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ANNOUNCEMENT

STERKIANA is named after Dr. Victor Sterki (1846-1933) of New Philadelphia, Ohio, famed for his work on the Sphaeriidae, Pupillidae, and Valloniidae. It is fitting that this serial should bear his name both because of his association with the Midwest and his lifelong interest in non-marine Mollusca.

The purpose of STERKIANA is to serve malacologists and paleontologists interested in the living and fossil non-marine Mollusca of North and South America by disseminating information in that special field. Since its resources are modest, STERKIANA is not printed by conventional means. Costs are kept at a minimum by utilizing various talents and services available to the Editor. Subscription and reprint prices are based on cost of paper and mailing charges.

STERKIANA accepts articles dealing with non-marine Mollusca of the Americas in English, French, or Spanish, the three official languages of North America. Contributors are requested to avoid descriptions of new species or higher taxa in this serial as the limited distribution of STERKIANA would probably prevent recognition of such taxa as validly published. Papers on distribution, ecology, and revised checklists for particular areas or formations are especially welcome but those on any aspect of non-marine Mollusca will be considered.

STERKIANA will appear twice a year or oftener, as material is available. All correspondence should be addressed to the Editor.

SUBSCRIPTIONS: 50¢ per number; subscriptions may be entered for not more than 4 numbers in advance; please make checks and money orders payable to the Editor.

STERKIANA est une collection de travaux sur les Mollusques extra-marins des deux Amériques, distribuée par un groupe de malacologues du centre des Etats-Unis. STERKIANA publie des travaux en anglais, en français et en espagnol acceptés par le conseil de rédaction. Prière d'adresser toute correspondance au Rédacteur.

ABONNEMENT: 50¢ le numéro, par chèque ou mandat payable au Rédacteur.

STERKIANA es una coleccion de trabajos sobre los Moluscos extra-marinos viventes y fosiles de las dos Americas, editada por un grupo de malacólogos de los Estados Unidos centrales. Contenirá en el porvenir trabajos en inglés, francés, y español que serán acceptados por la mesa directiva. La correspondencia deberá ser dirigida al Editor.

PRECIO: 50¢ el número.

NOTES ON *OMALONYX*

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AND

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The habits of *Omalonyx* are incompletely known. These strange-looking Succineids are known from South America (Brasil, Argentina, Paraguay, Uruguay, Bolivia, Venezuela) and the Lesser Antilles (Dominica, Guadeloupe, Trinidad). In this paper we are reporting their presence in Ecuador, St. Lucia and Antigua.

Several species of *Omalonyx* have been named: *Omalonyx unguis* (Férussac), *O. patera* Doering, *O. felina* Guppy, and *O. guadeloupensis* (Lesson) among others. In a recent work Parodiz (1963) compared two of the species: *O. unguis* and *O. patera*. Parodiz (personal communication, 1966) feels that *O. unguis* is associated with the Amazon system while *O. patera* seems to be in the Parana River system. He has identified our Ecuadorian specimens as *O. unguis* (Férussac).

We also have specimens from the Lesser Antilles and this paper will compare those with *Omalonyx unguis* from Ecuador. Some of the Lesser Antillean specimens seem to match the description of *O. felina* Guppy (those from Antigua) as described by Baker (1925, 1926) and others that of *O. guadeloupensis* (those from St. Lucia). We are not attempting to make a taxonomic evaluation here but merely a comparison of the habits, habitats, and some of the anatomical detail.

OMALONYX UNGUIS FROM ECUADOR

The animals Casual inspection of *Omalonyx* from Ecuador and *Omalonyx* from the Lesser Antilles reveals little difference. However, when one examines the radulae (Figs. 3, 5) and the jaws (Figs. 4, 6) of the two, one finds distinct differences. In comparing the radulae of our Ecuadorian specimens (Fig. 5) with the sketch of the radula of *O. unguis* from Argentina (Fig. 7) we also see rather distinctive differences; however, these may be the result of different individuals making the sketches. Further, in comparing our material with the sketch (Fig. 8) of *O. patera* we see little comparison. The central tooth and jaw of *O. felina* from Venezuela (Fig. 9) and *O. guadeloupensis* from Guadeloupe (pictured, Fig. 3) and those of St. Lucia and Antigua (not pictured) resemble one another enough that it is possible that the whole group may be one species.

Twenty-two *O. unguis* collected at random from the study area (see next section) in Ecuador were measured. The largest measured 38 mm in length and 13 mm wide when in the normal crawling position; the shell was 17 mm long and 10 mm wide. The smallest one measured 5 mm in length and 2 mm wide when crawling; its shell measured 3 X 2 mm.

