695]
Quebec to Manitoba, Canada, and the Great Lakes states, Iowa, South Dakota, Tennessee, Kentucky and West Virginia.
Physella (Costatella) integra integra morph *walkeri* (Crandall 1901) [Fig. 696]
Quebec, Ontario and the Great Lakes states.
Physella (Costatella) integra brevispira (Lea 1864) [Fig. 697]
New York, Ohio, Wisconsin and Minnesota.
Physella (Costatella) johnsoni (Clench 1926) [Fig. 684]
Alberta, Canada, and Montana, Wyoming and Colorado.
Physella (Costatella) osculans (Haldeman 1841) [Fig. 685]
Colorado west to California and southeast to Arizona and into Mexico.
Physella (Costatella) spelunca (Turner & Clench 1974) [Fig. 686]
Wyoming.
Physella (Costatella) squalida (Morelet 1851) [Fig. 687]
Texas into Mexico, Central and South America, and in Costa Rica.
Physella (Costatella) virgata virgata (Gould 1855) [Fig. 688]
Nebraska west to California, east to Texas and into Mexico.
Physella (Costatella) virgata virgata morph *parva* (Lea 1864) [Fig. 689]
Iowa west to California, east to Texas and north to Kansas.
Physella (Costatella) virgata anatina (Lea 1864) [Fig. 690]
Wisconsin and South Dakota southwest to Colorado and Nevada; Texas and Arkansas north to Illinois and Nebraska.
Physella (Costatella) virgata berendti (Fischer & Crosse 1886) [Fig. 691]
Wyoming to California, southeast to Texas and Mexico and north to Kansas.
Physella (Costatella) virgata concolor (Haldeman 1841) [Fig. 692]
Manitoba and Wisconsin to Idaho.
Physella (Costatella) virgata concolor morph [Fig. 693]
Wyoming.
Physella (Costatella) virgata rhyssa (Pilsbry 1899) [Fig. 694]
California, New Mexico and Texas into Mexico.

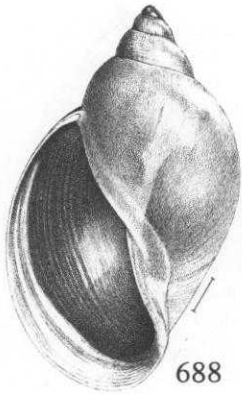
Subgenus *Petrophysa* Pilsbry 1926

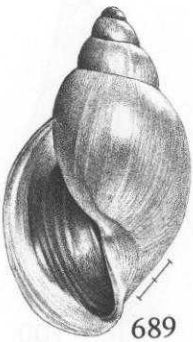
Physella (Petrophysa) zionis (Pilsbry 1926) [Fig. 698]
Utah.

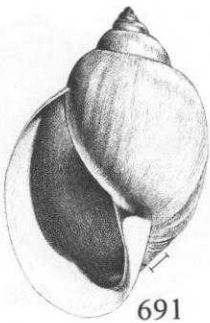
Subfamily Aplexinae

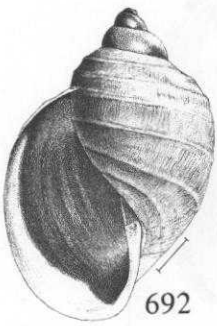
Genus *Aplexa* Fleming 1820

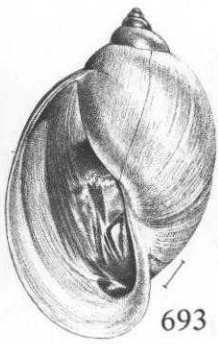
Aplexa elongata (Say 1821) [Fig. 699]
Ontario to Saskatchewan, Canada, and Alaska; New England through the Great Lakes states to Washington; south to Idaho, Utah and Wyoming.
Aplexa elongata morph *tryoni* (Currier 1867) [Fig. 700]
Ontario and Alberta, Canada; Michigan and Minnesota west to Washington; also in Utah, Illinois and Indiana.



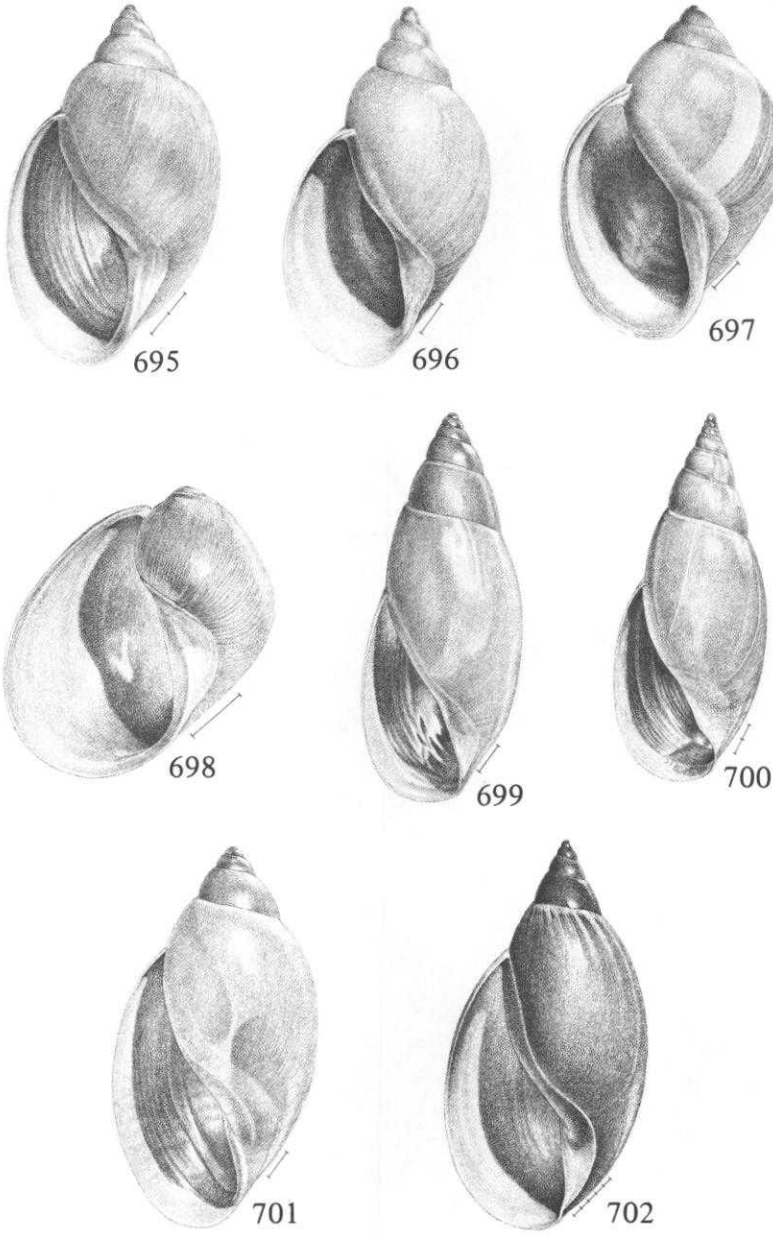








FIGS. 686-694. Shells of Physidae (Physinae). FIG. 686. *Physella (Costatella) spelunca*. FIG. 687. *P. (C.) squalida*. FIG. 688. *P. (C.) virgata virgata*. FIG. 689. *P. (C.) virgata virgata* morph *parva*. FIG. 690. *P. (C.) virgata anatina*. FIG. 691. *P. (C.) virgata berendti*. FIG. 692. *P. (C.) virgata concolor*. FIG. 693. *P. (C.) virgata concolor* morph. FIG. 694. *P. (C.) virgata rhyssa*. Measurement lines = 1 mm or are divided into millimeters.



FIGS. 695-702. Shells of Physidae (Physinae and Aplexinae). FIG. 695. *Physella (Costatella) integra integra*. FIG. 696. *P. (C.) integra integra* morph *walkeri*. FIG. 697. *P. (C.) integra brevispira*. FIG. 698. *P. (Petrophysa) zionis*. FIG. 699. *Aplexa elongata*. FIG. 700. *A. elongata* morph *tryoni*. FIG. 701. *Stenophysa marmorata*. FIG. 702. *S. maugeriae*. Measurement lines = 1 mm or are divided into millimeters.

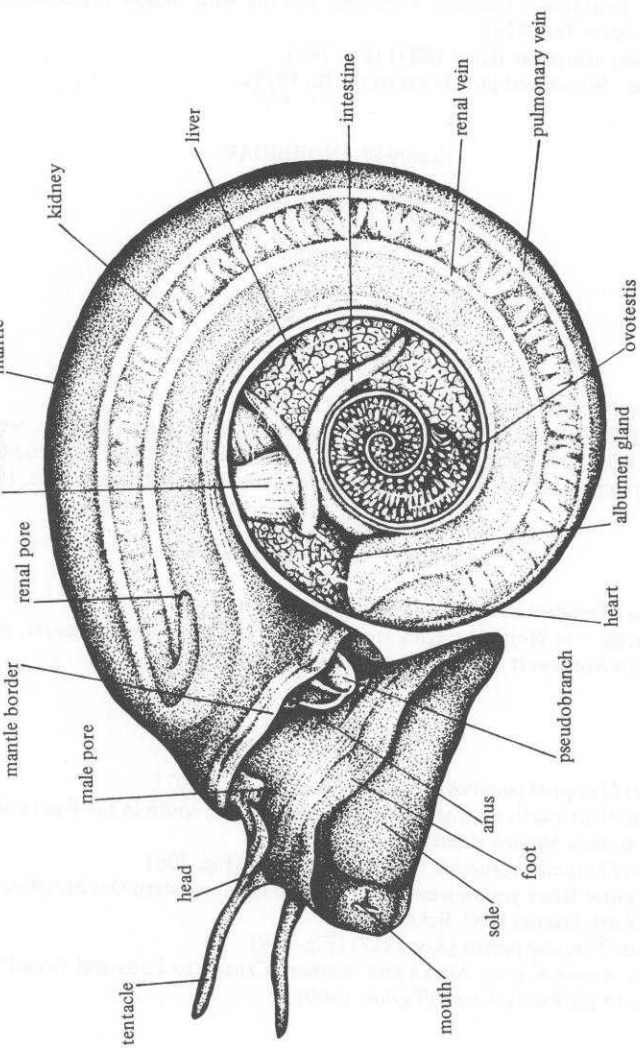


FIG. 703. Planorbid (*Biomphalaria*) with shell removed to show aspects of anatomy (left side) (from Barbosa et al., 1968, after Demian).

