



**FLORIDA
MUSEUM**
OF NATURAL HISTORY®

BULLETIN

**ANNOTATED SYNONYMY OF THE RECENT FRESHWATER
MUSSEL TAXA OF THE FAMILIES MARGARITIFERIDAE AND
UNIONIDAE DESCRIBED FROM FLORIDA AND DRAINAGES
CONTIGUOUS WITH ALABAMA AND GEORGIA**

James D. Williams, Robert S. Butler, and Jason M. Wisniewski

Vol. 51, No. 1, pp. 1–84

2011

UNIVERSITY OF FLORIDA

GAINESVILLE

The **FLORIDA MUSEUM OF NATURAL HISTORY** is Florida's state museum of natural history, dedicated to understanding, preserving, and interpreting biological diversity and cultural heritage.

The **BULLETIN OF THE FLORIDA MUSEUM OF NATURAL HISTORY** is a peer-reviewed journal that publishes results of original research in zoology, botany, paleontology, archaeology, and museum science. The Bulletin is published at irregular intervals, and volumes are not necessarily completed in any one year. Volumes contain between 150 and 300 pages, sometimes more. The number of papers contained in each volume varies, depending upon the number of pages in each paper, but four numbers is the current standard. Multi-author issues of related papers have been published together, and inquiries about putting together such issues are welcomed. Address all inquiries to the Managing Editor of the Bulletin.

Richard C. Hulbert Jr., *Editor*

Bulletin Committee

Ann S. Cordell

Richard C. Hulbert Jr.

Jacqueline Miller

Larry M. Page

Roger W. Portell, *Treasurer*

Irvy R. Quitmyer

David W. Steadman, *Ex officio Member*

ISSN: 0071-6154

Copyright © 2011 by the Florida Museum of Natural History, University of Florida. All rights reserved. Text, images and other media are for nonprofit, educational, and personal use of students, scholars, and the public. Any commercial use or republication by printed or electronic media is strictly prohibited without written permission of the museum.

Publication Date: December 21, 2011 Price: \$20.00

**Send communications concerning purchase or exchange
of this publication and manuscript queries to:**

Managing Editor of the Bulletin
Florida Museum of Natural History
University of Florida
P.O. Box 117800
Gainesville, FL 32611-7800 USA

FAX: 352-846-0287
Email: bulletin@flmnh.ufl.edu

ANNOTATED SYNONYMY OF THE RECENT FRESHWATER MUSSEL TAXA OF THE FAMILIES MARGARITIFERIDAE AND UNIONIDAE DESCRIBED FROM FLORIDA AND DRAINAGES CONTIGUOUS WITH ALABAMA AND GEORGIA

JAMES D. WILLIAMS¹, ROBERT S. BUTLER², and
JASON M. WISNIEWSKI³

ABSTRACT

Freshwater habitats of the southeastern U.S. support a high diversity of mussels in the families Margaritiferidae and Unionidae, order Unionoida. River systems of Florida and drainages contiguous with Alabama and Georgia are known to be inhabited by 65 mussel species, representing about 20% of the North American fauna north of Mexico. This diversity led early naturalists to describe a large number of species which were based primarily on shell characters. There are 149 nominal taxa described from the study area, 72 (48%) in Florida, 68 (46%) in Georgia, and nine (6%) in Alabama. Most of the Florida taxa were described from the St. Johns River drainage. In Georgia, the majority of taxa were described from the Chattahoochee and Flint River drainages. Type localities were restricted herein for several taxa with vague specimen collection information reported in the original description. Of the 149 taxa described from the study area, it was determined that 41 (28%) are valid species. This represents 64% of the recognized mussel fauna that occur in the study area. The remaining 23 (35%) recognized species in the study area were described from outside drainages, and one (1%) species is undescribed. There are 40 described and one undescribed species endemic to the study area.

Key Words: freshwater mussels; Unionoida; Margaritiferidae; Unionidae; Florida; Alabama; Georgia; synonymy

TABLE OF CONTENTS

Introduction.....	2
Study Area.....	2
Methods.....	2
Results and Discussion	4
Annotated Synonymy.....	10
Acknowledgments.....	78
Literature Cited	79

¹Florida Museum of Natural History, Dickinson Hall, University of Florida, Gainesville, FL 32611, and Florida Fish and Wildlife Conservation Commission, 7922 NW 71st Street, Gainesville, FL 32653, <fishwilliams@gmail.com>

²U.S. Fish and Wildlife Service, 160 Zillicoa Street, Asheville, NC 28801, <bob_butler@fws.gov>

³Georgia Department of Natural Resources, Nongame Conservation, 2065 U.S. Highway 278 SE, Social Circle, GA 30025, <jason_wisniewski@dnr.state.ga.us>

INTRODUCTION

The most biologically diverse drainages for freshwater mussels of the bivalve order Unionoida in North America are found in the southeastern U.S. An important element of this diversity is located in Florida and drainages contiguous with Alabama and Georgia. Major river drainages (west to east from the Perdido to the Suwannee and southward from the St. Marys to the Kissimmee) include Perdido, Escambia, Yellow, Choctawhatchee, Chipola, Apalachicola, Chattahoochee, Flint, Ochlockonee, Suwannee, St. Marys, St. Johns, Withlacoochee, Hillsborough, Peace, and Kissimmee (Fig. 1). Collectively, there are 65 mussel species, representing about 20% of the North American fauna north of Mexico, known to inhabit the study area drainages. There are 41 species (64%), 40 described and 1 undescribed, endemic to these drainages.

High biodiversity in the region attracted naturalists from the east coast beginning in the early 19th century. Early conchologists either personally made expeditions to the area or had colleagues collect material and ship it to them for examination. Freshwater mussels were abundant and displayed an amazing array of shapes and colors. This diversity led early naturalists to describe a large number of species that were based solely on highly variable shell characters. The typological species concept was prevalent among taxonomists during the 1800s and early 1900s. This concept allowed only for a limited amount of intraspecific variation and anything beyond those narrow limits was often described as a new species.

The major goals of this study were to compile Margaritiferidae and Unionidae taxa described from Florida and drainages contiguous with Alabama and Georgia, determine taxonomic validity of each species, and establish the appropriate binomial. An analysis of temporal and spatial data, author, and museum information associated with each nominal taxon are included. Type localities were restricted herein in some cases where the original specimen collection information was vague.

STUDY AREA

The geographic area covered by this study includes

Florida and drainages contiguous with Alabama and Georgia (Fig. 1). This study area encompasses all drainages from the Perdido River, which comprises the western border of Florida with Alabama, east to the St. Marys River, the border between northeast Florida and southeast Georgia, and southward throughout peninsular Florida. All of these drainages are tributary to the Gulf of Mexico except those along the east coast of Florida from the St. Marys River south, which flow into the Atlantic Ocean. Kissimmee River, Lake Okeechobee, and Everglades drainages flow west into the Gulf of Mexico, south into Florida Bay and east into the Atlantic Ocean.

The study area lies almost entirely within the Coastal Plain Physiographic Province with the exception of the upper portions of the Chattahoochee and Flint rivers. These rivers primarily drain the Piedmont Physiographic Province except for a small portion of the Chattahoochee River headwaters, which are located in the Blue Ridge Physiographic Province. The boundary between the Piedmont and Coastal Plain provinces, the Fall Line, on the Chattahoochee River is in the vicinity of Phenix City, Russell County, Alabama, and Columbus, Muscogee County, Georgia. The Fall Line on the Flint River is north of Montezuma, Macon County, Georgia.

METHODS

The initial compilation of taxa described from the study area was extracted from a variety of publications. The primary among these were Simpson's synopsis (1900a) and catalog (1914) of pearly fresh-water mussels. Subsequent biographies and conchologist-specific taxon lists were checked for additional described species. These included published works of L. S. Frierson (Johnson 1972a), I. Lea (Scudder 1885; Johnson 1974), W. A. Marsh (Johnson 1975a), C. T. Simpson (Johnson 1975b), and B. H. Wright and S. H. Wright (Johnson 1967a). Museum catalogs examined for types included primarily those of American Museum of Natural History (AMNH) (Boyko & Sage 1996), Academy of Natural Sciences, Philadelphia (ANSP) (Johnson & Baker 1973; Johnson 1980), Museum

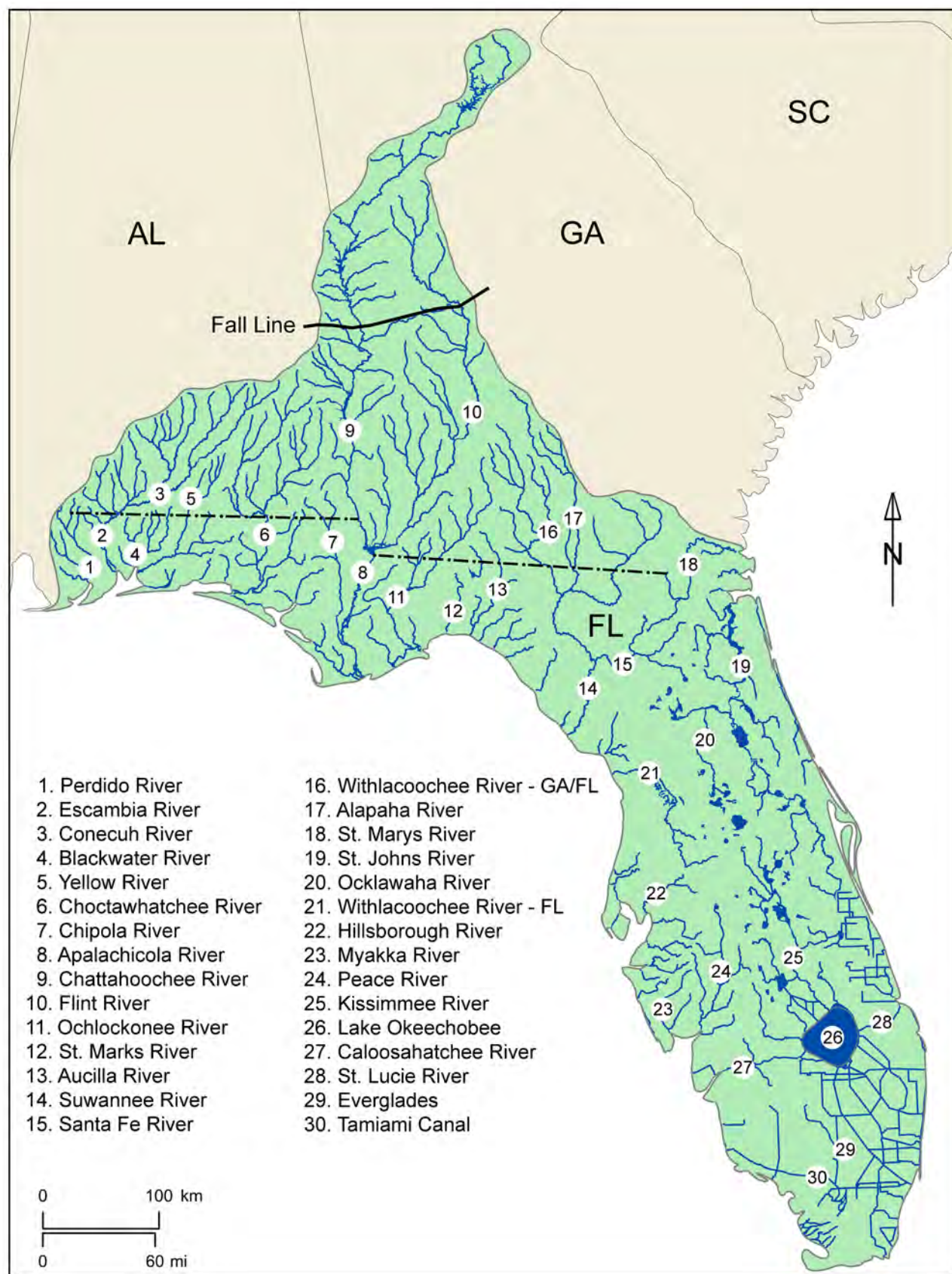


Figure 1. Major river drainages of Florida and adjacent areas in Alabama and Georgia. Rivers are identified from west to east from the Perdido to the Suwannee and southward from the St. Marys to the Tamiami Canal.

of Comparative Zoology (MCZ) (Johnson 1956), and University of Michigan Museum of Zoology (UMMZ) (Johnson 1979). Various other museum catalogs and publications were also checked for types from the study area.

Museums holding primary types from the study area are all located in North America and most were visited between 2008 and 2010 (Table 1). All extant type specimens were examined with the exception of one, *Unio sloatianus* Lea 1840, in the AMNH collection. Label information associated with the type specimen was compared to data in the original description and checked for accuracy. In addition, each type specimen was compared with illustrations published in the original description, subsequent elaborations on the original description, or type catalogs.

The Annotated Synonymy is arranged in alphabetical order by nominal taxon and followed by the binomen recognized herein. Recognition of species as valid is based primarily on our examination of type and nontype material, distribution patterns, and genetic data if available. Taxa considered valid generally agree with those recognized by Turgeon et al. (1998) with noted exceptions. Author, year of publication, and literature citation associated with the original description are presented for all taxa. The type specimen information, including status, museum number, sex (if known), and length if the specimen is extant are provided. The

type locality, date, and collector as reported in the original description are included. For species with restricted type localities, that information has been included along with the original data. In some cases information was added to the locality description for clarification and in these situations the supplementary text is enclosed in brackets. A comments section is also included for some taxa when needed for discussion of various subjects pertinent to the species. A copy of the figured type from the original description or a subsequent elaboration on the original description has been included for most species. However, some of the early drawings and black and white photographs that were of poor quality and did not reproduce well are not included. A recent photograph, taken by J. D. Williams unless otherwise indicated, has been included for the types of many species.

RESULTS AND DISCUSSION

There are 149 nominal taxa of Unionoida, one Margaritiferidae and 148 Unionidae, described from the study area (Table 2). Most of these were from Florida (72, 48%) and Georgia (68, 46%), with the remaining (9, 6%) from Alabama. Numbers of type localities by state reflect the relative drainage area in each state as well as access to major drainages in the 1800s and early 1900s. The type localities for the 149 nominal taxa with plottable sites are depicted in Figure 2.

Table 1. The following institutional abbreviations are used for museum collections housing primary type material referenced in the text. Those followed by an asterisk were not visited by the authors.

Abbreviation	Museum or Institution
AMNH*	American Museum of Natural History, New York, New York
ANSP	Academy of Natural Sciences, Philadelphia, Pennsylvania
CMNML*	Canadian Museum of Nature, Mollusks, Ottawa, Ontario (formerly National Museums of Canada)
MCZ	Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts
UF	University of Florida, Florida Museum of Natural History, Gainesville
UMMZ	University of Michigan Museum of Zoology, Ann Arbor
USNM	U.S. National Museum of Natural History, Smithsonian Institution, Washington, DC

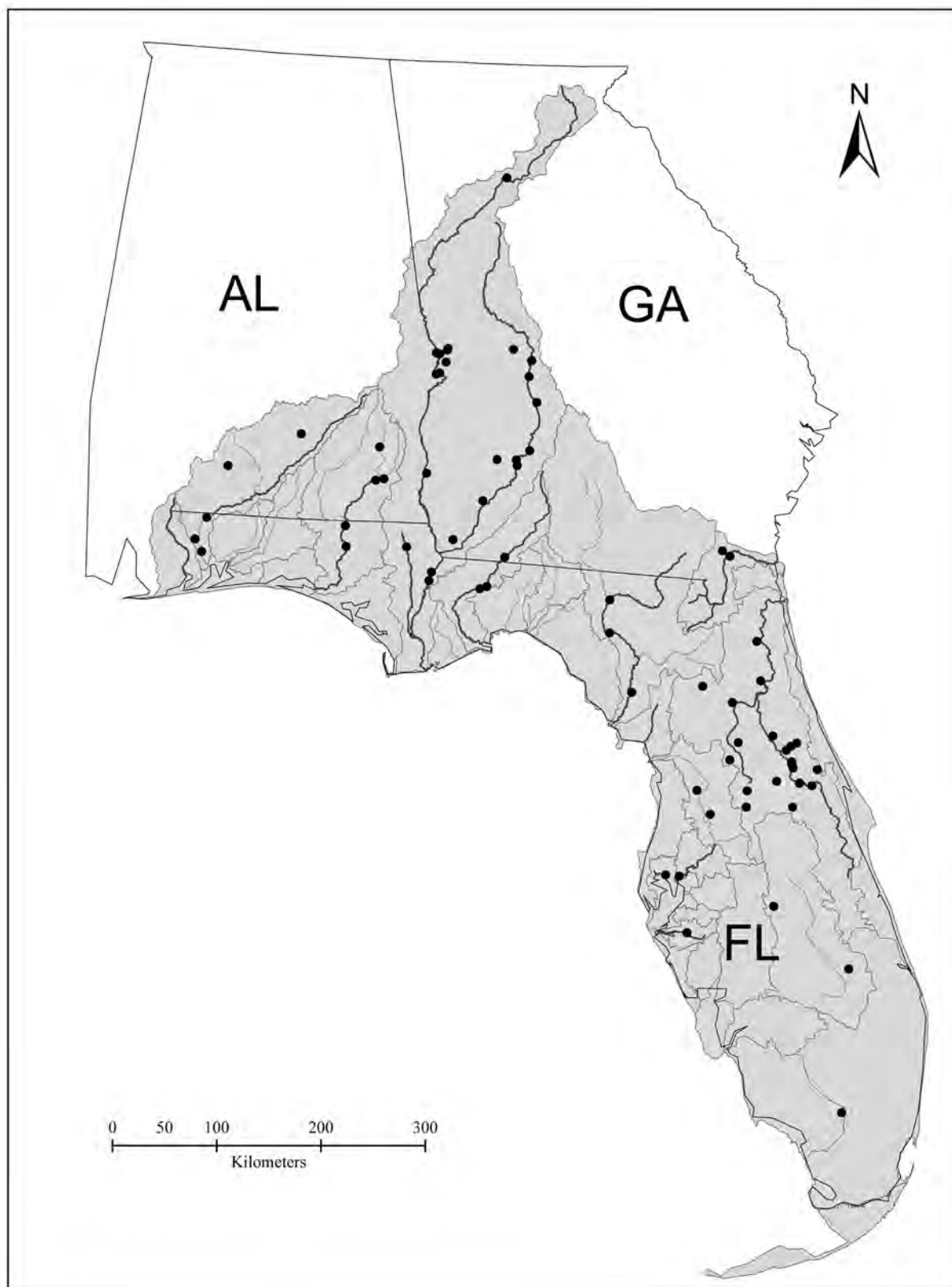


Figure 2. Type localities of mussels described from Florida and drainages contiguous with Alabama and Georgia. Type localities with imprecise data (e.g., Escambia River, Florida; Lakelets of Marion County, Florida) could not be plotted. Some dots may represent multiple taxa described from the same general locality.

Table 2. Freshwater mussel taxa and synonyms (indented) known from the study area. An asterisk indicates the species was described from drainages beyond the study area.

Family Margaritiferidae

Margaritifera marrianae Johnson 1983

Family Unionidae

Alasmidonta triangulata (Lea 1858)

Alasmidonta wrightiana (Walker 1901)

Amblema neislerii (Lea 1858)

Amblema plicata (Say 1817)*

Anodonta couperiana Lea 1840*

Anodonta hartfeldorum Williams, Bogan & Garner 2009*

Anodonta heardi Gordon & Hoeh 1995

Anodonta suborbiculata Say 1831*

Anodontoides radiatus (Conrad 1834)*

Margaritana elliottii Lea 1858

Elliptio ahenea (Lea 1843)

Unio waltoni B. H. Wright 1888

Elliptio arctata (Conrad 1834)*

Unio strigosus Lea 1840

Unio tortivus Lea 1840

Unio viridans Lea 1859

Elliptio chipolaensis (Walker 1905)

Elliptio crassidens (Lamarck 1819)*

Unio danielsi B. H. Wright 1899

Unio incrassatus Lea 1840

Elliptio fraterna (Lea 1852)*

Elliptio fumata (Lea 1857)

Unio basalis Lea 1872

Unio corneus Lea 1874

Unio dooleyensis Lea 1874

Unio gesnerii Lea 1874

Unio hallenbeckii Lea 1859

Unio invenustus Lea 1874

Unio plantii Lea 1857

Unio salebrosus Lea 1859

Unio subniger Lea 1857

Elliptio jayensis (Lea 1838)

Unio buckleyi Lea 1843

Unio buddianus Lea 1843

Unio buxtoni B. H. Wright 1897

Unio coruscus Gould 1856

Unio cunninghami B. H. Wright 1883

Unio dallii B. H. Wright 1888

Unio diazensis S. H. Wright 1897

Unio dorei B. H. Wright 1888

Unio ferrissii Marsh 1891

Unio (Elliptio) webbianus hartii B. H. Wright 1934

Unio hinkleyi B. H. Wright 1888

Unio leonensis B. H. Wright 1892

Unio marshii B. H. Wright 1888

Elliptio maywebbae B. H. Wright 1934

Unio nolani B. H. Wright 1888

Unio orcuttii S. H. Wright 1888

Unio oscar B. H. Wright 1892

Unio pinei B. H. Wright 1897

Unio prasinatus Conrad 1866

Unio (Elliptio) sanctorumjohanium B. H. Wright 1933

Unio simpsoni B. H. Wright 1888

Unio subluridus Simpson 1892

Unio suttoni B. H. Wright 1897

Unio tenuisculus Frierson 1911

Unio tryoni B. H. Wright 1888

Unio (Elliptio) webbianus B. H. Wright 1934

Elliptio mcMichaeli Clench & Turner 1956

Elliptio monroensis (Lea 1843)

Unio anthonyi Lea 1861

Unio hartwrightii B. H. Wright 1896

Unio polymorphus B. H. Wright 1899

Unio websterii B. H. Wright 1888

Elliptio nigella (Lea 1852)

Unio denigratus Lea 1857

Elliptio occulta (Lea 1843)

Unio burtchianus S. H. Wright 1897

Unio dispalans B. H. Wright 1899

Unio fryanus B. H. Wright 1888

Unio fuscatus Lea 1843

Unio lehmanii S. H. Wright 1897

Elliptio pullata (Lea 1856)

Unio aquilus Lea 1857

Unio extensus Lea 1857

Unio maconensis Lea 1857

Unio mercerii Lea 1862

Unio roswellensis Lea 1858

Unio singularis B. H. Wright 1899

Unio subblatus Lea 1857

Unio tetricus Lea 1857

Unio verutus Lea 1859

Unio viridiradiatus Lea 1859

Elliptio purpurella (Lea 1857)

Elliptioideus sloatianus (Lea 1840)

Unio atromarginatus Lea 1840

Unio plectophorus Conrad 1850

Fusconaia apalachicola Williams & Fradkin 1999

Fusconaia burkei (Walker 1922)

Fusconaia escambia Clench & Turner 1956

Fusconaia rotulata (B. H. Wright 1899)

Glebula rotundata (Lamarck 1819)*

Hamiota australis (Simpson 1900)

Hamiota subangulata (Lea 1840)

Unio kirklandianus S. H. Wright 1897

Lampsilis binominata Simpson 1900

Lampsilis floridensis (Lea 1852)

Lampsilis ornata (Conrad 1835)*

Lampsilis straminea (Lea 1838)*

Unio contrarius Conrad 1849

Unio obtusus Lea 1840

Lasmigona subviridis (Conrad 1835)*

Medionidus acutissimus (Lea 1831)*

Medionidus penicillatus (Lea 1857)

Unio kingii B. H. Wright 1900

Medionidus simpsonianus Walker 1905

Medionidus walkeri (B. H. Wright 1897)

Megaloniais nervosa (Rafinesque 1820)*

Unio boykinianus Lea 1840

Obovaria choctawensis (Athearn 1964)

Obovaria haddletoni (Athearn 1964)

Plectomerus dombeyanus (Valenciennes 1827)*

Table 2. Continued.

<i>Pleurobema pyriforme</i> (Lea 1857)
<i>Unio amabilis</i> Lea 1865
<i>Unio bulbosus</i> Lea 1857
<i>Unio harperi</i> B. H. Wright 1899
<i>Unio modicus</i> Lea 1857
<i>Unio reclusus</i> B. H. Wright 1898
<i>Pleurobema simpsoni</i> Vanatta 1915
<i>Pleurobema strodeanum</i> (B. H. Wright 1898)
<i>Pleurobema patsaligensis</i> Simpson 1900
<i>Ptychobranchus jonesi</i> (van der Schalie 1934)
<i>Pyganodon cataracta</i> (Say 1817)*
<i>Pyganodon grandis</i> (Say 1829)*
<i>Quadrula infucata</i> (Conrad 1834)
<i>Unio securiformis</i> Conrad 1849
<i>Quadrula kleiniana</i> (Lea 1852)
<i>Quadrula succissa</i> (Lea 1852)
<i>Unio cacao</i> Lea 1859
<i>Quadrula wrightii</i> Simpson 1914
<i>Toxolasma parvum</i> (Barnes 1823)*
<i>Toxolasma paulum</i> (Lea 1840)
<i>Unio corvinus</i> Lea 1868
<i>Unio corvunculus</i> Lea 1868
<i>Unio cromwellii</i> Lea 1865
<i>Unio marginis</i> Lea 1865
<i>Unio minor</i> Lea 1843
<i>Toxolasma</i> sp. "Gulf Lilliput" (undescribed)
<i>Uniomerus carolinianus</i> (Bosc 1801)*
<i>Unio blandingianus</i> Lea 1834
<i>Unio jewettii</i> Lea 1867
<i>Unio paludicolus</i> Gould 1845
<i>Unio rivicolus</i> Conrad 1868
<i>Uniomerus columbensis</i> (Lea 1857)
<i>Uniomerus tetralasmus</i> (Say 1831)*
<i>Utterbackia imbecillis</i> (Say 1829)*
<i>Utterbackia peggyae</i> (Johnson 1965)
<i>Utterbackia peninsularis</i> Bogan & Hoeh 1995
<i>Villosa amygdalum</i> (Lea 1843)
<i>Unio lepidus</i> Gould 1856
<i>Unio papyraceus</i> Gould 1845
<i>Unio singleyanus</i> Marsh 1891
<i>Unio trossulus</i> Lea 1846
<i>Unio vesicularis</i> Lea 1872
<i>Lampsilis wrightiana</i> Frierson 1927
<i>Villosa lienosa</i> (Conrad 1834)*
<i>Unio concestator</i> Lea 1857
<i>Unio dispar</i> Lea 1860
<i>Unio fallax</i> Lea 1857
<i>Unio intercedens</i> Lea 1857
<i>Unio linguaeformis</i> Lea 1860
<i>Unio obfuscus</i> Lea 1857
<i>Unio prattii</i> Lea 1858
<i>Unio subellipsis</i> Lea 1856
<i>Unio sudus</i> Lea 1857
<i>Unio unicostatus</i> B. H. Wright 1899
<i>Villosa vibex</i> (Conrad 1834)*
<i>Unio averellii</i> B. H. Wright 1888
<i>Unio exiguus</i> Lea 1840
<i>Unio nigrinus</i> Lea 1852
<i>Unio pellucidus</i> Lea 1845
<i>Villosa villosa</i> (B. H. Wright 1898)

There are 65 recognized unionoid taxa that are known to occur within the study area (Table 2). Of the 65 taxa, 41 (64%) were described from drainages within the study area and 23 (35%) were described from drainages beyond the study area. There is one undescribed *Toxolasma* species endemic to drainages within the study area (Williams et al. 2008). Most of the 23 taxa described from outside the study area were from the Mobile Basin to the west and Altamaha and Savannah rivers to the north along the south Atlantic Coast. A small number of taxa were described from the Mississippi River Basin.

Several taxa from the study area not included in Turgeon et al. (1998) have been recognized as valid or described since 1998. Species described since that publication are *Fusconaia apalachicola* (Williams & Fradkin 1999) and *Anodonta hartfieldorum* (Williams et al. 2009). Four species have been elevated from synonymy, *Elliptio purpurella* by Brim Box & Williams (2000), and *Elliptio fumata*, *Elliptio pullata*, and *Lampsilis floridensis* by Williams et al. (2008). *Elliptio occulta* is recognized herein as valid for the first time in a century. In the past, *E. occulta* was considered to be a synonym of *Elliptio icterina*, which does not occur in Florida. Two taxa recognized by Turgeon et al. (1998), *Elliptio buckleyi* and *Elliptio waltoni*, have been synonymized herein with *Elliptio jayensis* and *Elliptio ahenea*, respectively.

Three taxa have been reassigned to genera different than those listed by Turgeon et al. (1998). Two species formerly in the genus *Quincuncina*, which is no longer recognized as valid (Lydeard et al. 2000; Campbell et al. 2005), have been reassigned, *Quincuncina burkei* to *Fusconaia* and *Quincuncina infucata* to *Quadrula* (Lydeard et al. 2000; Campbell et al. 2005; Williams et al. 2008). The third taxon, *Fusconaia succissa*, was also reassigned to *Quadrula* (Lydeard et al. 2000; Campbell et al. 2005; Williams et al. 2008).

Of the 149 taxa described from the study area, 71 were described from the Apalachicola, Chattahoochee, and Flint River drainages between 1834 and 1999 (Fig. 3). The large number from the Apalachicola River Basin reflects the relative ease

of access to the Chattahoochee and Flint rivers, which were important streams of commerce during the 19th century and had population centers (e.g., Columbus, Georgia, on the Chattahoochee River) with associated early road systems.

The St. Johns River drainage in Florida had 39 taxa described between 1834 and 1934. The St. Johns River was the most important transportation route for commerce in northeast Florida during the 1800s. The mild winter climate also attracted numerous naturalists and conchologists who sampled widely in the rivers and lakes of the drainage. A total of 16 taxa was described from the western panhandle of Florida, 9 from the Choctawhatchee River and 7 from the Escambia River. The Ochlockonee and Suwannee rivers in north Florida each had 5 taxa described from their drainages. An additional 10 taxa were described from peninsular Florida south of the St. Johns and Suwannee River drainages. Three species were described from the St. Marys River, located on the south Atlantic Coast just north of the St. Johns River drainage.

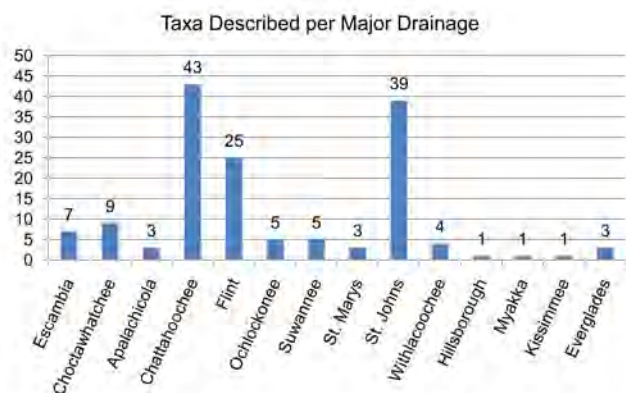


Figure 3. Number of taxa described from each major drainage area. Drainages are arranged from west to east from the Escambia River to the Suwannee River and southward from the St. Marys River to the Everglades.

Most of the 149 mussel taxa were described between 1830 and 1879 (Fig. 4). This period could be termed the Isaac Lea era as he was responsible for describing 77 of 87 species (89%), half of those in the 1850s. Isaac Lea published most of his original descriptions in the Proceedings of the Academy of Natural Sciences of Philadelphia. His descriptions, as was typical for the time, were read before meetings of the ANSP and later published, but were generally limited in length to a few lines and were not accompanied by illustrations. After his descriptions appeared in the Proceedings, Lea would publish more detailed information along with illustrations in the Transactions of the American Philosophical Society or the Journal of the Academy of Natural Sciences of Philadelphia. In an effort to bring his descriptions together in a single publication, he periodically published what he entitled, "Observations on the Genus *Unio*." These were reprints from the Transactions and the Journal and provided no new information. Lea published 13 volumes of the Observations between 1829 and 1874. Only 250 copies of the 13-volume

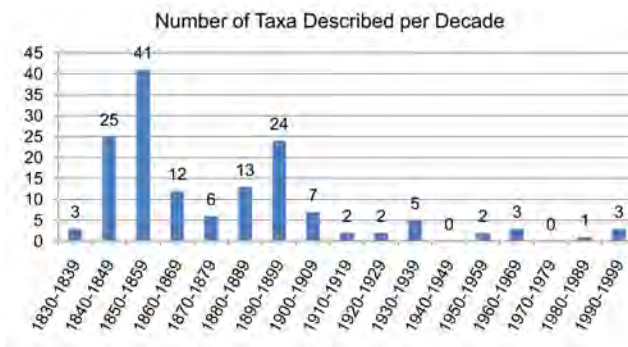


Figure 4. Number of taxa described from the study area per decade between 1830 and 1999.

set were printed (Bogan & Bogan 2002). Reference to the Observations have not been included herein since they are reprinted information from the Transactions and Journal. The remaining 10 descriptions during this period were by Timothy A. Conrad (6) and Anthony A. Gould (4).

The second major period of species descriptions occurred between 1880 and 1909 when 44 of the 149 taxa (30%) were named. Descriptions during this 30-year period were dominated by Berlin H. Wright (30 taxa) and, to a lesser degree, his father Samuel H. Wright (5 taxa), accounting for 35 of 44 descriptions (80%). One name, *Unio woodruffensis*, which was attributed to B. H. Wright by Simpson (1892) and never described or figured, is a *nomen nudum* (Johnson 1967a). Other authors during this period were William H. Dall, William A. Marsh, Charles T. Simpson, and Bryant Walker. Since 1910, only 18 taxa (12%) have been described by numerous authors, including the still active B. H. Wright, who described 4 taxa in 1933 and 1934.

Of the 149 taxa described from the study area, 128 (86%) were in the genus *Unio*. In the 1800s almost all freshwater bivalves were placed in that genus. The remaining 21 taxa (14%) were described in 13 genera, of which 11 are currently recognized.

Primary types from the study area are currently housed in seven museums (Fig. 5). The majority, 118 (79%), are housed in the USNM. Almost all of these taxa were described by I. Lea and, to a lesser degree, B. H. and S. H. Wright. Most other primary types are housed in the ANSP, MCZ, and UMMZ. The original type specimens of 8 nominal taxa were not found and presumed lost.

Of the 149 nominal taxa included in the Annotated Synonymy, 41 (28%) are recognized as valid. One species, *Fusconaia apalachicola*, was described from specimens recovered from pre-Columbian archaeological sites and is extinct.

The incredible degree of phenotypic variation displayed by currently recognized taxa in the study area highlights the need for thorough taxonomic research to identify potential cryptic species. Molecular techniques have proven useful in delineating many taxonomic boundaries (Lydeard et al. 2000; Campbell et al. 2005). However, efforts to distinguish species in the taxonomically confusing genus *Elliptio* using molecular techniques have been generally unsuccessful (N. A. Johnson pers. comm.). Several taxa currently recognized as nominal forms may eventually prove to be valid species.

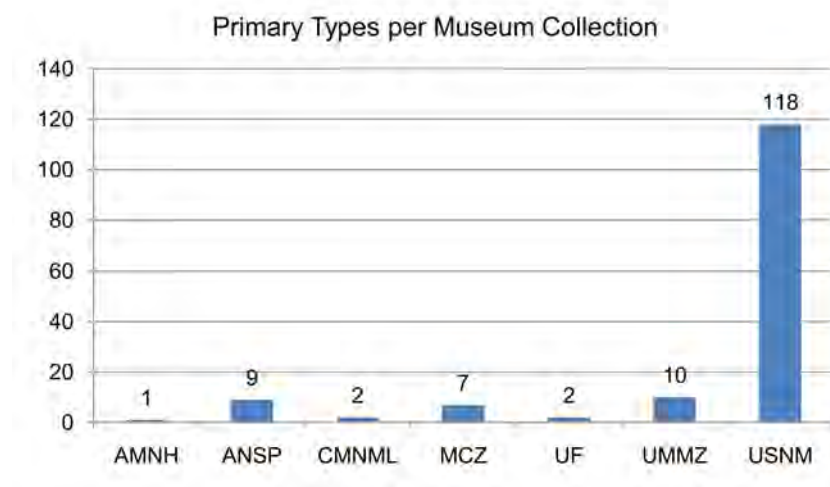


Figure 5. Number of primary types described from the study area by museum collection.

ANNOTATED SYNONYMY

FAMILY MARGARITIFERIDAE

***marrianae* = *Margaritifera marrianae* Johnson 1983**

Margaritifera marrianae Johnson 1983. Johnson 1983:299–304, pl. 41.

Type Specimen.—Holotype, MCZ 28491, length 83 mm (Fig. 6).

Type Locality.—Hunters [Hunter] Creek, 8 miles southwest of Evergreen, Conecuh County, Alabama, [Escambia River drainage].

FAMILY UNIONIDAE

***aheneus* = *Elliptio ahenea* (Lea 1843)**

Unio aheneus Lea 1843. Lea 1843:[one page privately published]; Lea 1846:280, pl. 41, fig. 9.

Type Specimen.—Lectotype, USNM 86030, length 54 mm (Fig. 7), designated by Johnson (1974).

Type Locality.—Black Creek, Florida, [St. Johns River drainage,] S. B. Buckley.

Comments.—*Elliptio ahenea* was synonymized with *Elliptio jayensis* by Johnson (1972b), but recent authors have recognized it as a valid species (e.g., Turgeon et al. 1998).



Figure 6. Holotype of *Margaritifera marrianae*, MCZ 28491.

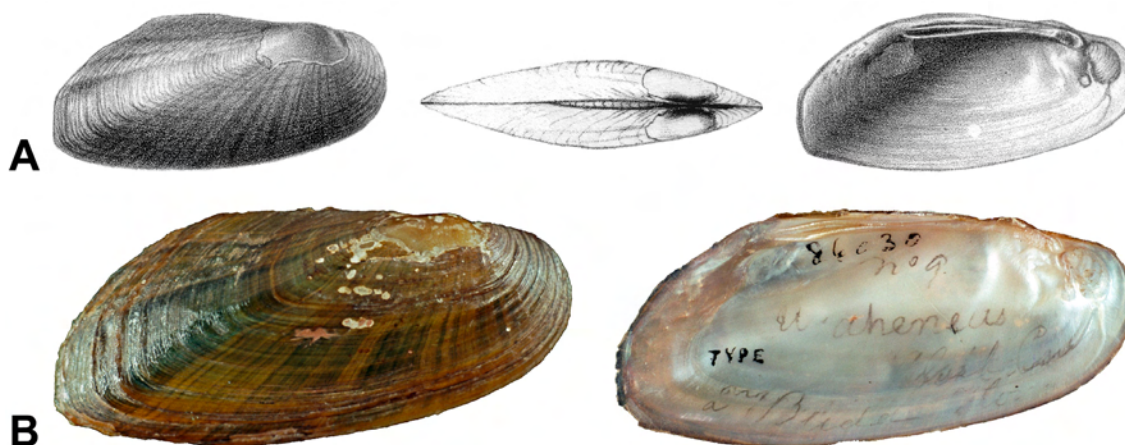


Figure 7. Lectotype of *Unio aheneus* (= *Elliptio ahenea*), USNM 86030. A, figure from Lea (1846); and B, recent photograph.

***amabilis* = *Pleurobema pyriforme* (Lea 1857)**

Unio amabilis Lea 1865. Lea 1865:89; Lea 1868a:257, pl. 31, fig. 72.

Type Specimen.—Lectotype, USNM 84573, length 36 mm (Fig. 8), designated by Johnson (1974).

Type Locality.—Butler, Taylor County, Georgia, [Flint River drainage,] Dr. H. M. Neisler.

***amygdalum* = *Villosa amygdalum* (Lea 1843)**

Unio amygdalum Lea 1843. Lea 1843:[one page privately published]; Lea 1846:275, pl. 39, fig. 1.

Type Specimen.—Lectotype, USNM 86127, appears to be a female, length 32 mm (Fig. 9), designated by Johnson (1974).

Type Locality.—Lake George, [Putnam and Volusia counties,] Florida, [St. Johns River drainage,] S. B. Buckley.

Comments.—Clench and Turner (1956) recognized *amygdalum* as a subspecies of *Villosa vibex*.

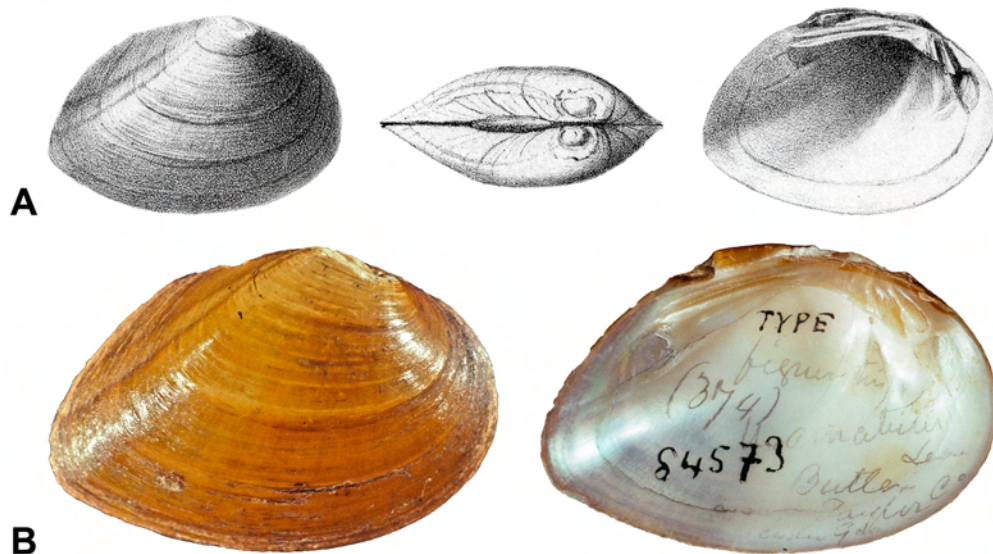


Figure 8. Lectotype of *Unio amabilis* (= *Pleurobema pyriforme*), USNM 84573. A, figure from Lea (1868a); and B, recent photograph.