Habitat type: *Omalonyx unguis* was found living at Limoncocha in the Oriente jungle region of Ecuador. Limoncocha is a small Quechua Indian village and jungle base for the Ecuadorian branch of the Instituto Linguistico de Verano. It is located at 00° 24' S Lat. and 76° 36' W Long. near the junction of the Rio Napo and Rio Jivino and is on the west bank of Lake Limoncocha at an elevation of 900 feet. Lake Limoncocha, which empties into the Rio Napo, is a fresh-water lake 1.5-2 miles long and 0.5-0.75 mile wide.

The study area: This was on the west bank of Lake Limoncocha. It extended about 10 feet along the bank and 20 feet into the water (Fig. 1). Vegetation, consisting mainly of the grass, *Hymenachne donacifolia* (Raddi) Chase and two members of the Pontederiaceae, *Eichornia crassipes* (Martius) Solms, water-hyacinth, and *Pontederia* sp., pickerel-weed, extends, in some areas, out into the lake about 100 feet from the bank. Surrounding the lake is a tropical rain forest. Animals common in the lake are *Ampullaria* sp., Piranha, and fresh-water sting rays.

Macro- and Microclimates of the study area: Weather data are collected thrice daily at Limoncocha. Maximum and minimum temperatures recorded during January, 1961, to March, 1964, were 31° C and 20° C, respectively. There is almost no seasonal temperature variation. The average annual rainfall for three years prior to this study was 107.8 inches. Two rainy seasons occur: April-May-June, and October-November. Humidities, based on 3 readings per day for a 3-year period, average 94.3% at 7 a.m., 73.5% at 1 p.m., and 92.5% at 7 p.m. These readings are taken at a distance of 200-300 feet from the lake so it may be assumed that the humidity in the microhabitat is even greater.

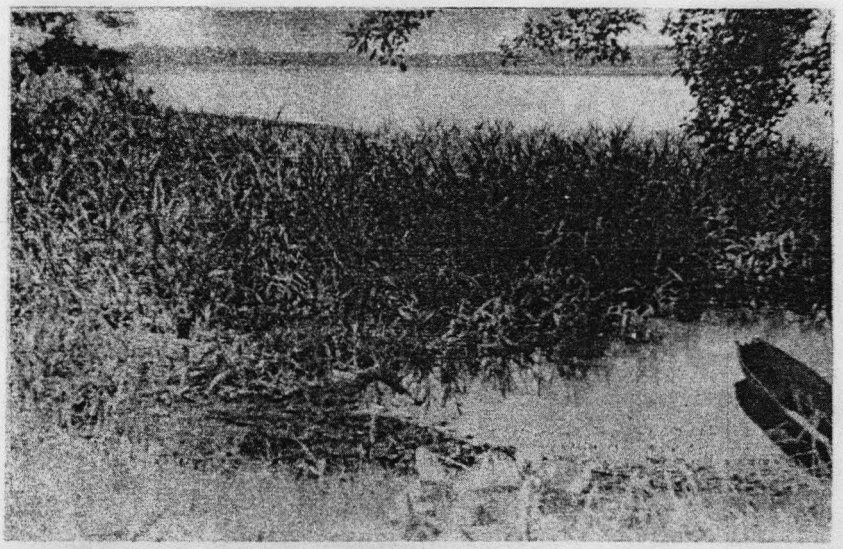
A 24-hour temperature check in September, 1964, gave the following results: air temperature over the lake (20 feet from the bank and 1 foot above the water) ranged from 20 to 26° C with a mean of 22.8° C whereas the lake water temperature (1 foot below the surface) in the same area fluctuated from 22 to 33° C with a mean of 28°3 C.

Distribution of Omalonyx *in the area:* Data gathered in the study area (limited to 20 feet from the bank because of depth) from 11 p.m., September 27, to 3:30 p.m., September 28, 1964 reveal that 63.8% of the snails were found 11-20 feet from the bank; the remaining 36.2% were within ten feet of the bank. There was no significant movement toward or away from the bank at any time during this period. It is possible that others were farther out in the lake also but equipment was not available for working farther out.

The grass, *Hymenachne donacifolia* (Raddi) Chase, was the choice site of 67.2% of the snails sampled while 25.8% were found on floating logs on boards which were often covered with algae. Three and one-half percent were on plants of the Pontederiaceae and 3.5% were swimming in the water. Of those found on the grass above the water, 91.4% were 0-6 inches high while the remainder, 8.6%, were 7-18 inches above water level. About 60% of these snails sampled were larger than 20 mm in length. Also found on the grass above the wwter were numerous *Omalonyx* egg masses (Fig. 1a).