Genus *Stenophysa* Martens 1898[47]

Stenophysa marmorata (Guilding 1828) [Fig. 701]
Brazil, Guatemala, Uruguay, Venezuela and the West Indies. Introduced into Texas (*teste* Te, 1978).
Stenophysa maugeriae (Gray 1837) [Fig. 702]
Mexico. Introduced into Texas (*teste* Te, 1978).

Family PLANORBIDAE

Subfamily Planorbinae

Tribe Planorbini

Genus *Gyraulus* 'Agassiz' Charpentier 1837

Subgenus *Gyraulus* s.s.

Gyraulus deflectus (Say 1824) [Fig. 705]
Along the Atlantic Coast from Prince Edward Island south to Virginia, west to Ohio, Illinois, Alberta and Idaho (Miller, 1966); north to near the Arctic Coast in the Ungava, Coppermine River and Mackenzie River districts (Clarke, 1973).

Subgenus *Armiger* Hartmann 1840

Gyraulus (Armiger) crista (Linnaeus 1758) [Fig. 706]
Holarctic. In North America from Ontario and Maine to Minnesota, northwestern Northwest Territories and Alaska (Clarke, 1973).

Subgenus *Torquis* Dall 1905

Gyraulus (Torquis) circumstriatus (Tryon 1866) [Fig. 707]
Connecticut north to Quebec, west to Alberta and south in the Rocky Mountains to New Mexico (Clarke, 1973).
Gyraulus (Torquis) hornensis F.C. Baker 1934[48] [Fig. 708]
Mackenzie River region west of Great Slave Lake; western Ontario, Wisconsin and North Dakota (F.C. Baker, 1934).
Gyraulus (Torquis) parvus (Say 1817) [Fig. 709]
North America, from Alaska and northern Canada to Cuba and from the Atlantic to the Pacific Coast (Taylor, 1960).

Tribe Drepanotremini[49]

Genus *Drepanotrema* Fischer & Crosse 1880

Subgenus *Antillorbis* Harry & Hubendick 1964

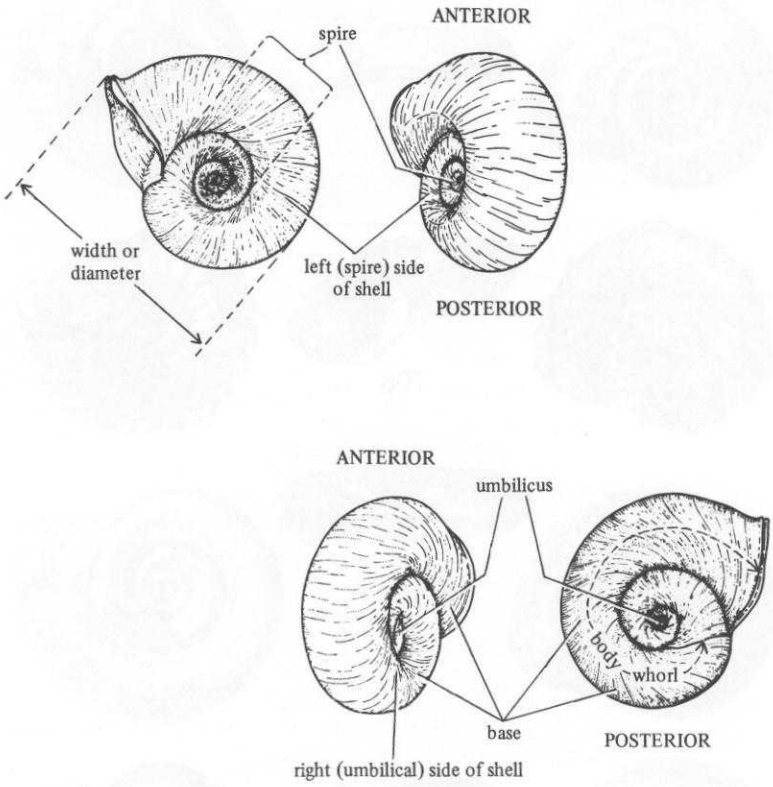
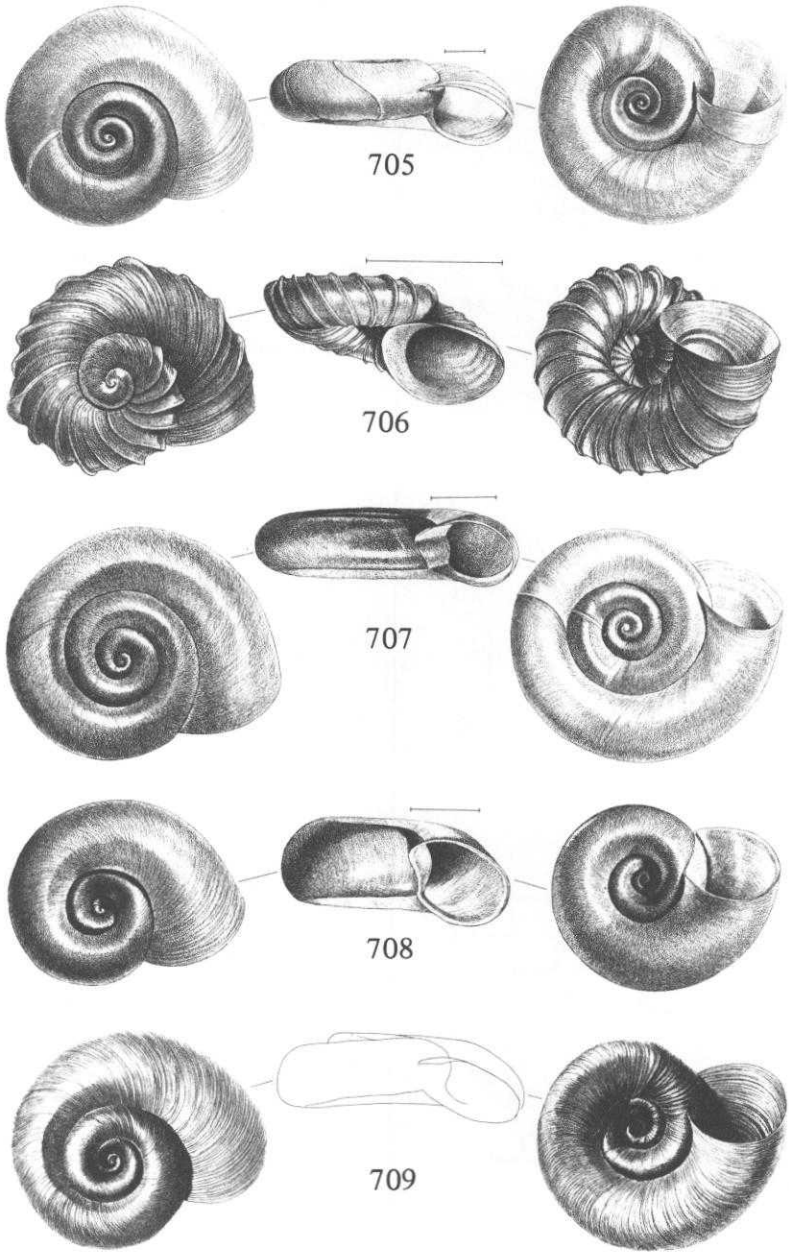
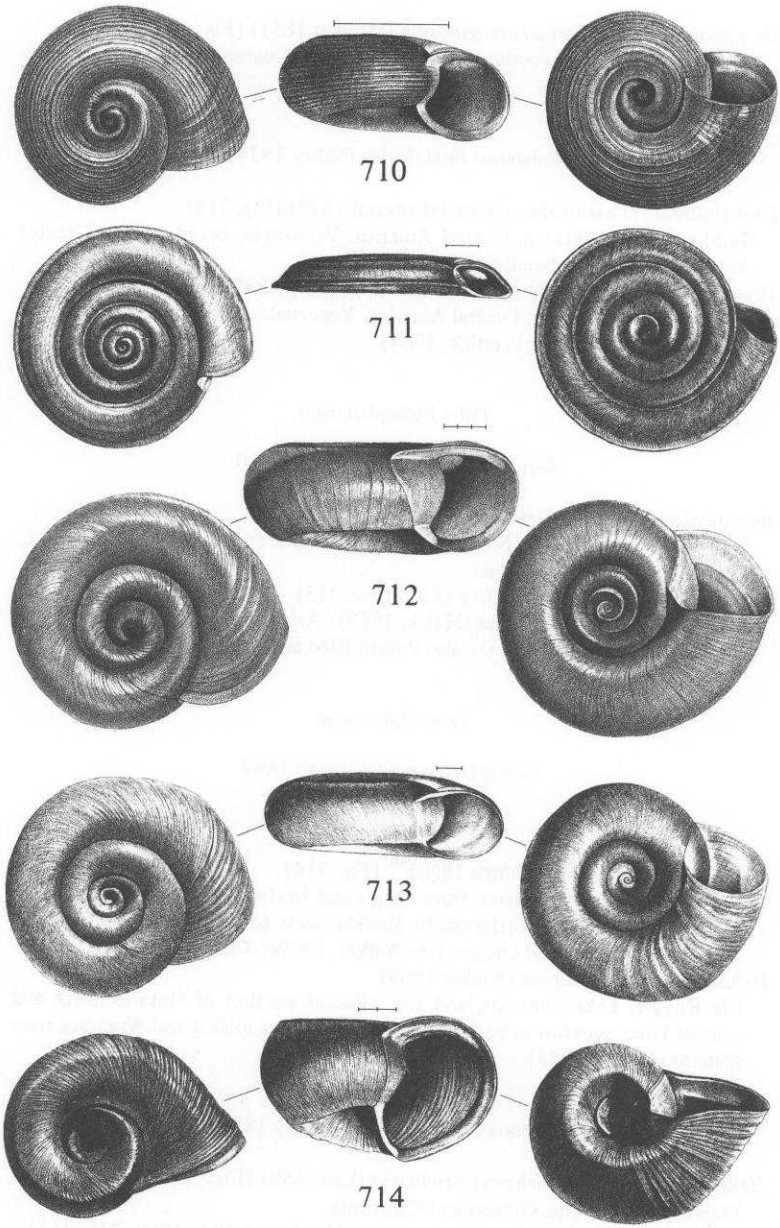