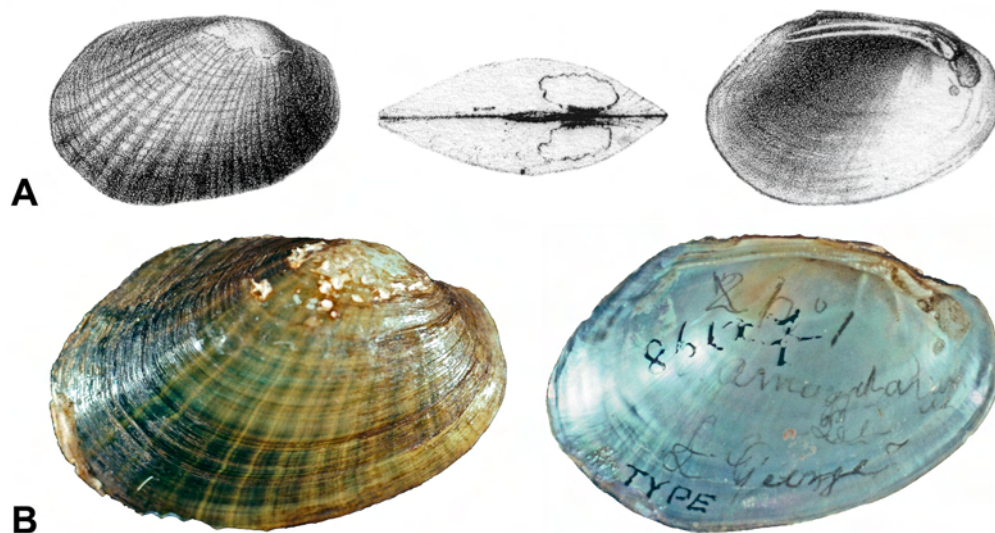


Figure 9. Lectotype of *Unio amygdalum* (= *Villosa amygdalum*), USNM 86127. A, figure from Lea (1846); and B, recent photograph.

***anthonyi* = *Elliptio monroensis* (Lea 1843)**

Unio anthonyi Lea 1861. Lea 1861:41; Lea 1862a:197, pl. 27, fig. 266.

Type Specimen.—Holotype by monotypy, USNM 84986, length 58 mm (Fig. 10).

Type Locality.—Florida, J. G. Anthony. Restricted herein to Lake Monroe, Seminole County, St. Johns River drainage, Florida.

Comments.—In the original description, the locality given for the type specimen was “Florida.” While the precise locality and drainage are unknown, based on color and morphology, the shell most resembles *Elliptio monroensis* from the St. Johns River drainage.

Elliptio anthonyi, along with *Elliptio mcmichaeli*, was synonymized with *Elliptio fraterna* by Johnson (1970). This was contrary to Simpson (1892, 1914), who synonymized it with *Elliptio congaraea* (Lea 1831). Based on shell characters, *E. anthonyi* is more similar to the Florida taxon, *Elliptio monroensis* and its synonyms *Elliptio*

hartwrightii and *Elliptio polymorpha* described from the St. Johns and St. Marys River drainages, respectively. These taxa appear to represent one variable species endemic to the St. Johns and St. Marys River drainages in Florida and Georgia.

Based on shell morphology, it appears that *Elliptio monroensis* and its synonyms belong to a group of *Elliptio* typically characterized by the presence of small corrugations on the posterior slope of the shell. Other species of *Elliptio* that usually possess this character and appear to belong to this group include most Gulf Coast populations of *E. crassidens*, *E. mcmichaeli*, and *E. fraterna*, which occur in the Apalachicola and Savannah River basins. *Elliptio dariensis* (Lea 1842) and *Elliptio congaraea*, which occur along the south Atlantic Coast, Georgia and South Carolina, also belong to this group. At least three of these species, *E. crassidens*, *E. dariensis*, and *E. mcmichaeli*, share glochidial characteristics that differ from other *Elliptio* (O’Brien et al. 2003).



Figure 10. Holotype of *Unio anthonyi* (= *Elliptio monroensis*), USNM 84986. A, figure from Lea (1862a); and B, recent photograph.

***apalachicola* = *Fusconaia apalachicola* Williams and Fradkin 1999**

Fusconaia apalachicola Williams and Fradkin 1999. Williams and Fradkin 1999:51–62, fig. 2.

Type Specimen.—Holotype, UF 5260690.1 (right valve), length 40 mm (Fig. 11A); paratype, UF 5260528.9 (left valve), length 40 mm (Fig. 11B).

Type Locality.—Archeological Site 8LI76, located 500 meters east of the Apalachicola River (T1N; R8W; SE 1/4 Sec. 1) near river mile 88 (U.S. Army Corps of Engineers), about 5 miles north of Bristol, Liberty County, Florida, [Apalachicola River drainage].

***aquilus* = *Elliptio pullata* (Lea 1856)**

Unio aquilus Lea 1857. Lea 1857a:172; Lea 1858a:92, pl. 20, fig. 72.

Type Specimen.—Lectotype, USNM 85993, length 66 mm (Fig. 12), designated by Johnson (1974).

Type Locality.—Flint River near Macon [County], Georgia, [Flint River drainage,] J. C. Plant.

***aratus* = *Elliptoideus sloatianus* (Lea 1840)**

Unio aratus Conrad 1849 *non* Lea 1843. Conrad 1849:154. See *plectrophorus* (p. 56).

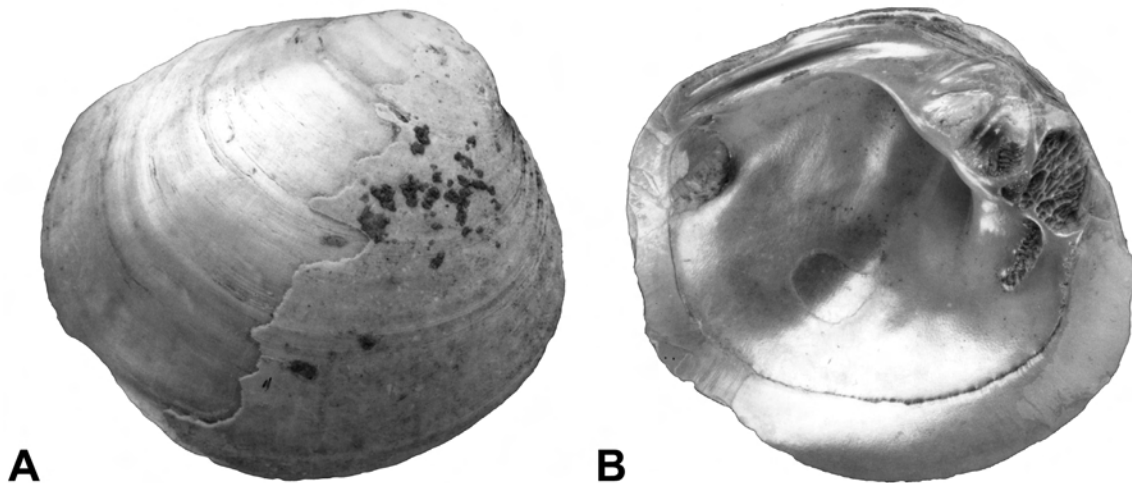


Figure 11. *Fusconaia apalachicola*. A, holotype, UF 5260690.1; and B, paratype, UF 5260528.9. © Richard T. Bryant.

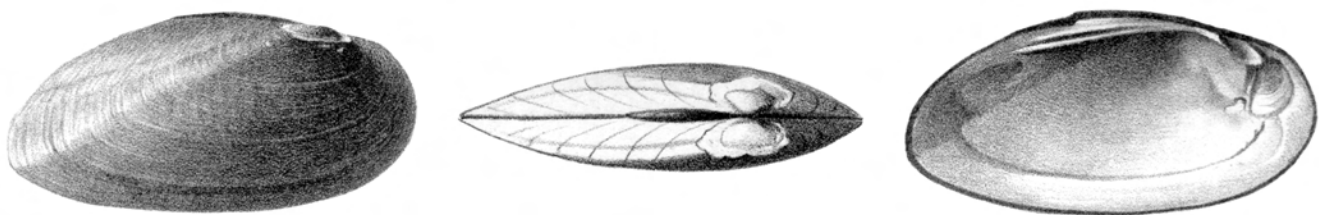


Figure 12. Lectotype of *Unio aquilus* (= *Elliptio pullata*), USNM 85993, from Lea (1858a).

***atromarginatus* = *Elliptoideus sloatianus* (Lea 1840)**

Unio atromarginatus Lea 1840. Lea 1840:288; Lea 1842:207, pl. 13, fig. 21.

Type Specimen.—Lectotype, USNM 83977, length 47 mm (Fig. 13), designated by Johnson (1974).

Type Locality.—Chattahoochee River, Columbus, [Muscogee County,] Georgia, [Chattahoochee River drainage,] Dr. Boykin.

Comments.—The lectotype of *Unio atromarginatus* is a small atypical specimen.

Unlike large individuals of *Elliptoideus sloatianus*, the posterior shell margin is undulating or wavy instead of straight.

***australis* = *Hamiota australis* (Simpson 1900)**

Lampsilis australis Simpson 1900. Simpson 1900b:75, pl. 2, fig. 2.

Type Specimen.—Holotype, USNM 150473, length 52 mm (Fig. 14).

Type Locality.—Little Patsaliga Creek, [Crenshaw County,] southeastern Alabama, [Escambia River drainage,] Dr. R. Kirkland.

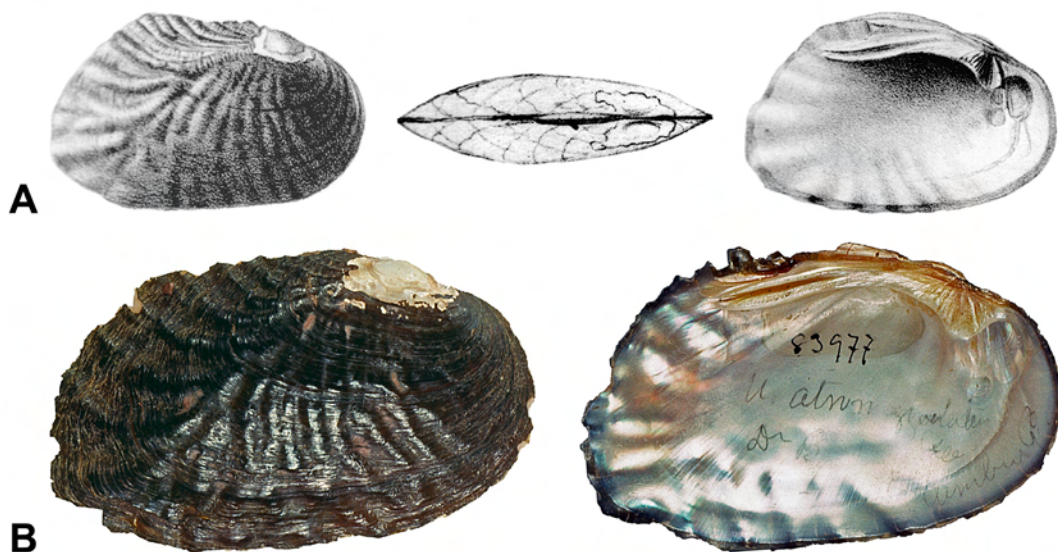


Figure 13. Lectotype of *Unio atromarginatus* (= *Elliptoideus sloatianus*), USNM 83977. A, figure from Lea (1842); and B, recent photograph.



Figure 14. Holotype of *Lampsilis australis* (= *Hamiota australis*), USNM 150473.

***averellii* = *Villosa vibex* (Conrad 1834a)**

Unio averellii B. H. Wright 1888. B. H. Wright 1888:115, pl. 3, fig. 2.

Type Specimen.—Lectotype, USNM 91142, female, length 49 mm (Fig. 15), designated and refigured by Johnson (1967a:5, pl. 7, fig. 4).

Type Locality.—Lake Ashby, Volusia County, Florida, [St. Johns River drainage].

***basalis* = *Elliptio fumata* (Lea 1857)**

Unio basalis Lea 1872. Lea 1872:161; Lea 1874a:48, pl. 16, fig. 46.

Type Specimen.—Lectotype, USNM 85703, length 65 mm (Fig. 16), designated by Johnson

(1974).

Type Locality.—Carter's Creek near Columbus, [Muscogee County,] Georgia, [Chattahoochee River drainage].

Comments.—The type locality was reported in the original description as "Carter's Creek near Columbus, Georgia." However, after a search of maps for Carter's Creek on both the Georgia and Alabama sides of the Chattahoochee River in the vicinity of Columbus, Georgia, none was located. The only stream bearing the name Carters Creek is a tributary to Beaverdam Creek (tributary to the Savannah River), in Elbert County, Georgia.

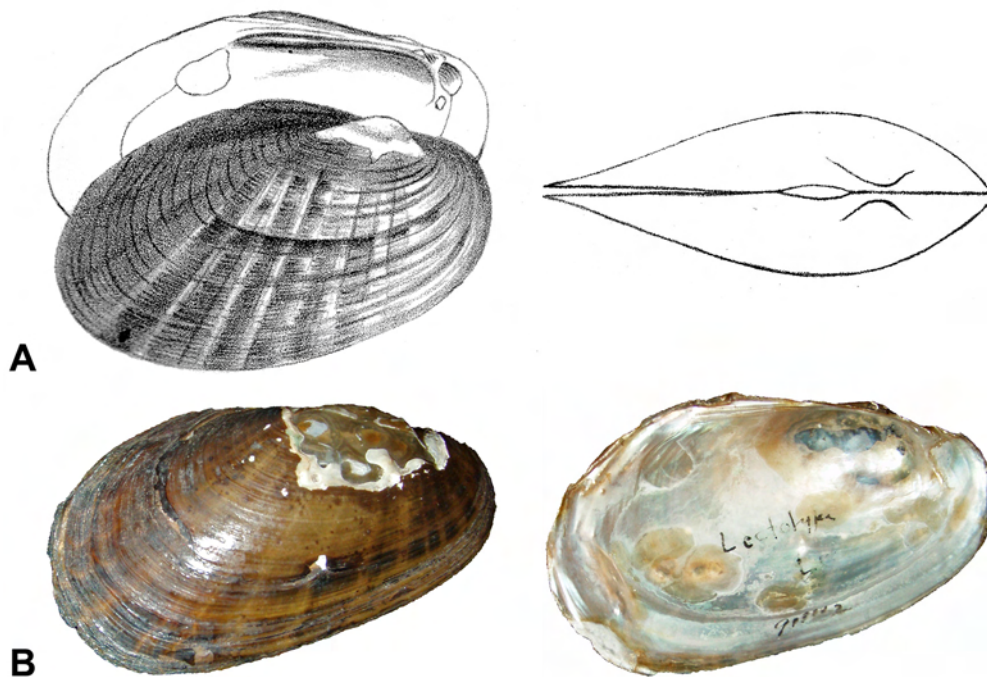


Figure 15. Lectotype of *Unio averellii* (= *Villosa vibex*), USNM 91142. A, figure from B. H. Wright (1888); and B, recent photograph.

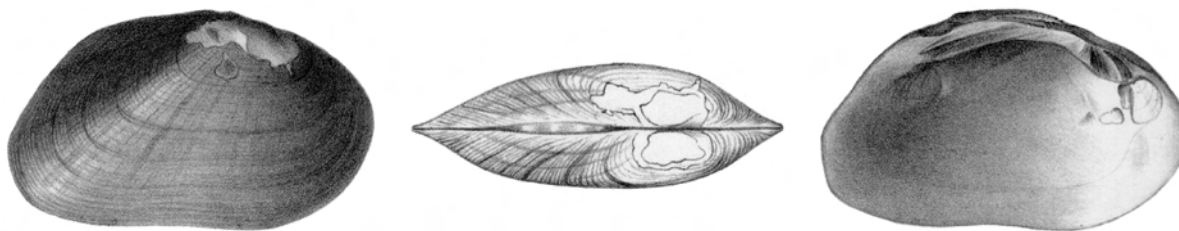


Figure 16. Lectotype of *Unio basalis* (= *Elliptio fumata*), USNM 85703, from Lea (1874a).

binominatus* = *Lampsilis binominata* Simpson 1900Lampsilis binominatus* Simpson 1900. Simpson 1900a:528.

Type Specimen.—Lectotype, USNM 84884, length 33 mm (Fig. 17), designated by Johnson (1974).

Type Locality.—Chattahoochee River, Columbus, [Muscogee County,] Georgia, [Chattahoochee River drainage,] Dr. Boykin.

Comments.—*Lampsilis binominatus* is a replacement name for *Unio lineatus* Lea 1840, which was preoccupied (Simpson 1900a).

blandingianus* = *Uniomerus carolinianus* (Bosc 1801)Unio blandingianus* Lea 1834. Lea 1834:101, pl. 14, fig. 44.

Type Specimen.—Lectotype, USNM 85715, length 58 mm (Fig. 18), designated by Johnson (1974).

Type Locality.—St. Johns River, Florida, [St. Johns River drainage,] Dr. Blanding.

Comments.—A note on back of the USNM label reads, “= *U. obesus* Lea (Simpson), near St. Augustine.”

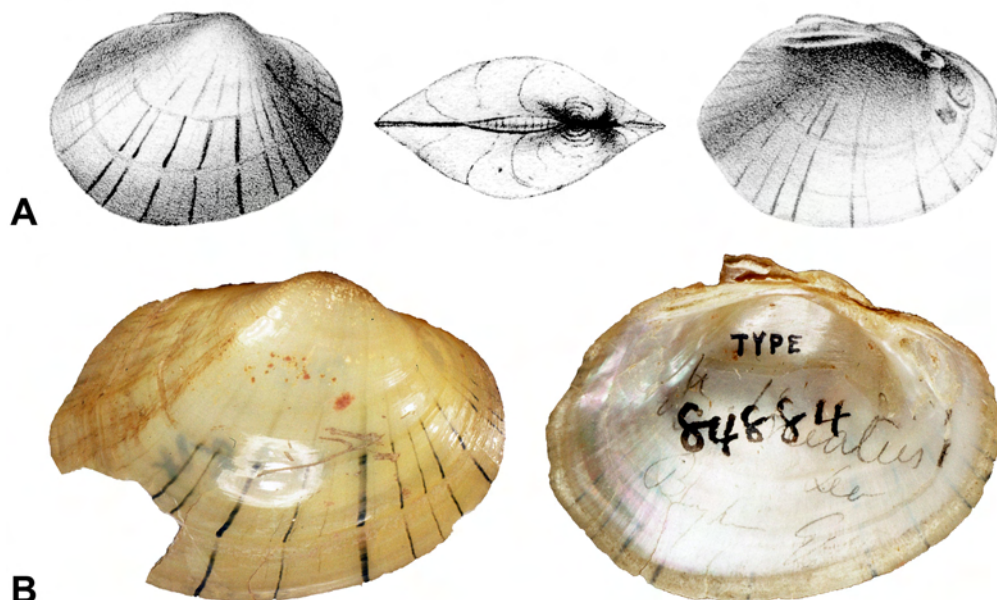


Figure 17. Lectotype of *Lampsilis binominatus* (= *Lampsilis binominata*), USNM 84884. A, figure from Lea (1842); and B, recent photograph.

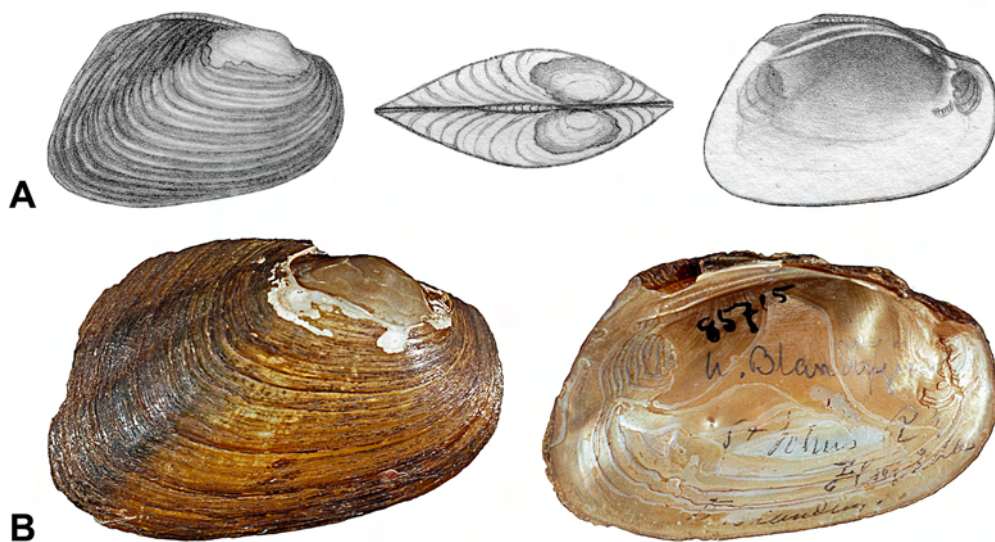


Figure 18. Lectotype of *Unio blandingianus* (= *Uniomerus carolinianus*), USNM 85715. A, figure from Lea (1834); and B, recent photograph.

***boykinianus* = *Megaloniaias nervosa* (Rafinesque 1820)**

Unio boykinianus Lea 1840. Lea 1840:288; Lea 1842:208, pl. 13, fig. 22.

Type Specimen.—Neotype, USNM 83903, length 118 mm (Fig. 19), designated by Johnson (1974).

Type Locality.—Chattahoochee River, Columbus, [Muscogee County,] Georgia, [Chattahoochee River drainage,] Dr. Boykin.

Comments.—Lea's (1942) figured specimen was reported to be about 71 mm, but this shell was not found by Johnson and Baker (1973) and is presumed lost. Therefore, a specimen subsequently

identified by Lea from Hallenbeck was designated as the neotype by Johnson (1974).

Megaloniaias boykiniana was recognized as a valid species endemic to the Apalachicola and Ochlockonee River drainages prior to 1997 (Clench & Turner 1956; Turgeon et al. 1988). *Megaloniaias boykiniana* was synonymized with *Megaloniaias nervosa* based on mitochondrial DNA analysis (Mulvey et al. 1997). These results were based on a very small sample size and were questioned by Berg and Berg (2000). Additional research is needed to resolve the taxonomic status of *Megaloniaias* in the eastern Gulf drainages and its relationship to Mississippi Basin populations.



Figure 19. Neotype, *Unio boykinianus* (= *Megaloniaias nervosa*), USNM 83903.

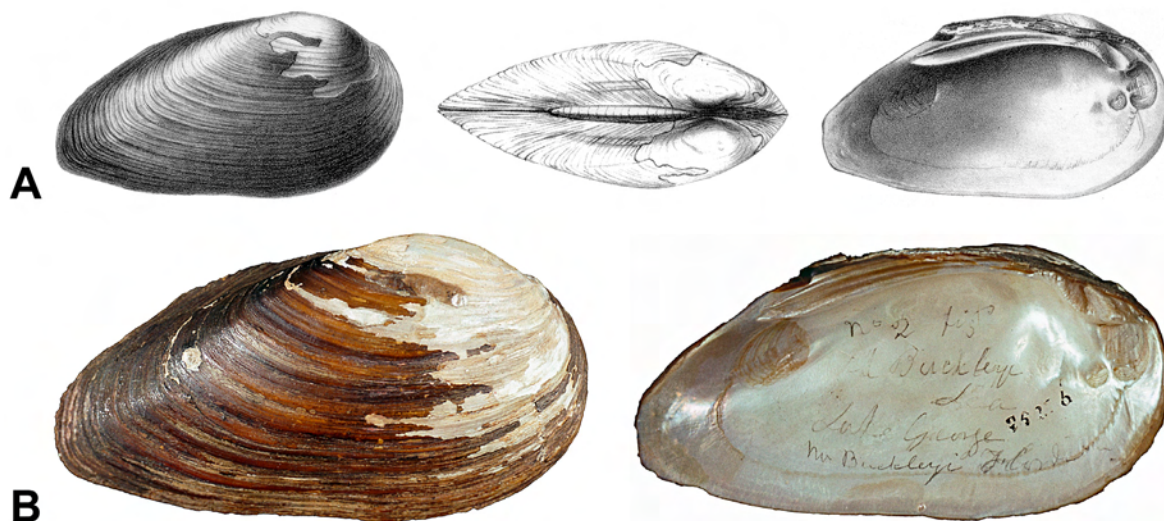


Figure 20. Lectotype of *Unio buckleyi* (= *Elliptio jayensis*), USNM 85236. A, figure from Lea (1846); and B, recent photograph.

***buckleyi* = *Elliptio jayensis* (Lea 1838)**

Unio buckleyi Lea 1843. Lea 1843:[one page privately published]; Lea 1846:276, pl. 39, fig. 2.

Type Specimen.—Lectotype, USNM 85236, length 94 mm (Fig. 20), designated by Johnson (1974).

Type Locality.—Lake George, [Putnam and Volusia counties,] Florida, [St. Johns River drainage,] S. B. Buckley.

Comments.—Additional material that was part of the syntypic series, paralectotype(s), was reported from Lake Monroe, [Volusia and Seminole counties,] Florida, [St. Johns River drainage].

Elliptio buckleyi has generally been recognized as a valid, but perplexing, species in having an incredible variety of shell shapes, and nacre and periostracum color (Simpson 1892; Johnson 1972b; Turgeon et al. 1998). The extreme variation was recognized by Lea (1846), who acknowledged that in variability of form and nacre color it was comparable to the many varieties of *Elliptio complanata*. Variation in shell shape was best

expressed by Simpson (1892), who referred to it as a “protean” species. While both *E. buckleyi* and *Elliptio jayensis* were recognized as valid species by Simpson (1892, 1914), Ortmann (1912) concluded that *E. buckleyi* was only an older adult of *E. jayensis*. Subsequent authors generally recognized both taxa as valid (Johnson 1972b; Heard 1979; Turgeon et al. 1988, 1998). After examination of hundreds of museum lots representing thousands of individuals, *E. buckleyi* appears to represent an extreme in the shell morphology of *E. jayensis* and is synonymized herein with that species.

***buddianus* = *Elliptio jayensis* (Lea 1838)**

Unio buddianus Lea 1843. Lea 1843:[one page privately published]; Lea 1846:277, pl. 40, fig. 5.

Type Specimen.—Lectotype, USNM 85606, length 97 mm (Fig. 21), designated by Johnson (1974).

Type Locality.—Lake George, [Putnam and Volusia counties,] Florida, [St. Johns River drainage].

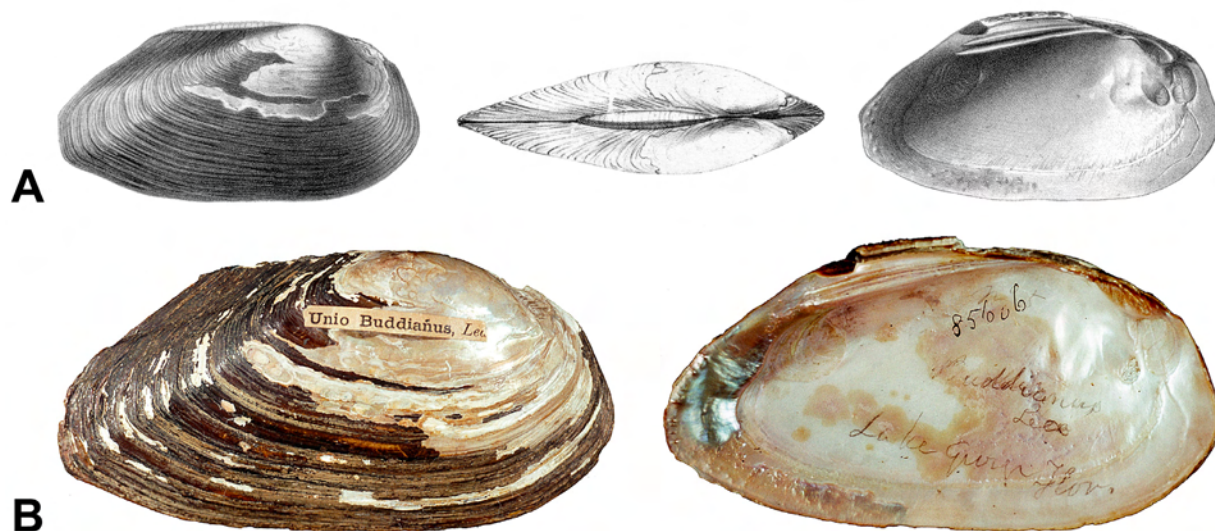


Figure 21. Lectotype of *Unio buddianus* (= *Elliptio jayensis*), USNM 85606. A, figure from Lea (1846); and B, recent photograph.

***bulbosus* = *Pleurobema pyriforme* (Lea 1857)**

Unio bulbosus Lea 1857. Lea 1857a:172; Lea 1859a:191, pl. 21, fig. 75.

Type Specimen.—Lectotype, USNM 84715, length 46 mm (Fig. 22), designated by Johnson (1974).

Type Locality.—Flint River near Macon [County], Georgia, [Flint River drainage,] J. C. Plant and Dr. H. M. Neisler.

***burkei* = *Fusconaia burkei* (Walker 1922)**

Quincuncina burkei Walker 1922. Walker in Ortmann and Walker

1922:3, pl. 1, figs. 1, 4.

Type Specimen.—Holotype, UMMZ 94495 (Walker collection no. 41626), length 51 mm (Fig. 23).

Type Locality.—Sikes Creek, a tributary of Choctawhatchee River, Barbour County, Alabama, [Choctawhatchee River drainage].

Comments.—The genus *Quincuncina* (Ortmann & Walker 1922) is no longer recognized (Lydeard et al. 2000; Campbell et al. 2005). *Quincuncina burkei* was reassigned to *Fusconaia* by Lydeard et al. (2000).



Figure 22. Lectotype of *Unio bulbosus* (= *Pleurobema pyriforme*), USNM 84715. A, figure from Lea (1859a); and B, recent photograph.

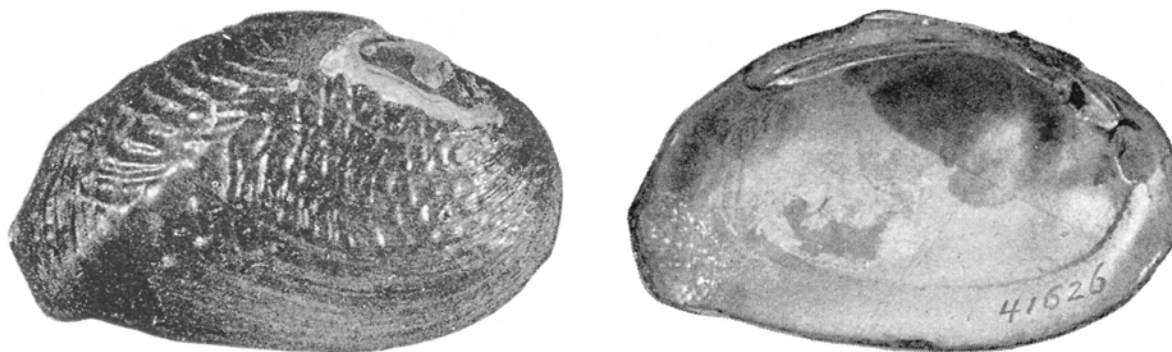


Figure 23. Holotype of *Quincuncina burkei* (= *Fusconaia burkei*), UMMZ 94495, from Ortmann and Walker (1922).

burtchianus* = *Elliptio occulta* (Lea 1843)Unio burtchianus* S. H. Wright 1897. S.H. Wright 1897:137.

Type Specimen.—Lectotype, USNM 149653, length 53 mm (Fig. 24), designated and figured by Simpson (1900b:80, pl. 4, fig. 8), refigured by Johnson (1967a:5, pl. 8, fig. 4).

Type Locality.—St. Marys River, Nassau County, Florida, [St. Marys River drainage].

Comments.—*Elliptio burtchianus* was synonymized with *Elliptio icterina* by Johnson (1967a, 1970).

buxtoni* = *Elliptio jayensis* (Lea 1838)Unio buxtoni* B. H. Wright 1897. B. H. Wright 1897a:55.

Type Specimen.—Lectotype, USNM 150131, length 47 mm (Fig. 25), designated and figured

by Simpson (1900b:80, pl. 1, fig. 6), refigured by Johnson (1967a:5, pl. 11, fig. 4).

Type Locality.—Lakelets of Marion County, Florida, [St. Johns River drainage or Withlacoochee River drainage].

Comments.—The type locality, “Lakelets of Marion Co., Florida,” is a vague reference to sandhill lakes in southern Marion County. Most of these waterbodies are in the St. Johns River drainage. However, some are in the Withlacoochee River drainage, which empties into the Gulf of Mexico. It is impossible to determine the drainage from which the type specimen was collected.

Simpson (1900b) noted that *Unio buxtoni* was “a peculiarly formed member of the *buckleyi* [= *jayensis*] group.” *Elliptio buxtoni* was synonymized with *Elliptio jayensis* by Johnson (1972b).

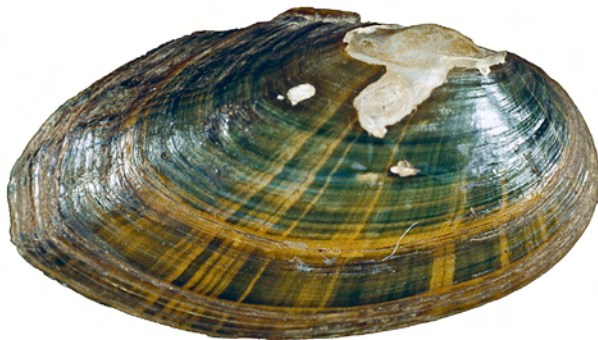


Figure 24. Lectotype of *Unio burtchianus* (= *Elliptio occulta*), USNM 149653.



Figure 25. Lectotype of *Unio buxtoni* (= *Elliptio jayensis*), USNM 150131.

***cacao* = *Quadrula succissa* (Lea 1852)**

Unio cacao Lea 1859. Lea 1859b:154; Lea 1860a:344, pl. 56, fig. 169.

Type Specimen.—Holotype by monotypy, USNM 84574, length 43 mm (Fig. 26).

Type Locality.—Chacktahatchie [Choctawhatchee] River, west Florida, [Choctawhatchee River drainage,] Major J. E. Le Conte.

Comments.—*Unio cacao* was synonymized with *Quadrula succissa* by Clench and Turner (1956).

***chipolaensis* = *Elliptio chipolaensis* (Walker 1905)**

Unio chipolaensis Walker 1905. Walker 1905a:135, pl. 9, figs. 6–7.

Type Specimen.—Holotype, UMMZ 96363, length 57 mm (Fig. 27A); paratype, USNM 217569, length 58 mm (Fig. 27B).

Type Locality.—Chipola River, Florida. Subsequently, restricted to Chipola River, 1 mile north of Marianna, Jackson County, Florida, [Apalachicola River drainage,] by Clench and Turner (1956).

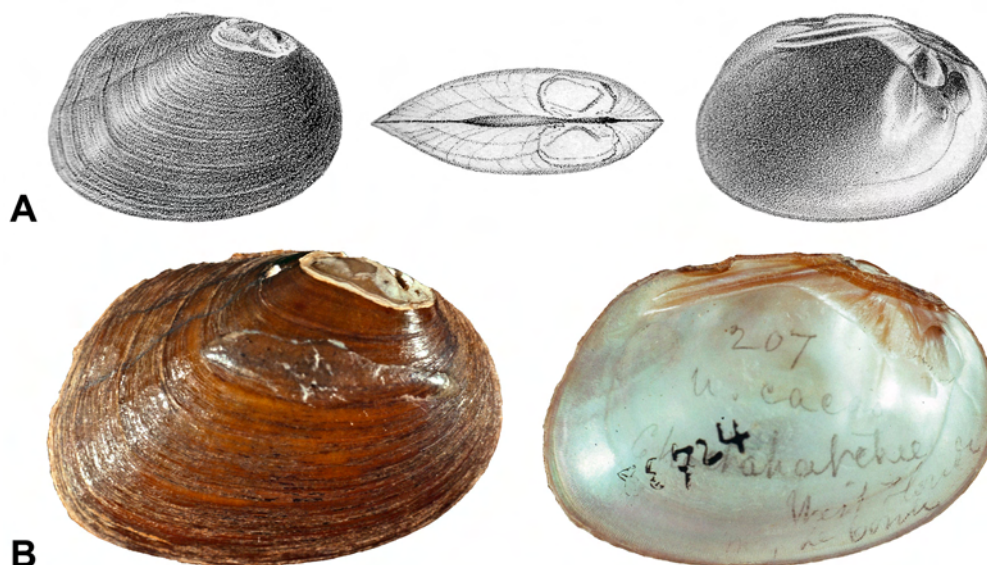


Figure 26. Holotype of *Unio cacao* (= *Quadrula succissa*), USNM 84574. A, figure from Lea (1860a); and B, recent photograph.

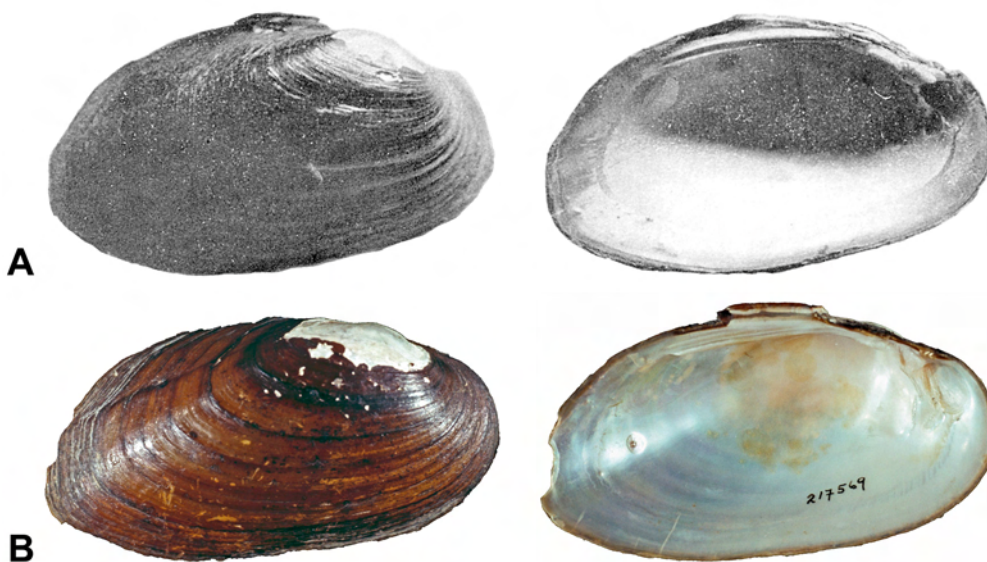


Figure 27. *Unio chipolaensis* (= *Elliptio chipolaensis*). A, holotype, UMMZ 96363, from Walker (1905a); and B, recent photograph of paratype, USNM 217569.

***choctawensis* = *Obovaria choctawensis* (Athearn 1964)**

Villosa choctawensis Athearn 1964. Athearn 1964:137, pl. 9, figs. c–f (paratypes).

Type Specimen.—Holotype, CMNML 20096, length 37 mm (Fig. 28), was not figured in the original description.

Type Locality.—Choctawhatchee River, 2 miles southwest of Caryville, about 1 mile downstream of U.S. Highway 90, Holmes County, Florida, [Choctawhatchee River drainage,] 28 November 1958, H. D. Athearn.

Comments.—The original description of *Villosa choctawensis* was based entirely on shell characters. After examination of gravid females of *V. choctawensis*, it is reassigned herein to *Obovaria* based on position, shape, and color of the marsupia. This alignment is also supported by mitochondrial DNA data (N. A. Johnson pers. comm.).

***columbensis* = *Uniomerus columbensis* (Lea 1857)**

Unio columbensis Lea 1857. Lea 1857b:31; Lea 1858a:75, pl. 14, fig. 55.

Type Specimen.—Lectotype, USNM 85360, length 88 mm (Fig. 29), designated by Johnson (1974).

Type Locality.—Creeks near Columbus, [Muscogee County,] Georgia, [Chattahoochee River drainage,] Bishop Elliott.

Comments.—*Uniomerus columbensis* was synonymized with *Uniomerus obesus* (Lea 1831) by Clench and Turner (1956) and *Uniomerus tetralasmus* (Say 1831) by Johnson (1970). *Uniomerus columbensis* was recognized as valid by Williams et al. (2008) based on preliminary genetic data. A subsequent genetic analysis, including specimens from all major river systems of the south Atlantic and eastern Gulf drainages, confirms the distinctiveness of *U. columbensis*. It is limited in distribution to the Apalachicola and Choctawhatchee River drainages and Econfinia Creek drainages (N. A. Johnson pers. comm.).



Figure 28. Holotype of *Villosa choctawensis* (= *Obovaria choctawensis*), CMNML 20096. © Richard T. Bryant.

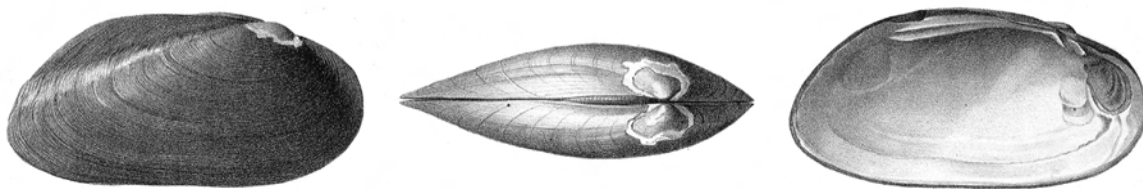


Figure 29. Lectotype of *Unio columbensis* (= *Uniomerus columbensis*), USNM 85360, from Lea (1858a).

***concestator* = *Villosa lienosa* (Conrad 1834b)**

Unio concestator Lea 1857. Lea 1857b:31; Lea 1858a:66, pl. 12, fig. 48.