Snail densities at three different times varied from 1.6 snails per sq. ft. to 0.5 snails per sq. ft. A canoe trip around the lake revealed *Omalonyx* to be present on all sides of the lake but they were more abundant on the west side where the growth of the grass was more extensive.

Habits: Movements of *O. unguis* were studied in several marking experiments. Identifying marks were made on the shells with nail polish. As is usually the case, the longer the time after release, the less the recapture rate. Only a general conclusion can be drawn from these data: that *O. unguis* does not move a great distance. The maximum movement reached by any of the snails up to the time of re-



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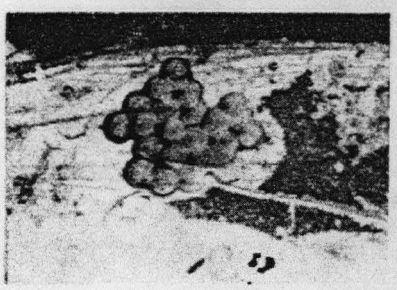
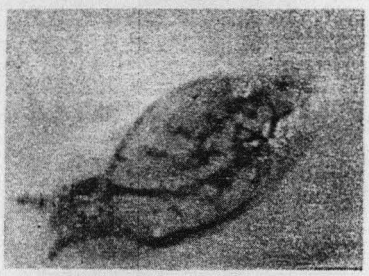


1a



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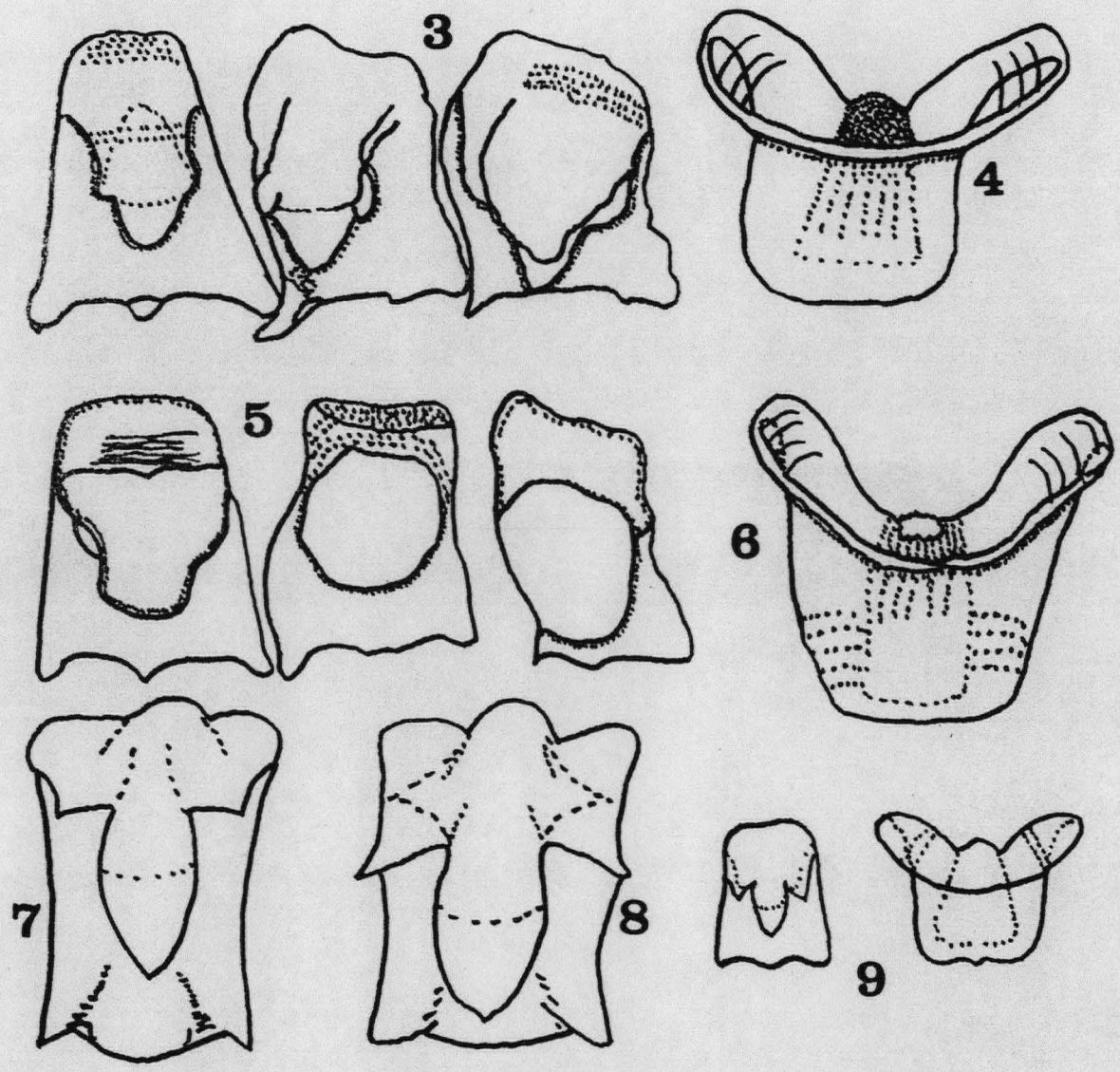
EXPLANATION OF FIGURES 1-2

1. Lake Limoncocha, the habitat of *Omalonyx unguis*.

1a. Clutch of *Omalonyx* eggs.