FIG. 704. Terminology of a planorbid shell.



FIGS. 705-709. Shells of Planorbidae (Planorbinae, Planorbini). FIG. 705. *Gyraulus deflectus*, umbilical, apertural and spire views (left to right). FIG. 706. *G. (Armiger) crista*. FIG. 707. *G. (Torquis) circumstriatus*. FIG. 708. *G. (T.) hornensis*. FIG. 709. *G. (T.) parvus*. Measurement lines = 1 mm.



FIGS. 710-714. Shells of Planorbidae (Planorbinae, Drepanotremini, Biomphalariini and Helisomini). FIG. 710. *Drepanotrema (Antillorbis) aeruginosum*, umbilical, apertural and spire views (left to right). FIG. 711. *D. (Fossulorbis) kermatoides*. FIG. 712. *Biomphalaria glabrata*. FIG. 713. *B. havanensis*. FIG. 714. *Helisoma anceps anceps*. Measurement lines = 1 mm or are divided into millimeters.

Drepanotrema (Antillorbis) aeruginosum (Morelet 1851) [Fig. 710]
Southern Texas and southern Arizona, Mexico, Guatemala and Antilles (Bequaert & Miller, 1973).

Subgenus *Fossulorbis* Pilsbry 1934

Drepanotrema (Fossulorbis) cimex (Moricand 1839) [Fig. 715]
Southern Texas, Mexico, Central America, Venezuela, Brazil and the Greater Antilles (Harry & Hubendick, 1964).
Drepanotrema (Fossulorbis) kermatoides (d'Orbigny 1835) [Fig. 711]
Florida, Texas, Mexico, Central America, Venezuela, Peru, Brazil and the Lesser Antilles (Harry & Hubendick, 1964).

Tribe Biomphalariini

Genus *Biomphalaria* Preston 1910

Biomphalaria glabrata (Say 1818) [Fig. 712]
West Indies, Venezuela, Surinam, French Guiana and Brazil (Barbosa et al., 1968); introduced to Florida.
Biomphalaria havanensis (Pfeiffer 1839) [Fig. 713]
Florida, Louisiana and Texas (Malek, 1969); Arizona, Mexico, Central America (Bequaert & Miller, 1973); also Puerto Rico and Cuba.

Tribe Helisomini

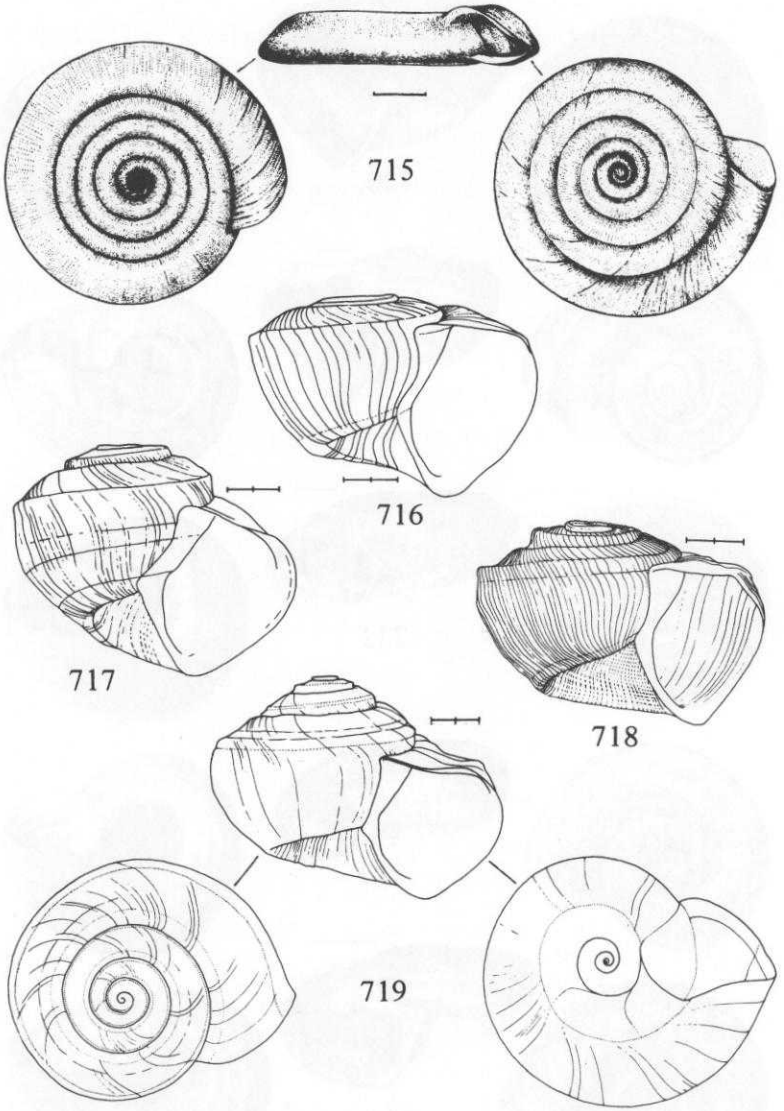
Genus *Helisoma* Swainson 1840

Subgenus *Helisoma* s.s.

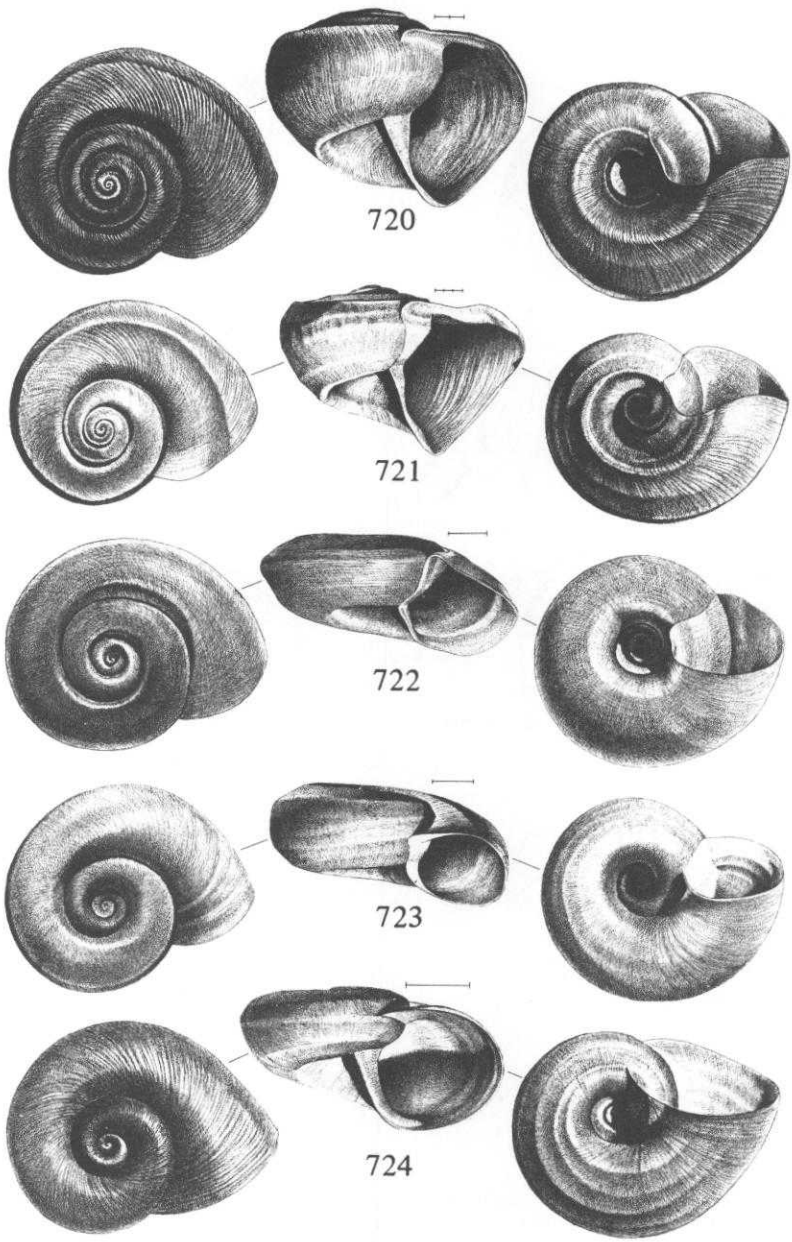
Helisoma anceps anceps (Menke 1830)[50] [Fig. 714]
Throughout North America from James and Hudson bays south to Georgia, Alabama, Texas and northwestern Mexico, west to southwestern Northwest Territories, Alberta and Oregon (see Walker, 1909e; Clarke, 1973).
Helisoma anceps royalense (Walker 1909)
Isle Royale, Lake Superior, and the adjacent portion of Ontario north and west of Lake Superior in parts of the Albany, Attawapiskat and Winnipeg river systems (Clarke, 1973).