Type Specimen.—Lectotype, USNM 85102, length 60 mm (Fig. 30), designated by Johnson (1974).

Type Locality.—Creeks near Columbus, [Muscogee County,] Georgia, [Chattahoochee River drainage,] Bishop Elliott.

***contrarius* = *Lampsilis straminea* (Lea 1838)**

Unio contrarius Conrad 1849. Conrad 1849:153; Conrad 1850:276, pl. 37, fig. 7.

Type Specimen.—The figured type (Fig. 31), length reported to be about 81 mm, was not found in the ANSP or MCZ and is presumed lost (Johnson & Baker 1973).

Type Locality.—Ogeechee River, Georgia.

Subsequently corrected and restricted to Flint River, Georgia, [Flint River drainage,] by Johnson (1970).

Comments.—As indicated by Johnson (1970), Conrad (1849, 1850) erroneously reported the type locality of *Unio contrarius* to be “Ogeechee River, Georgia.”

Unio contrarius is synonymized herein with *Lampsilis straminea* based on comparison of the original description and figure with numerous lots of museum material. *Lampsilis straminea* in the study area was previously recognized as *Lampsilis claibornensis* (Clench & Turner 1956; Johnson 1972b) or *Lampsilis straminea claibornensis* (Frierson 1927; Turgeon et al. 1998). The *claibornensis* subspecies was not recognized by Williams et al. (2008).

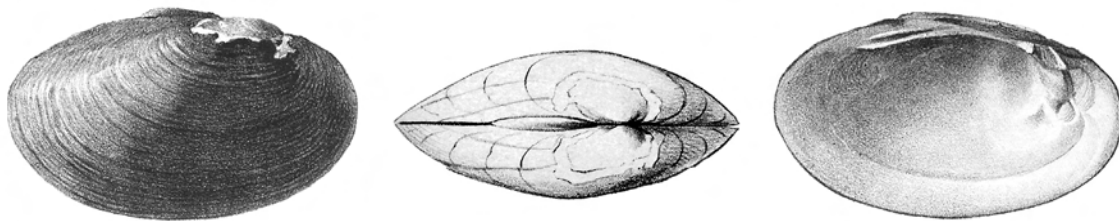


Figure 30. Lectotype of *Unio concestator* (= *Villosa lienosa*), USNM 85102, from Lea (1858a).



Figure 31. Figured type of *Unio contrarius* (= *Lampsilis straminea*) from Conrad (1850).

***corneus* = *Elliptio fumata* (Lea 1857)**

Unio corneus Lea 1874. Lea 1874b:423; Lea 1874c:59, pl. 20, fig. 58.

Type Specimen.—Lectotype, USNM 85580, length 69 mm (Fig. 32), designated by Johnson (1974).

Type Locality.—[Chattahoochee River,] Columbus, [Muscogee County,] Georgia, [Chattahoochee River drainage,] G. Hallenbeck.

Comments.—Additional material that was part of the syntypic series, paralectotypes, was reported from Marietta, [Cobb County,] Georgia, [Chattahoochee River drainage]; Abbeville District, South Carolina, [Savannah River drainage]. The South Carolina locality appears to be in error since this species does not occur in Atlantic Coast drainages.

***coruscus* = *Elliptio jayensis* (Lea 1838)**

Unio coruscus Gould 1856. Gould 1856:15.

Type Specimen.—Lectotype, MCZ 169097, length 36 mm (Fig. 33), designated and figured by Frierson (1911:29, pl. 1, figs. 1–3), refigured by Johnson (1964:60, pl. 32, fig. 3).

Type Locality.—River St. Johns near Lake Beresford, [Volusia County,] Florida, [St. Johns River drainage].

***corvinus* = *Toxolasma paulum* (Lea 1840)**

Unio corvinus Lea 1868. Lea 1868b:144; Lea 1868c:310, pl. 48, fig. 123.

Type Specimen.—Lectotype, USNM 85277,

female, length 35 mm (Fig. 34), designated by Johnson (1974).

Type Locality.—Flint River, Georgia, [Flint River drainage,] J. C. Plant and Dr. H. M. Neisler.

Comments.—Additional material that was part of the syntypic series, paralectotype(s), was reported from Neuse River, Raleigh, [Wake County,] North Carolina, [Neuse River drainage]. The North Carolina locality appears to be in error since this species does not occur in Atlantic Coast drainages.

***corvunculus* = *Toxolasma paulum* (Lea 1840)**

Unio corvunculus Lea 1868. Lea 1868b:144; Lea 1868c:314, pl. 50, fig. 127.

Type Specimen.—The figured type (Fig. 35A) was not found in the USNM and is presumed lost (R. S. Butler & J. D. Williams pers. obs.).

Type Locality.—Flint River, Georgia, [Flint River drainage,] J. C. Plant and Dr. H. M. Neisler.

Comments.—There is confusion surrounding this species. In the original description, Lea (1868b) did not figure the type specimen but did report the Flint River and Darien, Georgia, as the localities of the syntypic series. Another specimen that was subsequently figured by Lea (1868c) as *Unio corvunculus* was from Swamp Creek, Whitfield County, Georgia, [Coosa River drainage of the Mobile Basin,] collected by Major T. C. Downie, and there was no mention of the type localities—Flint River and Darien, Georgia. Simpson (1914) and Johnson (1974) also reported the type locality



Figure 32. Lectotype of *Unio corneus* (= *Elliptio fumata*), USNM 85580. A, figure from Lea (1874c); and B, recent photograph.

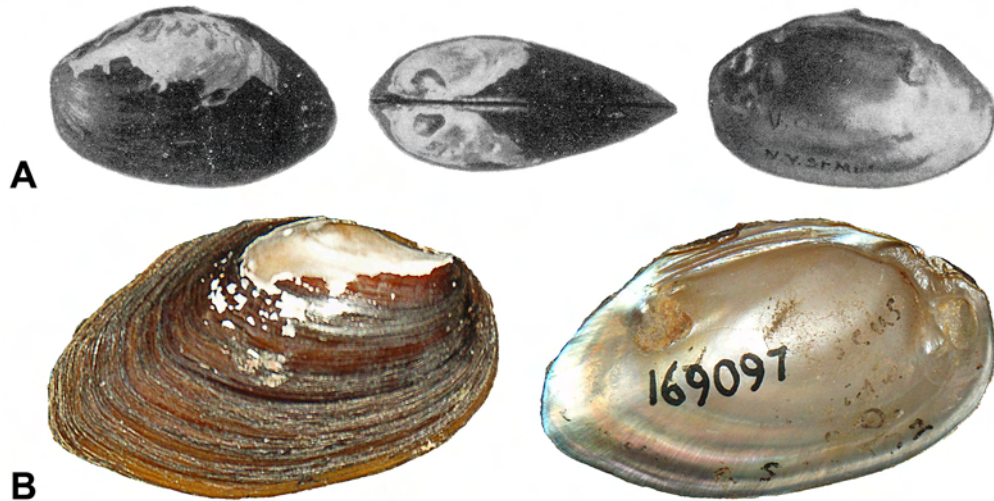


Figure 33. Lectotype of *Unio coruscus* (= *Elliptio jayensis*), MCZ 169097. A, figure from Frierson (1911); and B, recent photograph.

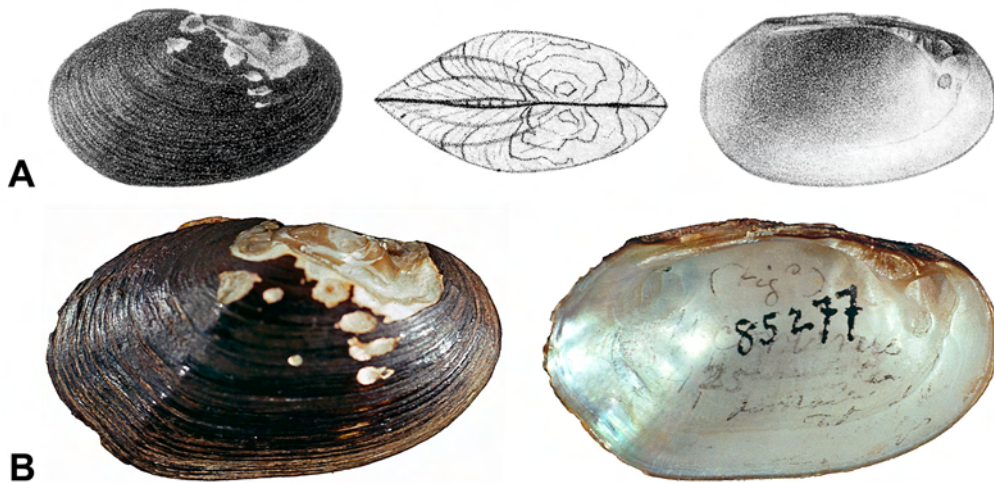


Figure 34. Lectotype of *Unio corvinus* (= *Toxolasma paulum*), USNM 85277. A, figure from Lea (1868c); and B, recent photograph.

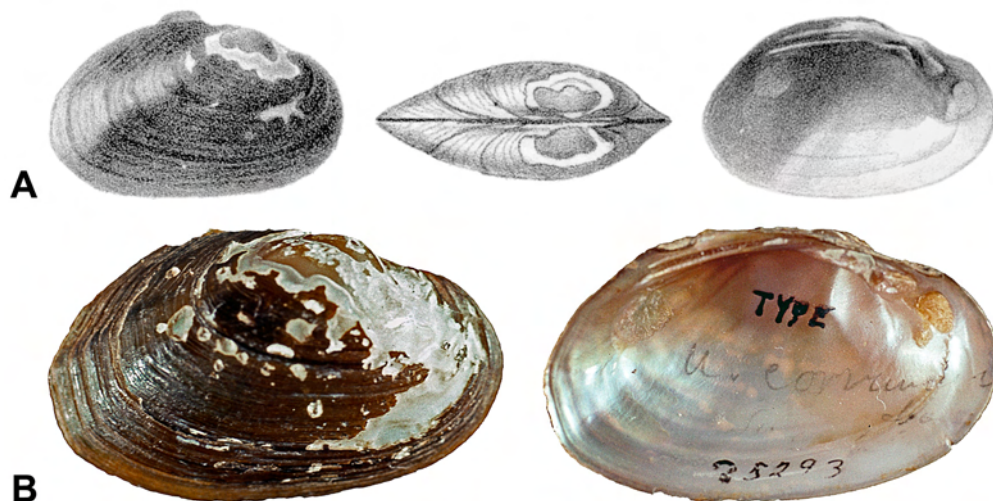


Figure 35. *Unio corvunculus* (= *Toxolasma paulum*). A, figure from Lea (1868c); and B, recent photograph of USNM 85293.

as “Swamp Creek, Whitfield County, Georgia.” Since Johnson’s designated lectotype, USNM 85298, length 29 mm (Fig. 35B), was not part of the syntypic series, it is invalid and the type locality has not been restricted to Swamp Creek, Georgia.

Additional material that was part of the syntypic series was reported from Darien, [Georgia, Altamaha River drainage].

***cromwellii* = *Toxolasma paulum* (Lea 1840)**

Unio cromwellii Lea 1865. Lea 1865:89; Lea 1868a:258, pl. 31, fig. 73.

Type Specimen.—Lectotype, USNM 85280, length 28 mm (Fig. 36), designated by Johnson (1974).

Type Locality.—Kiokee Creek near Albany, Dougherty County, Georgia, [Flint River drainage,] Dr. B. M. Cromwell.

***cunninghami* = *Elliptio jayensis* (Lea 1838)**

Unio cunninghami B. H. Wright 1883. B. H. Wright 1883:58, pl. 1, figs. 1–4.

Type Specimen.—Lectotype, ANSP 41348a, length 49 mm (Fig. 37), designated and refigured by Johnson (1967a:5, p. 13, fig. 2).

Type Locality.—Lakes of Sumter County, Florida, T. L. Cunningham. Subsequently restricted to Lake Harris, Yalaha, Lake County, Florida, [St. Johns River drainage,] by Johnson (1967a).

Comments.—In the original description (Wright 1883) the type locality was reported to be “Lakes of Sumter County, Florida.” It appears that Wright failed to include the locality for the specimen he figured.

A note associated with the ANSP lectotype indicates *Unio cunninghami* differs from *Unio buckleyi* in “being rayless in all stages.” The shell is also highly inflated and thick, which is characteristic of many lake populations of *Elliptio* in peninsular Florida.

***dallii* = *Elliptio jayensis* (Lea 1838)**

Unio dallii B. H. Wright 1888. B. H. Wright 1888:119, pl. 6, figs. 1, 1a.

Type Specimen.—Lectotype, USNM 151037, length 64 mm (Fig. 38), designated and refigured by Johnson (1967a:5, pl. 10, fig. 2).

Type Locality.—Lake Beresford, Volusia County, Florida, [St. Johns River drainage].

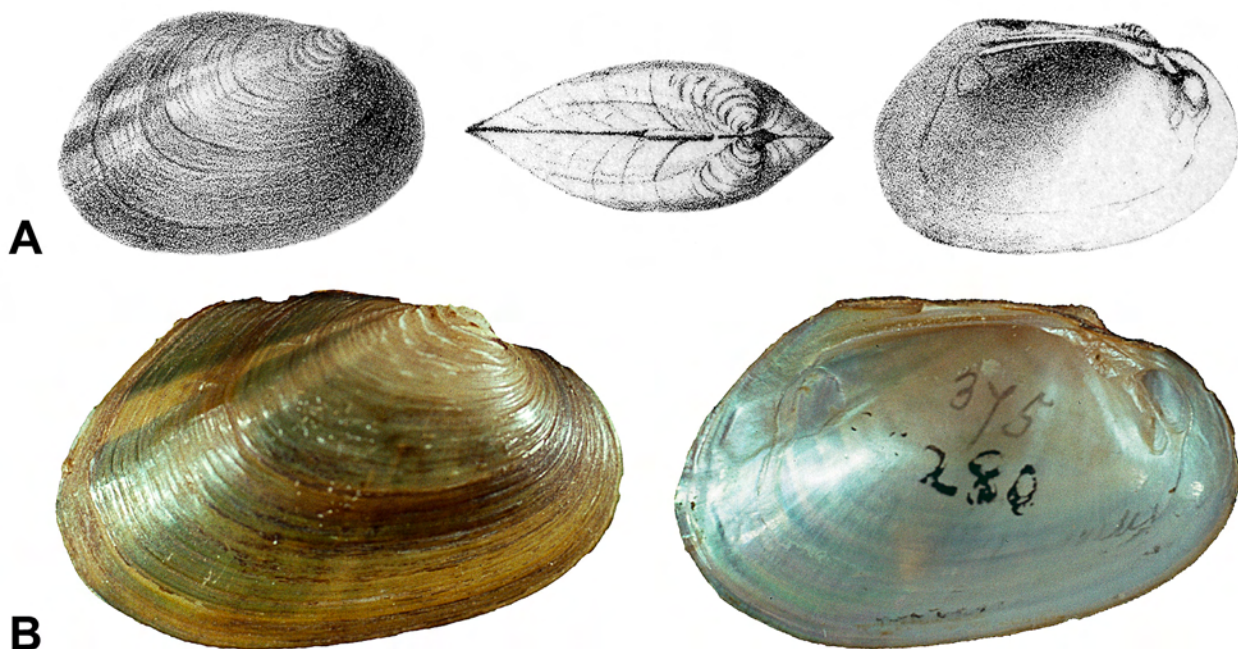


Figure 36. Lectotype of *Unio cromwellii* (= *Toxolasma paulum*), USNM 85280. A, figure from Lea (1868a); and B, recent photograph.

danielsi* = *Elliptio crassidens* (Lamarck 1819)Unio danielsi* B. H. Wright 1899. B. H. Wright 1899:31.

Type Specimen.—Lectotype, USNM 168967, length 56 mm (Fig. 39), designated and figured by Johnson (1967a:5, pl. 6, fig. 1).

Type Locality.—Spring Creek, [tributary to

Flint River,] Decatur County, Georgia, [Flint River drainage].

Comments.—The lectotype of *Unio danielsi* has sculpturing on the posterior slope (not visible in Fig. 39), which is typical of *Elliptio crassidens* in eastern Gulf drainages.

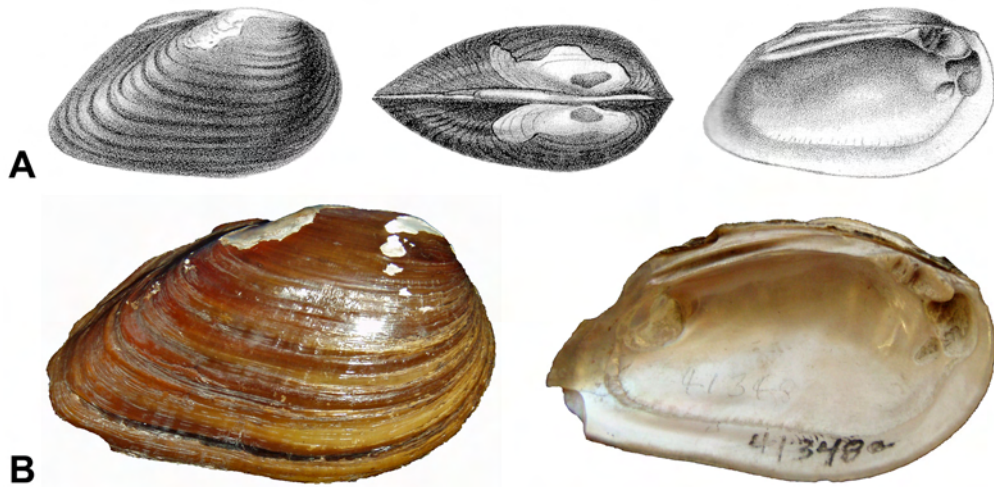


Figure 37. Lectotype of *Unio cunninghami* (= *Elliptio jayensis*), ANSP 41348a. A, figure from B. H. Wright (1883); and B, recent photograph.



Figure 38. Lectotype of *Unio dallii* (= *Elliptio jayensis*), USNM 151037.

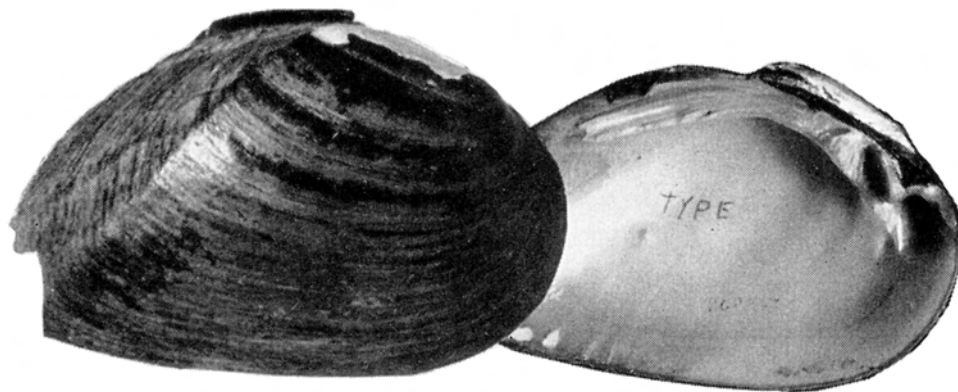


Figure 39. Lectotype of *Unio danielsi* (= *Elliptio crassidens*), USNM 168967, from Johnson (1967a).

***denigratus* = *Elliptio nigella* (Lea 1852)**

Unio denigratus Lea 1857. Lea 1857a:171; Lea 1859a:200, pl. 23, fig. 83.

Type Specimen.—Lectotype, USNM 85568, length 39 mm (Fig. 40), designated and refigured by Johnson (1968:22, fig. 4).

Type Locality.—Streams near Columbus, [Muscogee County,] Georgia, [Chattahoochee River drainage,] Bishop Elliott.

***diazensis* = *Elliptio jayensis* (Lea 1838)**

Unio diazensis S. H. Wright 1897. S. H. Wright 1897:5.

Type Specimen.—Lectotype, USNM 149652, length 34 mm (Fig. 41), designated and figured by

Johnson (1967a:6, pl. 8, fig. 6).

Type Locality.—Lake Diaz [Dias], Volusia County, Florida, [St. Johns River drainage,] B. H. Wright.

***dispalans* = *Elliptio occulta* (Lea 1843)**

Unio dispalans B. H. Wright 1899. B. H. Wright 1899:50.

Type Specimen.—Lectotype, USNM 159986, length 63 mm (Fig. 42), designated and figured by Simpson (1900b:80, pl. 1, fig. 9), refigured by Johnson (1967a:6, pl. 8, fig. 3).

Type Locality.—Suwannee River, Florida, [Suwannee River drainage].

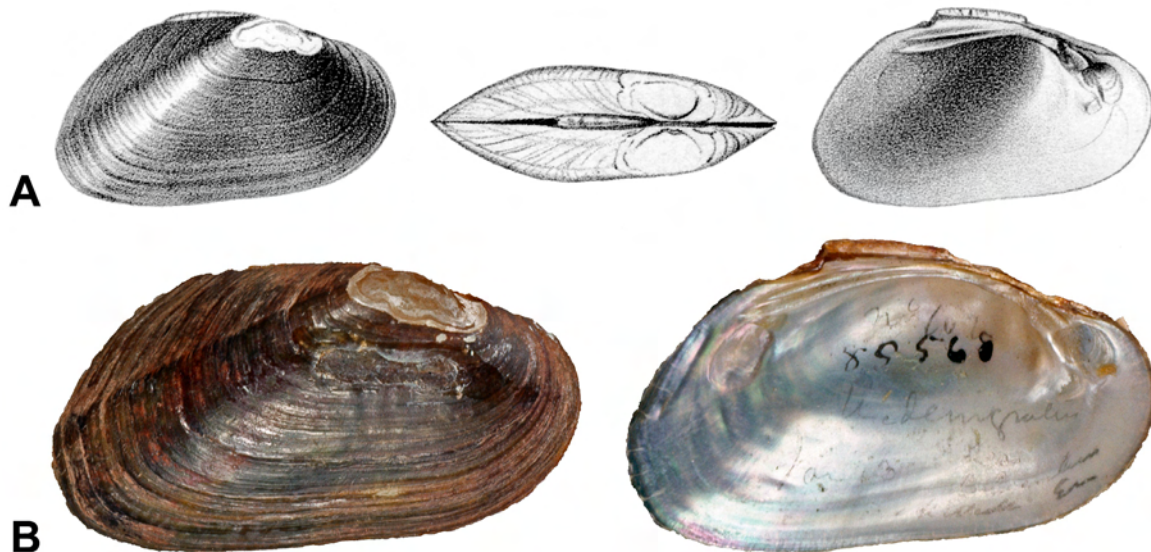


Figure 40. Lectotype of *Unio denigratus* (= *Elliptio nigella*), USNM 85568. A, figure from Lea (1859a); and B, recent photograph.



Figure 41. Lectotype of *Unio diazensis* (= *Elliptio jayensis*), USNM 149652, from Johnson (1967a).

***dispar* = *Villosa lienosa* (Conrad 1834b)**

Unio dispar Lea 1860. Lea 1860b:305; Lea 1860a:327, pl. 51, fig. 153.

Type Specimen.—Lectotype, USNM 85101, length 55 mm (Fig. 43), designated by Johnson (1974).

Type Locality.—[Chattahoochee River,] Columbus, [Muscogee County,] Georgia, [Chattahoochee River drainage,] Bishop Elliott and G. Hallenbeck.

***dooleyensis* = *Elliptio fumata* (Lea 1857)**

Unio dooleyensis Lea 1874. Lea 1874d:424; Lea 1874c:64, pl. 22,

fig. 60.

Type Specimen.—Lectotype, USNM 85538, length 62 mm (Fig. 44), designated by Johnson (1974).

Type Locality.—Dooley [Dooly] County, Georgia, [Flint River drainage].

Comments.—Additional material that was part of the syntypic series, paralectotype(s), was reported from Abbeville, Abbeville County, South Carolina, [Savannah River drainage]. The South Carolina locality appears to be in error since this species does not occur in Atlantic Coast drainages.

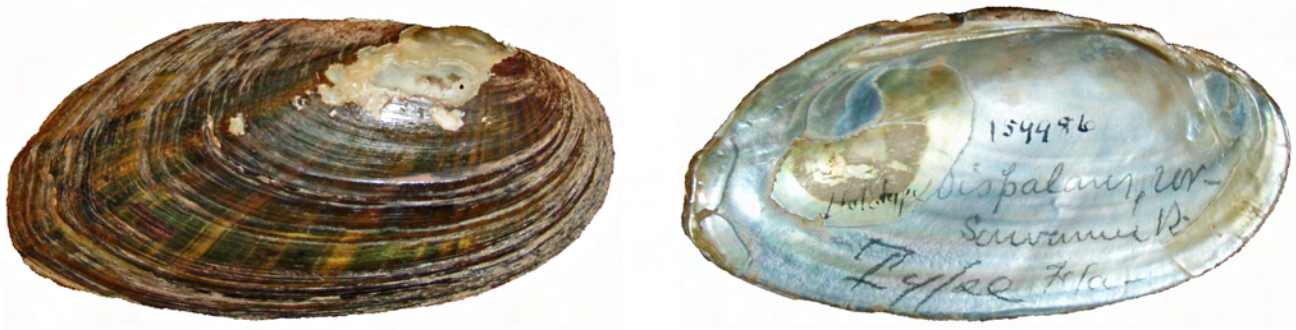


Figure 42. Lectotype of *Unio dispalans* (= *Elliptio occulta*), USNM 159986.

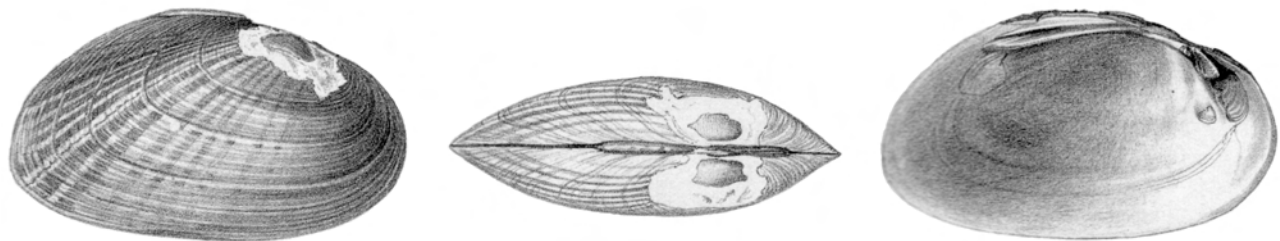


Figure 43. Lectotype of *Unio dispar* (= *Villosa lienosa*), USNM 85101, from Lea (1860a).

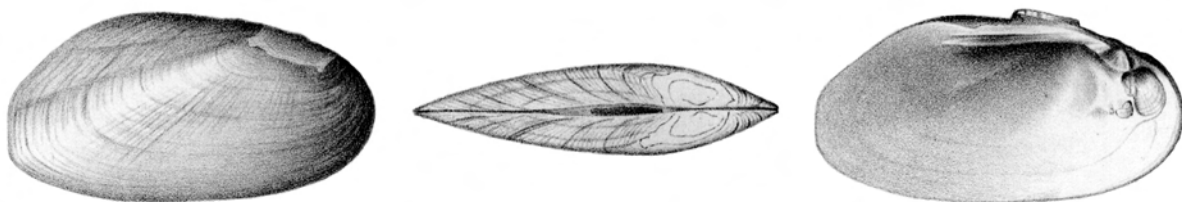


Figure 44. Lectotype of *Unio dooleyensis* (= *Elliptio fumata*), USNM 85538, from Lea (1874c).

***dorei* = *Elliptio jayensis* (Lea 1838)**

Unio dorei B. H. Wright 1888. B. H. Wright 1888:115, pl. 3, fig. 1.

Type Specimen.—Lectotype, USNM 151034, length 66 mm (Fig. 45), designated and refigured by Johnson (1967a:6, pl. 9, fig. 2).

Type Locality.—Lake Monroe, [Volusia and Seminole counties,] Florida, [St. Johns River drainage].

***elliottii* = *Anodontoides radiatus* (Conrad 1834b)**

Margaritana elliottii Lea 1858. Lea 1858b:138; Lea 1859a:226, pl. 31, fig. 108.

Type Specimen.—Lectotype, USNM 86257, length 45 mm (Fig. 46), designated by Johnson (1967b).

Type Locality.—Chattahoochee River [below Uchee Bar] near Columbus, [Muscogee County,] Georgia, [Chattahoochee River drainage,] Bishop Elliott.

Comments.—*Anodontoides elliottii* was recognized as valid by Clench and Turner (1956), but was subsequently synonymized with *Anodontoides radiatus* by Johnson (1967b).

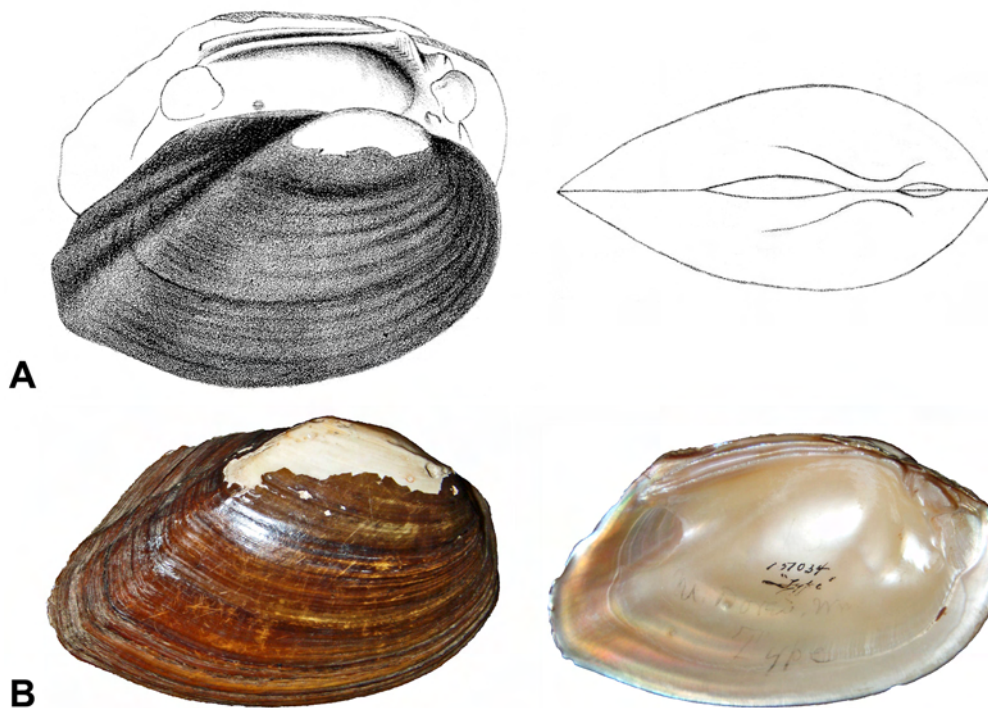


Figure 45. Lectotype of *Unio dorei* (= *Elliptio jayensis*), USNM 151034. A, figure from B. H. Wright (1888); and B, recent photograph.

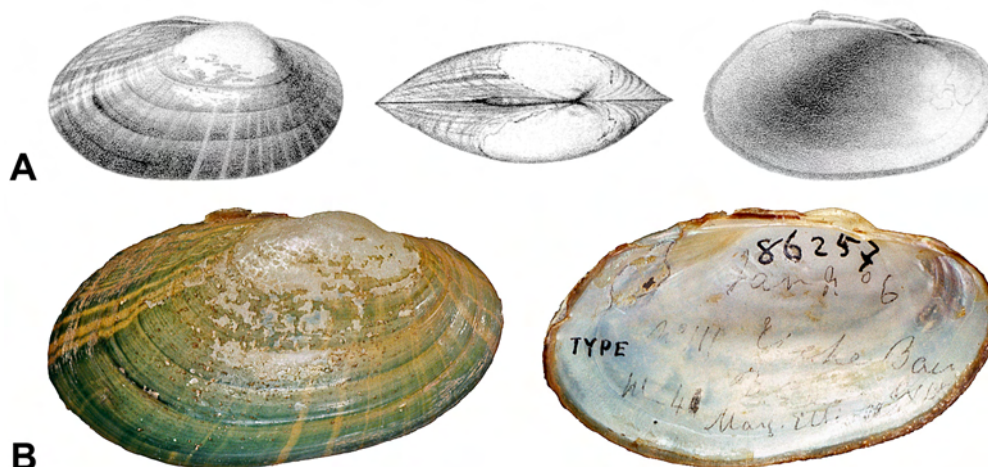


Figure 46. Lectotype of *Margaritana elliottii* (= *Anodontoides radiatus*), USNM 86257. A, figure from Lea (1859a); and B, recent photograph.

***escambia* = *Fusconaia escambia* Clench and Turner 1956**

Fusconaia escambia Clench and Turner 1956. Clench and Turner 1956:152, pl. 7, figs. 3–4.

Type Specimen.—Holotype, MCZ 191470, length 46 mm (Fig. 47).

Type Locality.—Escambia River, 3 miles southeast of Century, Escambia County, Florida, [Escambia River drainage].

***exiguus* = *Villosa vibex* (Conrad 1834a)**

Unio exiguus Lea 1840. Lea 1840:287; Lea 1842:191, pl. 7, fig. 1.

Type Specimen.—Lectotype, USNM 84974, length 45 mm (Fig. 48), designated by Johnson (1974).

Type Locality.—Chattahoochee River, Columbus, [Muscogee County,] Georgia, [Chattahoochee River drainage,] Dr. Boykin.

***extensus* = *Elliptio pullata* (Lea 1856)**

Unio extensus Lea 1857. Lea 1857b:31; Lea 1858a:67, pl. 12, fig. 49.

Type Specimen.—Lectotype, USNM 85995, length 88 mm (Fig. 49), designated by Johnson (1974).

Type Locality.—Dry Creek, [tributary to Upatoi Creek,] near Columbus, [possibly Talbot County,] Georgia, [Chattahoochee River drainage,] Bishop Elliott.

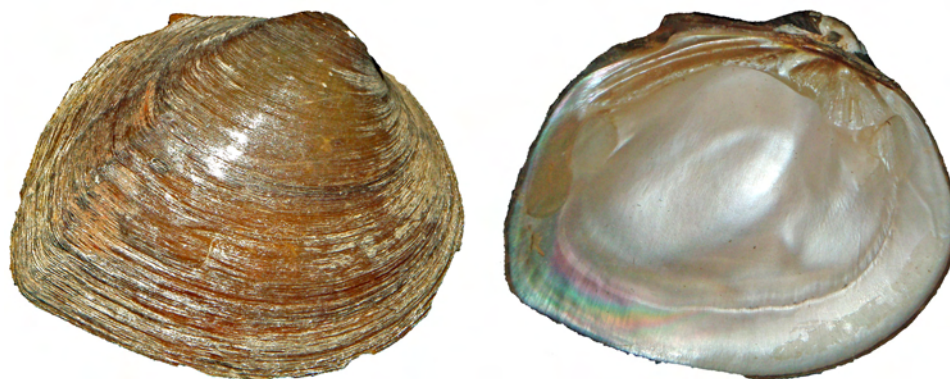


Figure 47. Holotype of *Fusconaia escambia*, MCZ 191470.



Figure 48. Lectotype of *Unio exiguus* (= *Villosa vibex*), USNM 84974, from Lea (1842).

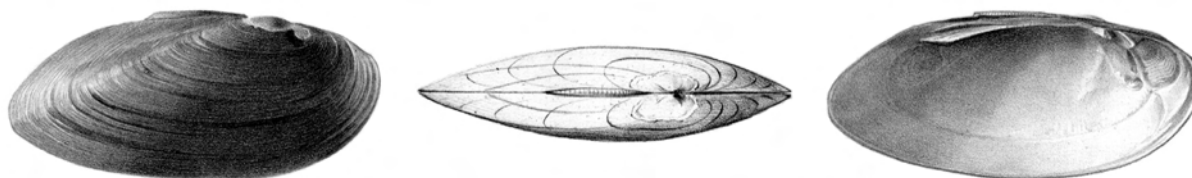


Figure 49. Lectotype of *Unio extensus* (= *Elliptio pullata*), USNM 85995, from Lea (1858a).

***fallax* = *Villosa lienosa* (Conrad 1834b)**

Unio fallax Lea 1857. Lea 1857b:32; Lea 1858a:79, pl. 15, fig. 59.

Type Specimen.—The figured type (Fig. 50) was not found in the USNM and is presumed lost (Johnson 1974).

Type Locality.—Streams near Columbus, [Muscogee County,] Georgia, [Chattahoochee River drainage,] Bishop Elliott.

Comments.—Additional material that was part of the syntypic series was reported from French Broad River, Tennessee, [Tennessee River drainage].

***ferrissii* = *Elliptio jayensis* (Lea 1838)**

Unio ferrissii Marsh 1891. Marsh 1891:30.

Type Specimen.—Lectotype (Fig. 51), designated and figured by Simpson (1892:423, pl. 66, figs. 1–2).

Type Locality.—A small creek near Pilatka [Palatka, Putnam County,] Florida, [St. Johns River drainage].

Comments.—The lectotype was illustrated by Simpson and apparently returned to Marsh. This specimen is presumed lost (Johnson 1979).

Elliptio ferrissii is synonymized herein with *Elliptio jayensis* based on the original description, which indicated that the shell was smooth anteriorly

and had pink nacre. Simpson (1892) reported it to be similar to *Elliptio buckleyi* (= *E. jayensis*) or *Elliptio crassidens*.

***floridensis* = *Lampsilis floridensis* (Lea 1852)**

Unio floridensis Lea 1852. Lea 1852:274, pl. 21, fig. 31.

Type Specimen.—Holotype by monotypy, ANSP 42081, length 76 mm (Fig. 52).

Type Locality.—Chácktaháchi [Choctawhatchee] River, west Florida, Major J. E. Le Conte. Subsequently restricted to Choctawhatchee River, 1 mile west of Caryville, Holmes County, Florida, [Choctawhatchee River drainage,] by Clench and Turner (1956).

Comments.—Clench and Turner (1956) erroneously reported that the shell figured by Lea was in the USNM. This specimen is actually in the ANSP as reported by Johnson and Baker (1973).

Clench and Turner (1956) recognized *floridensis* as a subspecies of *Lampsilis anodontoides* (= *Lampsilis teres*), but Johnson (1972b) synonymized it with *L. teres*. It was elevated to species status by Williams et al. (2008) based on genetics and subtle differences in shell morphology. All previous records of *L. teres* from the study area are referable to *Lampsilis floridensis*.

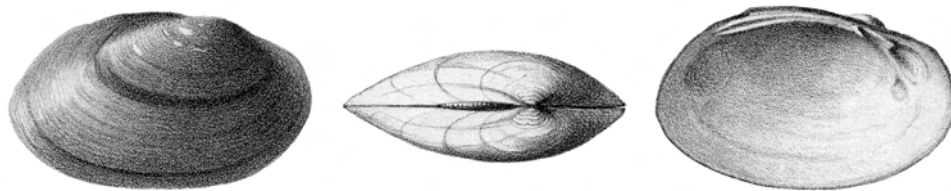


Figure 50. Figured type of *Unio fallax* (= *Villosa lienosa*) from Lea (1858a).

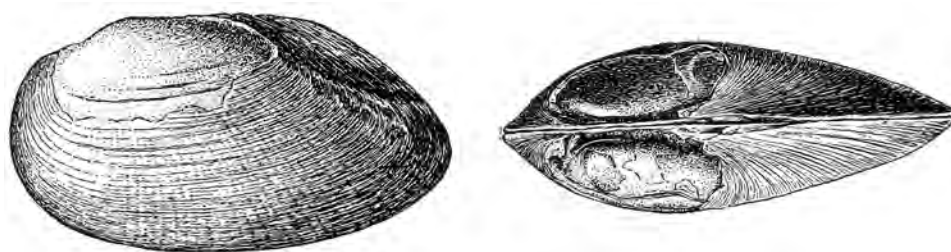


Figure 51. Lectotype of *Unio ferrissii* (= *Elliptio jayensis*) from Simpson (1892).

fryanus* = *Elliptio occulta* (Lea 1843)Unio fryanus* B. H. Wright 1888. B. H. Wright 1888:113, pl. 2, fig. 1.

Type Specimen.—Lectotype, USNM 151032, length 44 mm (Fig. 53), designated and refigured

by Johnson (1967a:6, pl. 8, fig. 5).

Type Locality.—Lake Ashby, Volusia County, Florida, [St. Johns River drainage,] B. H. Wright.

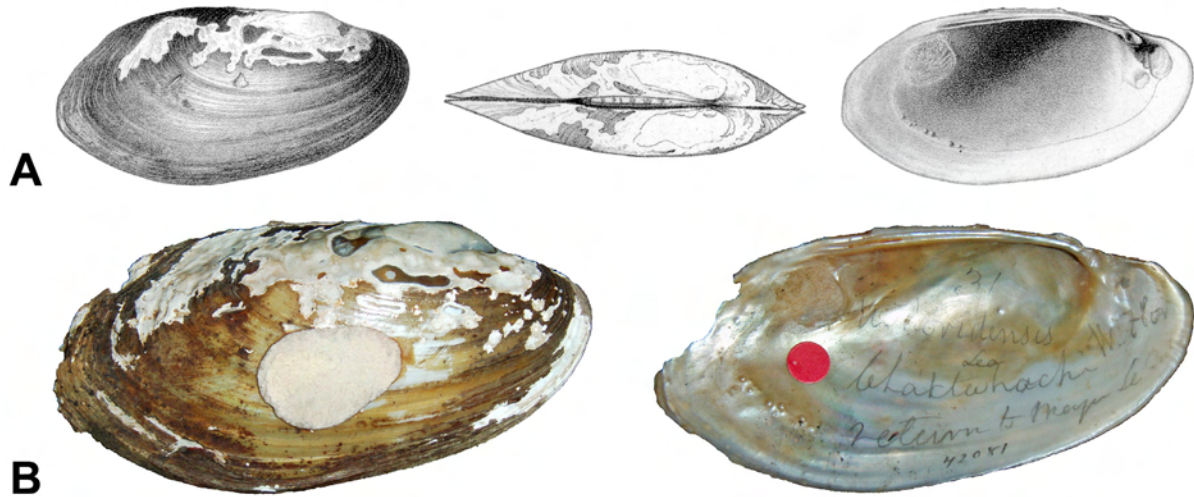


Figure 52. Holotype of *Unio floridensis* (= *Lampsilis floridensis*), ANSP 42081. A, figure from Lea (1852); and B, recent photograph.