2. *Omalonyx felina* from Antigua.



EXPLANATION OF FIGURES 3-9

3. Radular components of *Omalonyx guadeloupensis* from Guadeloupe. Central tooth, first lateral, seventh lateral.

4. Jaw of *Omalonyx guadeloupensis from* Guadeloupe. Central tooth, first lateral, seventh lateral.

5. Radular components of *Omalonyx unguis* from Ecuador. Central tooth, first lateral, seventh lateral.

6. Jaw of *Omalonyx unguis* from Ecuador.

7. Central tooth of *Omalonyx unguis* from Argentina. (Copied directly from Parodiz, 1963).

8. Central tooth of *Omalonyx patera.* (Copied directly from Parodiz, 1963).

9. Central tooth and jaw from *Omalonyx felina* from Venezuela. (Copied directly from Baker, 1926).

capture was 6.1 m. On one occasion 2 empty, marked shells were found on top of a floating board. Since they swim 'upside down,' it is possible that, once painted, they become more conspicuous to subsurface predators.

Studies involving food preferences, mating, and egg deposition were conducted both in the field and in the laboratory. Plastic containers (17.5 X 12.5 X 7.5 cm) provided with 2.5 cm of lake water and vegetation from the lake were used to house the animals in the laboratory.

In the laboratory *Omalonyx unguis* was offered 4 types of vegetation taken from the study area and accepted all of the types. However, they showed a preference for the grass, *Hymenachne donacifolia*. Field studies supported the laboratory observations and, in addition, the snails were seen rasping on the algal growth on floating boards and logs. The other plants accepted were: *Eichornia crassipes* (Martius) Solms, *Pontederia* sp., and the fruit of *Ficus* sp. Of interest also was the observing of one *Omalonyx* rasping on the dying soft parts of another. Only the shell and a portion of its posterior remained.

Reproductive habits: From September through November mating pairs were found in the field and laboratory with no particular time of day preferred for this activity. All of the pairs were found after mating had begun so if there is a courtship, it was not observed. During coitus the snails faced in opposite directions, right sides adjacent, and each was bent into a crescent, the points of which were to the right side of each snail. The duration of the seven matings which were timed ranged from 45 minutes to 6 hours. In one case, coitus was terminated by a member of the pair moving clockwise, mounting its partner's dorsum and moving forward until the two were parallel, one on top of the other. Then, continuing in a clockwise direction, it began dismounting and the penis from each was then retracted. Two mating pairs were found in the field between October 25 and 26 and each pair placed in a plastic container. Each pair was again found in coitus twice during the next 6 days. In each case, eggs were laid from the 6th through the 16th day after the first mating. One pair deposited 6 egg clutches (61 eggs) during this period and the other laid 9 clutches (73 eggs). The first two egg masses deposited in each container had almost twice the number of eggs as subsequent clutches.

In the lake, egg masses were often found on the stems or leaves of *Hymenachne* while in the laboratory most clutches were deposited on the vertical sides of the containers with *Hymenachne* a second choice.

Eggs were usually deposited in clutches containing 4 to 20 with occasional drops of 1 to 3 eggs. The eggs, spherical and clear with a milky-looking center, measured 2 mm soon after deposition and were supported by a mass of transparent gelatinous material in an oval to circular single-layered clutch. One egg mass containing 17 eggs measured 16 X 19 mm.

OMALONYX FROM THE LESSER ANTILLES

Both the animals collected on St. Lucia and those from Antigua seem to be more amphibious than those from Ecuador. The Antiguan specimens (Fig. 2), for example, were taken from atop a steep bank adjacent to a stream which had been dammed to form a small water-supply reservoir. The animals were living beneath a large brushpile on soil which was merely moist—not wet. Dr. Malek (in conversation) reports that the St. Lucian specimens were found on vegetation along a bank and that he has seen one animal floating on vegetation in the water.