Subgenus *Carinifex* W.G. Binney 1865[51]

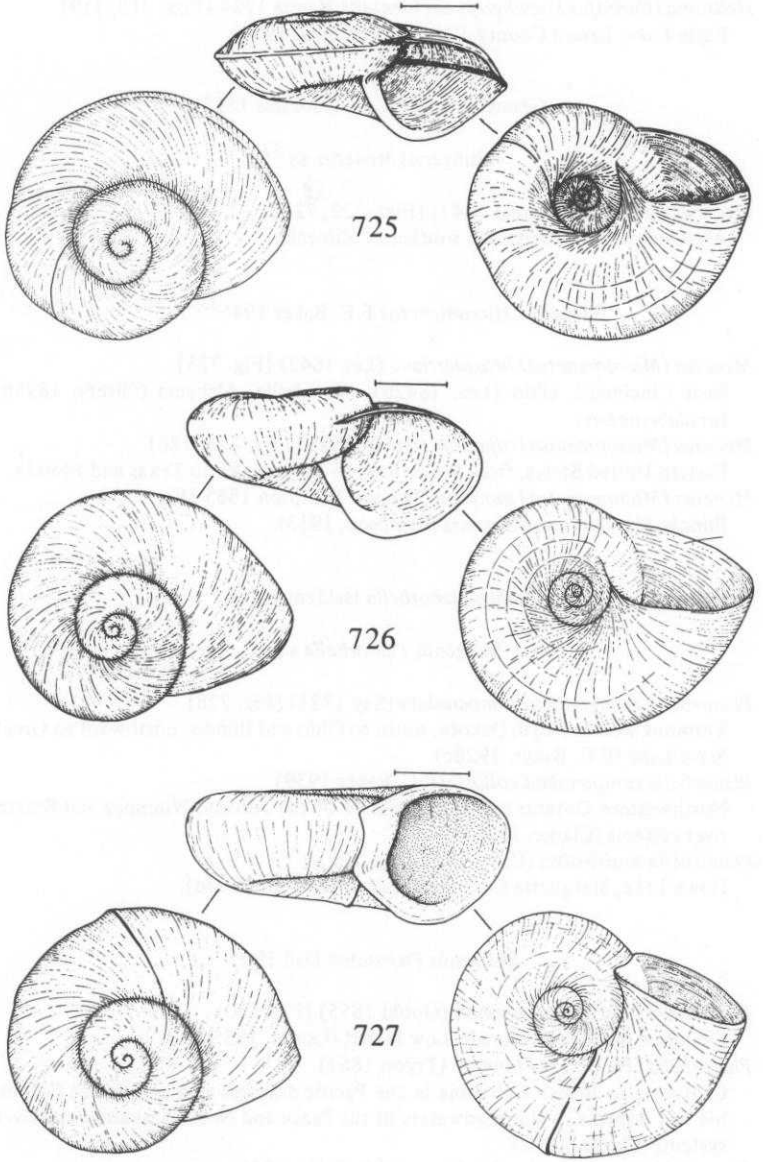
Helisoma (Carinifex) newberryi newberryi (Lea 1858) [Figs. 720, 721]
Idaho, Utah, Nevada, Oregon and California.
Helisoma (Carinifex) newberryi jacksonensis Henderson 1932 [Figs. 716, 717]
Jackson Lake, Wyoming (Henderson, 1932a).



FIGS. 715-719. Shells of Planorbidae (Planorbinae, Drepanotremini and Helisomini). FIG. 715. *Drepanotrema (Antillorbis) cimex*, umbilical, apertural and spire views (left to right). FIG. 716. *Helisoma (Carinifex) newberryi jacksonensis*. FIG. 717. *H. (C.) newberryi jacksonensis*. FIG. 718. *H. (C.) newberryi occidentalis*. FIG. 719. *H. (C.) newberryi occidentalis*. Measurement lines = 1 mm or are divided into millimeters. FIG. 715 is from Barbosa et al. (1968).



FIGS. 720-724. Shells of Planorbidae (Planorbinae, Helisomini). FIG. 720. *Helisoma (Carinifex) newberryi newberryi*, umbilical, apertural and spire views (left to right). FIG. 721. *H. (C.) newberryi newberryi* form *ponsonbyi*. FIG. 722. *Menetus opercularis*. FIG. 723. *M. opercularis* ? form *callioglyptus*. FIG. 724. *M. (Micromenetus) dilatatus*. Measurement lines = 1 mm or are divided into millimeters.



FIGS. 725-727. Shells of Planorbidae (Planorbinae, Helisomini). FIG. 725. *Menetus (Micromenetus) brogniartiana*, umbilical, apertural and spire views (left to right). FIG. 726. *Me. (Mi.) dilatatus*. FIG. 727. *Me. (Mi.) sampsoni*. Measurement lines = 1 mm.

Helisoma (Carinifex) newberryi occidentalis Hanna 1924 [Figs. 718, 719]
Eagle Lake, Lassen County, California (Hanna, 1924).

Genus *Menetus* H. & A. Adams 1855

Subgenus *Menetus* s.s.[52]

Menetus opercularis (Gould 1847) [Figs. 722, 723]
Alaska south to Alberta and southern California.

Subgenus *Micromenetus* F.C. Baker 1945[53, 54, 55]

Menetus (Micromenetus) brogniartiana (Lea 1842) [Fig. 725]
Near Cincinnati, Ohio (Lea, 1842b); Woodville, Alabama (Pilsbry, 1895b; for *alabamensis*).
Menetus (Micromenetus) dilatatus (Gould 1841 [Figs. 724, 726]
Eastern United States, from Maine west to Iowa, south to Texas and Florida.
Menetus (Micromenetus) sampsoni 'Ancey' Sampson 1885 [Fig. 727]
Illinois, Missouri and Arkansas (Sampson, 1913).

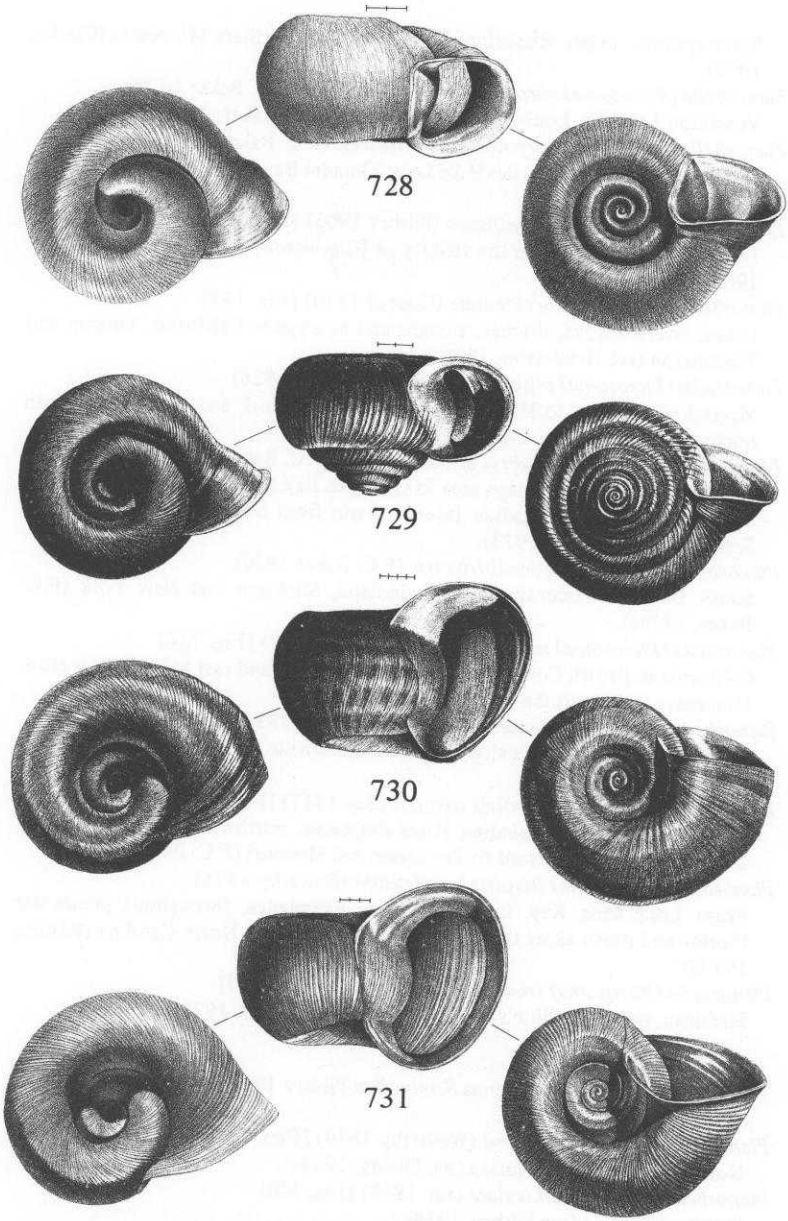
Genus *Planorbella* Haldeman 1842

Subgenus *Planorbella* s.s.[56]

Planorbella campanulata campanulata (Say 1821) [Fig. 728]
Vermont west to North Dakota, south to Ohio and Illinois, northward to Great Slave Lake (F.C. Baker, 1928c).
Planorbella campanulata collinsi (F.C. Baker 1939)
Northwestern Ontario in the headwaters of the Albany, Winnipeg and Severn river systems (Clarke, 1973).
Planorbella multivolvis (Case 1847) [Fig. 729]
Howe Lake, Marquette County, Michigan (Walker, 1907d).