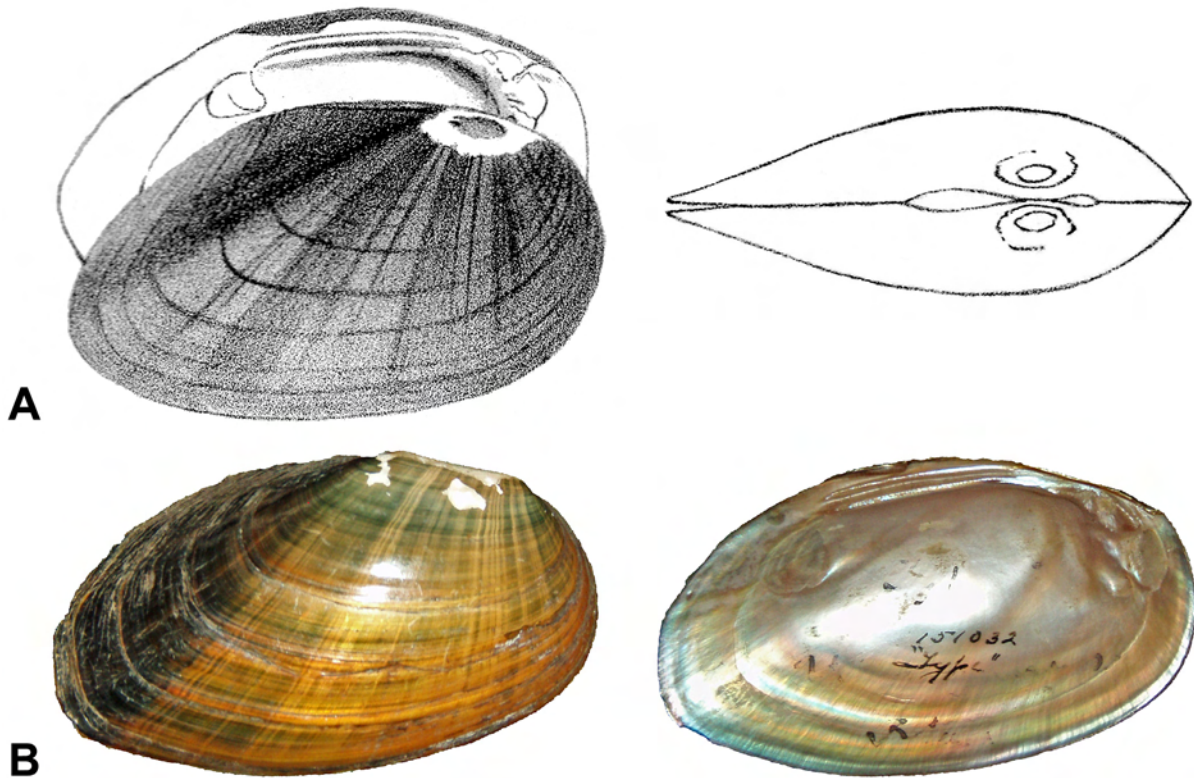


Figure 53. Lectotype of *Unio fryanus* (= *Elliptio occulta*), USNM 151032. A, figure from B. H. Wright (1888); and B, recent photograph.

***fumatus* = *Elliptio fumata* (Lea 1857)**

Unio fumatus Lea 1857. Lea 1857a:171; Lea 1858a:88, pl. 18, fig. 68.

Type Specimen.—Lectotype, USNM 85552, length 59 mm (Fig. 54), designated by Johnson (1970).

Type Locality.—Chattahoochee River near Columbus, [Muscogee County,] Georgia, [Chattahoochee River drainage,] Bishop Elliott.

Comments.—Additional material that was part of the syntypic series, paralectotype(s), was reported from Hospaliga [Hospilika] Creek, [Lee and Russell counties,] Alabama, [Chattahoochee River drainage].

Elliptio fumata was recognized as valid by Williams et al. (2008) based on shell morphology

and zoogeography. Most previous records of *Elliptio complanata* from the Apalachicola River drainage are probably referable to *E. fumata*.

***fuscatus* = *Elliptio occulta* (Lea 1843)**

Unio fuscatus Lea 1843. Lea 1843:[one page privately published]; Lea 1846:277, pl. 40, fig. 4.

Type Specimen.—Lectotype, USNM 85243, length 44 mm (Fig. 55), designated by Johnson (1974).

Type Locality.—Black Creek, [Clay County,] Florida, [St. Johns River drainage,] Dr. Budd.

Comments.—The description of *Unio fuscatus* was published on the same page as that of *Unio occultus*. The name *occultus* was arbitrarily chosen over *fuscatus* as the name to represent this species.

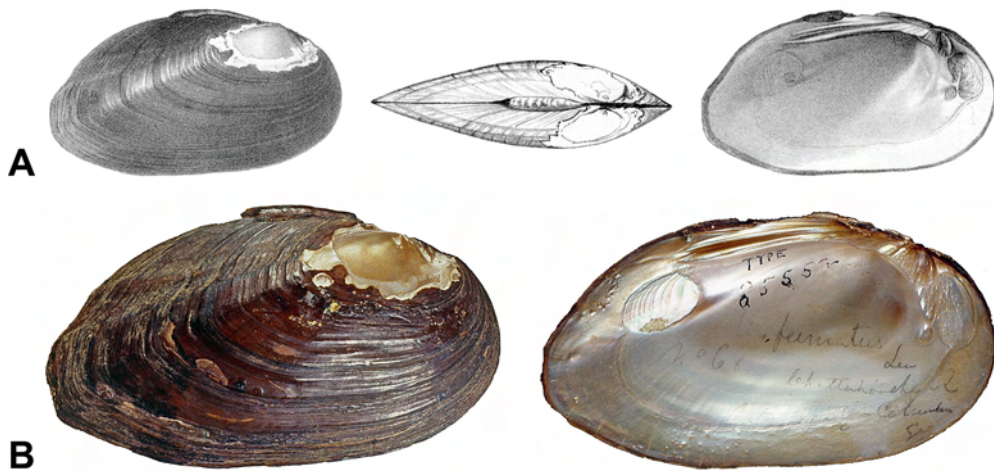


Figure 54. Lectotype of *Unio fumatus* (= *Elliptio fumata*), USNM 85552. A, figure from Lea (1858a); and B, recent photograph.



Figure 55. Lectotype of *Unio fuscatus* (= *Elliptio occulta*), USNM 85243. A, figure from Lea (1846); and B, recent photograph.

***gesnerii* = *Elliptio fumata* (Lea 1857)**

Unio gesnerii Lea 1874. Lea 1874d:424; Lea 1874c:65, pl. 22, fig. 64.

Type Specimen.—Lectotype, USNM 85670, length 82 mm (Fig. 56), designated by Johnson (1970).

Type Locality.—Uchee River [Creek, Lee and Russell counties, Alabama,] near Columbus, Georgia, [Chattahoochee River drainage,] Dr. J. Lewis.

***haddletoni* = *Obovaria haddletoni* (Athearn 1964)**

Lampsilis haddletoni Athearn 1964. Athearn 1964:135–136, pl. 9, figs. g–h (paratypes).

Type Specimen.—Holotype, CMNML 20095, length 30 mm (Fig. 57).

Type Locality.—Choctawhatchee River, West

Fork, 7 miles southwest [southeast] of Ozark, Dale County, Alabama, [Choctawhatchee River drainage,] 23 September 1956, H. D. Athearn.

Comments.—The type locality information given in the original description was erroneous (Butler 1989). Athearn (1964) reported the collection from “Choctawhatchee River, West Fork, 7 miles southwest of Ozark...” but it should read, “...southeast of Ozark.”

Obovaria haddletoni was originally described as a species of *Lampsilis*. However, no justification or discussion was given by Athearn (1964) regarding this placement. Based on shell morphology, circular shape, shallow umbo cavity, and triangular, divergent, striated pseudocardinal teeth, it was placed in *Obovaria* by Williams et al. (2008).



Figure 56. Lectotype of *Unio gesnerii* (= *Elliptio fumata*), USNM 85670. A, figure from Lea (1874c); and B, recent photograph.

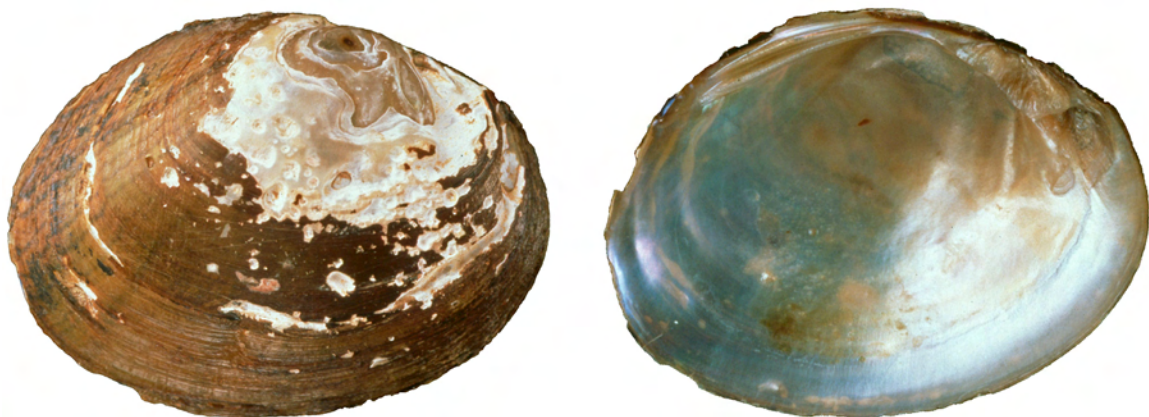


Figure 57. Holotype of *Lampsilis haddletoni* (= *Obovaria haddletoni*), CMNML 20095.

***hallenbeckii* = *Elliptio fumata* (Lea 1857)**

Unio hallenbeckii Lea 1859. Lea 1859c:170; Lea 1860a:328, pl. 51, fig. 154.

Type Specimen.—Lectotype, USNM 85537, length 76 mm (Fig. 58), designated by Johnson (1974).

Type Locality.—Flat Rock [Flatrock] Creek near Columbus, [Muscogee County,] Georgia, [Chattahoochee River drainage,] G. Hallenbeck and Bishop Elliott.

Comments.—Additional material that was part of the syntypic series, paralectotype(s), was reported from Four Mile Creek near Columbus, Georgia. A note written inside the shell of the lectotype reads, “Black Dirt Creek.”

***harperi* = *Pleurobema pyriforme* (Lea 1857)**

Unio harperi B. H. Wright 1899. B. H. Wright 1899:6.

Type Specimen.—Lectotype, USNM 159197, length 48 mm (Fig. 59), designated and figured by Simpson (1900b:81, pl. 1, fig. 10), refigured by Johnson (1967a:6, pl. 4, fig. 3).

Type Locality.—Restricted to Spring Creek, a branch of the Flint River, Decatur County, Georgia,

[Flint River drainage,] by Johnson (1967a).

Comments.—Additional material that was part of the syntypic series, paralectotype(s), was reported from Altamaha River, Liberty County, Georgia, [Altamaha River drainage]; Suwannee River, Madison County, Florida, [Suwannee River drainage]. The locality reported by Wright (1899), “Altamaha River, Liberty County, Georgia,” is an error (Clench & Turner 1956).

***hartii* = *Elliptio jayensis* (Lea 1838)**

Unio (Elliptio) webbianus hartii B. H. Wright 1934. B. H. Wright 1934a:95, pl. 10, figs. 3–4.

Type Specimen.—Holotype, USNM 424925, length 34 mm (Fig. 60), refigured by Johnson (1967a:6, pl. 9, fig. 5).

Type Locality.—Lake Consuelo near Floral City, Citrus County, Florida, [Withlacoochee River drainage].

Comments.—Johnson (1967a) amended the description of the type locality to include “or Little Lake, southeast of Floral City, just outside village limits.”



Figure 58. Lectotype of *Unio hallenbeckii* (= *Elliptio fumata*), USNM 85537, from Lea (1860a).



Figure 59. Lectotype of *Unio harperi* (= *Pleurobema pyriforme*), USNM 159197.

***hartwrightii* = *Elliptio monroensis* (Lea 1843)**

Unio hartwrightii B. H. Wright 1896. B. H. Wright 1896:121, pl. 2, figs. 4–6.

Type Specimen.—Lectotype, USNM 151031 (right valve), USNM 151033 (left valve), length 79 mm (Fig. 61), designated and refigured by Johnson (1967a:6, pl. 7, fig. 1).

Type Locality.—Lake Beresford, [Volusia County,] Florida, [St. Johns River drainage].

Comments.—The type locality was restricted to St. Johns River, Blue Springs, 3 miles south of Lake Beresford, Volusia County, Florida, by Johnson (1967a) based on information on the label of the type specimen. This appears to be an invalid restriction as that locality was not mentioned in the original description.

Elliptio hartwrightii was synonymized with

Elliptio dariensis by Johnson (1970, 1972b).

***heardi* = *Anodonta heardi* Gordon and Hoeh 1995**

Anodonta heardi Gordon and Hoeh 1995. Gordon and Hoeh 1995:265, fig. 1.

Type Specimen.—Holotype, UMMZ 250516, length 89 mm (Fig. 62).

Type Locality.—Apalachicola River, approximately 9.7 kilometers north of Blountstown at Ocheese Landing, Calhoun County, Florida, [Apalachicola River drainage,] 4 August 1968, W. H. Heard and R. H. Guckert.

Comments.—In the original description, the shell included below is indicated as being the holotype in the figure legend; however, the number is referenced in the text as being a paratype (Gordon & Hoeh 1995).



Figure 60. Holotype of *Unio (Elliptio) webbianus hartii* (= *Elliptio jayensis*), USNM 424925.

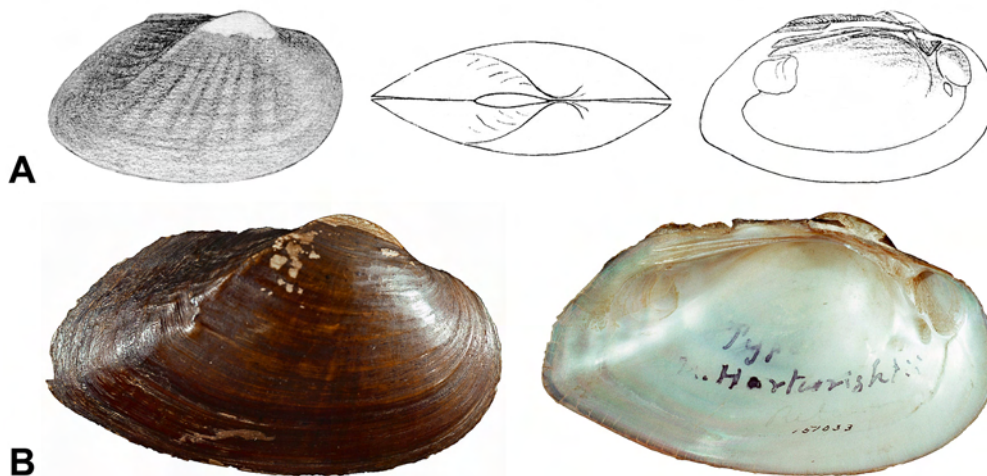


Figure 61. Lectotype of *Unio hartwrightii* (= *Elliptio monroensis*), USNM 151031 (right valve) and USNM 151033 (left valve). A, figure from B. H. Wright (1896); and B, recent photograph.



Figure 62. Holotype of *Anodonta heardi*, UMMZ 250516, from Gordon and Hoeh (1995).

***hinkleyi* = *Elliptio jayensis* (Lea 1838)**

Unio hinkleyi B. H. Wright 1888. B. H. Wright 1888:117, pl. 4, fig. 2.

Type Specimen.—Lectotype, USNM 151033, length 74 mm (Fig. 63), designated and refigured by Johnson (1967a:7, pl. 11, fig. 1).

Type Locality.—Lake Monroe, [Volusia and Seminole counties,] Florida, [St. Johns River drainage].

***incrassatus* = *Elliptio crassidens* (Lamarck 1819)**

Unio incrassatus Lea 1840. Lea 1840:286; Lea 1842:217, pl. 16, fig. 34.

Type Specimen.—Lectotype, USNM 84537, length 55 mm (Fig. 64), designated by Johnson (1970).

Type Locality.—Chattahoochee River near Columbus, [Muscogee County,] Georgia, [Chattahoochee River drainage,] Dr. Boykin.

Comments.—Clench and Turner (1956) recognized *incrassatus* as a subspecies of *Elliptio crassidens* and reported the distribution to be from the Apalachicola River system west to the Amite River in Louisiana, but absent in the Choctawhatchee River, Alabama and Florida.

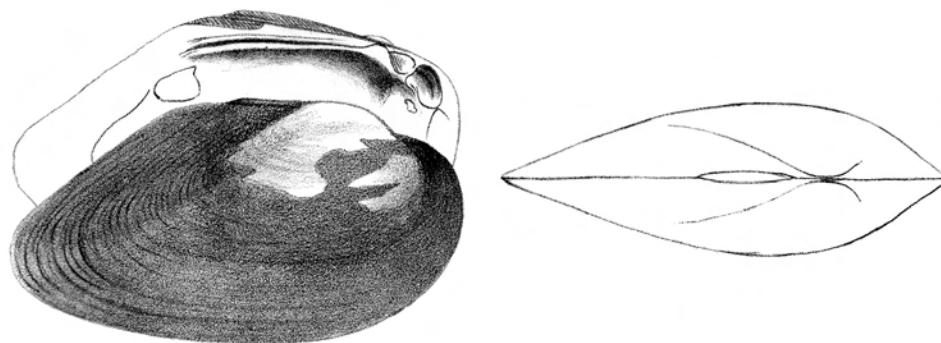


Figure 63. Lectotype of *Unio hinkleyi* (= *Elliptio jayensis*), USNM 151033, from B. H. Wright (1888).

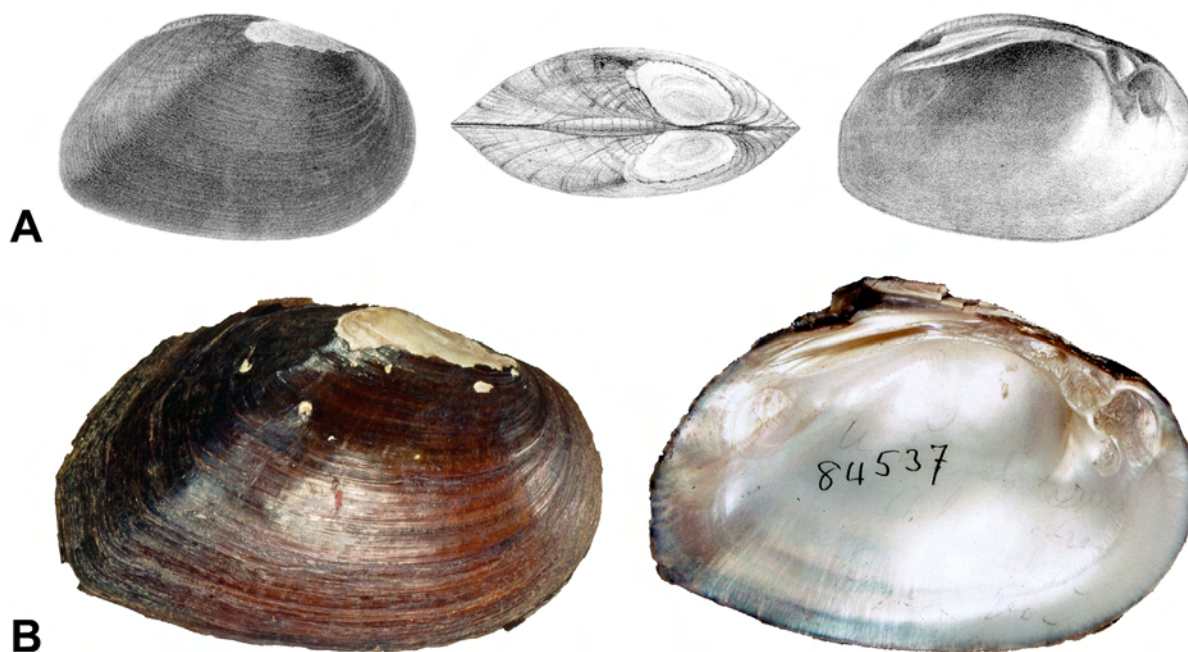


Figure 64. Lectotype of *Unio incrassatus* (= *Elliptio crassidens*), USNM 84537. A, figure from Lea (1842); and B, recent photograph.

***infucatus* = *Quadrula infucata* (Conrad 1834a)**

Unio infucatus Conrad 1834. Conrad 1834a:45, pl. 3, fig. 2.

Type Specimen.—The figured type (Fig. 65) is presumed lost (Johnson & Baker 1973).

Type Locality.—Flint River, Georgia. Subsequently restricted to Flint River, Albany, Dougherty County, Georgia, [Flint River drainage,] by Clench and Turner (1956).

Comments.—The genus *Quincuncina* is no longer recognized (Lydeard et al. 2000; Campbell et al. 2005), making this a new binomen (Williams et al. 2008).

***intercedens* = *Villosa lienosa* (Conrad 1834b)**

Unio intercedens Lea 1857. Lea 1857b:32; Lea 1858a:77, pl. 15, fig. 57.

Type Specimen.—Lectotype, USNM 85122, male, length 48 mm (Fig. 66), designated by Johnson (1974).

Type Locality.—Streams near Columbus, [Muscogee County,] Georgia, [Chattahoochee River drainage,] Bishop Elliott.

***invenustus* = *Elliptio fumata* (Lea 1857)**

Unio invenustus Lea 1874. Lea 1874d:424; Lea 1874c:66, pl. 22, fig. 62.

Type Specimen.—Lectotype, USNM 85704, length 57 mm (Fig. 67), designated by Johnson (1974).

Type Locality.—[Chattahoochee River,] Columbus, [Muscogee County,] Georgia, [Chattahoochee River drainage,] G. Hallenbeck.



Figure 65. Figured type of *Unio infucatus* (= *Quadrula infucata*) from Conrad (1834a).

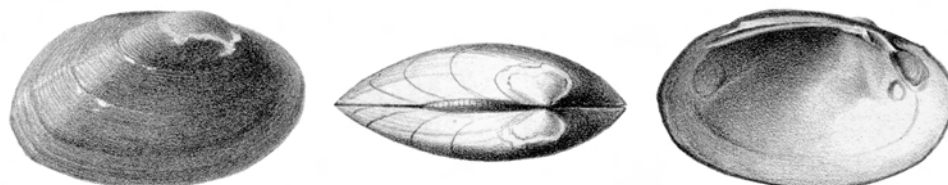


Figure 66. Lectotype of *Unio intercedens* (= *Villosa lienosa*), USNM 85122, from Lea (1858a).

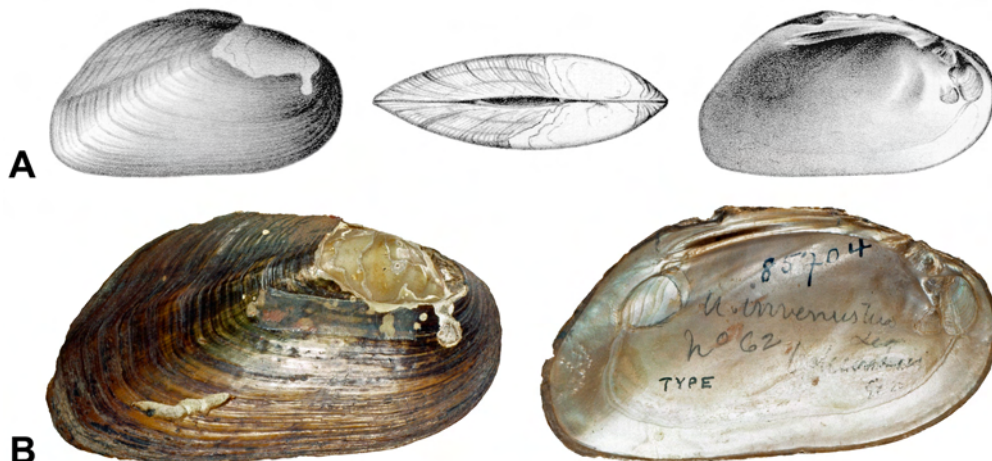


Figure 67. Lectotype of *Unio invenustus* (= *Elliptio fumata*), USNM 85704. A, figure from Lea (1874c); and B, recent photograph.

Comments.—Additional material that was part of the syntypic series, paralectotype(s), was reported from Russell County, Georgia [Alabama, Chattahoochee River drainage]; Irwins Creek, [Mecklenburg County,] North Carolina, [Catawba River drainage]. The North Carolina locality appears to be in error since this species does not occur in Atlantic Coast drainages.

***jayensis* = *Elliptio jayensis* (Lea 1838)**

Unio jayensis Lea 1838. Lea 1838:28, pl. 9, fig. 23.

Type Specimen.—Lectotype, USNM 86031 (right valve only), length 64 mm (Fig. 68), designated by Johnson (1974).

Type Locality.—Florida, J. C. Jay. Restricted herein to Lake Monroe, Seminole and Volusia counties, Florida, St. Johns River drainage.

Comments.—*Elliptio jayensis* is the most

morphologically variable species in the study area. *Elliptio buckleyi* and *E. jayensis* were recognized as valid by Simpson (1892, 1914), but Ortmann (1912) concluded that *E. buckleyi* was only an older adult of *E. jayensis*. However, subsequent authors generally recognized both taxa (Johnson 1972b; Heard 1979; Turgeon et al. 1988, 1998). *Elliptio buckleyi* is synonymized herein with *E. jayensis*.

***jewettii* = *Uniomerus carolinianus* (Bosc 1801)**

Unio jewettii Lea 1867. Lea 1867:81; Lea 1868a:276, pl. 37, fig. 89.

Type Specimen.—Lectotype, USNM 85374, length 51 mm (Fig. 69), designated and refigured by Johnson (1972b:222, fig. 9C).

Type Locality.—Florida, Colonel E. Jewett. Subsequently restricted to Sink of Noonan's [Newnans] Lake, [Alachua County,] Florida, [St. Johns River drainage,] by Lea (1868a).



Figure 68. Lectotype of *Unio jayensis* (= *Elliptio jayensis*), USNM 86031. A, figure from Lea (1838); and B, recent photograph.

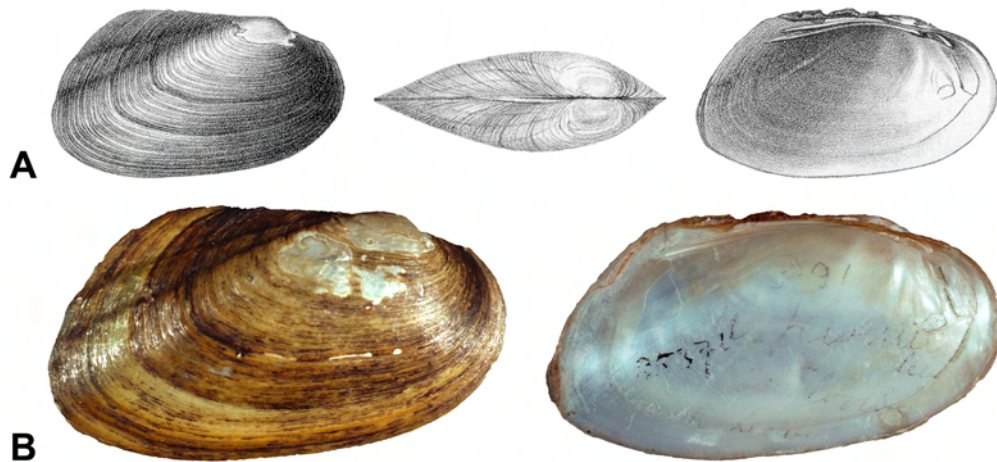


Figure 69. Lectotype of *Unio jewettii* (= *Uniomerus carolinianus*), USNM 85374. A, figure from Lea (1868a); and B, recent photograph.

***jonesi* = *Ptychobranthus jonesi* (van der Schalie 1934)**

Lampsilis jonesi van der Schalie 1934. van der Schalie 1934:125, pl. 15, figs. 1a, 1b.

Type Specimen.—Holotype, UF 65558, male, length 46 mm (Fig. 70).

Type Locality.—Pea River [East Fork Choctawhatchee River], Prestons [Prestons] Mill, [near County Road 67 crossing, about 7 kilometers north of Midland City,] Dale County, Alabama, [Choctawhatchee River drainage,] November 1915, J. A. Burke.

Comments.—The holotype was originally sent to the Alabama Museum of Natural History but is now in the UF collection. Johnson (1967b)

incorrectly designated a paratype (MCZ 98802) as the lectotype.

Additional material that was part of the syntypic series, paratypes, was reported from Pea River, Andrew's Fish Trap, Barbour County, Alabama, [Choctawhatchee River drainage,] November 1915.

***kingii* = *Medionidus penicillatus* (Lea 1857)**

Unio kingii B. H. Wright 1900. B. H. Wright 1900:138.

Type Specimen.—Lectotype, USNM 159965, length 43 mm (Fig. 71), designated and figured by Johnson (1967a:7, pl. 5, fig. 6).

Type Locality.—A branch of the Flint River, Baker County, Georgia, [Flint River drainage].

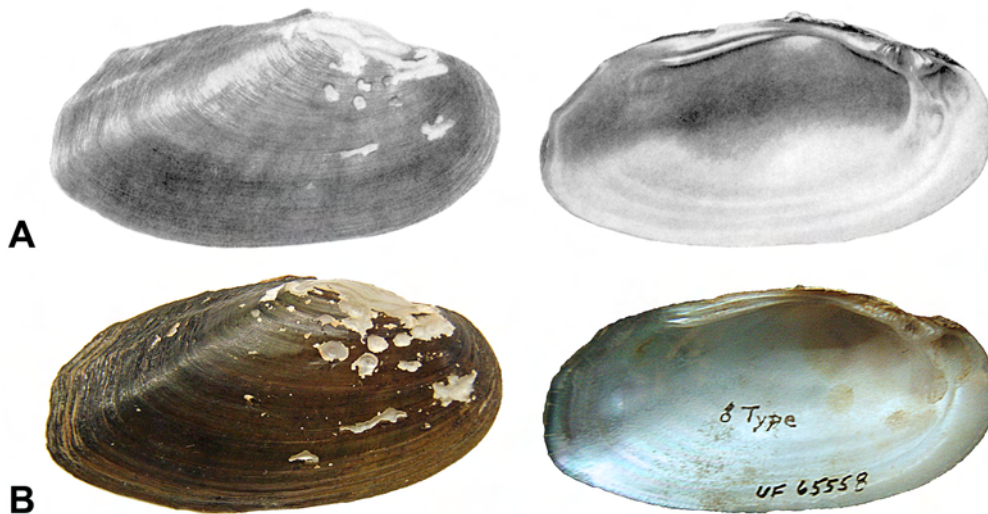


Figure 70. Holotype of *Lampsilis jonesi* (= *Ptychobranthus jonesi*), UF 65558. A, figure from van der Schalie (1934); and B, recent photograph.



Figure 71. Lectotype of *Unio kingii* (= *Medionidus penicillatus*), USNM 159965.

***kirklandianus* = *Hamiota subangulata* (Lea 1840)**

Unio kirklandianus S. H. Wright 1897 *non* Lea 1834. S. H. Wright 1897:136.

Type Specimen.—Lectotype, USNM 149648, length 48 mm (Fig. 72), designated and figured by Simpson (1900b:76, pl. 1, fig. 7), refigured by Johnson (1967a:7, pl. 5, fig. 3).

Type Locality.—Ocklocknee [Ochlockonee] River, Leon County, Florida, [Ochlockonee River drainage].

***kleinianus* = *Quadrula kleiniana* (Lea 1852)**

Unio kleinianus Lea 1852. Lea 1852:265, pl. 17, fig. 18.

Type Specimen.—Lectotype, USNM 84041, length 42 mm (Fig. 73), designated by Johnson (1974).

Type Locality.—Suwannee River, Florida, [Suwannee River drainage,] Major J. E. Le Conte.

Comments.—*Quadrula kleiniana* was synonymized with *Quadrula infucata* by Clench and Turner (1956) and Johnson (1972b). *Quadrula kleiniana* was elevated by Lydeard et al. (2000) based primarily on genetic data. Previous records of *Q. infucata* from the Suwannee River drainage are referable to *Q. kleiniana*.

***lehmanii* = *Elliptio occulta* (Lea 1843)**

Unio lehmanii S. H. Wright 1897. S. H. Wright 1897:138.

Type Specimen.—Lectotype, USNM 149650, length 61 mm (Fig. 74), designated and figured by Simpson (1900b:80, pl. 4, fig. 9), refigured by Johnson (1967a:7, pl. 6, fig. 3).

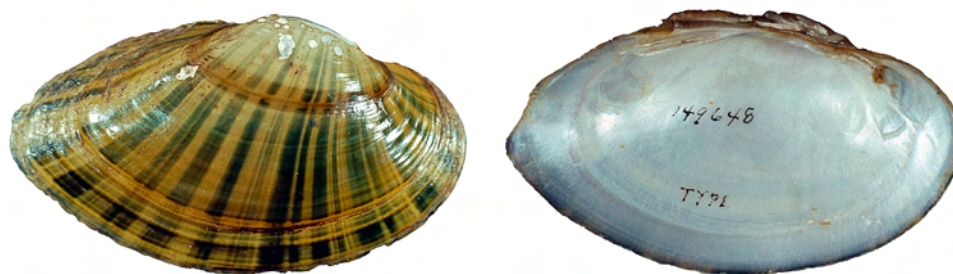


Figure 72. Lectotype of *Unio kirklandianus* (= *Hamiota subangulata*), USNM 149648.



Figure 73. Lectotype of *Unio kleinianus* (= *Quadrula kleiniana*), USNM 84041. A, figure from Lea (1852); and B, recent photograph.

Type Locality.—St. Marys River, [Nassau County,] Florida, [St. Marys River drainage,] B. H. Wright.

***leonensis* = *Elliptio jayensis* (Lea 1838)**

Unio leonensis B. H. Wright 1892. B. H. Wright in Simpson 1892:419, pl. 62, figs. 3–4.

Type Specimen.—Lectotype, USNM 91141, length 67 mm (Fig. 75), selected by J. P. E. Morrison while curator in the Mollusk Division, USNM.

Type Locality.—Lake Woodruff [Spring Garden Lake] near De Leon Springs, [Volusia County, Florida, St. Johns River drainage].

***lepidus* = *Villosa amygdalum* (Lea 1843)**

Unio lepidus Gould 1856. Gould 1856:15.

Type Specimen.—Lectotype, MCZ 169223, length 63 mm (Fig. 76), designated and refigured by Johnson (1964:100, pl. 31, fig. 1).

Type Locality.—From a creek near Lake Monroe, [Volusia and Seminole counties,] Florida, [St. Johns River drainage,] Dr. H. Bryant.

***lineatus* = *Lampsilis binominata* Simpson 1900**

Unio lineatus Lea 1840 non Valenciennes 1827. Lea 1840:287; Lea 1842:206, pl. 12, fig. 20. See *binominatus* (p. 16).



Figure 74. Lectotype of *Unio lehmanii* (= *Elliptio occulta*), USNM 149650.

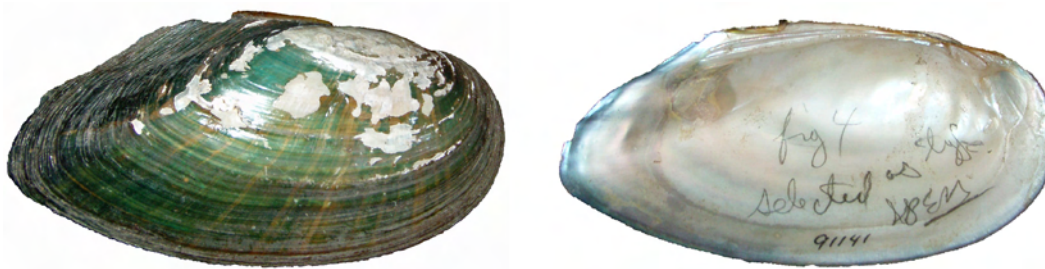


Figure 75. Lectotype of *Unio leonensis* (= *Elliptio jayensis*), USNM 91141.



Figure 76. Lectotype of *Unio lepidus* (= *Villosa amygdalum*), MCZ 169223.

***linguaeformis* = *Villosa lienosa* (Conrad 1834b)**

Unio linguaeformis Lea 1860. Lea 1860b:305; Lea 1860a:345, pl. 56, fig. 170.

Type Specimen.—Holotype by monotypy, USNM 85259, length 50 mm (Fig. 77).

Type Locality.—Columbus, [Muscogee County,] Georgia, [Chattahoochee River drainage].

***maconensis* = *Elliptio pullata* (Lea 1856)**

Unio maconensis Lea 1857. Lea 1857a:172; Lea 1858a:93, pl. 20, fig. 73.

Type Specimen.—Lectotype, USNM 86004, length 83 mm (Fig. 78), designated by Johnson (1974).

Type Locality.—Flint River near Macon [County], Georgia, [Flint River drainage,] J. C. Plant.

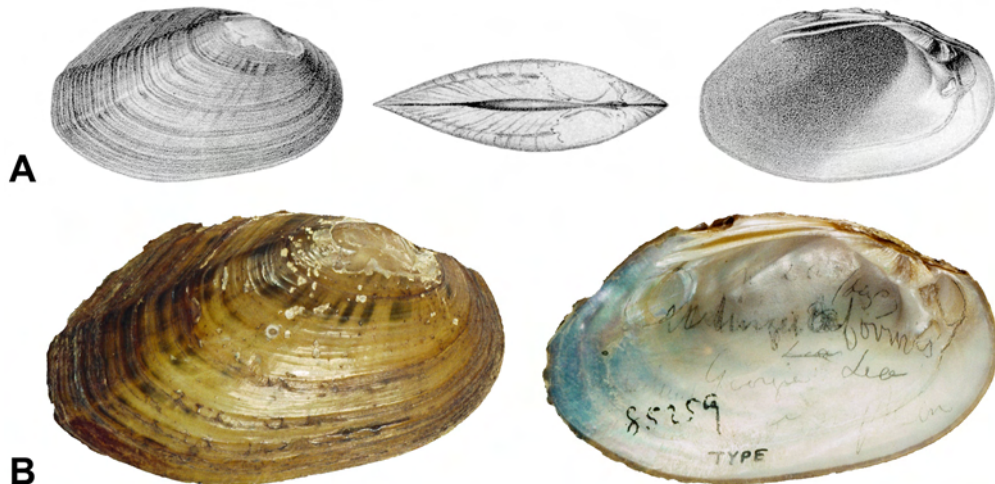


Figure 77. Holotype of *Unio linguaeformis* (= *Villosa lienosa*), USNM 85259. A, figure from Lea (1860a); and B, recent photograph.



Figure 78. Lectotype of *Unio maconensis* (= *Elliptio pullata*), USNM 86004, from Lea (1858a).

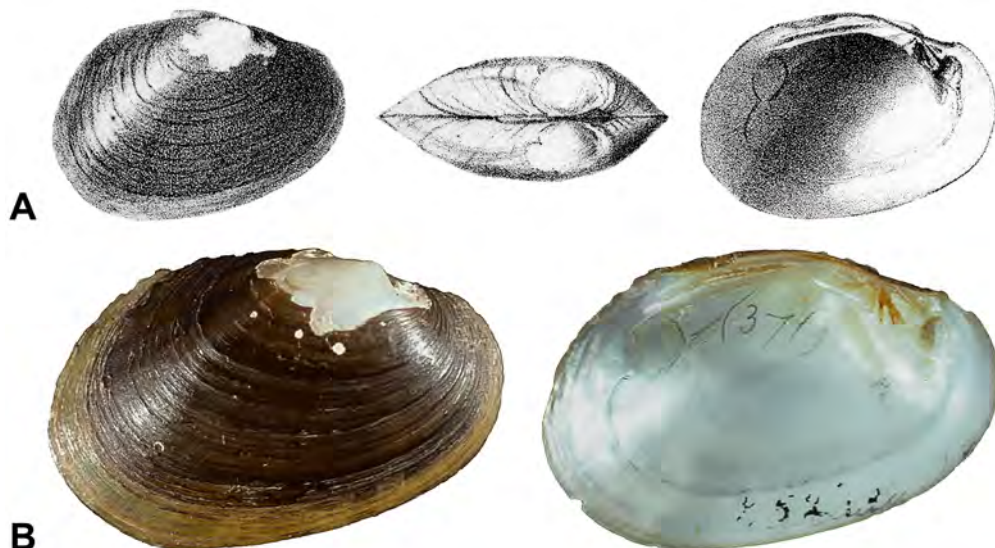


Figure 79. Lectotype of *Unio marginis* (= *Toxolasma paulum*), USNM 85295. A, figure from Lea (1868a); and B, recent photograph.

***marginis* = *Toxolasma paulum* (Lea 1840)**

Unio marginis Lea 1865. Lea 1865:89; Lea 1868a:255, pl. 31, fig. 69.

Type Specimen.—Lectotype, USNM 85295, length 28 mm (Fig. 79), designated by Johnson (1974).

Type Locality.—Blue Springs, [Albany,] Dougherty County, Georgia, [Flint River drainage,] Bishop Elliott.