Omalonyx felina is very easy to raise in the laboratory. In small plastic containers with a little sand or filter paper, a coconut husk, and some lettuce for

food, they reproduce well. The average incubation period of a number of clutches of eggs (Fig. 1a) was 11 days. This compares favorably with the *O. unguis* figures of 9 to 13 days. From two adults we obtained over two dozen clutches of eggs with an average of 16 eggs per clutch but, just as with *O. unguis*, the numbers ranged from 1 to 2 dropped singly to 26 per clutch. Average incubation time was 11 days (range 9 to 12); again this compares favorably with *O. unguis* from Ecuador. Although we have had none reach maturity yet in our laboratory, it appears that, based on the growth rate, maturity will be reached in approximately three months from hatching.

ACKNOWLEDGEMENTS

We would like to thank Dr. J. J. Parodiz for his identification of *O. unguis* from Ecuador, Dr. Emile Malek who collected and donated the specimens from St. Lucia, Drs. V. Rudd and J. J. Wurdack of the U. S. National Museum for their identifications of the plants.

The senior author extends gratitude to the Instituto Linguistico de Verano (Limoncocha and Quito, Ecuador) for their friendly interest and the use of their facilities while in Ecuador.

The junior author is indebted to The American Philosophical Society which provided travel funds for another project. While in the area to work on it, there was also opportunity to observe and collect these animals.

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MANUSCRIPT RECEIVED AUGUST 26, 1967
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PRELIMINARY CHECKLIST OF RECENT AND PLEISTOCENE MOLLUSCA OF KENTUCKY

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INTRODUCTION

The Mollusca of Kentucky have been collected and studied since the early nineteenth century. Early workers, especially Rafinesque at Lexington, Kentucky and Thomas Say at New Harmony, Indiana, recognized Kentucky as a prime collecting ground. Throughout the nineteenth century mollusks from the state were studied by the country's malacologists, most of whom resided in larger eastern cities. These men accumulated their material occasionally by personal collecting, but more often by exchanging specimens with local naturalists or by hiring collectors.

While there have been a few investigations by naturalists within the state, much of the research produced in this century on Kentucky mollusks has still been carried on outside the state at museums and universities where individuals or departments specialize in malacology. Two notable exceptions are William Ray Allen, late Professor of Zoology at the University of Kentucky who was interested in the biology of freshwater mussels, and Leslie Hubricht who during his years of residency in the state and afterward has contributed to a knowledge of the land snail fauna.

The list contains 114 bivalves, 20 aquatic pulmonates, 39 freshwater prosobranchs, and 155 land snails and slugs. This compilation consists only of published records. No new records are included and no formal attempt has been made to verify the records. Species reported from areas surrounding the state, but that probably occur within the state are included in the list preceded by a question mark. A question mark is also placed before a few species that are possibly erroneous records. The bibliography is not complete since some early citations are omitted and twentieth century references are stressed. In most cases the generic nomenclature is quite conservative.

Much of the information on Kentucky mollusks deals with freshwater mussels and land snails. Less has been written about fingernail clams and freshwater snails, with the exception of the Pleuroceridae. The mollusk fauna of the state is poorly known and much more collecting and publication are needed in every mollusk group and geographical area.

ACKNOWLEDGEMENTS

Dr. Aurèle La Rocque suggested this work and provided the beginnings of a Kentucky list. Dr. David Stansbery helped with a few nomenclatorial problems in the freshwater mussels. The final form, as well as any errors and omissions, is the product of the author.

PELECYPODA

Naiadacea (Freshwater Mussels)

Actinonaias carinata (Barnes) 1823. Price 1900: 78; Ortmann 1919: 232; Danglade 1922: 5 *(A. ligamentina);* Baker 1928: 218; Clench and van der Schalie 1944: 225; Rosewater 1959: 62; Stansbery 1965: 14.

Actinonaias carinata gibba Simpson, 1900. Wilson and Clark 1914: 48; Ortmann 1919: 237 *(A. ligamentina gibba);* Neel and Allen 1964: 442.

Actinonaias ellipsiformis (Conrad) 1836. Simpson 1914: 128 (in *Lampsilis);* Baker 1928: 263 (in *Ligumia).*

Actinonaias pectorosa (Conrad) 1834. Price 1900: 79 *(L. perdix);* Wilson and Clark 1914: 14; Neel and Allen 1964: 442.

Alasmidonta calceolus (Lea) 1830. Price 1900: 79 *(A. deltoidea);* Simpson 1914: 496; Baker 1928: 185; Clench and van der Schalie 1944: 225; Rosewater 1959: 62; Stansbery 1965: 13.

Alasmidonta marginata (Say) 1819. Price 1900: 79 *(A. truncata);* Simpson 1914: 504; Wilson and Clark 1914: 15 *(A. truncata);* Ortmann 1919: 181; Danglade 1922: 5; Clench and van der Schalie 1944: 225; Neel and Allen 1964: 440; Stansbery 1965: 14.