Subgenus *Pierosoma* Dall 1905

Planorbella (Pierosoma) ammon (Gould 1855) [Fig. 730]
Cienaga Grande, or Colorado Low Desert (Gould, 1855a).
Planorbella (Pierosoma) binneyi (Tryon 1867)
California to British Columbia in the Pacific drainage area and British Columbia and Alberta in the headwaters of the Peace and North Saskatchewan river systems (Clarke, 1973).
Planorbella (Pierosoma) columbiense (F.C. Baker 1945)
Lac La Hache, Cariboo District, British Columbia (F.C. Baker, 1945).
Planorbella (Pierosoma) corpulentum corpulentum (Say 1824)
Western Ontario, eastern Manitoba and northern Minnesota in the Winnipeg



FIGS. 728-731. Shells of Planorbidae (Planorbinae, Helisomini). FIG. 728. *Planorbella campanulata campanulata*, umbilical apertural and spire views (left to right). FIG. 729. *P. multivolvis*. FIG. 730. *Pl. (Pierosoma) ammon*. FIG. 731. *Pl. (Pi.) pilsbryi infracarinatum*. Measurement lines are divided into millimeters.

River system; upper Mississippi River system in northern Minnesota (Clarke, 1973).

Planorbella (Pierosoma) corpulentum vermilionense (F.C. Baker 1929)
Vermilion Lake, St. Louis County, Minnesota (F.C. Baker, 1929b).

Planorbella (Pierosoma) corpulentum whiteavesi (F.C. Baker 1932)
Greenwater Lake and Lac des Mille Lacs, Thunder Bay District, Ontario (Clarke, 1973).

Planorbella (Pierosoma) magnificum (Pilsbry 1903) [Fig. 732]
Lower Cape Fear River in the vicinity of Wilmington, North Carolina (Pilsbry, 1903b).

Planorbella (Pierosoma) occidentale (Cooper 1870) [Fig. 733]
Lakes, rivers, creeks, ditches, sloughs and swamps in California, Oregon and Washington (see Henderson, 1936c).

Planorbella (Pierosoma) pilsbryi pilsbryi (F.C. Baker 1926)
Massachusetts west to Minnesota, northern New York and central Wisconsin northward (F.C. Baker, 1928c).

Planorbella (Pierosoma) pilsbryi infracarinatum (F.C. Baker 1932) [Fig. 731]
St. Lawrence River drainage area in Georgian Bay and the St. Lawrence River and Rideau River; Canadian Interior Basin from eastern Ontario to central Saskatchewan (Clarke, 1973).

Planorbella (Pierosoma) pseudotrivolvis (F.C. Baker 1920)
South Dakota, Wisconsin, Illinois, Indiana, Michigan and New York (F.C. Baker, 1928c).

Planorbella (Pierosoma) subcrenatum (Carpenter 1857) [Fig. 734]
California to British Columbia and Yukon Territory and east to Utah, Colorado, Minnesota and Manitoba (Clarke, 1973).

Planorbella (Pierosoma) tenue (Dunker 1850) [Fig. 735]
Texas, Arizona, New Mexico, southern California and Mexico (Bequaert & Miller, 1973).

Planorbella (Pierosoma) trivolvis trivolvis (Say 1817) [Fig. 736]
Atlantic Coast and Mississippi River drainages, northward to Arctic Canada and Alaska, and southward to Tennessee and Missouri (F.C. Baker, 1928c).

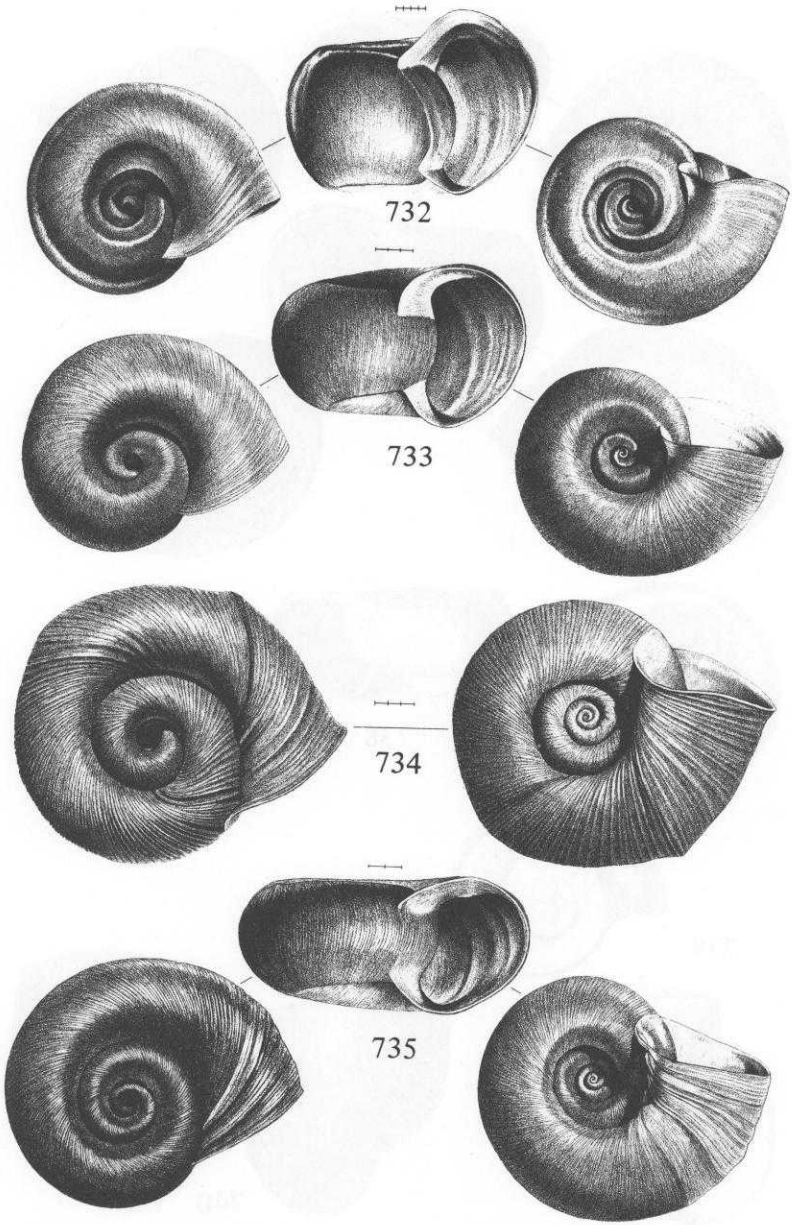
Planorbella (Pierosoma) trivolvis intertextum (Sowerby 1878)
From Long Pine Key, in the southern Everglades, throughout peninsular Florida and north along the coast to Lake Waccamaw, North Carolina (Pilsbry, 1934a).

Planorbella (Pierosoma) truncatum (Miles 1861) [Fig. 737]
Michigan, northern Illinois, and Wisconsin (F.C. Baker, 1928c).