***marshii* = *Elliptio jayensis* (Lea 1838)**

Unio marshii B. H. Wright 1888. B. H. Wright 1888:118, pl. 5, fig. 2.

Type Specimen.—Lectotype, USNM 151028, length about 92 mm (Fig. 80), designated and refigured by Johnson (1967a:7, pl. 12, fig. 2).

Type Locality.—Lake Woodruff, Volusia County, Florida, [St. Johns River drainage].

Comments.—The type locality was restricted to St. Johns River, Blue Springs, 3 miles south

of Lake Beresford, Volusia County, Florida, by Johnson (1967a) based on a note written inside the shell of the lectotype. This appears to be an invalid restriction as that locality was not mentioned in the original description.

***maywebbae* = *Elliptio jayensis* (Lea 1838)**

Elliptio maywebbae B. H. Wright 1934. B. H. Wright 1934b:28; B. H. Wright 1934c:[no pagination], pl. 13, figs. 5–8.

Type Specimen.—Holotype, USNM 425354, length 52 mm (Fig. 81), refigured by Johnson (1967a:7, pl. 10, fig. 3).

Type Locality.—Near Seminole Springs, 15 miles southeast of Eustis, [Lake County,] Florida, [St. Johns River drainage,] T. H. Van Hyning.

Comments.—This nominal species is fairly distinctive and appears to be typical for several spring run habitats in peninsular Florida. However, it tends to grade into *Elliptio jayensis* and is synonymized herein with that species.

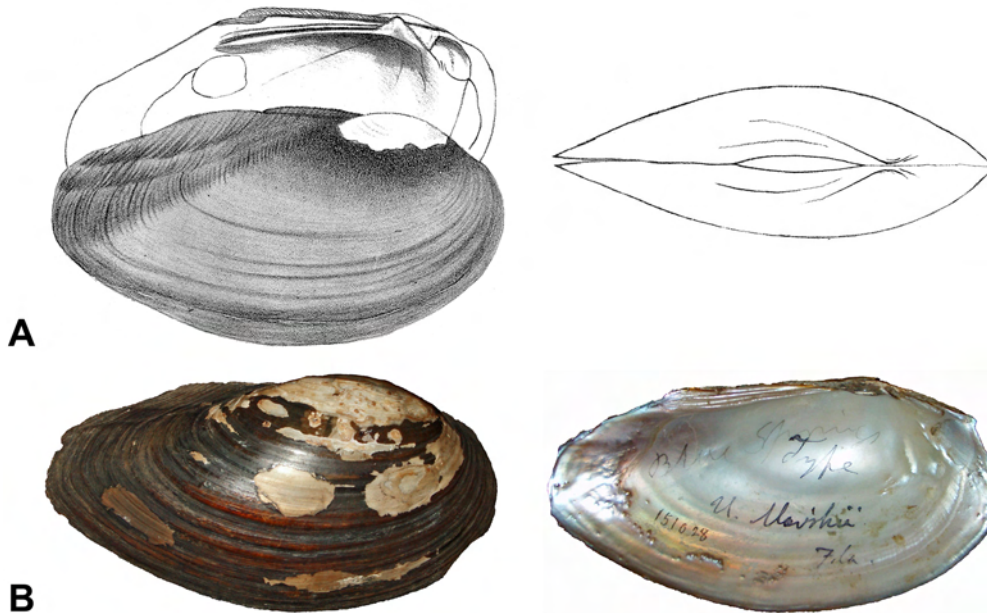


Figure 80. Lectotype of *Unio marshii* (= *Elliptio jayensis*), USNM 151028. A, figure from B. H. Wright (1888); and B, recent photograph.



Figure 81. Holotype of *Elliptio maywebbae* (= *Elliptio jayensis*), USNM 425354.

***mcmichaeli* = *Elliptio mcmichaeli* Clench and Turner 1956**

Elliptio mcmichaeli Clench and Turner 1956. Clench and Turner 1956:170, pl. 7, figs. 1–2.

Type Specimen.—Holotype, MCZ 191922, length 91 mm (Fig. 82).

Type Locality.—Choctawhatchee River, 8 miles west of Miller Crossroads, State Route 2, Holmes County, Florida, [Choctawhatchee River drainage].

Comments.—*Elliptio mcmichaeli* was synonymized with *Elliptio fraterna* by Johnson (1970).

***mercerii* = *Elliptio pullata* (Lea 1856)**

Unio mercerii Lea 1862. Lea 1862b:169; Lea 1862a:209, pl. 31, fig.

278.

Type Specimen.—Lectotype, USNM 86057, length 61 mm (Fig. 83), designated by Johnson (1974).

Type Locality.—Lee County, Georgia, [Flint River drainage,] Dr. Mercer.

***minor* = *Toxolasma paulum* (Lea 1840)**

Unio minor Lea 1843. Lea 1843:[one page privately published]; Lea 1846:276, pl. 39, fig. 3.

Type Specimen.—Lectotype, USNM 85310, female, length 22 mm (Fig. 84), designated by Johnson (1974).

Type Locality.—Lake George, [Putnam and Volusia counties,] Florida, [St. Johns River drainage,] S.B. Buckley.

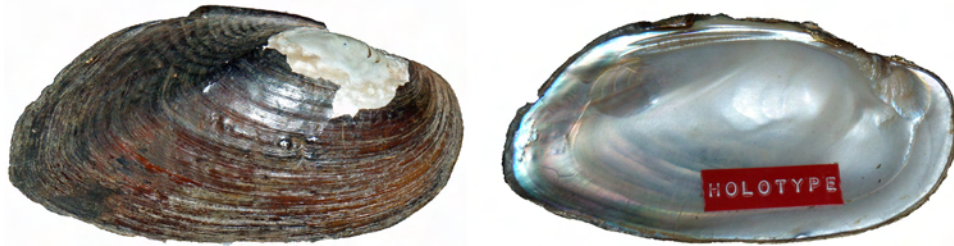


Figure 82. Holotype of *Elliptio mcmichaeli*, MCZ 191922.

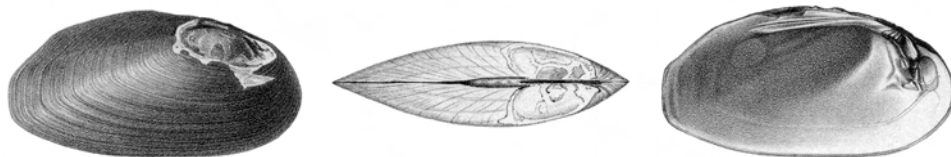


Figure 83. Lectotype of *Unio mercerii* (= *Elliptio pullata*), USNM 86057, from Lea (1862a).

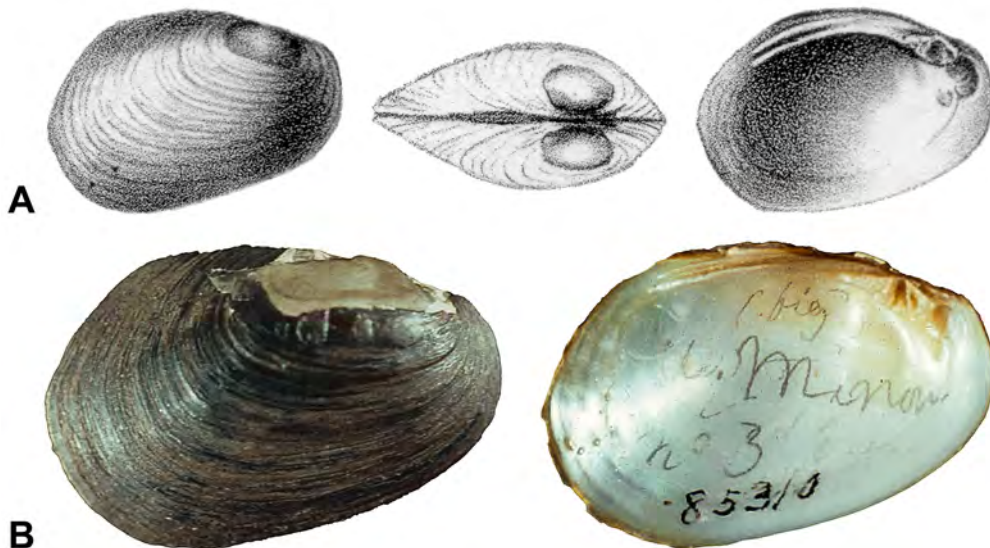


Figure 84. Lectotype of *Unio minor* (= *Toxolasma paulum*), USNM 85310. A, figure from Lea (1846); and B, recent photograph.

Comments.—Additional material that was part of the syntypic series, paralectotype(s), was reported from Lake Monroe, [Volusia and Seminole counties,] Florida.

***modicus* = *Pleurobema pyriforme* (Lea 1857)**

Unio modicus Lea 1857. Lea 1857a:171; Lea 1859a:204, pl. 24, fig. 86.

Type Specimen.—Lectotype, USNM 84787, length 35 mm (Fig. 85), designated by Johnson (1974).

Type Locality.—Chattahoochee River near Columbus, [Muscogee County,] Georgia, [Chattahoochee River drainage,] Bishop Elliott.

***monroensis* = *Elliptio monroensis* (Lea 1843)**

Unio monroensis Lea 1843. Lea 1843:[one page privately published]; Lea 1846:279, pl. 41, fig. 8.

Type Specimen.—Holotype by monotypy, USNM 85169, length 70 mm (Fig. 86).

Type Locality.—Lake Monroe, [Volusia and Seminole counties,] Florida, [St. Johns River drainage,] S. B. Buckley.

Comments.—The holotype of *Elliptio monroensis* is without corrugations on the posterior slope, which is somewhat atypical of the species.

Elliptio monroensis was synonymized with *Elliptio dariensis* by Johnson (1970, 1972b).

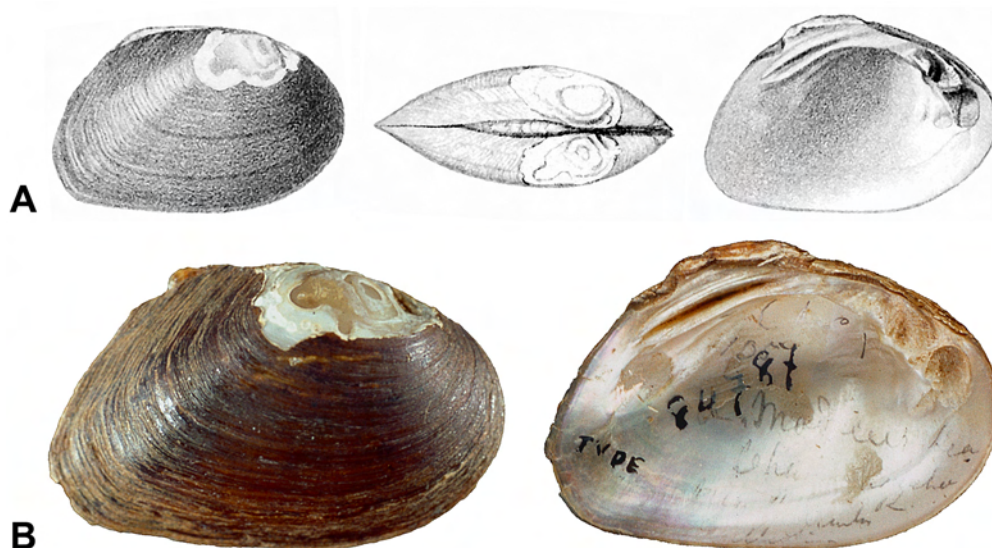


Figure 85. Lectotype of *Unio modicus* (= *Pleurobema pyriforme*), USNM 84787. A, figure from Lea (1859a); and B, recent photograph.

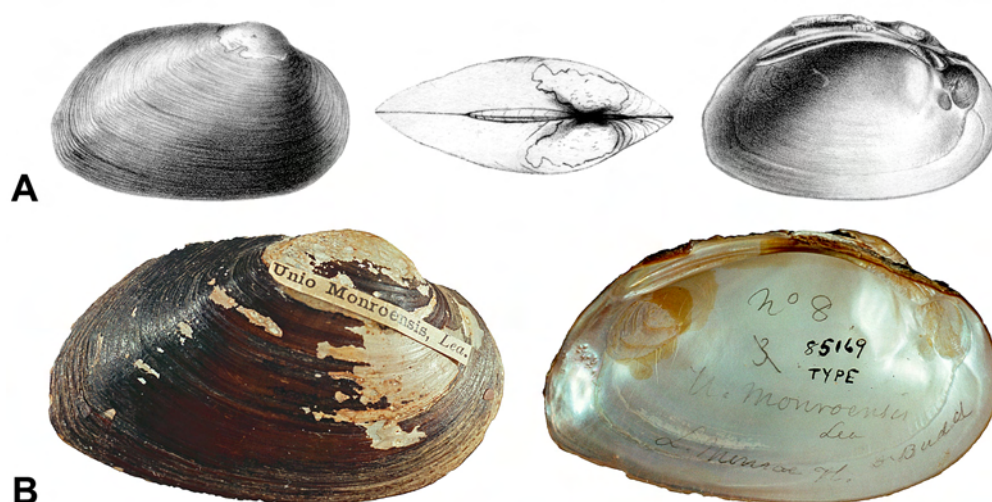


Figure 86. Holotype of *Unio monroensis* (= *Elliptio monroensis*), USNM 85169. A, figure from Lea (1846); and B, recent photograph.

***neislerii* = *Amblema neislerii* (Lea 1858)**

Unio neislerii Lea 1858. Lea 1858c:165; Lea 1859a:212, pl. 26, fig. 93.

Type Specimen.—Lectotype, USNM 83993, length 70 mm (Fig. 87), designated by Johnson (1974).

Type Locality.—Flint River at Lanier, [about 6 miles north of Oglethorpe, Macon County,] Georgia, [Flint River drainage,] Dr. H. M. Neisler.

Comments.—Clench and Turner (1956) clarified confusion over the type locality. The town of Lanier on the Flint River no longer exists and does not appear on modern maps. It was a settlement in the early to mid-1800s and was located about 6

miles north of the present-day town of Oglethorpe (Krakow 1994). It should not be confused with the town of Lanier in Bryan County, which is located in the Ogeechee River drainage, west of Savannah, Georgia.

***nigellus* = *Elliptio nigella* (Lea 1852)**

Unio nigellus Lea 1852. Lea 1852:283, pl. 24, fig. 42.

Type Specimen.—Holotype by monotypy, USNM 85567, length 39 mm (Fig. 88), refigured by Johnson (1968:22, fig. 2).

Type Locality.—Chattahoochee River near Columbia, [Houston County,] Georgia [Alabama, Chattahoochee River drainage,] Dr. Boykin.

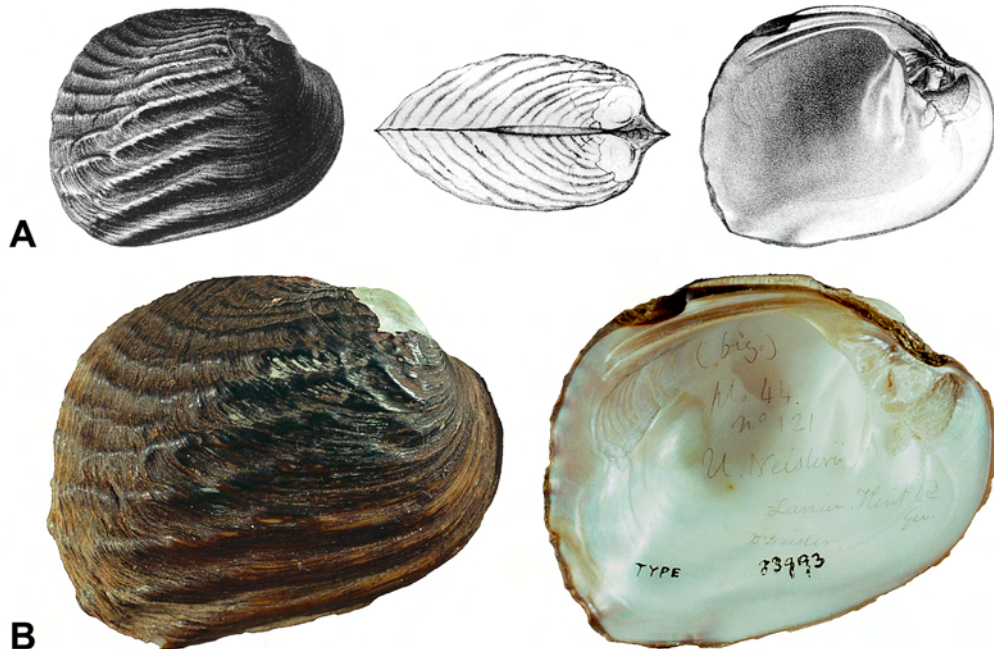


Figure 87. Lectotype of *Unio neislerii* (= *Amblema neislerii*), USNM 83993. A, figure from Lea (1859a); and B, recent photograph.

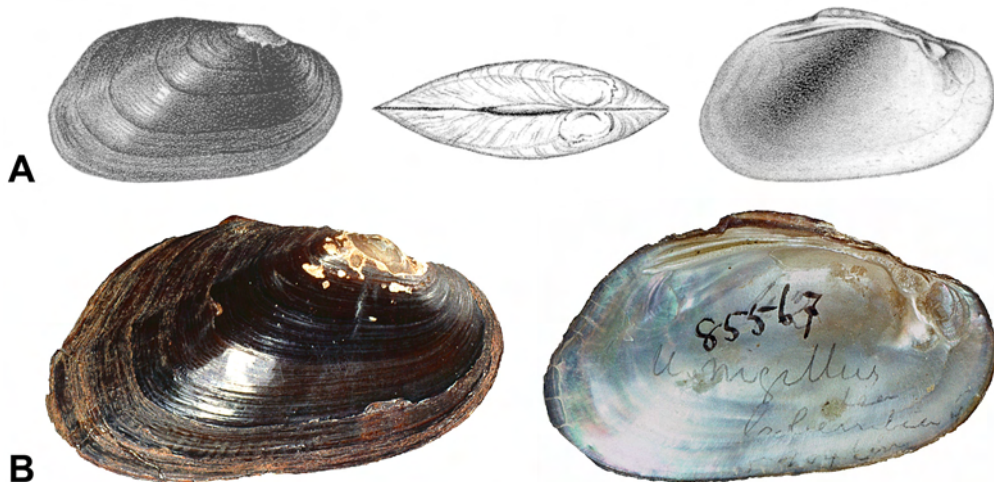


Figure 88. Holotype of *Unio nigellus* (= *Elliptio nigella*), USNM 85567. A, figure from Lea (1852); and B, recent photograph.

Comments.—The type locality of *Elliptio nigella* has been erroneously reported as “Columbus, Georgia” (Johnson 1968). This mistake appears to be the result of a transcription error, as the USNM label reads, “Columbus,” instead of “Columbia.” Both the original description and a note written inside the shell of the holotype read, “Columbia.” Columbia, Alabama, is located on the Chattahoochee River downstream of Columbus, Georgia (Williams et al. 2008).

***nigrinus* = *Villosa vibex* (Conrad 1834a)**

Unio nigrinus Lea 1852. Lea 1852:284, pl. 24, fig. 44.

Type Specimen.—Holotype by monotypy,

USNM 86132, length 48 mm (Fig. 89).

Type Locality.—West Florida, Major J. E. Le Conte.

Comments.—Based on shell shape, the type specimen appears to be a female.

***nolani* = *Elliptio jayensis* (Lea 1838)**

Unio nolani B. H. Wright 1888. B. H. Wright 1888:116, pl. 4, fig. 1.

Type Specimen.—Lectotype, USNM 151030, length 71 mm (Fig. 90), designated and refigured by Johnson (1967a:7, pl. 10, fig. 4).

Type Locality.—A creek flowing into St. Johns River, near Palatka, [Putnam County,] Florida, [St. Johns River drainage,] J. B. Upson.

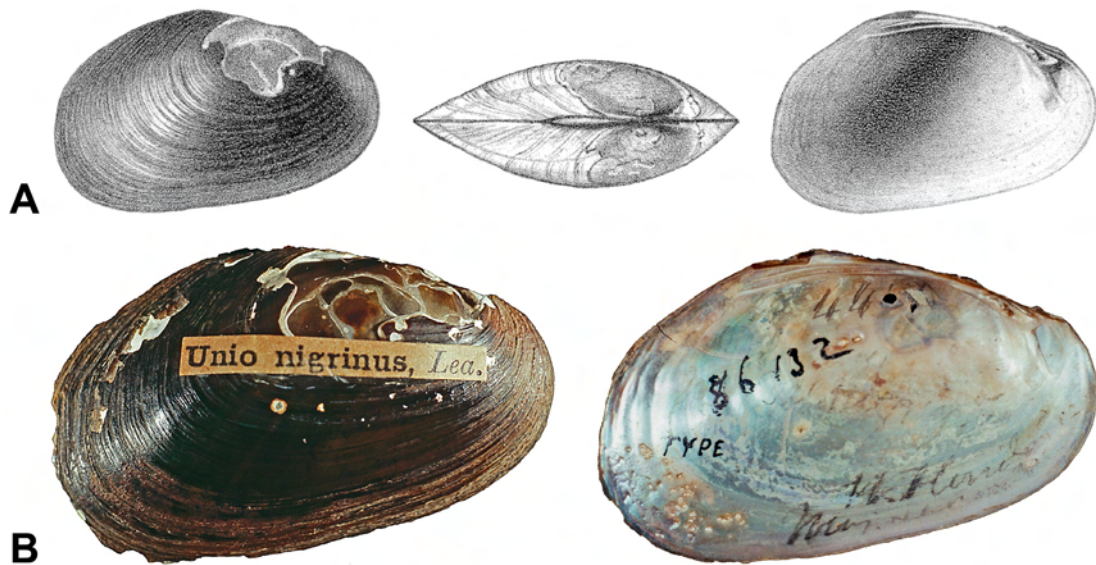


Figure 89. Holotype of *Unio nigrinus* (= *Villosa vibex*), USNM 86132. A, figure from Lea (1852); and B, recent photograph.

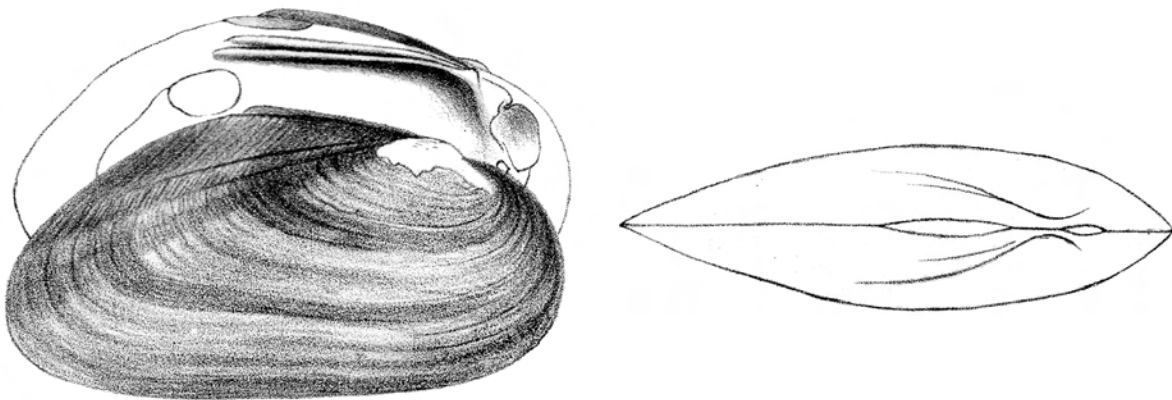


Figure 90. Lectotype of *Unio nolani* (= *Elliptio jayensis*), USNM 151030, from B. H. Wright (1888).

***obfuscus* = *Villosa lienosa* (Conrad 1834b)**

Unio obfuscus Lea 1857. Lea 1857a:172; Lea 1859a:197, pl. 22, fig. 80.

Type Specimen.—Lectotype, USNM 85089, length 41 mm (Fig. 91), designated by Johnson (1974).

Type Locality.—Flint River near Macon [County], Georgia, [Flint River drainage,] J. C. Plant.

***obtusus* = *Lampsilis straminea* (Lea 1838)**

Unio obtusus Lea 1840. Lea 1840:287; Lea 1842:201, pl. 11, fig. 13.

Type Specimen.—Lectotype, USNM 86142, male, length 55 mm (Fig. 92), designated by

Johnson (1974).

Type Locality.—Chattahoochee River, Columbus, [Muscogee County,] Georgia, [Chattahoochee River drainage,] Dr. Boykin.

Comments.—*Lampsilis straminea* in the study area was previously recognized as *Lampsilis claibornensis* (Clench & Turner 1956; Johnson 1972b) or *Lampsilis straminea claibornensis* (Frierson 1927; Turgeon et al. 1998). The form *claibornensis* was synonymized with *L. straminea* by Williams et al. (2008). *Unio obtusus* was also synonymized with *L. straminea* by Williams et al. (2008).

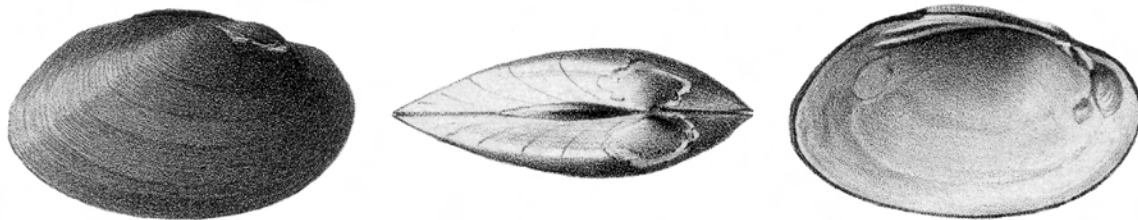


Figure 91. Lectotype of *Unio obfuscus* (= *Villosa lienosa*), USNM 85089, from Lea (1859a).

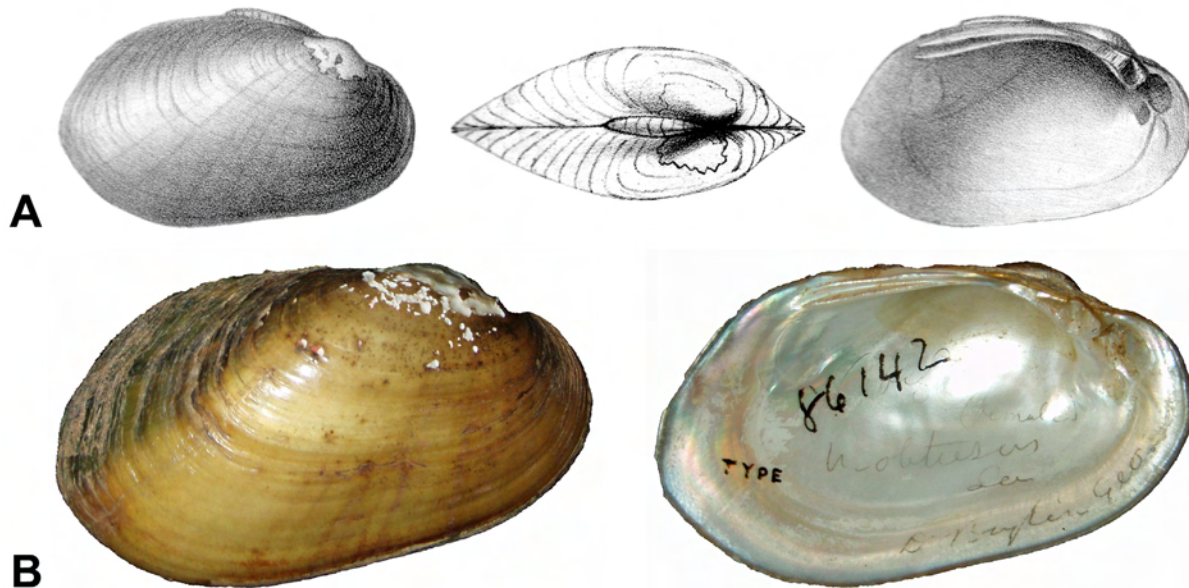


Figure 92. Lectotype of *Unio obtusus* (= *Lampsilis straminea*), USNM 86142. A, figure from Lea (1842); and B, recent photograph.

***occultus* = *Elliptio occulta* (Lea 1843)**

Unio occultus Lea 1843. Lea 1843:[one page privately published]; Lea 1846:279, pl. 41, fig. 7.

Type Specimen.—Lectotype, USNM 85247, length 53 mm (Fig. 93), designated by Johnson (1974).

Type Locality.—Lake Monroe, [Volusia and Seminole counties,] Florida, [St. Johns River drainage,] S. B. Buckley.

Comments.—The type locality was restricted to Black Creek, Clay County, Florida, by Johnson (1974). This appears to be an invalid restriction as “Lake Monroe” is written inside the shell of the lectotype.

Additional material that was part of the syntypic series, paralectotype(s), was reported from Black Creek, [Clay County,] Florida, [St. Johns River drainage].

Elliptio occulta has been synonymized with *Elliptio strigosus* (= *Elliptio arctata*) (Clench & Turner 1956) and *Elliptio icterina* (Johnson 1970, 1972b). Many of the previous records of *E. icterina*

from the Ochlockonee River east to the St. Johns River drainages are referable to *E. occulta*.

***orcuttii* = *Elliptio jayensis* (Lea 1838)**

Unio orcuttii S. H. Wright 1888. S. H. Wright 1888:60, [3 figures].

Type Specimen.—Lectotype, USNM 308971, length 60 mm (Fig. 94), designated and refigured by Johnson (1967a:7, pl. 9, fig. 1).

Type Locality.—Lake Miakka [Myakka, Sarasota County], Florida, Dr. W. Newcomb. Subsequently restricted to Upper Miakka [Myakka] Lake, Sarasota County, Florida, [Myakka River drainage,] by Johnson (1972b).

Comments.—Johnson (1967a) restricted the type locality to “[Horse Creek near] Manatee River, [Manatee County],” but subsequently concluded that was probably incorrect (Johnson 1972b).

Additional material that was part of the syntypic series, paralectotype(s), was reported from Manatee River, [Manatee River drainage,] and west coast of Florida.



Figure 93. Lectotype of *Unio occultus* (= *Elliptio occulta*), USNM 85247. A, figure from Lea (1846); and B, recent photograph.



Figure 94. Lectotype of *Unio orcuttii* (= *Elliptio jayensis*), USNM 308971.

***oscari* = *Elliptio jayensis* (Lea 1838)**

Unio oscari B. H. Wright 1892. B. H. Wright 1892:124; B. H. Wright 1896:122, pl. 2, figs. 1–3.

Type Specimen.—Lectotype, USNM 123526, length 59 mm (Fig. 95), designated and refigured by Johnson (1967a:8, pl. 11, fig. 3).

Type Locality.—A creek from Lake Osceola at Winter Park, [Orange County,] Florida, [St. Johns River drainage].

Comments.—The lectotype is badly eroded and appears to be deformed.

***paludicolus* = *Uniomerus carolinianus* (Bosc 1801)**

Unio paludicolus Gould 1845. Gould 1845:53.

Type Specimen.—Lectotype, MCZ 169278,

length 39 mm (Fig. 96), designated and figured by Johnson (1964:121, pl. 31, fig. 3).

Type Locality.—Everglades of Florida, [Everglades drainage,] J. Bartlett.

***papyraceus* = *Villosa amygdalum* (Lea 1843)**

Unio papyraceus Gould 1845. Gould 1845:53.

Type Specimen.—Lectotype, USNM 86125, length 43 mm (Fig. 97), designated and figured by Johnson (1964:122, pl. 31, fig. 2).

Type Locality.—Everglades of Florida, [Everglades drainage,] J. Bartlett.

Comments.—The right valve of the lectotype is broken into several pieces.

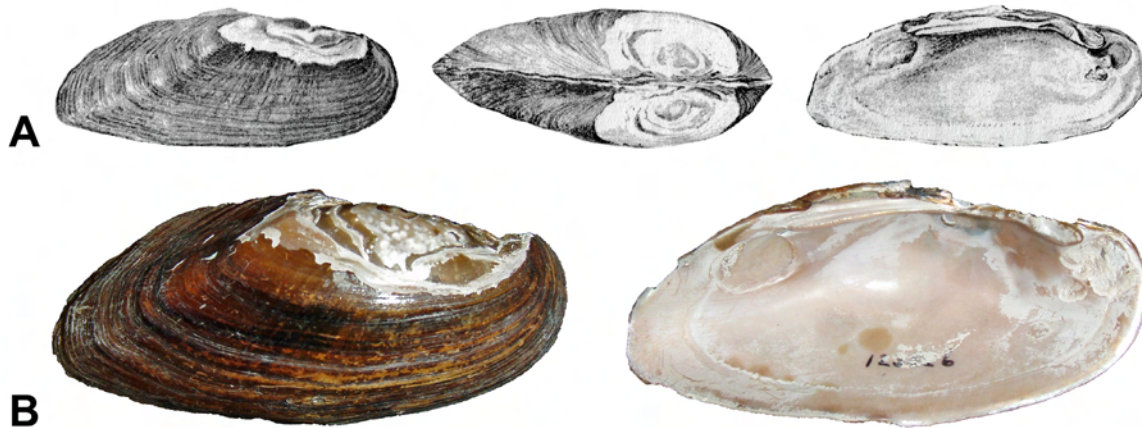


Figure 95. Lectotype of *Unio oscari* (= *Elliptio jayensis*), USNM 123526. A, figure from B. H. Wright (1896); and B, recent photograph.



Figure 96. Lectotype of *Unio paludicolus* (= *Uniomerus carolinianus*), MCZ 169278, from Johnson (1964).

Figure 97. Lectotype of *Unio papyraceus* (= *Villosa amygdalum*), USNM 86125, from Johnson (1964).

***patsaligensis* = *Pleurobema strodeanum* (B. H. Wright 1898)**

Pleurobema patsaligensis Simpson 1900. Simpson 1900b:82, pl. 2, fig. 1.

Type Specimen.—Lectotype, USNM 150475, length 44 mm (Fig. 98), designated by Clench and Turner (1956).

Type Locality.—Little Patsaliga Creek, [Crenshaw County,] southeast Alabama, [Escambia River drainage,] Dr. R. Kirkland.

Comments.—*Pleurobema patsaligensis* was synonymized with *Pleurobema strodeanum* by

Clench and Turner (1956).

***paulus* = *Toxolasma paulum* (Lea 1840)**

Unio paulus Lea 1840. Lea 1840:287; Lea 1842:213, pl. 15, fig. 29.

Type Specimen.—Holotype by monotypy, USNM 85274, length 24 mm (Fig. 99).

Type Locality.—Chattahoochee River, Columbus, [Muscogee County,] Georgia, [Chattahoochee River drainage,] Dr. Boykin.

Comments.—Clench and Turner (1956) synonymized five nominal species with *Toxolasma paulum*.



Figure 98. Lectotype of *Pleurobema patsaligensis* (= *Pleurobema strodeanum*), USNM 150475.

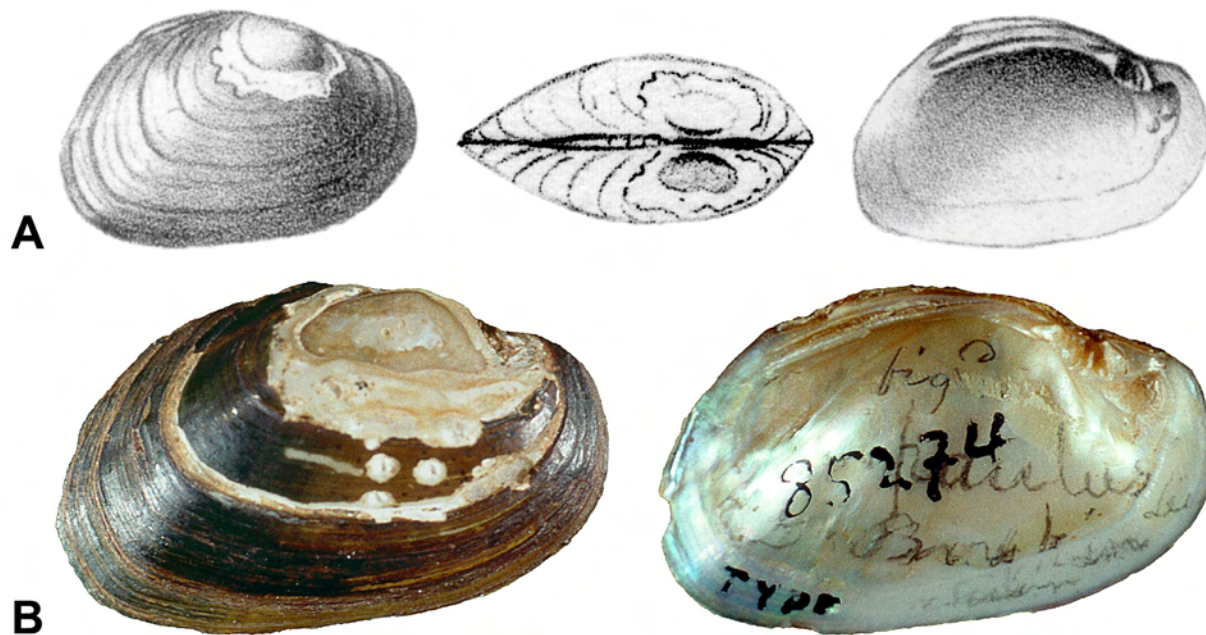


Figure 99. Holotype of *Unio paulus* (= *Toxolasma paulum*), USNM 85274. A, figure from Lea (1842); and B, recent photograph.

***peggyae* = *Utterbackia peggyae* (Johnson 1965)**

Anodonta peggyae Johnson 1965. Johnson 1965:1, pl. 2, figs. 1–3.

Type Specimen.—Holotype, MCZ 251040, length 71 mm (Fig. 100).

Type Locality.—Southeast shore of Lake Talquin (formed by a dam on the Ochlockonee River), Leon County public fishing ground, Leon County, Florida, [Ochlockonee River drainage,] R. I. Johnson and S. L. H. Fuller.

***pellucidus* = *Villosa vibex* (Conrad 1834a)**

Unio pellucidus Lea 1845. Lea 1845:163; Lea 1848:70, pl. 2, fig. 6.

Type Specimen.—Holotype by monotypy, ANSP 56493, length 32 mm (Fig. 101).

Type Locality.—Chattahoochee River, Georgia, [Chattahoochee River drainage,] Major J. E. Le Conte.

***penicillatus* = *Medionidus penicillatus* (Lea 1857)**

Unio penicillatus Lea 1857. Lea 1857a:171; Lea 1859a:203, pl. 23, fig. 85.

Type Specimen.—Lectotype, USNM 84142, length 34 mm (Fig. 102), designated by Johnson (1974).

Type Locality.—Flint River near Albany, [Dougherty County,] Georgia, [Flint River drainage,] Bishop Elliott and Reverend G. White.

Comments.—Additional material that was part of the syntypic series, paralectotype(s), was reported from Chattahoochee River near Columbus, [Muscogee County, Georgia, Chattahoochee River drainage]; [Chattahoochee River] near Atlanta, [Fulton County, Georgia, Chattahoochee River drainage].

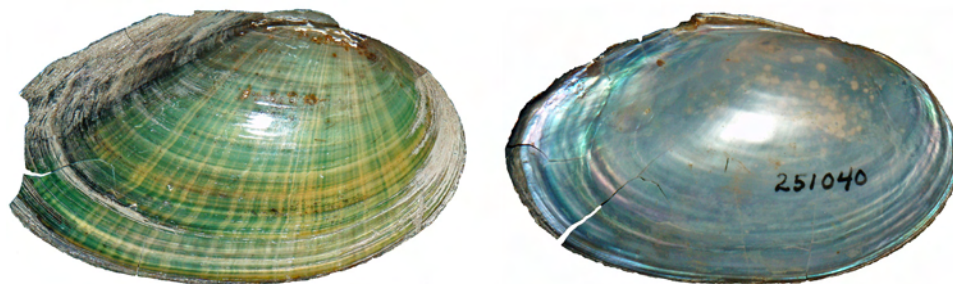


Figure 100. Holotype of *Anodonta peggyae* (= *Utterbackia peggyae*), MCZ 251040.

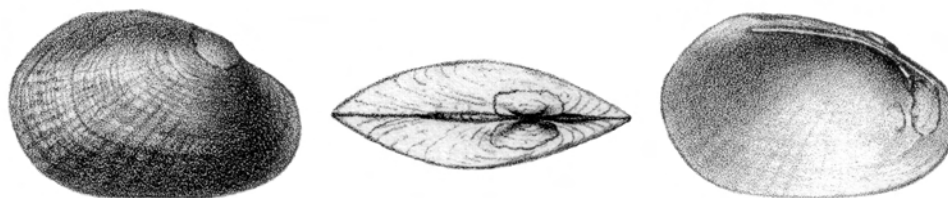


Figure 101. Holotype of *Unio pellucidus* (= *Villosa vibex*), ANSP 56493, from Lea (1848).

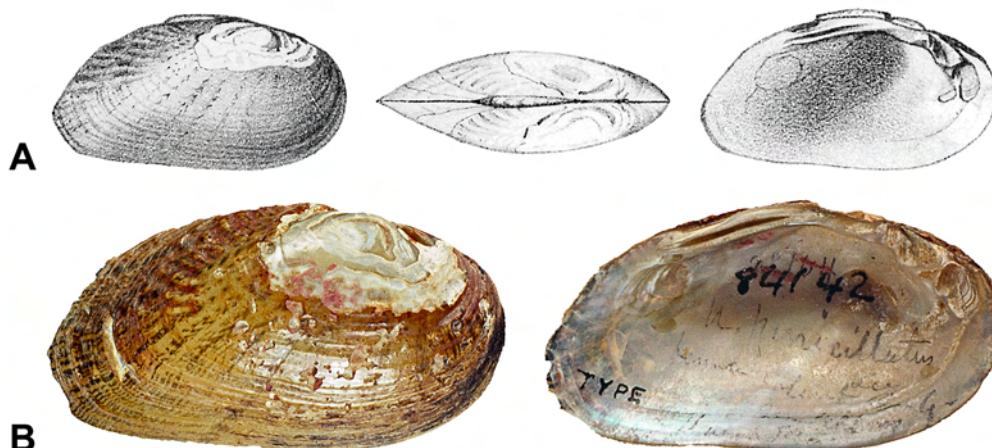


Figure 102. Lectotype of *Unio penicillatus* (= *Medionidus penicillatus*), USNM 84142. A, figure from Lea (1859a); and B, recent photograph.