Alasmidonta minor (Lea) 1845. Price 1900: 79; Wilson and Clark 1914: 15; Danglade 1922: 5.

Amblema costata (Rafinesque) 1820. Price 1900: 78 *(Quadrula plicata);* Ortmann 1919: 28; Danglade 1922: 5 *(Quadrula undulata);* Baker 1928: 80; Clench and van der Schalie 1944: 224; Rosewater 1959: 61 (in *Crenodonta);* Neel and Allen 1964: 434; Stansbery 1965: 13 *(A. plicata).*

Amblema costata rariplicata (Deshayes) 1830. Walker 1918: 168 (in *Quadrula).*

Amblema peruviana (Lamarck) 1819. Simpson 1914: 814 *(Quadrula plicata* Simpson, *non* Say); Baker 1928: 73.

Anodonta grandis Say, 1829. Price 1900: 79; Simpson 1914: 418; Ortmann 1919: 138; Danglade 1922: 5; Clench and van der Schalie 1944: 225; Rosewater 1959: 62.

Anodonta imbecillis Say, 1829. Price 1900: 79; Ortmann 1919: 162 *(A. ohioensis);* Danglade 1922:5; Baker 1928: 172 *(in Utterbackia);* Clench and van der Schalie 1944: 225.

Anodontoides ferussacianus (Lea) 1834. Price 1900: 79; Simpson 1914: 467; Wilson and Clark 1914: 14; Ortmann 1919: 165; Baker 1928: 175.

Arcidens confragosus (Say) 1829. Simpson 1914: 475; Clench and van der Schalie 1944: 225.

Carunculina glans (Lea) 1834. Simpson 1914: 153 (in *Lampsilis);* Clench and van der Schalie 1944: 225.

Carunculina moesta (Lea) 1841. Neel and Allen 1964: 444.

Carunculina parva (Barnes) 1823. Price 1900: 78 (in *Lampsilis);* Simpson 1914: 151 (in *Lampsilis);* Ortmann 1919: 258 (in *Toxolwsma);* Danglade 1922: 5 (in Lampsilis); Baker 1928: 251; Rosewater 1959: 62; Stansbery 1965: 14.

Cumberlandia monodonta (Say) 1829. Simpson 1914: 521 (in *Margaritana);* Clench and van der Schalie 1944: 224; Neel and Allen 1964: 432; Stansbery 1965: 13.

Cyclonaias tuberculata (Rafinesque) 1820. Simpson 1914: 903 (in *Quadrula);* Wilson and Clark 1914: 15 *(Quadrula tritogonia);* Ortmann 1919: 57 (in *Rotundaria);* Danglade 1922: 5 (in *Tritogonia);* Clench and van der Schalie 1944: 225; Neel and Allen 1964: 436; Stansbery 1965: 13.

Cyclonaias tuberculata granifera (Lea) 1838. Price 1900: 78 (in *Unio);* Wilson and Clark 1914: 15 (in *Quadrula);* Danglade 1922: 5 (in *Quadrula);* Neel and Allen 1964: 436.

Cyprogenia irrorata (Lea) 1828. Price 1900: 79; Simpson 1914: 326; Wilson and Clark 1914: 15; Ortmann 1919: 218 *(C. stegaria);* Danglade 1922: 5; Clench and van der Schalie 1944: 225; Neel and Allen 1964: 442.

Dromus dromus (Lea) 1834. Wilson and Clark 1914: 15; Neel and Allen 1964: 442.

Dysnomia arcaeformis (Lea) 1831. Wilson and Clark 1914: 14.

Dysnomia brevidens (Lea) 1834. Simpson 1914: 7 (in *Truncilla);* Wilson and Clark 1914: 15 (in *Truncilla);* Clench and van der Schalie 1944: 225; Neel and Allen 1964: 448.

Dysnomia capsaeformis (Lea) 1834. Wilson and Clark 1914: 14 (in *Truncilla*); Neel and Allen 1964: 448.

Dysnomia flexuosa (Rafinesque) 1820. Simpson 1914: 18 (*Truncilla foliata*).

Dysnomia florentina (Lea) 1857. Neel and Allen 1964: 448.

Dysnomia florentina walkeri (Wilson and Clark) 1914. Neel and Allen 1964: 448.

Dysnomia haysiana (Lea) 1833. Neel and Allen 1964: 450.

Dysnomia lewisi (Walker) 1910. Neel and Allen 1964: 450.

Dysnomia personata (Say) 1829. Simpson 1914: 23 (in *Truncilla*).