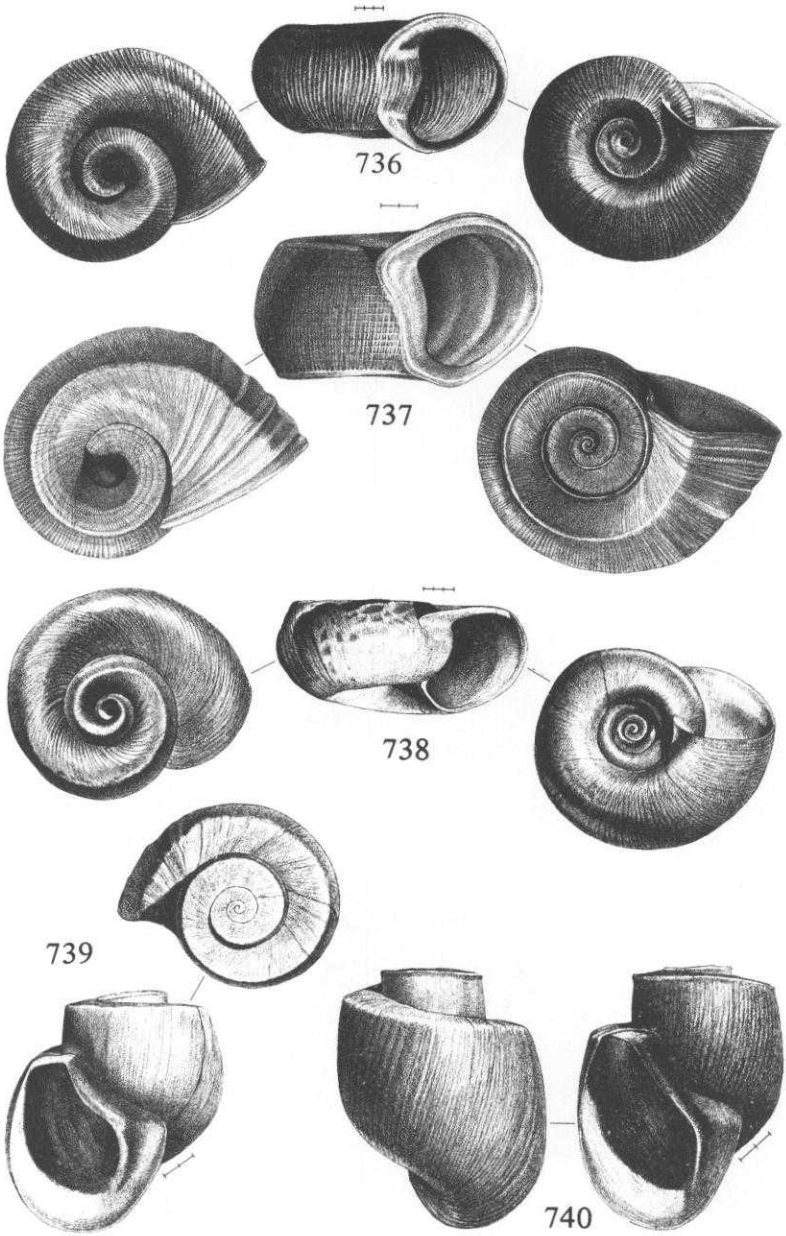
Subgenus *Seminolina* Pilsbry 1934

Planorbella (Seminolina) duryi (Wetherby 1879) [Figs. 738, 739]
Northern to southern Florida (see Pilsbry, 1934a).

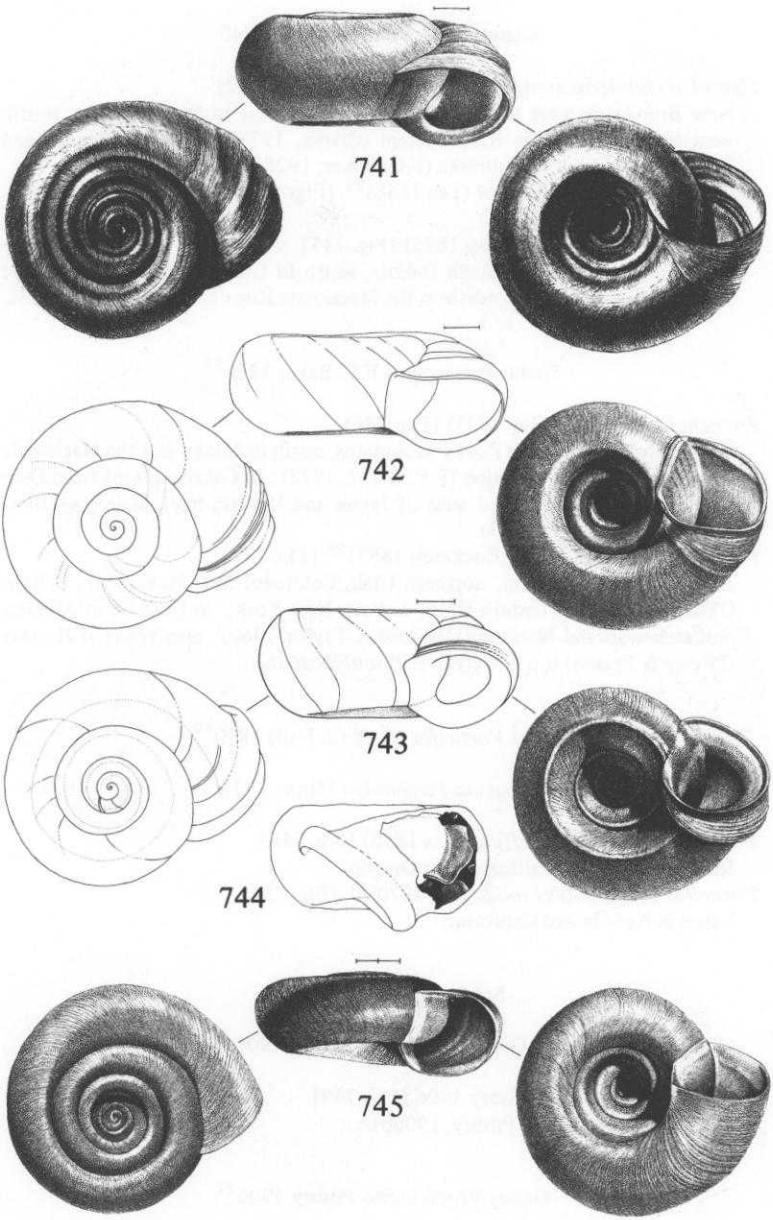
Planorbella (Seminolina) scalare (Jay 1839) [Fig. 740]
Southern Florida (see Pilsbry, 1934a).



FIGS. 732-735. Shells of Planorbidae (Planorbinae, Helisomini). FIG. 732. *Planorbella (Pierosoma) magnificum*, umbilical, apertural and spire views (left to right). FIG. 733. *Pl. (Pi.) occidentale*. FIG. 734. *Pl. (Pi.) subcrenatum*. FIG. 735. *Pl. (Pi.) tenue*. Measurement lines are divided into millimeters.



FIGS. 736-740. Shells of Planorbidae (Planorbinae, Helisomini). FIG. 736. *Planorbella (Pierosoma) trivolvis trivolvis*, umbilical, apertural and spire views (left to right). FIG. 737. *Pl. (Pi.) truncatum*. FIG. 738. *Pl. (Seminolina) duryi*. FIG. 739. *Pl. (S.) duryi* form *seminole*. FIG. 740. *Pl. (S.) scalare*. Measurement lines are divided into millimeters.



FIGS. 741-745. Shells of Planorbidae (Planorbinae, Helisomini). FIG. 741. *Planorbella armigera armigera*, umbilical, apertural and spire views (left to right). FIG. 742. *P. jenksii* = *P. armigera armigera*. FIG. 743. *P. armigera wheatleyi*. FIG. 744. *P. armigera wheatleyi*, showing lamellae in body whorl. FIG. 745. *P. campestris*. Measurement lines = 1 mm or are divided into millimeters.

Genus *Planorbula* Haldeman 1840

Planorbula armigera armigera (Say 1821) [Figs. 741, 742]
New Brunswick west to southeastern Ontario, west to Saskatchewan, northwest to the Mackenzie River system (Clarke, 1973); south to Georgia and Louisiana and west to Nebraska (F.C. Baker, 1928c).
Planorbula armigera wheatleyi (Lea 1858)[57] [Figs. 743, 744]
Alabama and Florida.
Planorbula campestris (Dawson 1875) [Fig. 745]
Southern Manitoba and North Dakota, south to Utah and New Mexico, west to British Columbia, and north to the Mackenzie River system (Clarke, 1973).

Genus *Promenetus* F.C. Baker 1935[58]

Promenetus exacuous (Say 1821) [Fig. 746]
United States east of the Rocky Mountains, north to Alaska and the Mackenzie River, south to New Mexico (F.C. Baker, 1928); in Canada absent from Quebec, but widely distributed west of James and Hudson bays, mainly south of the tree-line (Clarke, 1973).
Promenetus umbilicatellus (Cockerell 1887)[59] [Fig. 747]
Alaska south to Oregon, northern Utah, Colorado, New Mexico and eastern Oklahoma, east to eastern Ohio, western New York; in Canada, in Alberta, Saskatchewan and Manitoba (Hibbard & Taylor, 1960); also Texas, if *P. carus* (Pilsbry & Ferriss) is a synonym of *P. umbilicatellus*.

Genus *Vorticifex* Meek (in Dall) 1870[60]

Subgenus *Parapholyx* Hanna 1922

Vorticifex (Parapholyx) effusa (Lea 1856) [Fig. 748]
Rivers and lakes in California and Oregon.
Vorticifex (Parapholyx) solida Dall 1870)[61] [Fig. 751]
Lakes in Nevada and California.