***peninsularis* = *Utterbackia peninsularis* Bogan and Hoeh 1995**

Utterbackia peninsularis Bogan and Hoeh 1995. Bogan and Hoeh 1995:275, figs. 1a, 1b.

Type Specimen.—Holotype, UMMZ 253583, length 56 mm (Fig. 103).

Type Locality.—Canal off of the Suwannee River, at Dilger's Campground, Dixie County, Florida, [Suwannee River drainage,] 17 October 1988, W. R. Hoeh and R. S. Butler.

***pinei* = *Elliptio jayensis* (Lea 1838)**

Unio pinei B. H. Wright 1897. B. H. Wright 1897b:40.

Type Specimen.—Lectotype, USNM 150127, length 75 mm (Fig. 104), designated and figured by Simpson (1900b:80, pl. 3, fig. 1), refigured by Johnson (1967a:8, pl. 10, fig. 5).

Type Locality.—Unnamed lake in Withlacoochee [Withlacoochee] River region of Hernando County, Florida, [Withlacoochee River drainage,] G. Pine.

Comments.—The lectotype resembles *Elliptio ahenea* from the St. Johns River drainage but it is more inflated and the pseudocardinal teeth are larger.

***plantii* = *Elliptio fumata* (Lea 1857)**

Unio plantii Lea 1857. Lea 1857a:171; Lea 1859a:192, pl. 21, fig. 76.

Type Specimen.—Holotype by monotypy, USNM 85005, length 94 mm (Fig. 105).

Type Locality.—Flint River near Macon [County], Georgia, [Flint River drainage,] J. C. Plant.

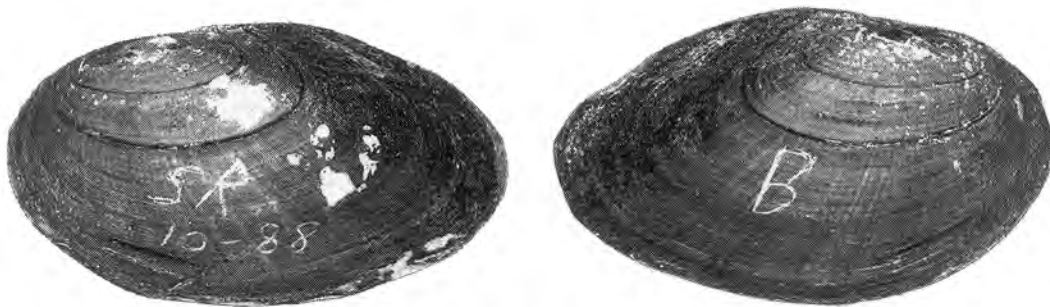


Figure 103. Holotype of *Utterbackia peninsularis*, UMMZ 253583, from Bogan and Hoeh (1995).

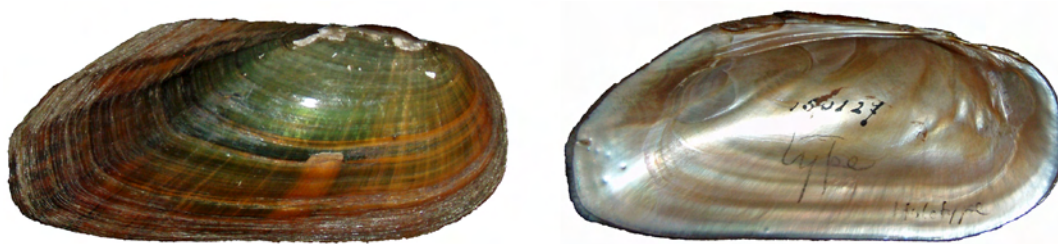


Figure 104. Lectotype of *Unio pinei* (= *Elliptio jayensis*), USNM 150127.

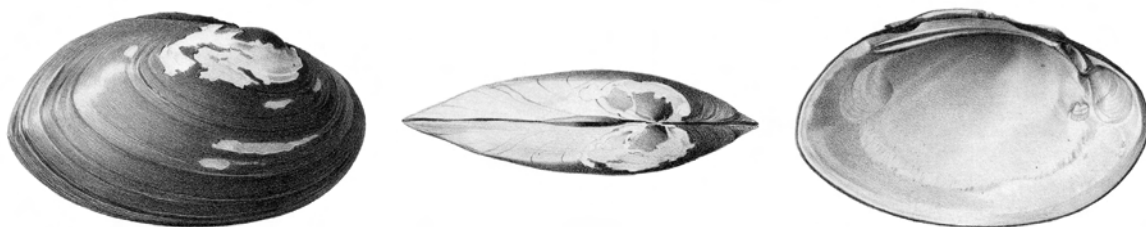


Figure 105. Holotype of *Unio plantii* (= *Elliptio fumata*), USNM 85005, from Lea (1859a).

***plectophorus* = *Elliptoideus sloatianus* (Lea 1840)**

Unio plectophorus Conrad 1850. Conrad 1850:277, pl. 38, fig. 7.

Type Specimen.—Lectotype, ANSP 290740, length 94 mm (Fig. 106), designated by Johnson and Baker (1973).

Type Locality.—Flint River, Georgia, [Flint River drainage].

Comments.—Conrad (1850) provided a figure and corrected the spelling of *Unio plectophorus* Conrad 1849 to *Unio plectophorus*.

***plectophorus* = *Elliptoideus sloatianus* (Lea 1840)**

Unio plectophorus Conrad 1849. See *plectophorus*.

Comments.—*Unio plectophorus* is a replace-

ment name for *Unio aratus* Conrad 1849.

***polymorphus* = *Elliptio monroensis* (Lea 1843)**

Unio polymorphus B. H. Wright 1899. B. H. Wright 1899:42.

Type Specimen.—Lectotype, USNM 152060, length 75 mm (Fig. 107), designated and figured by Johnson (1967a:8, pl. 6, fig. 2).

Type Locality.—Spanish Creek, [tributary to St. Marys River, west of Folkston,] Okefenokee Swamp, Charlton County, Georgia, [St. Marys River drainage].

Comments.—*Elliptio polymorpha* was synonymized with *Elliptio crassidens* by Johnson (1970).



Figure 106. Lectotype of *Unio plectophorus* (= *Elliptoideus sloatianus*), ANSP 290740.

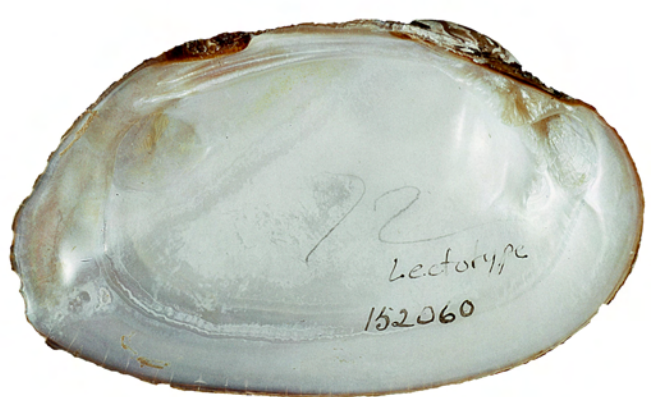


Figure 107. Lectotype of *Unio polymorphus* (= *Elliptio monroensis*), USNM 152060.

***prasinatus* = *Elliptio jayensis* (Lea 1838)**

Unio prasinatus Conrad 1866. Conrad 1866:279, pl. 15, fig. 14.

Type Specimen.—Lectotype, ANSP 41347, length 27 mm (Fig. 108), designated by Johnson and Baker (1973).

Type Locality.—Florida. Restricted herein to Lake Monroe, Seminole and Volusia counties, Florida, St. Johns River drainage.

***prattii* = *Villosa lienosa* (Conrad 1834b)**

Unio prattii Lea 1858. Lea 1858c:166; Lea 1859a:206, pl. 24, figs. 88, 88a.

Type Specimen.—Lectotype, USNM 85145, length 32 mm (Fig. 109), designated by Johnson (1974).

Type Locality.—Chattahoochee River at Roswell, Cobb County, Georgia, [Chattahoochee River drainage,] N. A. Pratt, Jr.

Comments.—Additional material that was part of the syntypic series, paralectotype(s), was reported from Tobesaufke Creek near Macon [County], Georgia, [Flint River drainage].

***pullatis* = *Elliptio pullata* (Lea 1856)**

Unio pullatis Lea 1856. Lea 1856:262. See *pullatus*.

***pullatus* = *Elliptio pullata* (Lea 1856)**

Unio pullatus Lea 1858. Lea 1858a:57, pl. 8, fig. 39.

Type Specimen.—Lectotype, USNM 86020, length 84 mm (Fig. 110), designated by Johnson (1970).



Figure 108. Lectotype of *Unio prasinatus* (= *Elliptio jayensis*), ANSP 41347, from Conrad (1866).



Figure 109. Lectotype of *Unio prattii* (= *Villosa lienosa*), USNM 85145, from Lea (1859a).

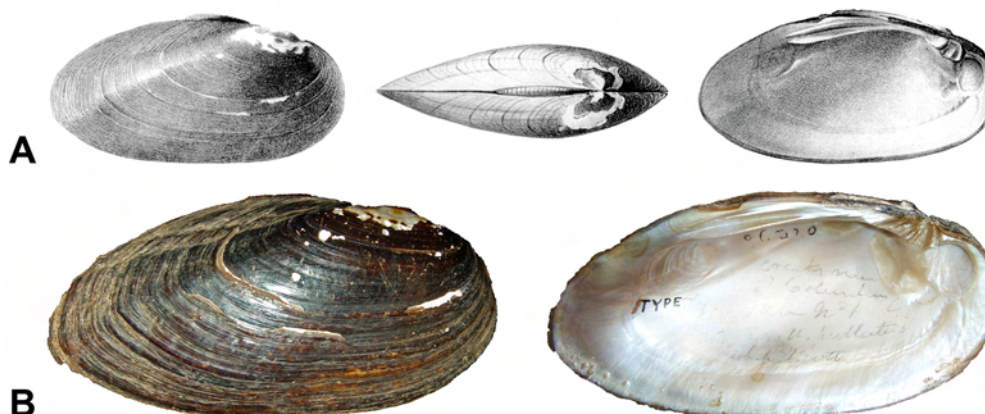


Figure 110. Lectotype of *Unio pullatus* (= *Elliptio pullata*), USNM 86020. A, figure from Lea (1858a); and B, recent photograph.

Type Locality.—Creeks near Columbus, [Muscogee County,] Georgia, [Chattahoochee River drainage,] Bishop Elliott.

Comments.—Lea (1858a) corrected the spelling of *Unio pullatis* Lea 1856 to *Unio pullatus*.

Elliptio pullata had not been recognized as valid for more than a century until it was elevated by Williams et al. (2008) based on shell characters and zoogeography. Many of the previous records of *Elliptio icterina* from the Escambia, Yellow, Choctawhatchee, and Apalachicola River drainages are referable to *E. pullata*.

***purpurellus* = *Elliptio purpurella* (Lea 1857)**

Unio purpurellus Lea 1857. Lea 1857a:171; Lea 1859a:198, pl. 23, fig. 81.

Type Specimen.—Lectotype, USNM 85675, length 36 mm (Fig. 111), designated and refigured

by Johnson (1968:22, fig. 3).

Type Locality.—Flint River near Albany, [Dougherty County,] Georgia, [Flint River drainage,] Bishop Elliott.

Comments.—*Elliptio purpurella* had not been recognized as valid for more than a century until it was elevated by Brim Box and Williams (2000) based on shell characters. Previous records of *Elliptio icterina* and *Elliptio arctata* from the Apalachicola River drainage may be based on *E. purpurella*.

***pyriformis* = *Pleurobema pyriforme* (Lea 1857)**

Unio pyriformis Lea 1857. Lea 1857b:31; Lea 1858a:69, pl. 12, fig. 50.

Type Specimen.—Lectotype, USNM 84781, length 54 mm (Fig. 112), designated by Johnson (1974).

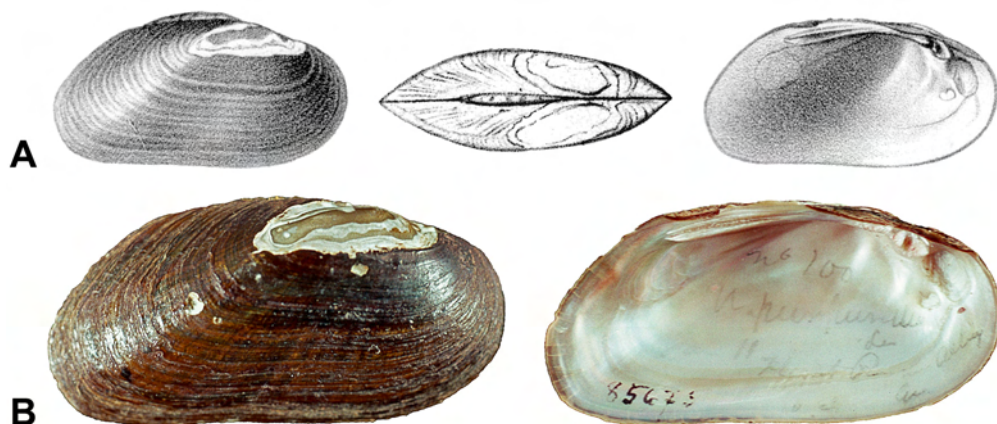


Figure 111. Lectotype of *Unio purpurellus* (= *Elliptio purpurella*), USNM 85675. A, figure from Lea (1859a); and B, recent photograph.

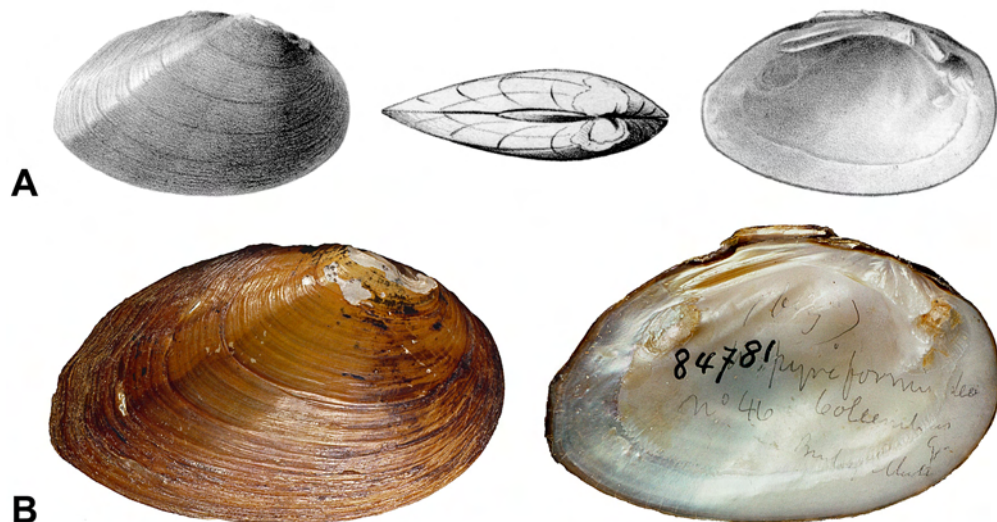


Figure 112. Lectotype of *Unio pyriformis* (= *Pleurobema pyriforme*), USNM 84781. A, figure from Lea (1858a); and B, recent photograph.

Type Locality.—Near Columbus, [Muscogee County,] Georgia, [Chattahoochee River drainage,] Bishop Elliott.

Comments.—Clench and Turner (1956) synonymized six nominal species with *Pleurobema pyriforme*.

***reclusus* = *Pleurobema pyriforme* (Lea 1857)**

Unio reclusus B. H. Wright 1898. B. H. Wright 1898a:111.

Type Specimen.—Lectotype, USNM 151029, length 40 mm (Fig. 113), designated and figured by Simpson (1900b:82, pl. 1, fig. 2), refigured by Johnson (1967a:8, pl. 4, fig. 5).

Type Locality.—Ocklocknee [Ochlockonee] River, Leon County, Florida, [Ochlockonee River drainage].

***rivicolus* = *Uniomerus carolinianus* (Bosc 1801)**

Unio rivicolus Conrad 1868. Conrad 1868:280, pl. 18, fig. 4.

Type Specimen.—Lectotype, ANSP 41411, length 65 mm (Fig. 114), designated by Johnson and Baker (1973).

Type Locality.—Brook near Tampa, [Hillsborough County,] Florida, [Hillsborough River drainage].



Figure 113. Lectotype of *Unio reclusus* (= *Pleurobema pyriforme*), USNM 151029.

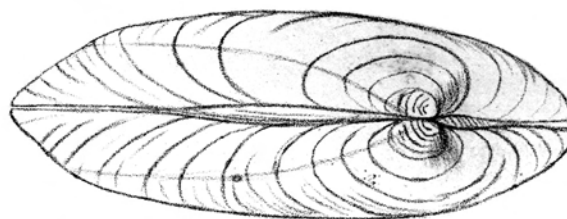
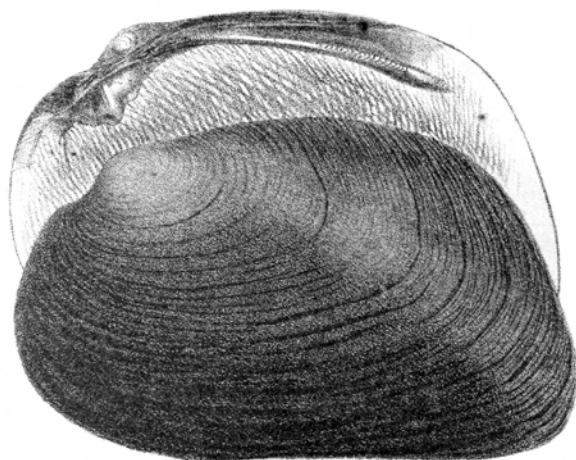


Figure 114. Lectotype of *Unio rivicolus* (= *Uniomerus carolinianus*), ANSP 41411, from Conrad (1868).

***roswellensis* = *Elliptio pullata* (Lea 1856)**

Unio roswellensis Lea 1858. Lea 1858c:165; Lea 1858a:70, pl. 13, fig. 51.

Type Specimen.—Lectotype, USNM 84136, length 79 mm (Fig. 115), designated by Johnson (1974).

Type Locality.—Chattahoochee River at Roswell, Cobb County, Georgia, [Chattahoochee River drainage,] N. A. Pratt, Jr.

***rotulatus* = *Fusconaia rotulata* (B. H. Wright 1899)**

Unio rotulatus B. H. Wright 1899. B. H. Wright 1899:22.

Type Specimen.—Holotype by monotypy, USNM 159969, length 49 mm (Fig. 116), figured by Simpson (1900b:78, pl. 4, fig. 2) and refigured by Johnson (1967a:8, pl. 4, fig. 4).

Type Locality.—Escambia River, Escambia County, Florida, [Escambia River drainage,] B. H. Wright.

Comments.—*Fusconaia rotulata* was formerly placed in *Obovaria* (Frierson 1927; Turgeon et al. 1998), but was reassigned to *Fusconaia* by Lydeard et al. (2000) based on genetic data and Williams et al. (2008) based on shell characters.

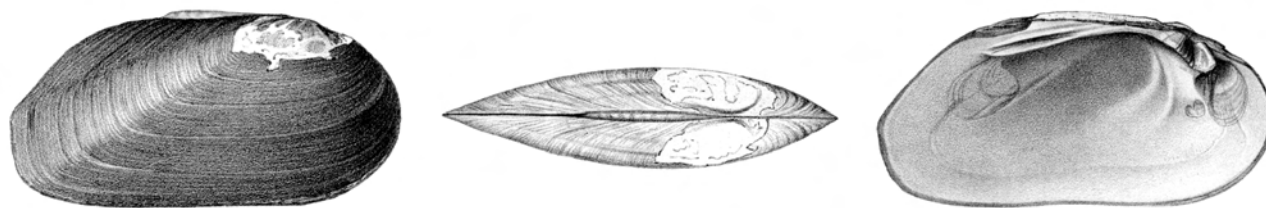


Figure 115. Lectotype of *Unio roswellensis* (= *Elliptio pullata*), USNM 84136, from Lea (1858a).



Figure 116. Holotype of *Unio rotulatus* (= *Fusconaia rotulata*), USNM 159969.

***salebrosus* = *Elliptio fumata* (Lea 1857)**

Unio salebrosus Lea 1859. Lea 1859c:170; Lea 1860a:332, pl. 52, fig. 157.

Type Specimen.—Lectotype, USNM 85574, length 79 mm (Fig. 117), designated by Johnson (1974).

Type Locality.—Flat Rock [Flatrock] Creek, [Muscogee County,] Georgia, [Chattahoochee River drainage,] G. Hallenbeck.

Comments.—Additional material that was part of the syntypic series, paralectotype(s), was reported from Bull Creek, [Muscogee County,] Georgia, [Chattahoochee River drainage]; Chat-

tahoochee River near Columbus, [Muscogee County,] Georgia, [Chattahoochee River drainage].

***sanctorumjohanium* = *Elliptio jayensis* (Lea 1838)**

Unio (Elliptio) sanctorumjohanium B. H. Wright 1933. B. H. Wright 1933:17, pl. 1.

Type Specimen.—Holotype, USNM 424738, length 65 mm (Fig. 118), refigured by Johnson (1967a:8, pl. 9, fig. 3).

Type Locality.—Lake Druid near Floral City, [Citrus County,] Florida, [Withlacoochee River drainage].

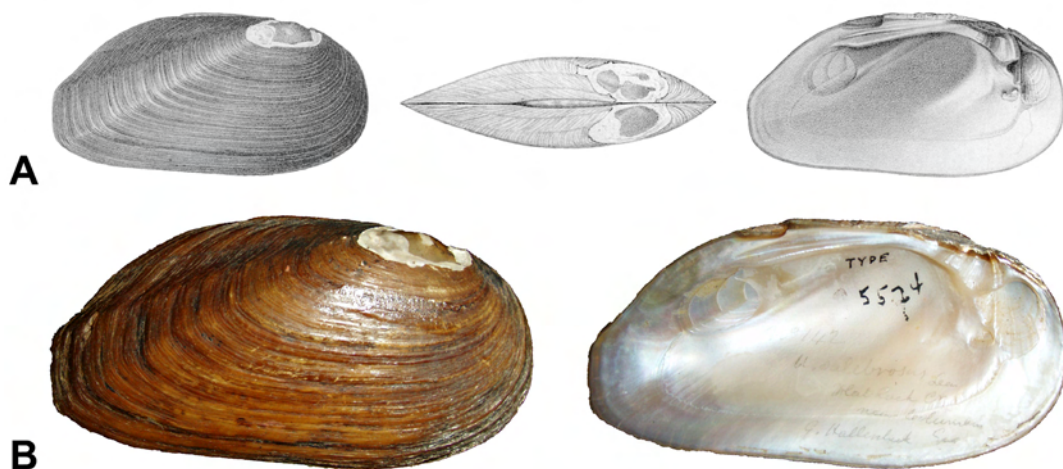


Figure 117. Lectotype of *Unio salebrosus* (= *Elliptio fumata*), USNM 85574. A, figure from Lea (1860a); and B, recent photograph.

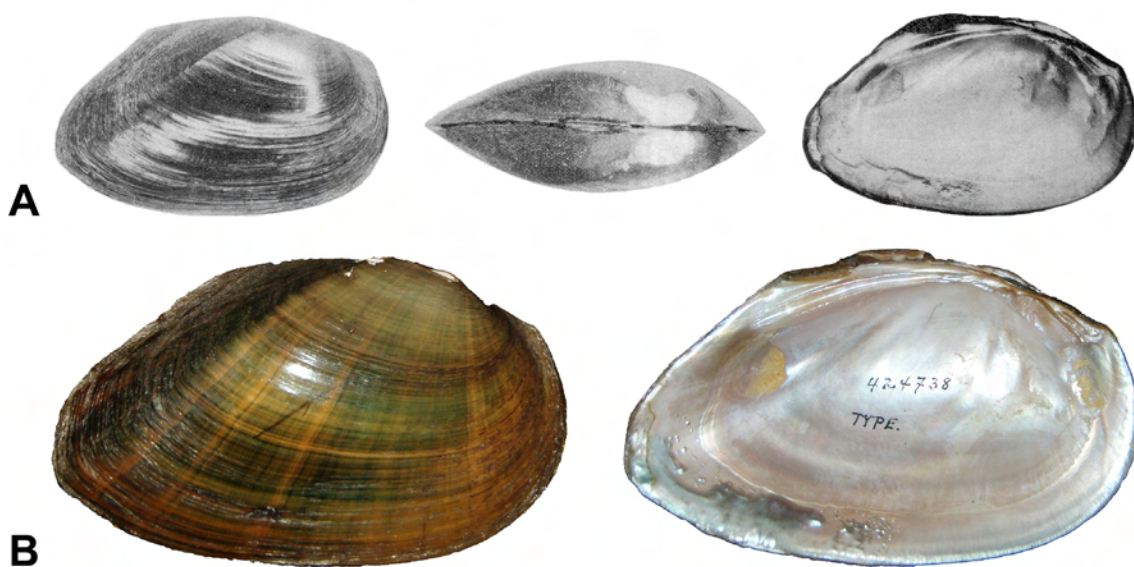


Figure 118. Holotype of *Unio (Elliptio) sanctorumjohanium* (= *Elliptio jayensis*), USNM 424738. A, figure from B. H. Wright (1933); and B, recent photograph.

***securiformis* = *Quadrula infucata* (Conrad 1834a)**

Unio securiformis Conrad 1849. Conrad 1849:152; Conrad 1850:275, pl. 37, fig. 1.

Type Specimen.—The figured type (Fig. 119), length reported as about 38 mm, is presumed lost (Johnson & Baker 1973).

Type Locality.—Flint River, Georgia, [Flint River drainage].

Comments.—*Quadrula securiformis* was synonymized with *Quincuncina infucata* by Clench and Turner (1956).

***simpsoni* = *Pleurobema pyriforme* (Lea 1857)**

Pleurobema simpsoni Vanatta 1915. Vanatta 1915:559.

Type Specimen.—Lectotype, USNM 84797, length 32 mm (Fig. 120), designated by Johnson (1974).

Type Locality.—Chattahoochee River, Columbus, [Muscogee County,] Georgia, [Chattahoochee River drainage,] Dr. Boykin.

Comments.—*Pleurobema simpsoni* is a replacement name for *Unio striatus* Lea 1840, which was preoccupied (Vanatta 1915).



Figure 119. Figured type of *Unio securiformis* (= *Quadrula infucata*) from Conrad (1850).

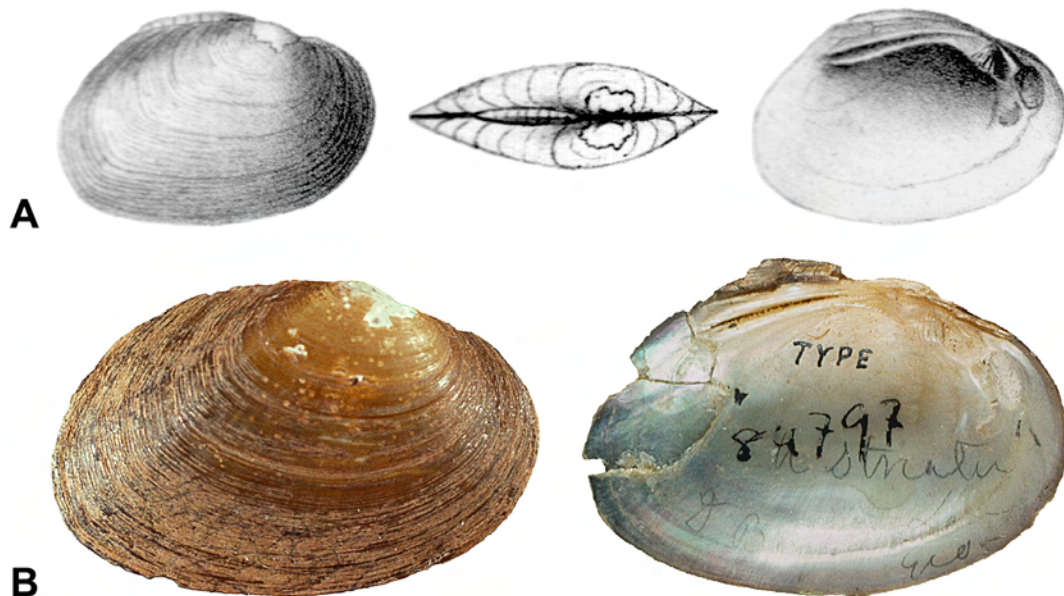


Figure 120. Lectotype of *Pleurobema simpsoni* (= *Pleurobema pyriforme*), USNM 84797. A, figure from Lea (1842); and B, recent photograph.

***simpsoni* = *Elliptio jayensis* (Lea 1838)**

Unio simpsoni B. H. Wright 1888. B. H. Wright 1888:117, pl. 5, fig. 1.

Type Specimen.—Lectotype, USNM 151038, length 59 mm (Fig. 121), designated and refigured by Johnson (1967a:8, pl. 8, fig. 2).

Type Locality.—Lake Woodruff, Volusia County, Florida, [St. Johns River drainage].

***simpsonianus* = *Medionidus simpsonianus* Walker 1905**

Medionidus simpsonianus Walker 1905. Walker 1905b:136, pl. 9, figs. 4–5.

Type Specimen.—Lectotype, UMMZ 98510, length 36 mm (Fig. 122), designated by Clench and Turner (1956).

Type Locality.—[Ochlockonee River,] Calvary, [Grady County,] Georgia, [Ochlockonee River drainage].

Comments.—*Medionidus simpsonianus* was synonymized with *Medionidus penicillatus* by Clench and Turner (1956), but recent authors have recognized it as valid (Johnson 1977; Williams & Butler 1994; Turgeon et al. 1998).

The type specimen is somewhat inflated, with a broad umbo elevated slightly above the hinge line. It has about 10 corrugations radiating from the posterior slope to the posterior dorsal margin, but none on the shell disk. There are 8–9 wide, dark green rays evenly spaced on the shell disk.

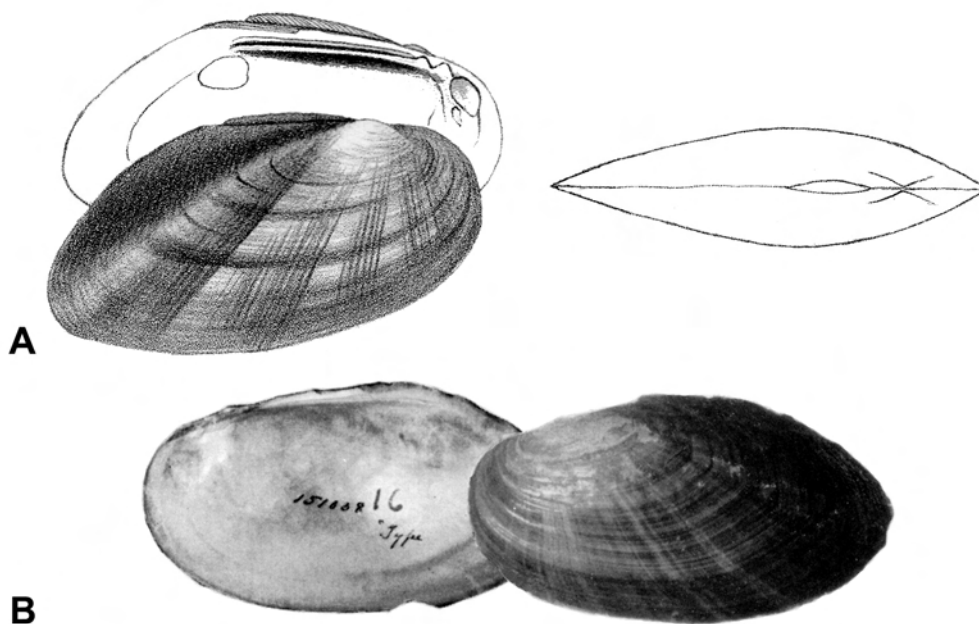


Figure 121. Lectotype of *Unio simpsoni* (= *Elliptio jayensis*), USNM 151038. A, figure from B. H. Wright (1888); and B, figure from Johnson (1967a).

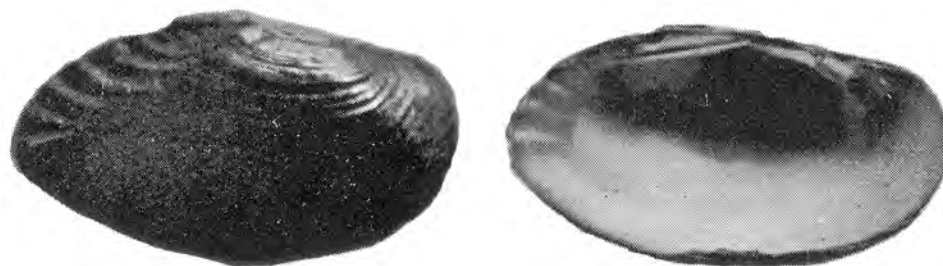


Figure 122. Lectotype of *Medionidus simpsonianus*, UMMZ 98510, from Walker (1905b).

***singleyanus* = *Villosa amygdalum* (Lea 1843)**

Unio singleyanus Marsh 1891. Marsh 1891:29.

Type Specimen.—Lectotype, UMMZ 249348, length 31 mm (Fig. 123), designated and figured by Simpson (1892:426, pl. 68, figs. 4–5).

Type Locality.—A small creek near Pilatka [Palatka, Putnam County,] Florida, [St. Johns River drainage,] T. L. Cunningham.

Comments.—The label for the type lot reads, “Sumter Co., Fla.” This appears to be an error as Sumter County is located southwest of Palatka, Putnam County. Most of Sumter County is in the Withlacoochee River drainage.

Johnson (1979) incorrectly reported the catalog number as UMMZ 17628.

***singularis* = *Elliptio pullata* (Lea 1856)**

Unio singularis B. H. Wright 1899. B. H. Wright 1899:75.

Type Specimen.—Holotype by monotypy, USNM 159988, length 67 mm (Fig. 124), figured

by Johnson (1967a:8, pl. 5, fig. 7).

Type Locality.—Spring Creek, [tributary to the Flint River,] Decatur County, Georgia, [Flint River drainage].

***sloatianus* = *Elliptoideus sloatianus* (Lea 1840)**

Unio sloatianus Lea 1840. Lea 1840:287; Lea 1842:217, pl. 16, fig. 33.

Type Specimen.—Lectotype, AMNH 56104, length 107 mm (Fig. 125), designated by Johnson (1974), refigured by Boyko and Sage (1996:27, fig. 12).

Type Locality.—Chattahoochee River, Georgia, L. W. Sloat. Subsequently restricted to Columbus, Georgia, [Chattahoochee River drainage,] by Clench and Turner (1956).

Comments.—*Elliptoideus* was created as a subgenus of *Elliptio* by Frierson (1927) to accommodate the taxon *sloatianus*. *Elliptoideus* is a monotypic genus (Turgeon et al. 1998).

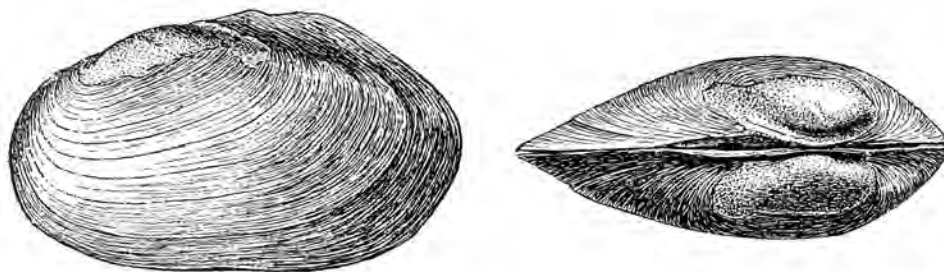


Figure 123. Lectotype of *Unio singleyanus* (= *Villosa amygdalum*), UMMZ 17628, from Simpson (1892).

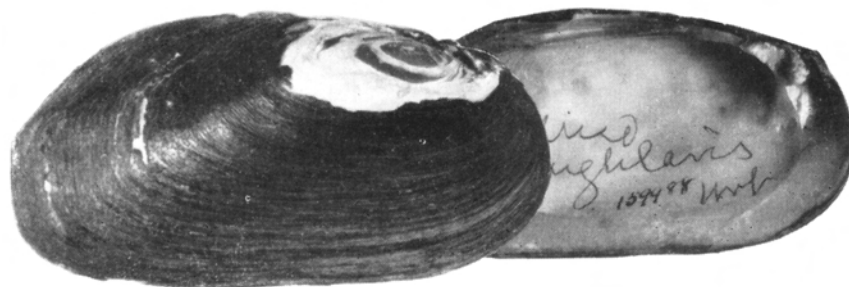


Figure 124. Holotype of *Unio singularis* (= *Elliptio pullata*), USNM 159988, from Johnson (1967a).

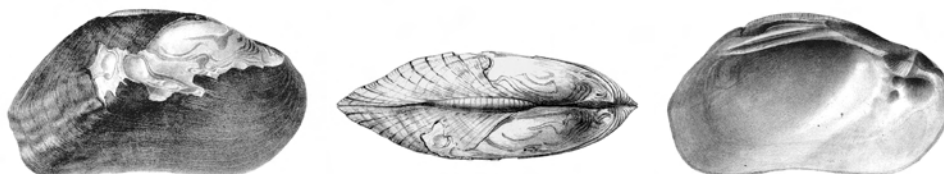


Figure 125. Lectotype of *Unio sloatianus* (= *Elliptoideus sloatianus*), AMNH 56104, from Lea (1842).

***striatus* = *Pleurobema pyriforme* (Lea 1857)**

Unio striatus Lea 1840 non Rafinesque 1820. Lea 1840:287; Lea 1842:203, pl. 12, fig. 16. See *simpsoni* (p. 62).

***strigosus* = *Elliptio arctata* (Conrad 1834b)**

Unio strigosus Lea 1840. Lea 1840:287; Lea 1842:198, pl. 9, fig. 9.

Type Specimen.—Lectotype, USNM 85890, length 56 mm (Fig. 126), designated and refigured by Johnson (1970:331, pl. 10, fig. 5).

Type Locality.—Chattahoochee River, Columbus, [Muscogee County,] Georgia, [Chattahoochee River drainage,] Dr. Boykin.

Comments.—*Elliptio strigosus* was recognized by Clench and Turner (1956) as the senior synonym of several currently recognized

Elliptio in north Florida (e.g., *E. fraterna*, *E. fumata*, *E. nigella*, *E. occulta*, *E. pullata*, *E. purpurella*). It was synonymized with *Elliptio arctata* by Johnson (1970) and Brim Box and Williams (2000).

***strodeanus* = *Pleurobema strodeanum* (B. H. Wright 1898)**

Unio strodeanus B. H. Wright 1898. B. H. Wright 1898b:5.

Type Specimen.—Lectotype, USNM 150498, length 38 mm (Fig. 127), designated and figured by Simpson (1900b:81, pl. 1, fig. 3), refigured by Johnson (1967a:9, pl. 4, fig. 1).

Type Locality.—Escambia River, [Escambia and Santa Rosa counties,] west Florida, [Escambia River drainage].

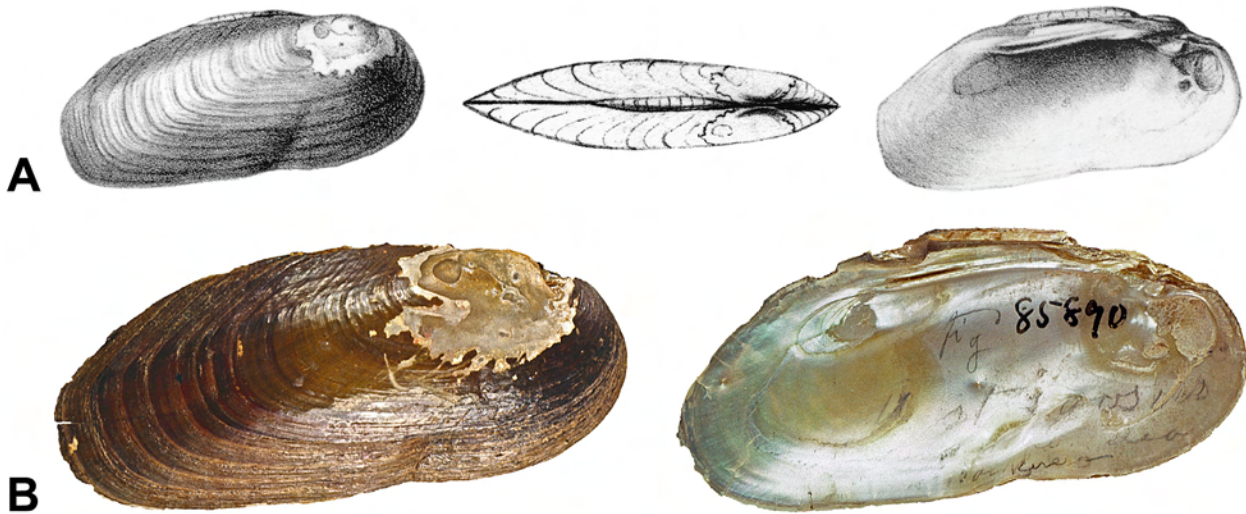


Figure 126. Lectotype of *Unio strigosus* (= *Elliptio arctata*), USNM 85890. A, figure from Lea (1842); and B, recent photograph.