Dysnomia sulcata (Lea) 1829. Simpson 1914: 14 (in *Truncilla*); Wilson and Clark 1914: 46 (in *Truncilla*); Clench and van der Schalie 1944: 225; Neel and Allen 1964: 450.

Dysnomia torulosa (Rafinesque) 1820. Price 1900: 79 (*Truncilla perplexa*); Simpson 1914: 24 (*T. perplexa*); Ortmann and Walker 1922: 69; Stansbery 1965: 14.

Dysnomia torulosa cincinnatiensis (Lea) 1840. Simpson 1914: 26 (in *Truncilla*).

Dysnomia torulosa rangiana (Lea) 1838. Price 1900: 79 (in *Truncilla*); Simpson 1914: 26 (in *Truncilla*); Ortmann 1919: 331 (in *Truncilla*); Danglade (1922: 5 (in *Truncilla*).

Dysnomia triquetra (Rafinesque) 1820. Price 1900: 79 (in *Truncilla*); Simpson 1914: 5 (in *Truncilla*); Wilson and Clark 1914: 45 (in *Truncilla*); Ortmann 1919: 325; Danglade 1922: 5 (in *Truncilla*); Baker 1928: 296; Clench and van der Schalie 1944: 225; Rosewater 1959: 62; Neel and Allen 1964: 450; Stansbery 1965: 14.

Elliptio crassidens (Lamarck) 1819. Wilson and Clark 1914: 15 (in *Unio*); Ortmann 1919: 91 (*E. niger*); Clench and van der Schalie 1944: 225; Neel and Allen 1964: 438; Stansbery 1965: 13.

Elliptio dilatatus (Rafinesque) 1820. Price 1900: 78 (*Unio gibbosus*); Wilson and Clark 1914: 15 (*Unio gibbosus*); Ortmann 1919: 95; Danglade 1922: 5 (*U. gibbosus*); Clench and van der Schalie 1944: 225; Rosewater 1959: 62; Neel and Allen 1964: 438; Stansbery 1965: 13.

Fusconaia ebenus (Lea) 1831. Simpson 1914: 897 (in *Quadrula*); Wilson and Clark 1914: 15 (in *Quadrula*); Clench and van der Schalie 1944: 224

Fusconaia flava (Rafinesque) 1820. Price 1900: 77 (*Quadrula rubiginosa*); Simpson 1914: 872 (*Q. rubiginosa*); Ortmann 1919: 14; Baker 1928: 55; Clench and van der Schalie 1944: 224; Rosewater 1959: 61; Neel and Allen 1964: 434; Stansbery 1965: 13.

Fusconaia subrotunda (Lea) 1831. Simpson 1914: 892 (in *Quadrula*); Wilson and Clark 1914: 15; Ortmann 1919: 7; Danglade 1922: 5 (*Quadrula kirtlandiana*); Clench and van der Schalie 1944: 224; Neel and Allen 1964: 434; Stansbery 1965: 13.

Fusconaia undata (Barnes) 1823. Simpson 1914: 880 (in *Quadrula*); Wilson and Clark 1914: 15 (in *Quadrula*); Clench and van der Schalie 1944: 224; Neel and Allen 1964: 434.

Fusconaia undata trigona (Lea) 1831. Price 1900: 77 (in *Quadrula*); Baker 1928: 63.

Lampsilis anodontoides (Lea) 1831. Price 1900: 78; Simpson 1914: 90; Wilson and Clark 1914: 14; Danglade 1922: 5; Clench and van der Schalie 1944: 225; Rosewater 1959: 62; Stansbery 1965: 14.

Lampsilis anodontoides fallaciosa (Smith) 1899. Simpson 1914: 92; Wilson and Clark 1914: 14; Danglade 1922: 5; Clench and van der Schalie 1944: 225.

Lampsilis fasciola Rafinesque, 1820. Price 1900: 78 (*L. multiradiata*); Simpson 1914: 55 (*L. multiradiata*); Wilson and Clark 1914: 48 (*L. multiradiata*); Ortmann 1919: 309; Danglade 1922: 5 (*L. multiradiata*); Clench and van der Schalie 1944: 225; Neel and Allen 1964: 446; Stansbery 1965: 14.

Lampsilis orbiculata (Hildreth) 1828. Simpson 1914: 76; Wilson and Clark 1914: 49; Ortmann 1919: 320; Neel and Allen 1964: 448.

Lampsilis ovata (Say) 1817. Price 1900: 78; Simpson 1914: 48; Wilson and Clark 1914: 14; Ortmann 1919: 297; Clench and van der Schalie 1944: 225; Neel and Allen 1964: 448; Stansbery 1965: 14.