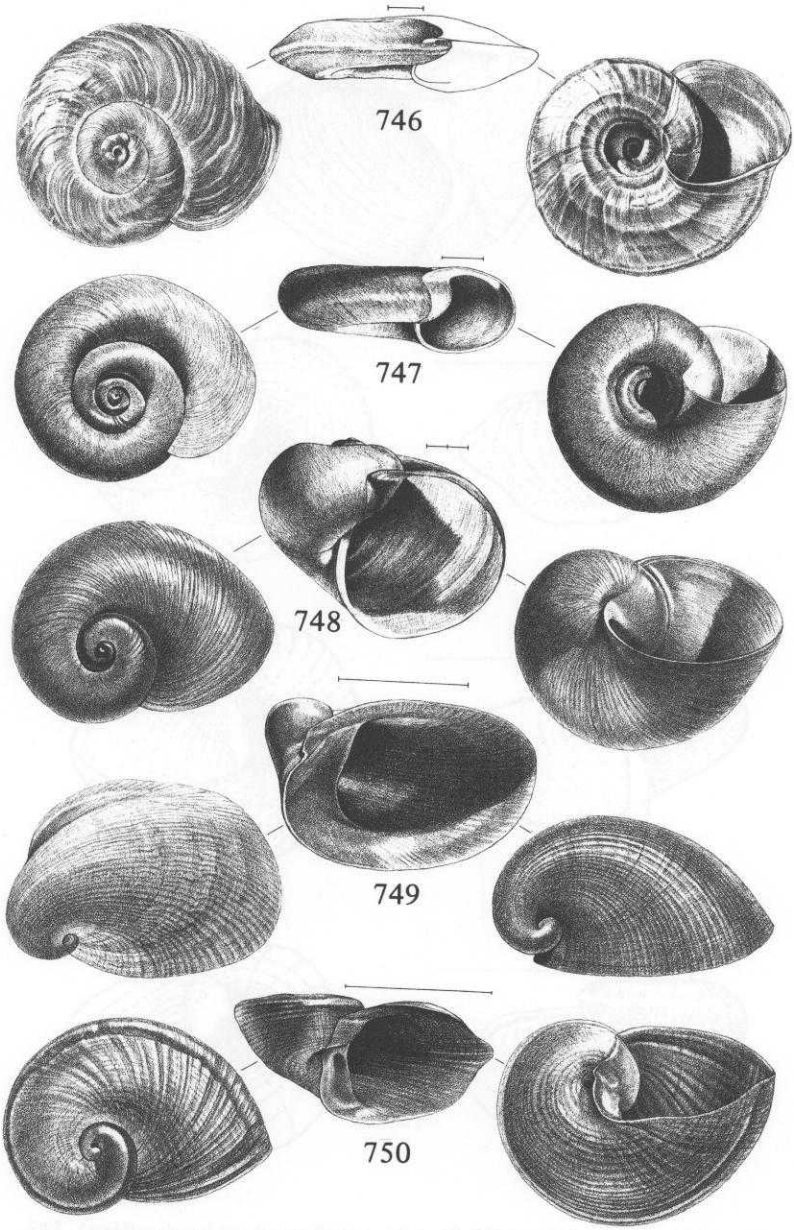
Subfamily Neoplanorbinae

Genus *Amphigyra* Pilsbry 1906

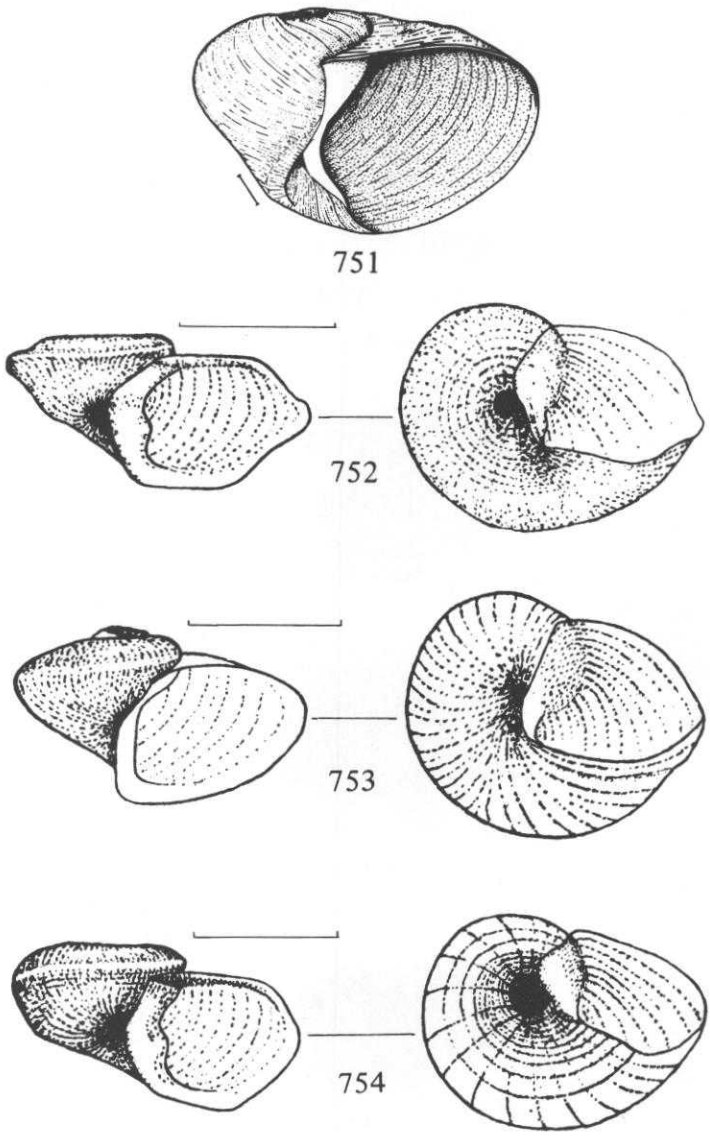
Amphigyra alabamensis Pilsbry 1906 [Fig. 749]
Coosa River, Alabama (Pilsbry, 1906b).

Genus *Neoplanorbis* Pilsbry 1906[62]

Neoplanorbis carinatus Walker 1908 [Fig. 752]
Coosa River, Alabama (Walker, 1908c).



FIGS. 746-750. Shells of Planorbidae (Planorbinae (Helisomini) and Neoplanorbinae). FIG. 746. *Promenetus exacuous*, umbilical, apertural and spire views (left to right). FIG. 747. *P. umbilicatellus*. FIG. 748. *Vorticifex (Parapholyx) effusa*. FIG. 749. *Amphigyra alabamensis*. FIG. 750. *Neoplanorbis tantillus*. Measurement lines = 1 mm or are divided into millimeters.



FIGS. 751-754. Shells of Planorbidae (Planorbinae (Helisomini) and Neoplanorbinae). FIG. 751. *Vorticifex (Parapholyx) solida* form *optima*. FIG. 752. *Neoplanorbis carinatus*. FIG. 753. *N. smithi*. FIG. 754. *N. umbilicatus*. Measurement lines = 1 mm.

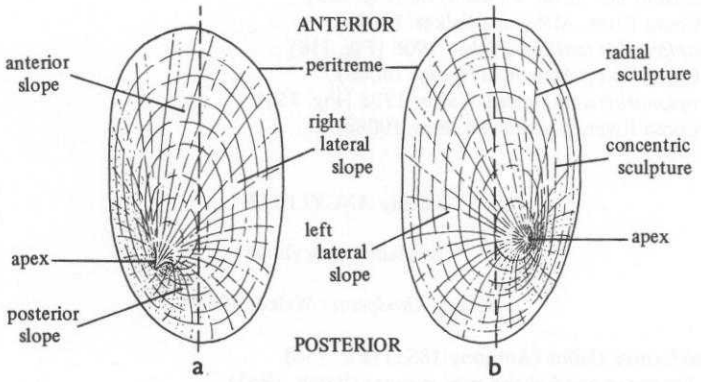
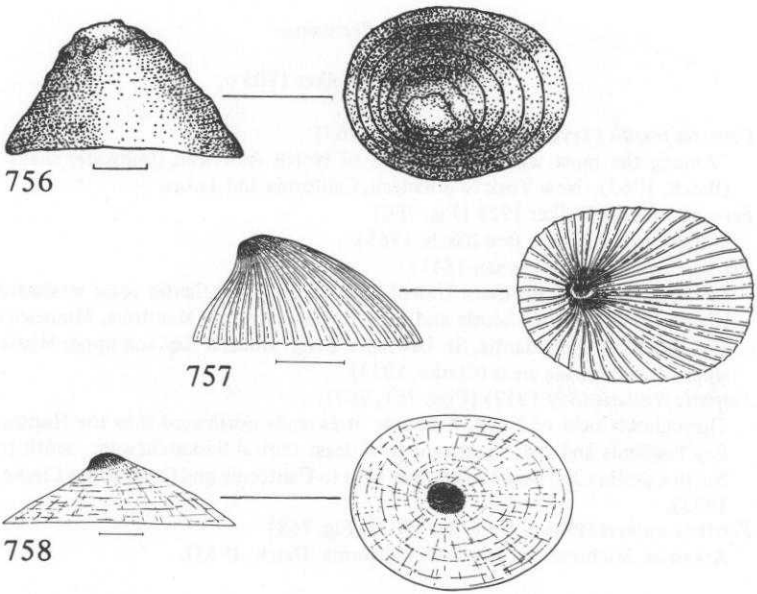


FIG. 755. Shell terminology of freshwater limpets. a, A dextral shell (note that the apex is directed to the *left*); b, a sinistral shell (note that the apex is directed to the *right*). "Radial" sculpture on ancyliform shells corresponds to "spiral" sculpture on coiled shells. "Concentric" sculpture on ancyliform shells corresponds to "transverse" sculpture on coiled shells; on freshwater limpets it usually consists only of growth lines.



FIGS. 756-758. Shells of Ancylidae (Ancylinae). FIG. 756. *Rhodacmea cahawbensis* = *R. elatior*. FIG. 757. *R. filosa*. FIG. 758. *R. rhodacme* = *R. hinkleyi*. Measurement lines = 1 mm. Fig. 756 is from Walker (1917b).

Neoplanorbis smithi Walker 1908 [Fig. 753]
Coosa River, Alabama (Walker, 1908c).
Neoplanorbis tantillus Pilsbry 1906 [Fig. 750]
Coosa River, Alabama (Pilsbry, 1906b).
Neoplanorbis umbilicatus Walker 1908 [Fig. 754]
Coosa River, Alabama (Walker, 1908c).