Figure 127. Lectotype of *Unio strodeanus* (= *Pleurobema strodeanum*), USNM 150498.

***subangulatus* = *Hamiota subangulata* (Lea 1840)**

Unio subangulatus Lea 1840. Lea 1840:287; Lea 1842:209, pl. 13, fig. 23.

Type Specimen.—Lectotype, USNM 85081, female, length 48 mm (Fig. 128), designated by Clench and Turner (1956).

Type Locality.—Chattahoochee River, Columbus, [Muscogee County,] Georgia, [Chattahoochee River drainage,] Dr. Boykin.

***subellipsis* = *Villosa lienosa* (Conrad 1834b)**

Unio subellipsis Lea 1856. Lea 1856:262; Lea 1858a:62, pl. 10, fig. 44.

Type Specimen.—Lectotype, USNM 85095, male, length 64 mm (Fig. 129), designated by Johnson (1974).

Type Locality.—Creeks near Columbus, [Muscogee County,] Georgia, [Chattahoochee River drainage,] Bishop Elliott.

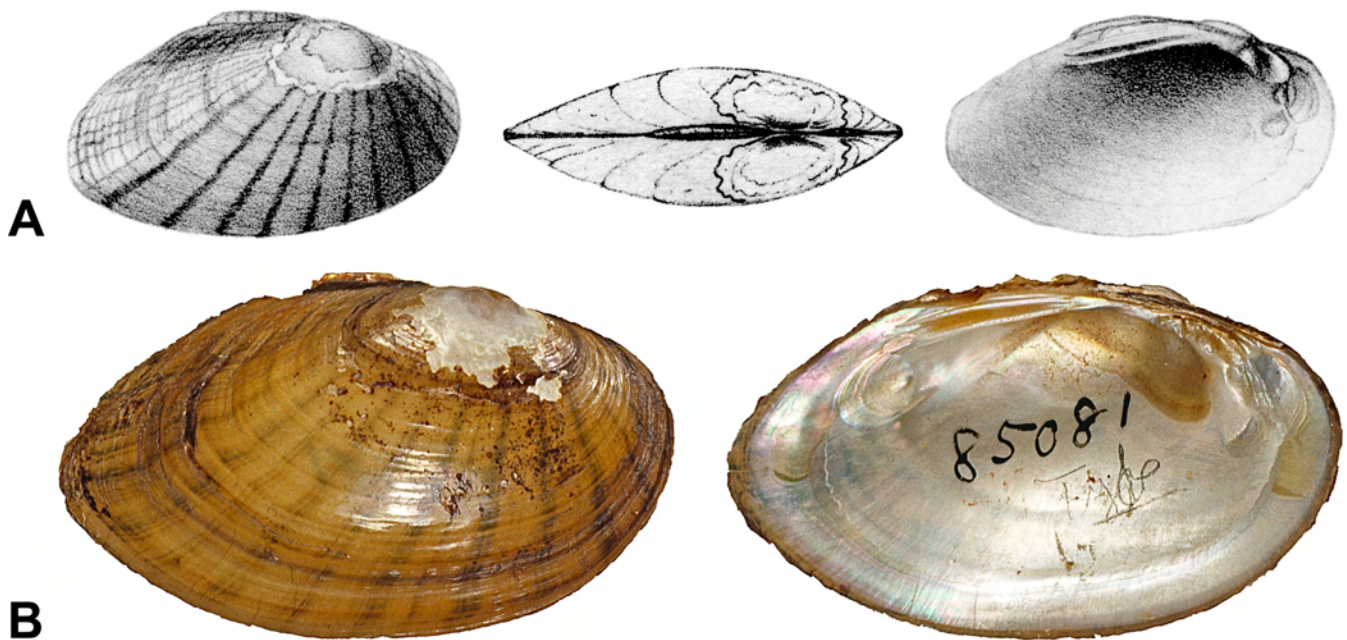


Figure 128. Lectotype of *Unio subangulatus* (= *Hamiota subangulata*), USNM 85081. A, figure from Lea (1842); and B, recent photograph.

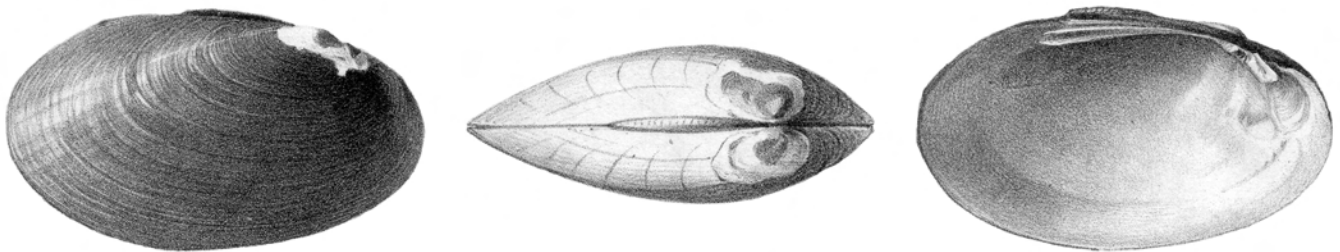


Figure 129. Lectotype of *Unio subellipsis* (= *Villosa lienosa*), USNM 85095, from Lea (1858a).

***sublatus* = *Elliptio pullata* (Lea 1856)**

Unio sublatus Lea 1857. Lea 1857a:169; Lea 1858a:82, pl. 16, fig. 62.

Type Specimen.—Lectotype, USNM 85897, length 50 mm (Fig. 130), designated by Johnson (1970).

Type Locality.—Uchee Bar, [Chattahoochee River, near mouth of Uchee Creek,] below Columbus, Georgia, [Chattahoochee River drainage,] Bishop Elliott.

***subluridus* = *Elliptio jayensis* (Lea 1838)**

Unio subluridus Simpson 1892. Simpson 1892:432, pl. 73, figs. 3–4; Simpson 1900a:743.

Type Specimen.—Lectotype, USNM 104002, length 41 mm (Fig. 131), designated and refigured by Johnson (1972b:212, fig. 7G).

Type Locality.—Orange Springs, Volusia [Marion] County, Florida, [St. Johns River drainage,] C. W. Johnson.

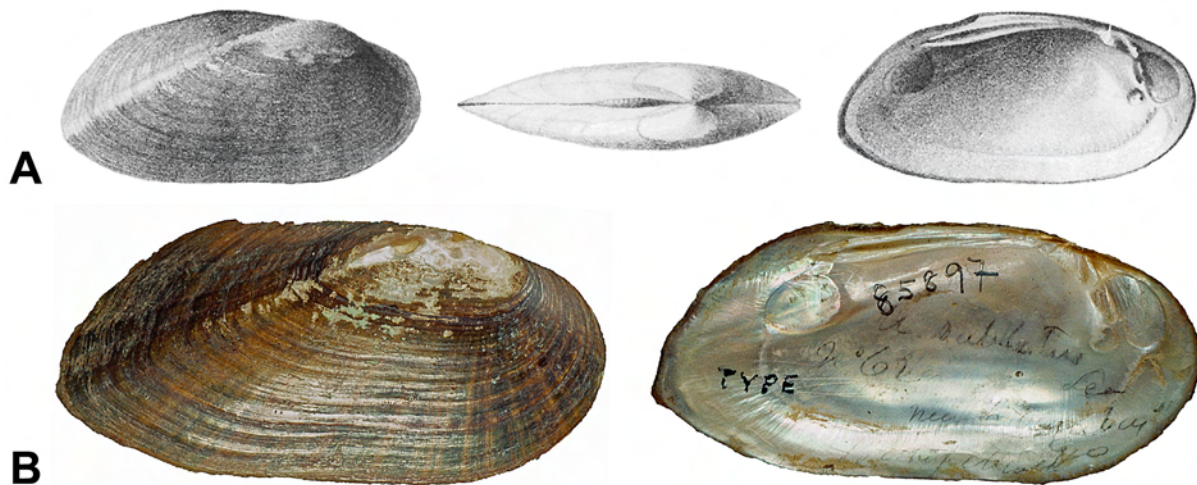


Figure 130. Lectotype of *Unio sublatus* (= *Elliptio pullata*), USNM 85897. A, figure from Lea (1858a); and B, recent photograph.

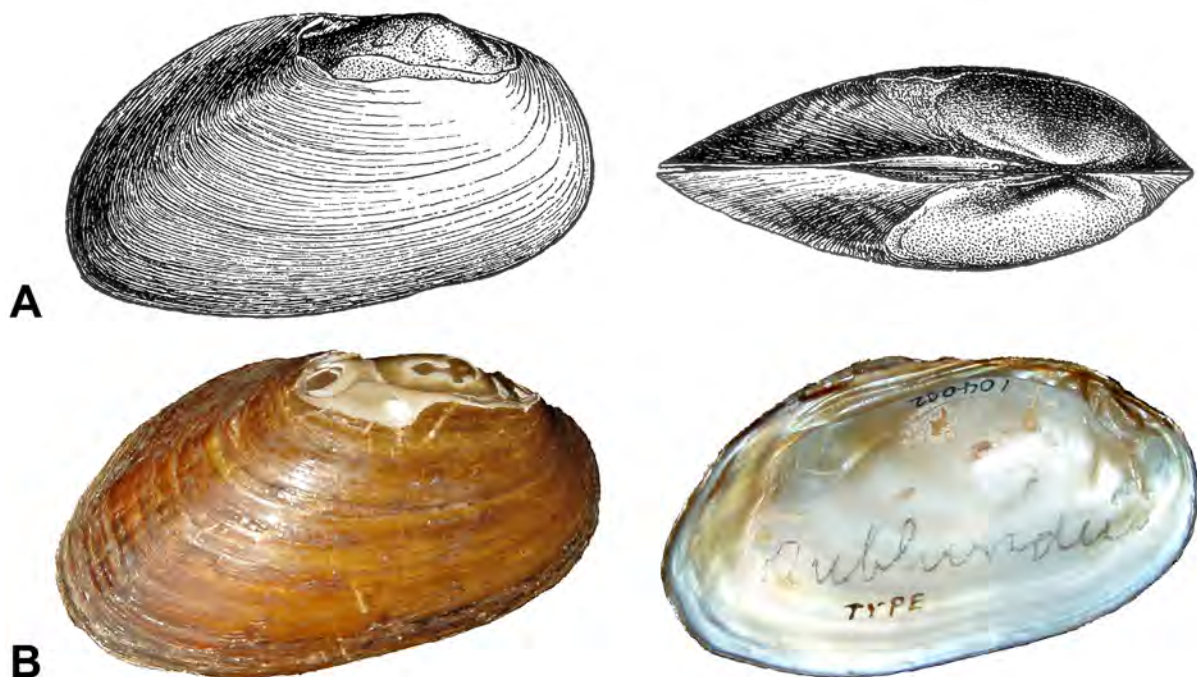


Figure 131. Lectotype of *Unio subluridus* (= *Elliptio jayensis*), USNM 104002. A, figure from Simpson (1892); and B, recent photograph.

***subniger* = *Elliptio fumata* (Lea 1857)**

Unio subniger Lea 1857. Lea 1857a:172; Lea 1859a:196, pl. 22, fig. 79.

Type Specimen.—Holotype by monotypy, USNM 85560, length 91 mm (Fig. 132).

Type Locality.—Flint River near Macon [County], Georgia, [Flint River drainage,] J. C. Plant.

***succissus* = *Quadrula succissa* (Lea 1852)**

Unio succissus Lea 1852. Lea 1852:275, pl. 21, fig. 32.

Type Specimen.—Holotype by monotypy,

USNM 84574, length 43 mm (Fig. 133).

Type Locality.—West Florida, Major J. E. Le Conte. Subsequently restricted to Choctawhatchee River, Caryville, Holmes County, Florida, [Choctawhatchee River drainage,] by Clench and Turner (1956).

Comments.—*Quadrula succissa* was formerly placed in *Fusconaia* (Turgeon et al. 1998), but was reassigned to *Quadrula* by Lydeard et al. (2000) based on genetic data and Williams et al. (2008) based on shell characters.

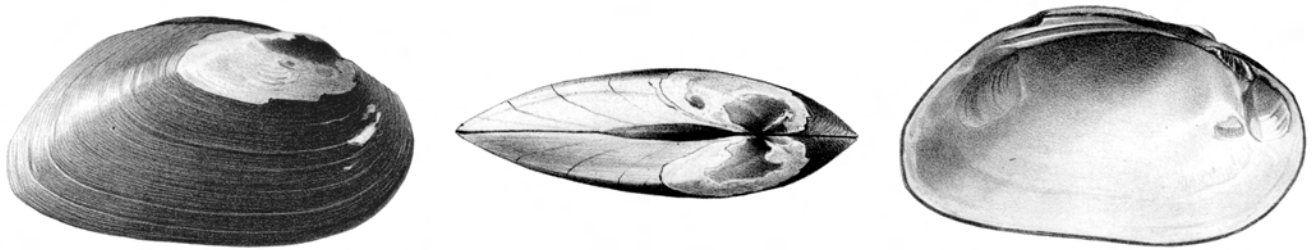


Figure 132. Holotype of *Unio subniger* (= *Elliptio fumata*), USNM 85560, from Lea (1859a).

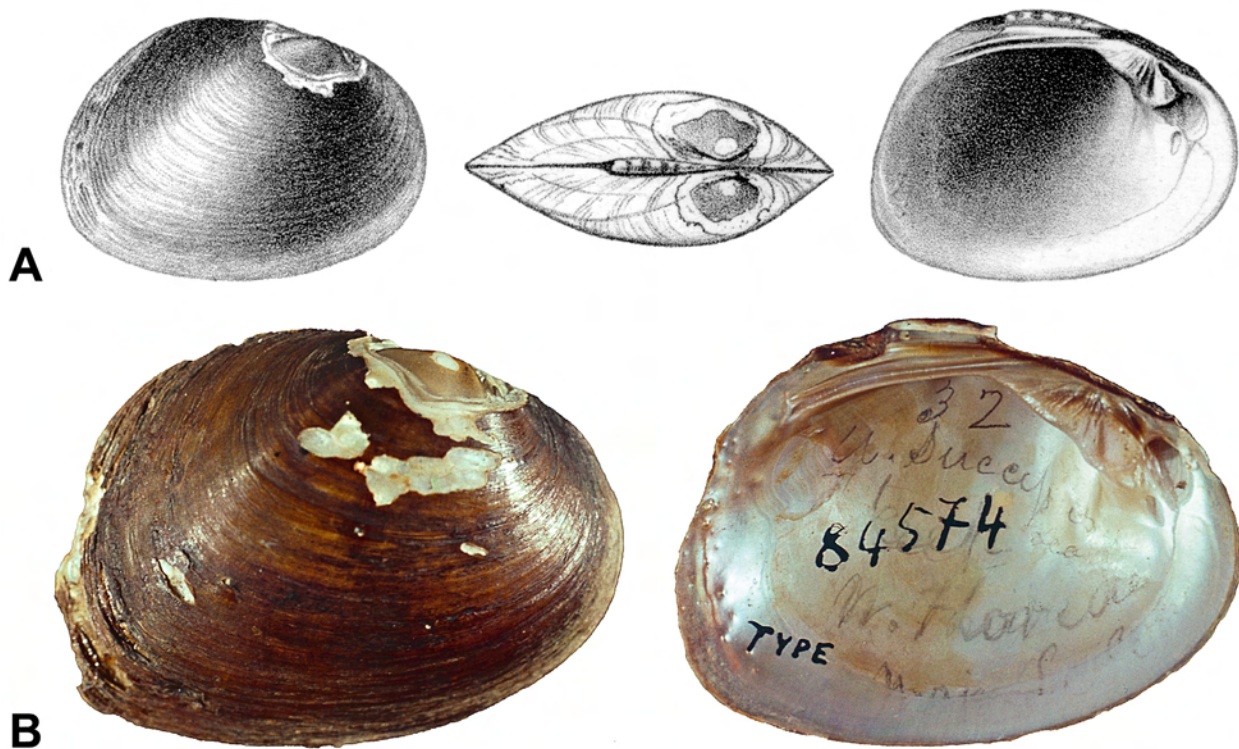


Figure 133. Holotype of *Unio succissus* (= *Quadrula succissa*), USNM 84574. A, figure from Lea (1852); and B, recent photograph.

***sudus* = *Villosa lienosa* (Conrad 1834b)**

Unio sudus Lea 1857. Lea 1857a:170; Lea 1859a:194, pl. 21, fig. 77.

Type Specimen.—Lectotype, USNM 85155, length 47 mm (Fig. 134), designated by Johnson (1974).

Type Locality.—Dry Creek near Columbus, [Muscogee County,] Georgia, [Chattahoochee River drainage,] Bishop Elliott.

Comments.—Additional material that was part of the syntypic series, paralectotype(s), was reported from Macon [County, Georgia, Apalachicola River drainage].

***suttoni* = *Elliptio jayensis* (Lea 1838)**

Unio suttoni B. H. Wright 1897. B. H. Wright 1897a:56.

Type Specimen.—Lectotype, USNM 150129,

length 60 mm (Fig. 135), designated and figured by Johnson (1967a:9, pl. 11, fig. 2).

Type Locality.—Lake near Candler, Marion County, Florida, [St. Johns River drainage].

Comments.—A note written inside the shell of the lectotype reads, “Lake near Candler, [Smith Lake,] Marion Co., FL.”

***tenuisculus* = *Elliptio jayensis* (Lea 1838)**

Unio tenuisculus Frierson 1911. Frierson 1911:29, pl. 1, figs. 4–6.

Type Specimen.—Lectotype, UMMZ 96312, length 37 mm (Fig. 136), designated and refigured by Johnson (1972a:150, pl. 29, fig. 3).

Type Locality.—Reedy Lake, [Frostproof,] Polk County, Florida, in the Gulf drainage [Kissimmee River drainage].



Figure 134. Lectotype of *Unio sudus* (= *Villosa lienosa*), USNM 85155, from Lea (1859a).

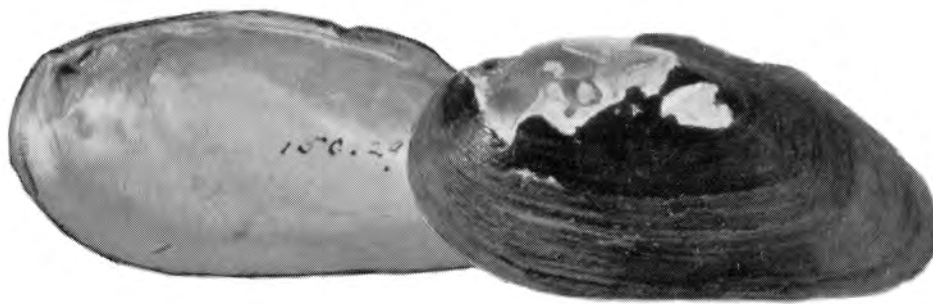


Figure 135. Lectotype of *Unio suttoni* (= *Elliptio jayensis*), USNM 150129, from Johnson (1967a).



Figure 136. Lectotype of *Unio tenuisculus* (= *Elliptio jayensis*), UMMZ 96312, from Frierson (1911).

***tetricus* = *Elliptio pullata* (Lea 1856)**

Unio tetricus Lea 1857. Lea 1857a:170; Lea 1859a:195, pl. 22, fig. 78.

Type Specimen.—Lectotype, USNM 85655, length 48 mm (Fig. 137), designated by Johnson (1974).

Type Locality.—Flint River near Albany, [Dougherty County,] Georgia, [Flint River drainage,] Bishop Elliott.

***tortivus* = *Elliptio arctata* (Conrad 1834b)**

Unio tortivus Lea 1840. Lea 1840:287; Lea 1842:204, pl. 12, fig. 17.

Type Specimen.—Figured type, length approximately 49 mm (Fig. 138A).

Type Locality.—Chattahoochee River, Columbus, [Muscogee County,] Georgia, [Chattahoochee River drainage,] Dr. Boykin.

Comments.—The specimen, USNM 85674, length 49 mm (Fig. 138B), from “Lee County, Georgia,” with a “type” label does not appear to be the specimen figured in the description. The specimen from Lee County is not mentioned in the original description or in Lea’s subsequent publications so may not have been part of the syntypic series, which would make it invalid as a name-bearing type. Lee County is located in the lower portion of the Flint River drainage north of Albany, Georgia.

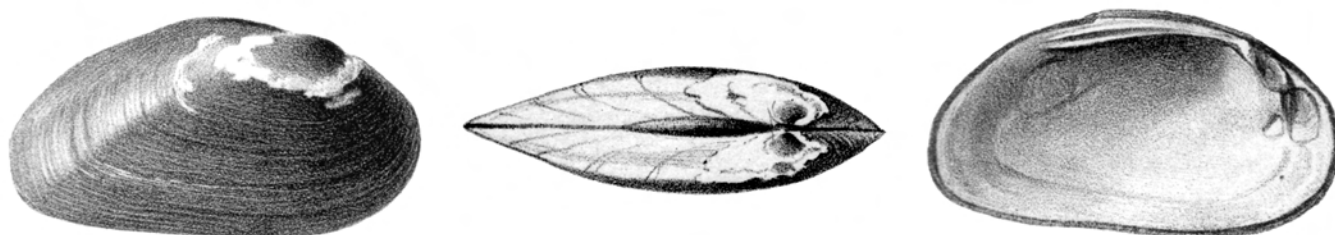


Figure 137. Lectotype of *Unio tetricus* (= *Elliptio pullata*), USNM 85655, from Lea (1859a).

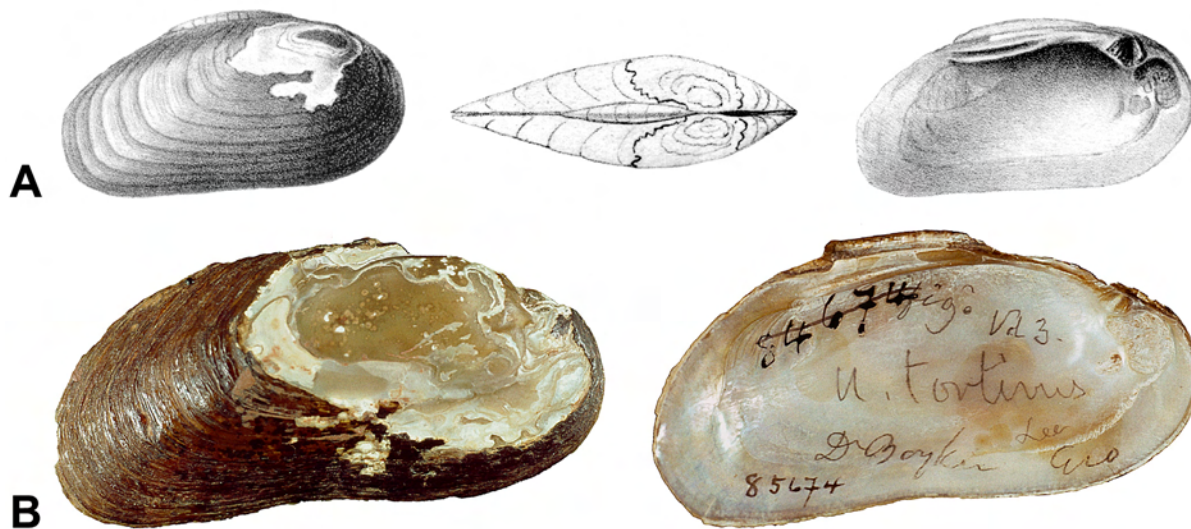


Figure 138. *Unio tortivus* (= *Elliptio arctata*). A, figure from Lea (1842); and B, recent photograph of USNM 85674.

***triangulata* = *Alasmidonta triangulata* (Lea 1858)**

Margaritana triangulata Lea 1858. Lea 1858b:138; Lea 1859a:228, pl. 32, fig. 111.

Type Specimen.—Lectotype, USNM 86249, length 56 mm (Fig. 139), designated and refigured by Johnson (1970:431, pl. 13, fig. 5).

Type Locality.—Upper Chattahoochee [River], Georgia, [Chattahoochee River drainage,] Bishop Elliott.

Comments.—Additional material that was part of the syntypic series, paralectotype(s), was reported from [Chattahoochee River,] Columbus, [Muscogee County,] Georgia, [Chattahoochee River drainage]; Potato Creek, [Upson County,] Georgia, [Flint River drainage]; Sawney's Creek,

[Kershaw County,] South Carolina, [Wateree River drainage].

Alasmidonta triangulata was synonymized with *Alasmidonta undulata* by Johnson (1970), but recent authors have recognized it as valid (Williams & Butler 1994; Turgeon et al. 1998; Brim Box & Williams 2000; Williams et al. 2008).

***trossulus* = *Villosa amygdalum* (Lea 1843)**

Unio trossulus Lea 1843. Lea 1843:[one page privately published]. See *trossulus*.

***trossulus* = *Villosa amygdalum* (Lea 1843)**

Unio trossulus Lea 1846. Lea 1846:278, pl. 40, fig. 6.

Type Specimen.—Holotype by monotypy, USNM 84705, male, length 35 mm (Fig. 140).

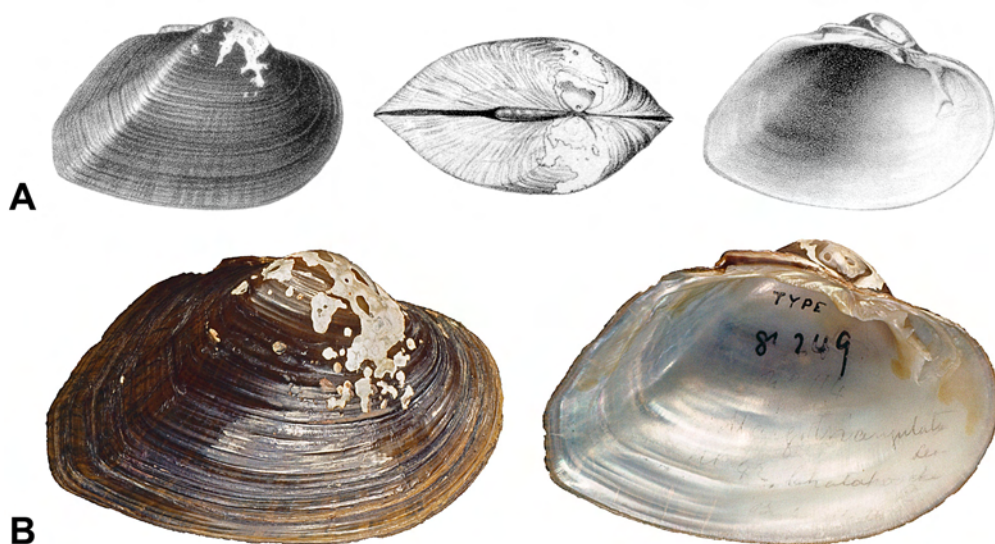


Figure 139. Lectotype of *Margaritana triangulata* (= *Alasmidonta triangulata*), USNM 86249. A, figure from Lea (1859a); and B, recent photograph.

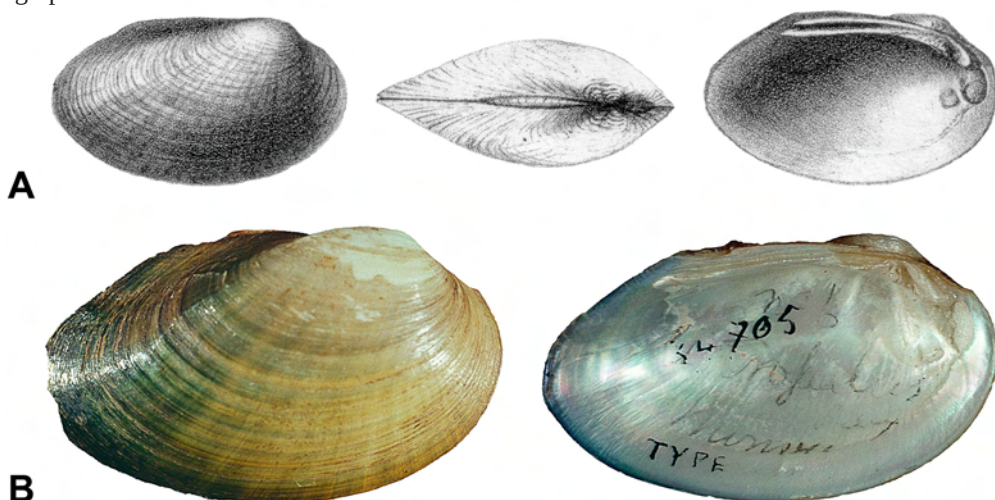


Figure 140. Holotype of *Unio trossulus* (= *Villosa amygdalum*), USNM 84705. A, figure from Lea (1846); and B, recent photograph.

Type Locality.—Lake Monroe, [Volusia and Seminole counties,] Florida, [St. Johns River drainage,] S. B. Buckley.

Comments.—Lea (1846) corrected the spelling of *Unio trosculus* Lea 1843 to *Unio trossulus*.

***tryoni* = *Elliptio jayensis* (Lea 1838)**

Unio tryoni B. H. Wright 1888. B. H. Wright 1888:120, pl. 6, fig. 2.

Type Specimen.—Lectotype, USNM 151036, length 100 mm (Fig. 141), designated and refigured by Johnson (1967a:9, pl. 12, fig. 1).

Type Locality.—Lake Woodruff [Spring

Garden Lake] near De Leon Springs, Volusia County, Florida, [St. Johns River drainage].

***unicostatus* = *Villosa lienosa* (Conrad 1834b)**

Unio unicostatus B. H. Wright 1899. B. H. Wright 1899:69.

Type Specimen.—Lectotype, USNM 159966, length 39 mm (Fig. 142), designated and figured by Johnson (1967a:9, pl. 7, fig. 3).

Type Locality.—Spring Creek, [tributary to the Flint River,] Decatur County, Georgia, [Flint River drainage].

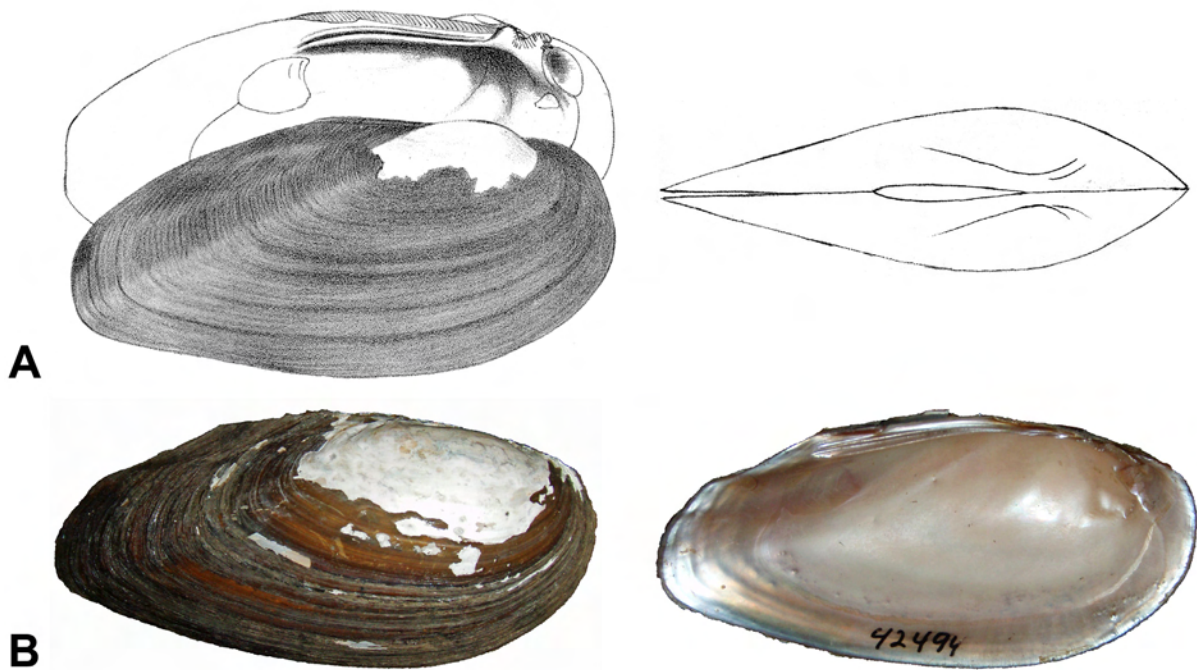


Figure 141. Lectotype of *Unio tryoni* (= *Elliptio jayensis*), USNM 151036. A, figure from B. H. Wright (1888); and B, recent photograph.

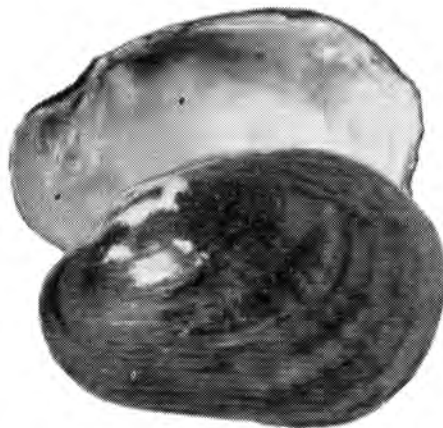


Figure 142. Lectotype of *Unio unicostatus* (= *Villosa lienosa*), USNM 159966, from Johnson (1967a).

***verutus* = *Elliptio pullata* (Lea 1856)**

Unio verutus Lea 1859. Lea 1859c:171; Lea 1860a:385, pl. 53, fig. 160.

Type Specimen.—Lectotype, USNM 85899, length 91 mm (Fig. 143), designated by Johnson (1974).

Type Locality.—Flat Rock [Flatrock] Creek near Columbus, [Muscogee County,] Georgia, [Chattahoochee River drainage,] G. Hallenbeck.

***vesicularis* = *Villosa amygdalum* (Lea 1843)**

Unio vesicularis Lea 1872. Lea 1872:156; Lea 1874a:37, pl. 12, fig. 34.

Type Specimen.—Lectotype, USNM 85292, length 32 mm (Fig. 144), designated by Johnson (1974).

Type Locality.—Lake Okeechobee, Florida, [Everglades drainage,] Dr. Budd and C. M. Wheatley.

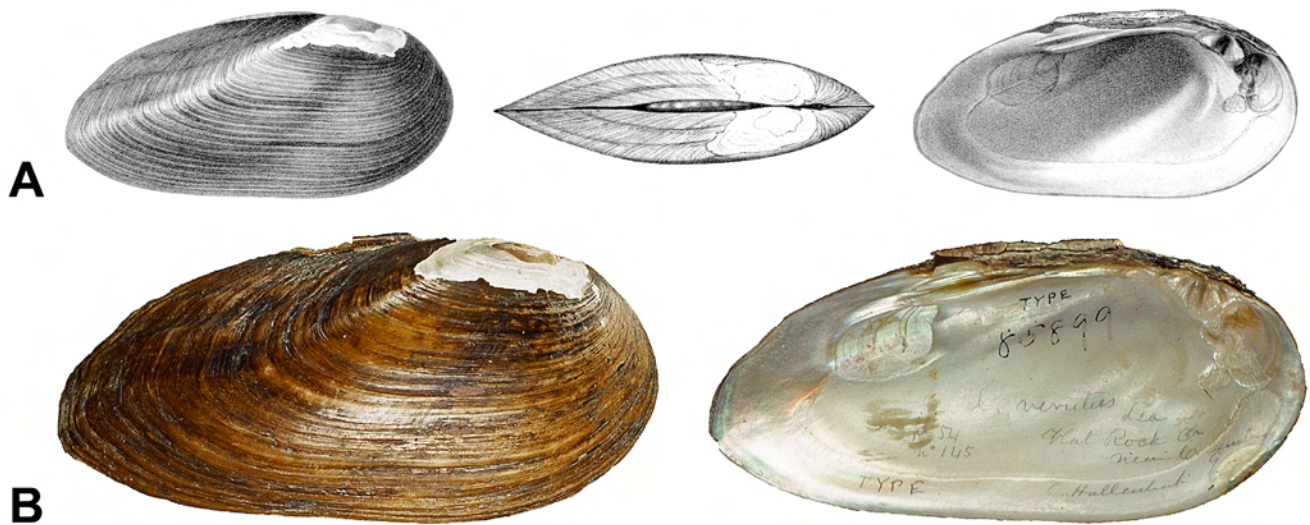


Figure 143. Lectotype of *Unio verutus* (= *Elliptio pullata*), USNM 85899. A, figure from Lea (1860a); and B, recent photograph.

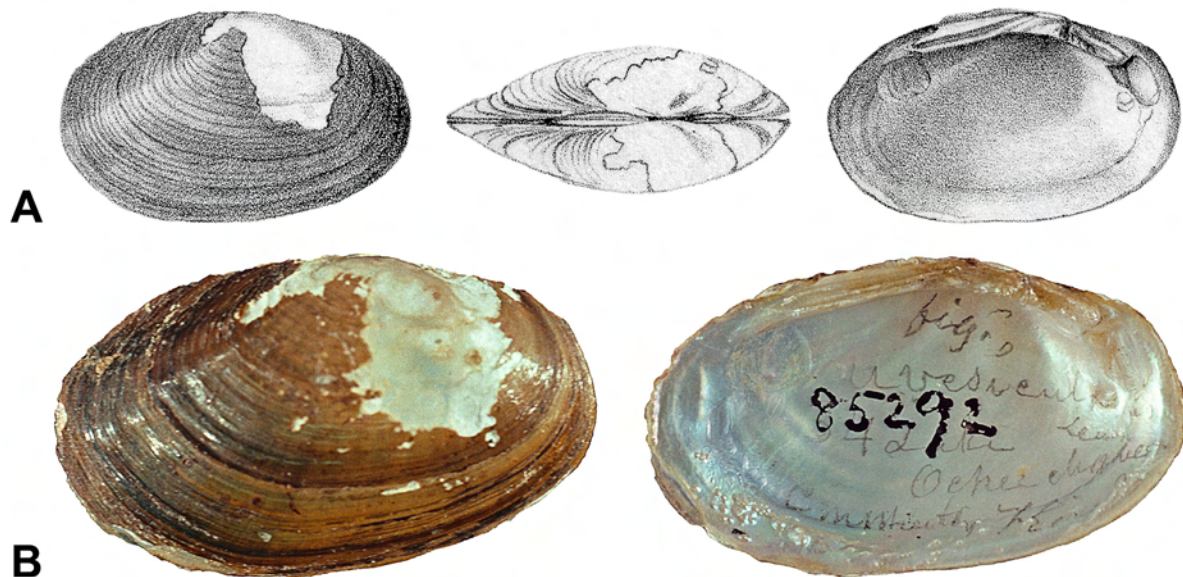


Figure 144. Lectotype of *Unio vesicularis* (= *Villosa amygdalum*), USNM 85292. A, figure from Lea (1874a); and B, recent photograph.

***villosus* = *Villosa villosa* (B. H. Wright 1898)**

Unio villosus B. H. Wright 1898. B. H. Wright 1898c:32.

Type Specimen.—Lectotype, USNM 150503, female, length 49 mm (Fig. 145), designated and figured by Simpson (1900b:77, pl. 1, fig. 1), refigured by Johnson (1967a:9, pl. 8, fig. 1).

Type Locality.—Suwannee River, Suwannee County, Florida. Subsequently restricted to Suwannee River, Luraville, Suwannee County, Florida, [Suwannee River drainage,] by Johnson (1967a).

***viridans* = *Elliptio arctata* (Conrad 1834b)**

Unio viridans Lea 1859. Lea 1859c:170; Lea 1860a:337, pl. 54, fig. 162.

Type Specimen.—Lectotype, USNM 85579, length 52 mm (Fig. 146), designated by Johnson (1970).

Type Locality.—Near Columbus, [Muscogee County,] Georgia, [Chattahoochee River drainage,] G. Hallenbeck.



Figure 145. Lectotype of *Unio villosus* (= *Villosa villosa*), USNM 150503.

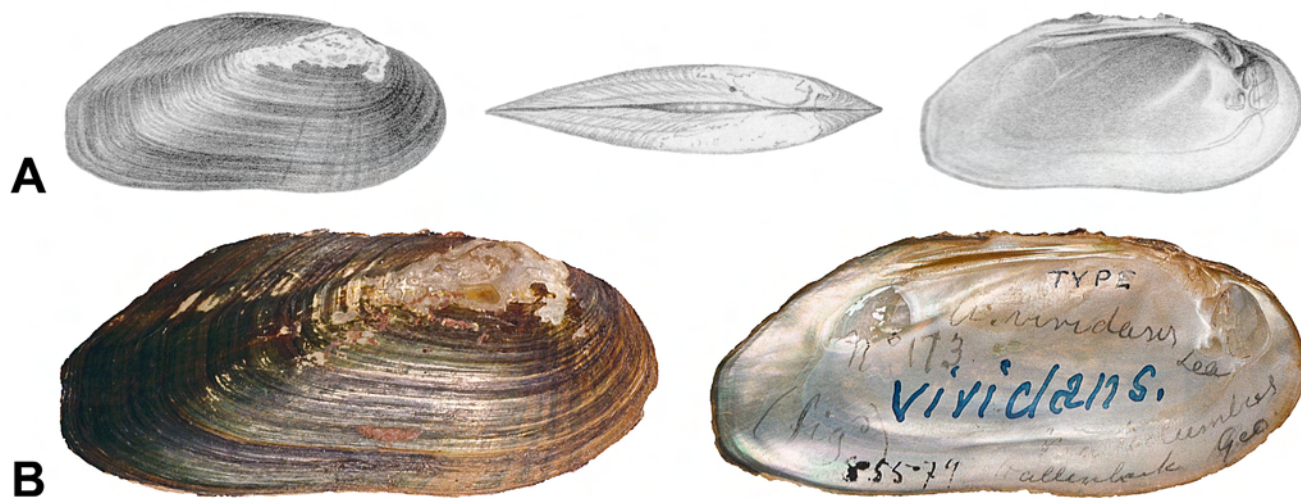


Figure 146. Lectotype of *Unio viridans* (= *Elliptio arctata*), USNM 85579. A, figure from Lea (1860a); and B, recent photograph.

***viridiradiatus* = *Elliptio pullata* (Lea 1856)**

Unio viridiradiatus Lea 1859. Lea 1859b:154; Lea 1860a:336, pl. 53, fig. 161.

Type Specimen.—Lectotype, USNM 86018, length 66 mm (Fig. 147), designated by Johnson (1970).

Type Locality.—Big Uchee [Creek, Lee and Russell counties, Alabama,] near Columbus, [Muscogee County,] Georgia, [Chattahoochee River drainage,] G. Hallenbeck.

***walkeri* = *Medionidus walkeri* (B. H. Wright 1897)**

Unio walkeri B. H. Wright 1897. B. H. Wright 1897c:91.

Type Specimen.—Lectotype, USNM 150506,

length 43 mm (Fig. 148), designated and figured by Simpson (1900b:77, pl. 1, fig. 5), refigured by Johnson (1967a:9, pl. 5, fig. 5).

Type Locality.—Suwannee River, Madison County, Florida. Subsequently restricted to Suwannee River, Ellaville, Madison [Suwannee] County, Florida, [Suwannee River drainage,] by Johnson (1967a).

Comments.—*Medionidus walkeri* was synonymized with *Medionidus penicillatus* by Clench and Turner (1956), but recent authors have recognized it as valid (Johnson 1977; Williams & Butler 1994; Turgeon et al. 1998).

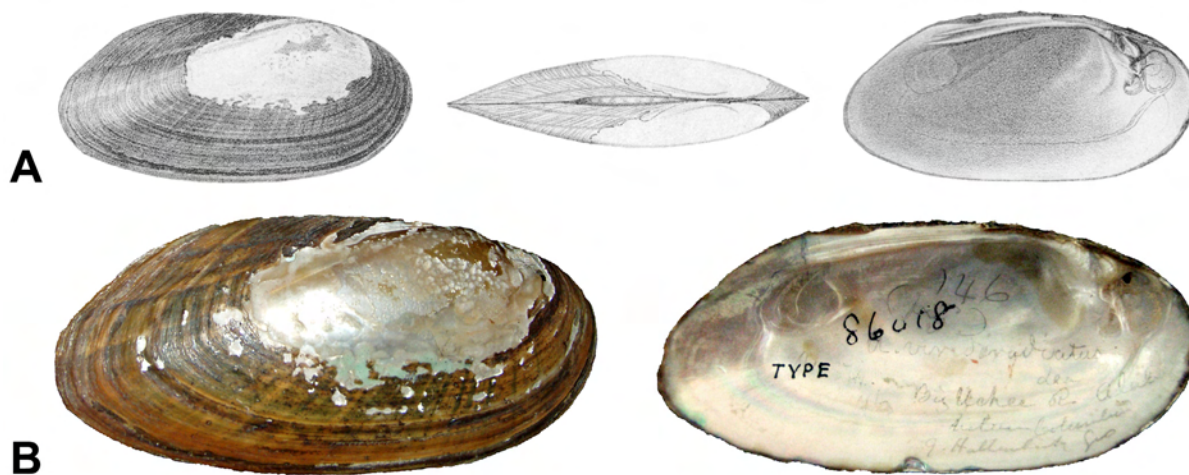


Figure 147. Lectotype of *Unio viridiradiatus* (= *Elliptio pullata*), USNM 86018. A, figure from Lea (1860a); and B, recent photograph.



Figure 148. Lectotype of *Unio walkeri* (= *Medionidus walkeri*), USNM 150506.

waltoni = *Elliptio ahenea* (Lea 1843)

Unio waltoni B. H. Wright 1888. B. H. Wright 1888:114, pl. 2, fig. 3.

Type Specimen.—Lectotype, USNM 91145, length 79 mm (Fig. 149), designated and refigured by Johnson (1967a:9, pl. 11, fig. 5).

Type Locality.—Lake Woodruff, Volusia County, Florida, [St. Johns River drainage].

Comments.—*Elliptio waltoni* was synonymized with *Elliptio jayensis* by Johnson (1972b), but recognized as valid by Turgeon et al. (1998). *Elliptio waltoni* appears to represent an extreme in the shell morphology of *Elliptio ahenea* and is synonymized herein with that species.

webbianus = *Elliptio jayensis* (Lea 1838)

Unio (Elliptio) webbianus B. H. Wright 1934. B. H. Wright 1934a:94, pl. 10, figs. 1–2.

Type Specimen.—Holotype, USNM 424923, length 54 mm (Fig. 150), figured by Johnson (1967a:10, pl. 9, fig. 4).

Type Locality.—Lake Consuelo near Floral City, Citrus County, Florida, [Withlacoochee River drainage,] B. H. Wright.

Comments.—Johnson (1967a) amended the description of the type locality to include “or Little Lake, southeast of Floral City, just outside village limits.”

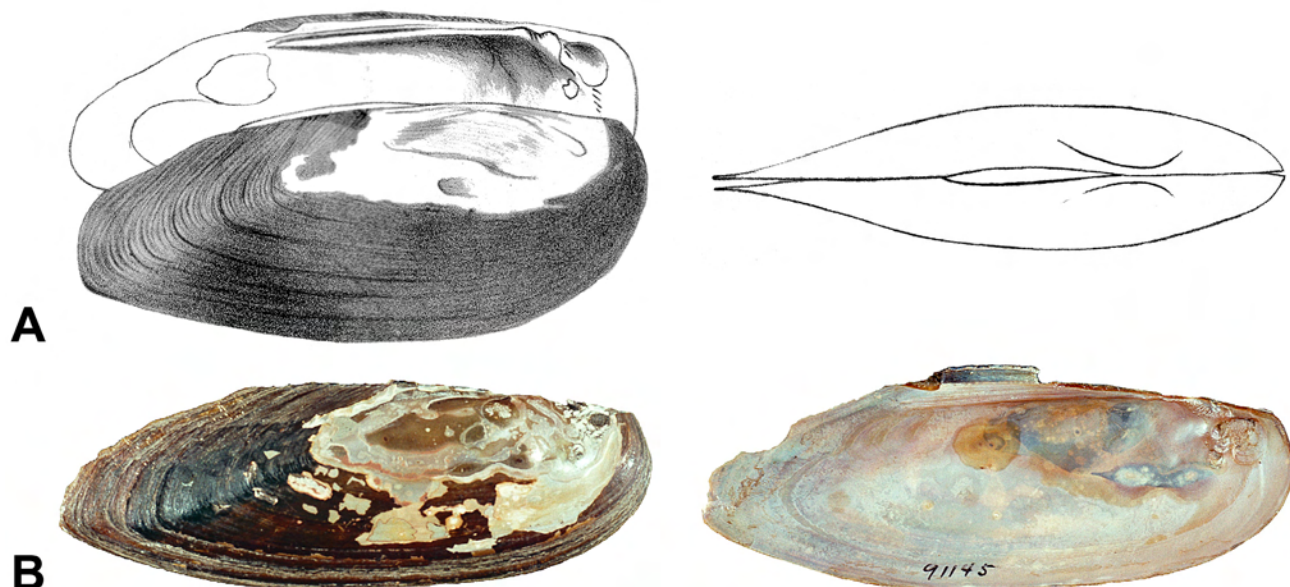


Figure 149. Lectotype of *Unio waltoni* (= *Elliptio ahenea*), USNM 91145. A, figure from B. H. Wright (1888); and B, recent photograph.



Figure 150. Holotype of *Unio (Elliptio) webbianus* (= *Elliptio jayensis*), USNM 424923.

***websterii* = *Elliptio monroensis* (Lea 1843)**

Unio websterii B. H. Wright 1888. B. H. Wright 1888:113, pl. 2, fig. 2.

Type Specimen.—Lectotype, USNM 125697, length 100 mm (Fig. 151), designated and refigured by Johnson (1967a:10, pl. 7, fig. 2).

Type Locality.—Lake Woodruff, Volusia County, Florida, [St. Johns River drainage,] B. H. Wright.

Comments.—*Elliptio websterii* was synonymized with *Elliptio dariensis* by Johnson (1970, 1972b).

The lectotype of *Unio websterii* is moderately

thin, with a sharp posterior ridge. The posterior slope lacks corrugations typical of sympatric *Elliptio crassidens* and *Elliptio monroensis*.

***wrightiana* = *Villosa amygdalum* (Lea 1843)**

Lampsilis wrightiana Frierson 1927. Frierson 1927:81; Frierson 1928:139, pl. 2, fig. 3.

Type Specimen.—Lectotype, UMMZ 91179, male, length 46 mm (Fig. 152), designated and refigured by Johnson (1972a).

Type Locality.—Volusia County, Florida, [St. Johns River drainage].

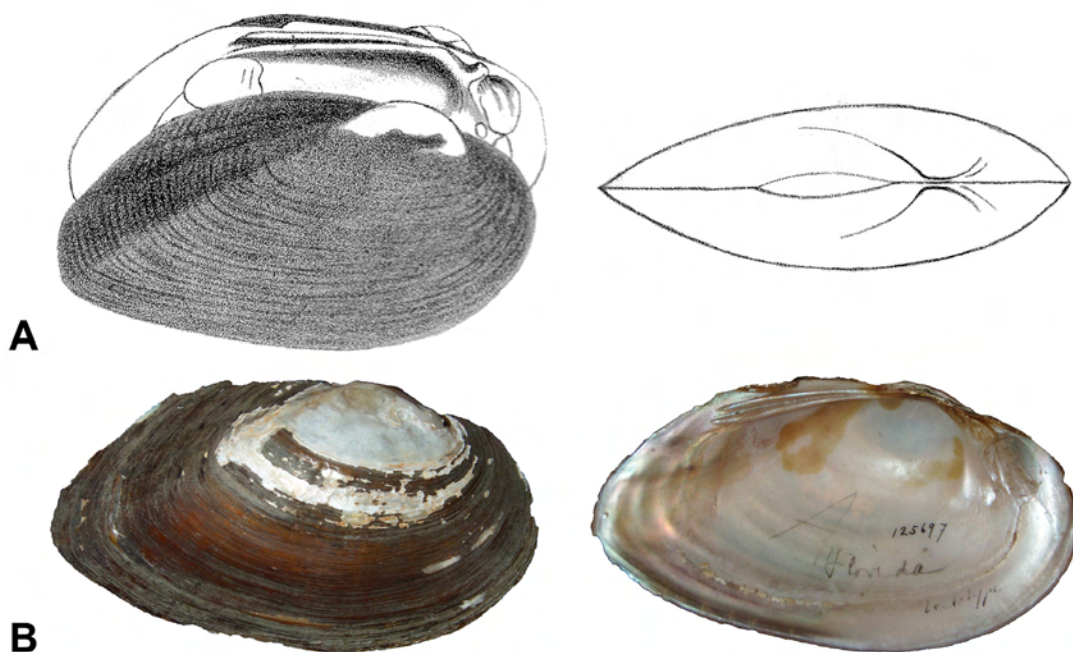


Figure 151. Lectotype of *Unio websterii* (= *Elliptio monroensis*), USNM 125697. A, figure from B. H. Wright (1888); and B, recent photograph.

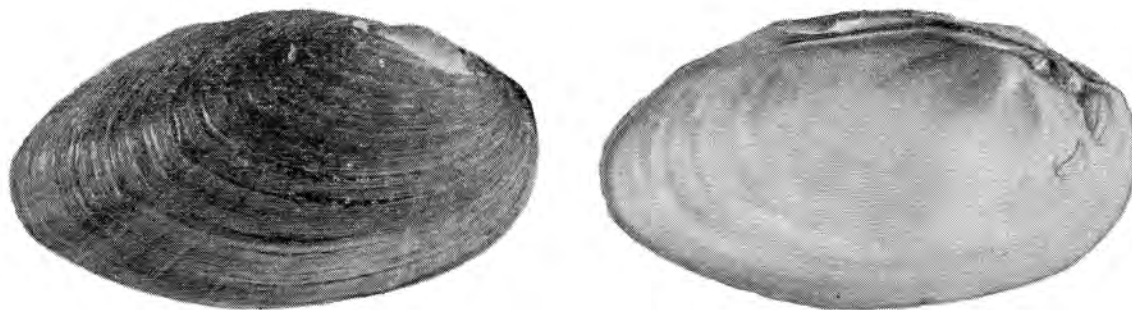


Figure 152. Lectotype of *Lampsilis wrightiana* (= *Villosa amygdalum*), UMMZ 91179, from Frierson (1928).



Figure 153. Holotype of *Strophitus wrightianus* (= *Alasmidonta wrightiana*), UMMZ 74938, from Walker (1901).

***wrightianus* = *Alasmidonta wrightiana* (Walker 1901)**

Strophitus wrightianus Walker 1901. Walker 1901:65, pl. 3.

Type Specimen.—Holotype by monotypy, UMMZ 74938, length 54 mm (Fig. 153).

Type Locality.—Ochlockonee River, Florida, [Ochlockonee River drainage].

Comments.—The type locality in the original description was erroneously reported as “tributaries of the Flint River, Baker County, Georgia” but was subsequently corrected by Walker (*in* Simpson 1914).

Alasmidonta wrightiana was overlooked by Clench and Turner (1956); however, Johnson (1967b) pointed out the occurrence of this species in the Ochlockonee River, Florida.

***wrightii* = *Quadrula succissa* (Lea 1852)**

Quadrula wrightii Simpson 1914. Simpson 1914:868.

Type Specimen.—The type, length reported as 55 mm, is presumed lost (Johnson 1975b).

Type Locality.—Pine Barren Creek, Escambia County, Florida, [Escambia River drainage].

Comments.—*Quadrula wrightii* was synonymized with *Quadrula succissa* by Clench and Turner (1956).

ACKNOWLEDGMENTS

We would like to thank the museum curators, collection managers and other staff of the following institutions for their gracious support and patience during our visits to examine material: Paul Callomon, Amanda Lawless, and Judy Goldberg, Academy of Natural Sciences of Philadelphia, Pennsylvania;

Adam Baldinger and Samantha Edelheit, Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts; Art Bogan and Jamie Smith, North Carolina State Museum of Natural Sciences, Raleigh; Amanda Bemis, Gustav Paulay, and John Slapcinsky, Florida Museum of Natural History, University of Florida, Gainesville; John Burch, Taehwan Lee, and Diarmaid O’Foighil, University of Michigan Museum of Zoology, Ann Arbor; and Paul Greenhall, Robert Hershler, and Tyjuana Nickens, U.S. National Museum of Natural History, Smithsonian Institution, Washington, DC.

We would also like to acknowledge and thank Richard T. Bryant for the use of two of his copyrighted images of type specimens and Wade Ross for drafting the base map of Florida rivers.

We would like to express our appreciation to our colleagues for their tolerance of long discussions and emails concerning various subjects during the preparation of this manuscript: Arthur E. Bogan, Jeffrey T. Garner, Mark E. Gordon, Richard I. Johnson, Harry G. Lee, and W. Henry McCullagh. Critical reviews by Arthur E. Bogan, Kevin S. Cummings, and Jeffrey T. Garner greatly improved the manuscript. We are especially grateful to Sherry Bostick, who displayed great patience while expertly preparing all the images of shells included herein. She also provided data management and editorial support throughout the duration of the project.

We thank the Florida Fish and Wildlife Conservation Commission for funding, through the Florida State Wildlife Grant Program (No. 9730 250 6324), for support of this project.

LITERATURE CITED

- Athearn, H. D. 1964. Three new unionids from Alabama and Florida and a note on *Lampsilis jonesi*. The Nautilus 77(4):134–139.
- Barnes, D. W. 1823. On the genera *Unio* and *Alasmodonta*; with introductory remarks. American Journal of Science and Arts 6(1):107–127; 6(2):258–280.
- Berg, D. J., & P. H. Berg. 2000. Conservation genetics of freshwater mussels: comments on Mulvey et al. Conservation Biology 14(6):1920–1923.
- Bogan, A. E., & C. M. Bogan. 2002. The development and evolution of Isaac Lea's publications on the Unionoida. Pp. 363–375 in M. Falkner, K. Groh, & M.C.D. Speight (eds.). Collectanea Malacologica: Festschrift für Gerhard Falkner. ConchBooks and Verlag der Friedrich-Held-Gesellschaft, Hackenheim and Munich, Germany.
- Bogan, A. E., & W. R. Hoeh. 1995. *Utterbackia peninsularis*, a newly recognized freshwater mussel (Bivalvia: Unionidae: Anodontinae) from peninsular Florida, USA. Walkerana [for 1993–1994] 7(17–18):275–287.
- Bosc, L. A. G. 1801. Histoire Naturelle Des Coquilles. Deterville edition, Paris. Volume 3, p. 142.
- Boyko, C. B., & W. E. Sage, III. 1996. Catalog of recent type specimens in the Department of Invertebrates, American Museum of Natural History. II. Mollusca Part I (Classes Aplacophora, Polyplacophora, Gastropoda [Subclass Opisthobranchia], Bivalvia and Scaphopoda). American Museum Novitates, No. 3170, 50 pp.
- Brim Box, J., & J. D. Williams. 2000. Unionid mollusks of the Apalachicola Basin in Alabama, Florida, and Georgia. Alabama Museum of Natural History Bulletin 21:1–143.
- Butler, R. S. 1989. Distributional records for freshwater mussels (Bivalvia: Unionidae) in Florida and south Alabama, with zoogeographic and taxonomic notes. Walkerana 3(10): 239–261.
- Campbell, D. C., J. M. Serb, J. E. Buhay, K. J. Roe, R. L. Minton, & C. Lydeard. 2005. Phylogeny of North American amblemines (Bivalvia, Unionoida): prodigious polyphyly proves pervasive across genera. Invertebrate Biology 124(2):131–164.
- Clench, W. J., & R. D. Turner. 1956. Freshwater mollusks of Alabama, Georgia, and Florida from the Escambia to the Suwannee River. Bulletin of the Florida State Museum, Biological Sciences 1(3):97–239.
- Conrad, T. A. 1834a. Descriptions of some new species of fresh water shells from Alabama, Tennessee, etc. American Journal of Science and Arts 25(2):338–343.
- Conrad, T. A. 1834b. New freshwater shells of the United States, with lithographic illustrations; and a monograph of the genus *Anculotus* of Say; also a synopsis of the American naiades. J. Dobson, Philadelphia. May 3, 1834. 76 pp.
- Conrad, T. A. 1835. Monography of the family Unionidae, or naiades of Lamarck, (fresh water bivalve shells) of North America, illustrated by figures drawn on stone from nature. J. Dobson, Philadelphia. Part 1(1835):1–12.
- Conrad, T. A. 1849. Descriptions of new fresh water and marine shells. Proceedings of the Academy of Natural Sciences of Philadelphia 4(7):152–155.
- Conrad, T. A. 1850. Descriptions of new fresh water and marine shells. Journal of the Academy of Natural Sciences of Philadelphia 1(New Series):275–280.
- Conrad, T. A. 1866. Descriptions of American fresh-water shells. American Journal of Conchology 2(3):278–279.
- Conrad, T. A. 1868. Description of a new *Unio* and fossil *Goniobasis*. American Journal of Conchology 4:280.
- Frierson, L. S. 1911. New Florida Unio. The Nautilus 25(2):29–30.
- Frierson, L. S. 1927. A Classified and Annotated Check List of the North American Naiades. Baylor University Press, Waco, Texas. 111 pp.
- Frierson, L. S. 1928. Illustrations of Unionidae. The Nautilus 41(4):138–139.

- Gordon, M. E., & W. R. Hoeh. 1995. *Anodonta heardi*, a new species of freshwater mussel (Bivalvia: Unionidae) from the Apalachicola River system of the southeastern United States. *Walkerana* (for 1993–1994) 7(17–18):265–273.
- Gould, A. A. 1845. [Descriptions of recent shells collected by Mr. John Bartlett in the everglades of Florida.] *Proceedings of the Boston Society of Natural History* 2:53.
- Gould, A. A. 1856. [Descriptions of shells.] *Proceedings of the Boston Society of Natural History* 6(1):11–16.
- Heard, W. H. 1979. Identification manual of the freshwater clams of Florida. Florida Department of Environmental Regulation, Technical Series 4(2):1–83.
- Johnson, R. I. 1956. Types of naiades (Mollusca: Unionidae) in the Museum of Comparative Zoology. *Bulletin of the Museum of Comparative Zoology* 115(4):102–142.
- Johnson, R. I. 1964. The recent Mollusca of Augustus Addison Gould. *U.S. National Museum Bulletin* 239:1–182.
- Johnson, R. I. 1965. A hitherto overlooked *Anodonta* (Mollusca: Unionidae) from the Gulf drainage of Florida. *Breviora*, No. 213, 7 pp.
- Johnson, R. I. 1967a. Illustrations of all the mollusks described by Berlin Hart and Samuel Hart Wright. *Museum of Comparative Zoology, Harvard University, Occasional Papers on Mollusks* 3(35):1–35.
- Johnson, R. I. 1967b. Additions to the unionid fauna of the Gulf drainage of Alabama, Georgia and Florida (Mollusca: Bivalvia). *Breviora*, No. 270, 21 pp.
- Johnson, R. I. 1968. *Elliptio nigella*, overlooked unionid from Apalachicola River system. *The Nautilus* 82(1):22–24.
- Johnson, R. I. 1970. The systematics and zoogeography of the Unionidae (Mollusca: Bivalvia) of the southern Atlantic Slope Region. *Bulletin of the Museum of Comparative Zoology* 140(6):263–449.
- Johnson, R. I. 1972a. Illustrations of all of the mollusks described by Lorraine Screven Frierson. *Museum of Comparative Zoology, Harvard University, Occasional Papers on Mollusks* 3(41):137–173.
- Johnson, R. I. 1972b. The Unionidae (Mollusca: Bivalvia) of peninsular Florida. *Bulletin of the Florida State Museum, Biological Sciences* 16(4):181–249.
- Johnson, R. I. 1974. Lea's unionid types or recent and fossil taxa of Unionacea and Mutelacea introduced by Isaac Lea, including the location of all the extant types. *Museum of Comparative Zoology, Harvard University, Special Occasional Publication*, No. 2, 159 pp.
- Johnson, R. I. 1975a. William A Marsh, his introduced taxa of Unionidae or fresh water mussels. *Museum of Comparative Zoology, Harvard University, Occasional Papers on Mollusks* 4(54):145–147.
- Johnson, R. I. 1975b. Simpson's unionid types and miscellaneous unionid types in the National Museum of Natural History. *Museum of Comparative Zoology, Harvard University, Special Occasional Publication*, No. 4, 56 pp.
- Johnson, R. I. 1977. Monograph of the genus *Medionidus* (Bivalvia: Unionidae) mostly from the Apalachicola Region, southeastern United States. *Museum of Comparative Zoology, Harvard University, Occasional Papers on Mollusks* 4(56):161–187.
- Johnson, R. I. 1979. The types of Unionacea (Mollusca: Unionidae) in the Museum of Zoology, the University of Michigan. *Malacological Review* 12(1–2):29–36.
- Johnson, R. I. 1980. The types of Unionacea (Mollusca: Bivalvia) in the Academy of Natural Sciences of Philadelphia: Additions and corrections. *Proceedings of the Academy of Natural Sciences of Philadelphia* 132:277–278.
- Johnson, R. I. 1983. *Margaritifera marrianae*, a new species of Unionacea (Bivalvia: Margaritiferidae) from the Mobile-Alabama-Coosa and Escambia River systems, Alabama. *Museum of Comparative Zoology, Harvard University, Occasional Papers on Mollusks* 4(62):299–304.

- Johnson, R. I., & H. B. Baker. 1973. The types of Unionacea (Mollusca: Bivalvia) in the Academy of Natural Sciences of Philadelphia. *Proceedings of the Academy of Natural Sciences of Philadelphia* 125(9):145–186.
- Krakow, K. K. 1994. Georgia Place-names. Second edition. Winship Press, Macon, Georgia. 272 pp.
- Lamarck, J. B. P. A. 1815–1822. *Histoire naturelle des Animaux sans Vertébrés*. 8 volumes. [Les nayades, 1819. 5:67–100.]
- Lea, I. 1831. Observations on the naiades, and descriptions of new species of that and other families. *Transactions of the American Philosophical Society* 4 (New Series) (1):63–121.
- Lea, I. 1834. Observations on the naiades; and descriptions of new species of that, and other families. *Transactions of the American Philosophical Society* 5 (New Series) (1):23–119.
- Lea, I. 1838. Description of new freshwater and land shells. *Transactions of the American Philosophical Society* 6 (New Series) (1):1–154.
- Lea, I. 1840. Descriptions of new fresh water and land shells. *Proceedings of the American Philosophical Society* 1(13):284–289.
- Lea, I. 1842. Description of new fresh water and land shells. *Transactions of the American Philosophical Society* 8 (New Series) (Part 2):163–250.
- Lea, I. 1843. Description of twelve new species of Uniones. 1 p. [Read by Isaac Lea before the American Philosophical Society on 18 August 1843, and privately published on 19 August 1843, Philadelphia.]
- Lea, I. 1845. Descriptions of new fresh water and land shells. *Proceedings of the American Philosophical Society* 4(33):162–168.
- Lea, I. 1846. Description of new fresh water and land shells. *Transactions of the American Philosophical Society* 9 (New Series) (Part 2):275–282.
- Lea, I. 1848. Description of new fresh water and land shells. *Transactions of the American Philosophical Society* 10 (New Series) (Part 1):67–101.
- Lea, I. 1852. Descriptions of new species of the family Unionidae. *Transactions of the American Philosophical Society* 10 (New Series) (Part 2):253–294.
- Lea, I. 1856. Description of eleven new species of uniones, from Georgia. *Proceedings of the Academy of Natural Sciences of Philadelphia* 8(6):262–263.
- Lea, I. 1857a. Descriptions of twenty-seven new species of uniones from Georgia. *Proceedings of the Academy of Natural Sciences of Philadelphia* 9(1857):169–172.
- Lea, I. 1857b. Description of thirteen new species of uniones, from Georgia. *Proceedings of the Academy of Natural Sciences of Philadelphia* 9(1857):31–32.
- Lea, I. 1858a. New Unionidae of the United States. *Journal of the Academy of Natural Sciences of Philadelphia* 4 (New Series) (1):51–95.
- Lea, I. 1858b. Descriptions of seven new species of Margaritanae, and four new species of Anodontae. *Proceedings of the Academy of Natural Sciences of Philadelphia* 10(1858):138–139.
- Lea, I. 1858c. Descriptions of twelve new species of uniones and other fresh-water shells of the United States. *Proceedings of the Academy of Natural Sciences of Philadelphia* 10(1858):165–166.
- Lea, I. 1859a. New Unionidae of the United States. *Journal of the Academy of Natural Sciences of Philadelphia* 4 (New Series) (2):191–233.
- Lea, I. 1859b. Descriptions of two new species of uniones, from Georgia. *Proceedings of the Academy of Natural Sciences of Philadelphia* 11(1859):154.
- Lea, I. 1859c. Descriptions of twelve new species of uniones, from Georgia. *Proceedings of the Academy of Natural Sciences of Philadelphia* 11(1859):170–172.
- Lea, I. 1860a. New Unionidae of the United States and northern Mexico. *Journal of the Academy of Natural Sciences of Philadelphia* 4 (New Series) (4):327–374.

- Lea, I. 1860b. Descriptions of two new species of uniones from Georgia. *Proceedings of the Academy of Natural Sciences of Philadelphia* 12(1860):305.
- Lea, I. 1861. Descriptions of twenty-five new species of Unionidae from Georgia, Alabama, Mississippi, Tennessee, and Florida. *Proceedings of the Academy of Natural Sciences of Philadelphia* 13(1861):38–41.
- Lea, I. 1862a. New Unionidae of the United States and Arctic America. *Journal of the Academy of Natural Sciences of Philadelphia* 5 (New Series) (2):187–216.
- Lea, I. 1862b. Descriptions of ten new species of Unionidae of the United States. *Proceedings of the Academy of Natural Sciences of Philadelphia* 14(1862):168–169.
- Lea, I. 1865. Descriptions of eight new species of *Unio* of the United States. *Proceedings of the Academy of Natural Sciences of Philadelphia* 17(1865):88–89.
- Lea, I. 1867. Descriptions of five new species of Unionidae and one *Paludina* of the United States. *Proceedings of the Academy of Natural Sciences of Philadelphia* 19(1867):81.
- Lea, I. 1868a. New Unionidae, Melanidae, etc., chiefly of the United States. *Journal of the Academy of Natural Sciences of Philadelphia* 6 (New Series) (3):249–302.
- Lea, I. 1868b. Description of sixteen new species of the genus *Unio* of the United States. *Proceedings of the Academy of Natural Sciences of Philadelphia* 20(1868):143–145.
- Lea, I. 1868c. New Unionidae, Melanidae, etc., chiefly of the United States. *Journal of the Academy of Natural Sciences of Philadelphia* 6 (New Series) (4):303–343.
- Lea, I. 1872. Descriptions of twenty-nine species of Unionidae from the United States. *Proceedings of the Academy of Natural Sciences of Philadelphia* 24(1872):155–161.
- Lea, I. 1874a. Descriptions of fifty-two species of Unionidae. *Journal of the Academy of Natural Sciences of Philadelphia* 8 (New Series) (1):5–54.
- Lea, I. 1874b. Description of seven new species of Unionidae of the United States. *Proceedings of the Academy of Natural Sciences of Philadelphia* 25(1874):422–423.
- Lea, I. 1874c. Supplement to Isaac Lea's paper on Unionidae. *Journal of the Academy of Natural Sciences of Philadelphia* 8 (New Series) (1):55–69.
- Lea, I. 1874d. Description of three new species of uniones of the United States. *Proceedings of the Academy of Natural Sciences of Philadelphia* 25(1874):424.
- Lydeard, C., R. L. Minton, & J. D. Williams. 2000. Prodigious polyphyly in imperiled freshwater pearly-mussels (Bivalvia: Unionidae): a phylogenetic test of species and generic designations. Pp. 145–158 in E. M. Harper, J. D. Taylor, & J. A. Crane (eds.). *The Evolutionary Biology of the Bivalvia*. Geological Society Special Publication, No. 177.
- Marsh, W. A. 1891. Description of two new species of *Unio* from Florida. *The Nautilus* 5(3):29–30.
- Mulvey, M., C. Lydeard, D. L. Pyer, K. M. Hicks, J. Brim-Box, J. D. Williams, & R. S. Butler. 1997. Conservation genetics of North American freshwater mussels *Amblema* and *Megaloniais*. *Conservation Biology* 11(4):868–878.
- O'Brien, C. A., J. D. Williams, & M. A. Hoggarth. 2003. Morphological variation in glochidia shells of six species of *Elliptio* from Gulf of Mexico and Atlantic Coast drainages in the southeastern United States. *Proceedings of the Biological Society of Washington* 116(3):719–731.
- Ortmann, A. E. 1912. Notes upon the families and genera of the najades. *Annals of the Carnegie Museum* 8(2):222–365.
- Ortmann, A. E., & B. Walker. 1922. A new genus and species of American naiades. *The Nautilus* 36(1):1–6.
- Rafinesque, C. S. 1820. *Monographie des coquilles bivalves fluviatiles de la Rivière Ohio, contenant douze genres et soixante-huit espèces*. *Annales générales des sciences Physiques, à Bruxelles* 5(5):287–322.

- Say, T. 1817. Article Conchology. [No pagination, 14 pp.] in W. Nicholson (ed.). American Edition of the British Encyclopedia or Dictionary of Arts and Sciences, Comprising an Accurate and Popular View of the Present Improved State of Human Knowledge. Volume 2. First edition. Samuel A. Mitchel and Horace Ames, Philadelphia.
- Say, T. 1829. Descriptions of some new terrestrial and fluviatile shells of North America. The Disseminator of Useful Knowledge; containing hints to the youth of the United States, from the School of Industry, New Harmony, Indiana 2(19):291–293, 23 September 1829; 2(20):308–310, 7 October 1829; 2(21):323–325, 21 October 1829; 2(22):339–341, 4 November 1829; 2(23):355–356, 18 November 1829.
- Say, T. 1830a–1834. American Conchology, or descriptions of the shells of North America. Illustrated by colored figures from original drawings executed from nature. School Press, New Harmony, Indiana. Part 1 (1830); Part 2 (April 1831); Part 3 (September 1831); Part 4 (March 1832); Part 5 (August 1832); Part 6 (April 1834); Part 7 (1834?, published after Say's death, edited by T.A. Conrad).
- Say, T. 1830b–1831b. New terrestrial and fluviatile shells of North America (continued). The Disseminator (Second Series). New Harmony, Indiana. 1(27) (28 December 1830); 1(29) (15 January 1831); 1(31) (29 January 1831) [no pagination].
- Scudder, N. P. 1885. The published writings of Isaac Lea, LL.D. Biographies of American Naturalists II. Bulletin of the United States National Museum No. 23, 278 pp.
- Simpson, C. T. 1892. Notes on the Unionidae of Florida and the southeastern states. Proceedings of the United States National Museum 15:405–436.
- Simpson, C. T. 1900a. Synopsis of the naiades, or pearly fresh-water mussels. Proceedings of the United States National Museum 22(1205):501–1044.
- Simpson, C. T. 1900b. New and unfigured Unionidae. Proceedings of the Academy of Natural Sciences of Philadelphia 52(1900):74–86.
- Simpson, C. T. 1914. A Descriptive Catalogue of the Naiades, or Pearly Fresh-water Mussels. Parts I–III. Bryant Walker, Detroit, Michigan. 1540 pp.
- Turgeon, D. D., A. E. Bogan, E. V. Coan, W. K. Emerson, W. G. Lyons, W. L. Pratt, C. F. E. Roper, A. Scheltema, F. G. Thompson, & J. D. Williams. 1988. Common and Scientific Names of Aquatic Invertebrates from the United States and Canada: Mollusks. American Fisheries Society, Special Publication 16, 277 pp.
- Turgeon, D. D., J. F. Quinn, A. E. Bogan, E. V. Coan, F. G. Hochberg, W. G. Lyons, P. Mikkelsen, R. J. Neves, C. F. E. Roper, G. Rosenberg, B. Roth, A. Scheltema, F. G. Thompson, M. Vecchione, & J. D. Williams. 1998. Common and Scientific Names of Aquatic Invertebrates from the United States and Canada: Mollusks. Second edition. American Fisheries Society, Special Publication 26, 526 pp.
- Valenciennes, A. 1827. Coquilles fluviatiles bivalves du Nouveau-Continent, recueillies pendant le voyage de MM. De Humboldt et Bonpland. In A. von Humboldt & A. J. A. Bonpland. Recueil d'observations de zoologie et d'anatomie compare, faites dans l'océan Atlantique, dans l'intérieur du nouveau continent et dans la mer du sud pendant les années 1799, 1800, 1801, 1802 et 1803; par Al. de Humboldt et A. Bonpland. J. Smith and Gide, Paris. 2(13):225–237.
- Vanatta, E. G. 1915. Rafinesque's types of *Unio*. Proceedings of the Academy of Natural Sciences of Philadelphia 67(1915):549–559.
- van der Schalie, H. 1934. *Lampsilis jonesi*, a new naiad from southeastern Alabama. The Nautilus 47(4):125–127.
- Walker, B. 1901. A new species of *Strophitus*. The Nautilus 15(6):65–66.
- Walker, B. 1905a. List of shells from northwestern Florida. The Nautilus 18(12):133–136.
- Walker, B. 1905b. A new species of *Medionidus*.

- The Nautilus 18(12):136–137.
- Williams, J. D., A. E. Bogan, & J. T. Garner. 2008. Freshwater Mussels of Alabama and the Mobile Basin in Georgia, Mississippi and Tennessee. The University of Alabama Press, Tuscaloosa. 908 pp.
- Williams, J. D., A. E. Bogan, & J. T. Garner. 2009. A new species of freshwater mussel, *Anodonta hartfieldorum* (Bivalvia: Unionidae), from the Gulf Coastal Plain drainages of Alabama, Florida, Louisiana, and Mississippi, USA. The Nautilus 123(2):25–33.
- Williams, J. D., & R. S. Butler. 1994. Class Bivalvia, freshwater bivalves. Pp. 53–128, 740–742 in R. Ashton (ed.). Rare and endangered biota of Florida. Volume 6. Invertebrates. University of Florida Press, Gainesville.
- Williams, J. D., & A. Fradkin. 1999. *Fusconaia apalachicola*, a new species of freshwater mussel (Bivalvia: Unionidae) from pre-Columbian archeological sites in the Apalachicola Basin of Alabama, Florida, and Georgia. Tulane Studies in Zoology 31(1):51–62.
- Wright, B. H. 1883. A new *Unio* from Florida. Proceedings of the Academy of Natural Sciences of Philadelphia 35(1883):58.
- Wright, B. H. 1888. Descriptions of new species of Uniones from Florida. Proceedings of the Academy of Natural Sciences of Philadelphia 40(1888):113–120.
- Wright, B. H. 1892. A new Florida *Unio*. The Nautilus 5(11):124–125.
- Wright, B. H. 1896. New Florida Unios. The Nautilus 9(11):121–122.
- Wright, B. H. 1897a. New Unios. The Nautilus 11(5):55–57.
- Wright, B. H. 1897b. New Unios. The Nautilus 11(4):40–41.
- Wright, B. H. 1897c. A new plicate *Unio*. The Nautilus 11(8):91–92.
- Wright, B. H. 1898a. Description of a new *Unio*. The Nautilus 11(10):111–112.
- Wright, B. H. 1898b. New Unionidae. The Nautilus 12(1):5–6.
- Wright, B. H. 1898c. A new *Unio*. The Nautilus 12(3):32–33.
- Wright, B. H. 1899. New southern Unios. The Nautilus 13(1):6–8; 13(2):22–23; 13(3):31; 13(4):42–43; 13(5):50–51; 13(6):69; 13(7):75–76; 13(8):89–90.
- Wright, B. H. 1900. New Southern Unios. The Nautilus 13(12):138–139.
- Wright, B. H. 1933. A new species of Florida *Unio*. The Nautilus 47(1):17–18.
- Wright, B. H. 1934a. New Florida pearly mussels. The Nautilus 47(3):94–95.
- Wright, B. H. 1934b. A new Florida pearly freshwater mussel. The Nautilus 48(1):28–29.
- Wright, B. H. 1934c. *Elliptio* n. sp. The Nautilus 47(4):[no pagination].
- Wright, S. H. 1888. A new *Unio*. The Western American Scientist 4:60.
- Wright, S. H. 1897. Contributions to a knowledge of United States Unionidae. The Nautilus 10(12):136–139; 11(1):4–5.

The **BULLETIN OF THE FLORIDA MUSEUM OF NATURAL HISTORY** publishes original research conducted by our faculty, staff, students, and research associates. We also accept submissions of appropriate, fully funded manuscripts from external researchers. Priority is given to monograph-length papers describing specimen-based research. Forty-five double-spaced pages (including references and appendices but excluding figures, tables, and supplemental materials) is the minimum length for submitted manuscripts, although there can be exceptions as determined by the Managing Editor. Starting in 2010, the Bulletin is published simultaneously in two formats. Approximately 400 printed copies are distributed to libraries and museums world-wide by the University of Florida Library system. Authors have the option of purchasing additional printed copies at cost for distribution to colleagues and associates. An identical, electronic version is posted in PDF format on the Florida Museum of Natural History web site simultaneously with the availability of the printed version and is available free of charge for reading or downloading. Supplemental materials are available only through the web site.

INSTRUCTIONS FOR AUTHORS

Detailed instructions are posted on the web site http://www.flmnh.ufl.edu/bulletin/bulletin_inst.htm. All taxonomic papers must adhere to the rules published in the appropriate international code of systematic nomenclature.

RECENT PUBLICATIONS OF THE FLMNH BULLETIN

- Thompson, F. G. 2011. An annotated checklist and bibliography of the freshwater and land snails of Mexico and Central America. 50(1):1–299. \$45.00
- Lücking, R., F. Seavey, R. S. Common, S. Q. Beeching, O. Breuss, W. R. Buck, L. Crane, M., B. P. Hodkinson, E. Lay, J. C. Lendemer, R. T. McMullin, J. A. Mercado-Díaz, M. P. Nelsen, E. Rivas Plata, W. Safranek, W. B. Sanders, H. P. Schaefer Jr. & J. Seavey. 2011. The lichens of Fakahatchee Strand Preserve State Park, Florida: Proceedings from the 18th Tuckerman Workshop. 49(4):127–186. \$9.00
- Hulbert Jr., R. C. 2010. A new early Pleistocene tapir (Mammalia: Perissodactyla) from Florida, with a review of Blancan tapirs from the state. 49(3):67–126. \$9.00
- Thomson, A. W., & L. M. Page. 2010. Taxonomic revision of the *Amphilius uranoscopus* group (Teleostei: Siluriformes) in Kenya, with the description of a new species from the Athi River. 49(2):45–66. \$7.00
- Franz, R., & S. E. Franz. 2009. A new fossil land tortoise in the genus *Chelonoidis* (Testudines: Testudinidae) from the northern Bahamas, with an osteological assessment of other Neotropical tortoises. 49(1):1–44. \$8.00
- Snelson Jr., F. F., T. J. Krabbenhoft, & J. M. Quattro. 2009. *Elassoma gilberti*, a new species of pygmy sunfish (Elassomatidae) from Florida and Georgia. 48(4):119–144. \$7.00
- Zaspel, J. M., S. J. Weller, & R. T. Carde. 2008. A review of *Virbia* (formerly *Holomelina*) of North America. 48(3):59–118. \$10.00
- Webb, S. D. 2008. Revision of the extinct Pseudoceratinae (Artiodactyla: Ruminantia: Gelocidae). 48(2):17–58. \$7.00

A complete list of available issues and current prices of the Bulletin of the Florida Museum of Natural History and instructions for purchasing them can be found at http://www.flmnh.ufl.edu/bulletin/bulletin_vols.htm. Digital versions of out-of-print issues can be found at <http://ufdcweb1.uflib.ufl.edu/ufdc/?a=ufirg&m=hitflmnh>.