Family ANCYLIDAE

Subfamily Ancylinae

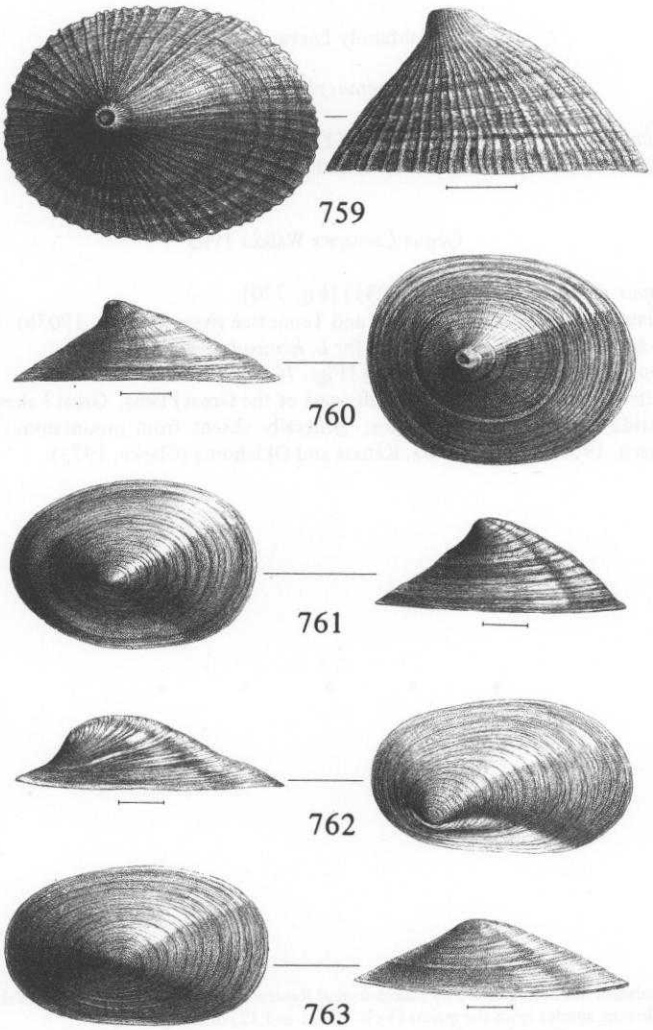
Genus *Rhodacmea* Walker 1917

Rhodacmea elatior (Anthony 1855) [Fig. 756]
Tennessee and Cahaba river systems (Basch, 1963).
Rhodacmea filosa (Conrad 1834) [Figs. 757, 759]
Black Warrior and Coosa rivers, Alabama, and tributaries; ? also in Tennessee River system (Basch, 1963).
Rhodacmea hinkleyi (Walker 1908) [Figs. 758, 760]
Coosa River, Alabama, and the Tennessee River drainage, extending irregularly northward to the southern borders of Illinois and Indiana (Basch, 1963).

Subfamily Ferrissinae

Genus *Ferrissia* Walker 1903

Ferrissia fragilis (Tryon 1863) [Figs. 764, 765]
"Among the most widely distributed of North American freshwater snails" (Basch, 1963); New York to Michigan, California and Texas.
Ferrissia mcneili Walker 1925 [Fig. 766]
Mobile area, Alabama (see Basch, 1963).
Ferrissia parallelus (Haldeman 1841)
In Canada and the northern United States from the Atlantic coast westward (Basch, 1963); Nova Scotia and New England west to Manitoba, Minnesota and Illinois in the Atlantic, St. Lawrence River, Hudson Bay and upper Mississippi River drainage areas (Clarke, 1973).
Ferrissia rivularis (Say 1817) [Figs. 761, 767]
Throughout most of North America; it extends northward into the Hudson Bay lowlands and northwestward to at least central Saskatchewan; south to North Carolina and New Mexico and west to California and Oregon (see Clarke, 1973).
Ferrissia walkeri (Pilsbry & Ferriss 1907) [Fig. 768]
Arkansas, Michigan and southern California (Basch, 1963).



FIGS. 759-763. Shells of Ancylidae (Ancylinae, Ferrissinae and Laevapecinae). FIG. 759. *Rhodacmea filosa*. FIG. 760. *R. rhodacme* = *R. hinkleyi*. FIG. 761. *Ferrissia rivularis*. FIG. 762. *Hebetancylus excentricus*. FIG. 763. *Laevapex fuscus*. Measurement lines = 1 mm.

Subfamily Laevapecinae

Genus *Hebetancylus* Pilsbry 1914

Hebetancylus excentricus (Morelet 1851) [Figs. 762, 769]
Central America; Georgia, Florida and Texas (Basch, 1963).

Genus *Laevapex* Walker 1903

Laevapex diaphanus (Haldeman 1841) [Fig. 770]
Delaware, Illinois, Ohio, Holston and Tennessee rivers (Walker, 1903b); Georgia and Alabama (Walker, 1908d, for *L. hemisphaericus*).
Laevapex fuscus (C.B. Adams 1841) [Figs. 763, 771]
United States and Canada, generally east of the Great Plains; Great Lakes area, Florida and southeastern states; generally absent from mountainous areas (Basch, 1963); west to Iowa, Kansas and Oklahoma (Clarke, 1973).

* * * * *

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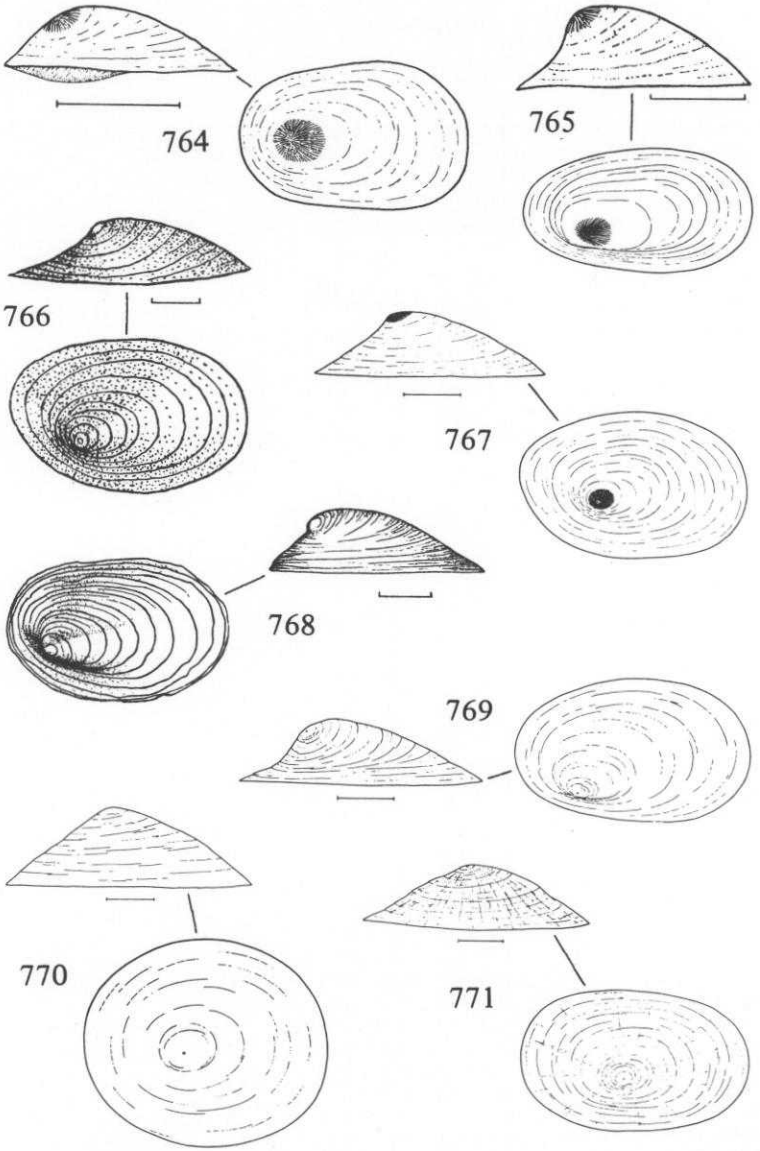
Viviparidae: *Campeloma brevispirum, Ca. coarctatum, Ca. decampi, Ca. geniculum, Ca. obesum, Cipangopaludina chinensis malleatus, Ci. japonicus, Lioplax pilsbryi, L. subcarinata, Tulotoma angulata, T. magnifica, Viviparus georgianus* and *V. subpurpureus.*

Pleuroceridae: *Elimia striatula, E. strigosa, Pleurocera acuta acuta, P. annuliferum, P. brumbyi, P. canaliculatum undulatum, P. currierianum, P. nobile nobile, P. pyrenellum, P. trochiformis, P. unciale unciale, P. vestitum, P. viridulum, P. (Strephobasis) curtum curtum* and *P. (S.) walkeri.*

Physidae: *Physa skinneri, Physella columbiana, P. gyrina gyrina* morph *elliptica, P. gyrina ampullacea, P. gyrina aurea, P. gyrina cylindrica, P. gyrina sayi, P. parkeri latchfordi, P. (Costatella) costata, P. (C.) integra brevispira, P. (C.) johnsoni, P. (C.) osculans, P. (C.) squalida, P. (C.) virgata virgata, P. (C.) virgata virgata* morph *parva, P. (C.) virgata concolor* and *Aplexa elongata.*



FIGS. 764-771. Shells of Ancylidae (Ferrissinae and Laevapecinae). FIG. 764. *Ferrissia californica* = *F. fragilis*. FIG. 765. *F. shimeki* = *F. fragilis*. FIG. 766. *F. mcneili*. FIG. 767. *F. rivularis*. FIG. 768. *F. walkeri*. FIG. 769. *Hebetancylus excentricus*. FIG. 770. *Laevapex diaphanus*. FIG. 771. *L. fuscus*. Measurement lines = 1 mm. Fig. 766 is from Walker (1925b); Fig. 768 is from Pilsbry & Ferriss (1907).