Lampsilis ovata ventricosa (Barnes) 1823. Price 1900: 78; Simpson 1914: 38; Ortmann 1919: 301; Danglade 1922: 5; Baker 1928: 281; Clench and van der Schalie 1944: 225; Rosewater 1959: 62; Neel and Allen 1964: 448; Stansbery 1965: 14.

Lampsilis radiata siliquoidea (Barnes) 1823. Price 1900: 78 (*L. luteolus*); Simp-

son 1914: 60 *(L. luteola);* Ortmann 1919: 283 *(L. luteola);* Danglade 1922: 5); Clench and van der Schalie 1944: 225; Rosewater 1959: 62; Stansbery 1965½ 14.

Lasmigona complanata (Barnes) 1823. Simpson 1914: 490 (in *Symphynota);* Wilson and Clark 1914: 15 (in *Symphynota);* Ortmann 1919: 133; Danglade 1922: 5 (in *Symphynota);* Clench and van der Schalie 1944: 225; Rosewater 1959: 62.

Lasmigona compressa (Lea) 1829. Simpson 1914: 481; Walker 1918: 177; Ortmann 1919: 116 *(L. viridis);* Ortmann and Walker 1922: 34; Clench and van der Schalie 1944: 225.

Lasmigona costata (Rafinesque) 1820. Price 1900: 79 *(Alasmidonta rugosa);* Simpson 1914: 488 (in *Symphynota);* Wilson and Clark 1914: 15 (in *Symphynota);* Ortmann 1919: 125; Danglade 1922: 5 (in *Symphynota);* Baker 1928: 141; Clench and van der Schalie 1944: 225; Rosewater 1959: 62; Neel and Allen 1964: 440; Stansbery 1965: 13.

Lastena lata (Rafinesque) 1820. Simpson 1914: 453; Wilson and Clark 1914: 15; Neel and Allen 1964: 438; Stansbery 1965: 13.

Leptodea fragilis (Rafinesque) 1820. Price 1900: 78 *(Lampsilis gracilis);* Simpson 1914: 181 *(L. gracilis);* Wilson and Clark 1914: 14 *(L. gracilis);* Ortmann 1919: 247 *(Paraptera gracilis);* Danglade 1922: 5 *(L. gracilis);* Clench and van der Schalie 1944: 225; Rosewater 1959: 62; Neel and Allen 1964: 444; Stansbery 1965: 14.

Leptodea leptodon (Rafinesque) 1820. Simpson 1914: 188 (in *Lampsilis);* Ortmann and Walker 1922: 52; Baker 1928: 239; Neel and Allen 1964: 444; Stansbery 1965: 14.

Ligumia recta latissima (Rafinesque) 1820. Price 1900: 78 (in *Lampsilis);* Wilson and Clark 1914: 14; Walker 1918: 184; Ortmann 1919: 276 (in *Eurynia);* Danglade 1922: 5 (in *Lampsilis);* Baker 1928: 257; Clench and van der Schalie 1944: 225; Neel and Allen 1964: 446; Stansbery 1965: 14.

Ligumia subrostrata (Say) 1831. Price 1900: 78 (in *Lampsilis);* Simpson 1914: 99 (in *Lampsilis).*

Medionidus conradicus (Lea) 1834. Wilson and Clark 1914: 14; Neel and Allen 1964: 444.

Megalonaias gigantea (Barnes) 1823. Price 1900: 77 *(Quadrula heros);* Simpson 1914: 825 *(Q. heros);* Wilson and Clark 1914: 15 *(Q. heros);* Danglade 1922: 5 *(Q. heros);* Baker 1928: 69; Clench and van der Schalie 1944: 224; Rosewater 1959: 61 (in *Crenodonta);* Neel and Allen 1964: 434; Stansbery 1965: 13.

Obliquaria reflexa Rafinesque, 1820. Price 1900: 79; Simpson 1914: 330; Wilson and Clark 1914: 15; Ortmann 1919: 214; Danglade 1922: 5; Baker 1928: 210; Clench and van der Schalie 1944: 225; Rosewater 1959: 62; Neel and Allen 1964: 440.

Obovaria olivaria (Rafinesque) 1820. Simpson 1914: 299 *(O. ellipsis);* Wilson and Clark 1914: 14; Ortmann 1919: 223; Baker 1928: 214.

Obovaria subrotunda (Rafinesque) 1820. Price 1900: 79 *(O. circularis);* Simpson 1914: 291 *(O. circularis);* Wilson and Clark 1914: 14 *(O. circula);* Ortmann 1919: 223; Danglade 1922: 5 (in *Quadrula);* Clench and van der Schalie 1944: 225; Neel and Allen 1964: 442; Stansbery 1965: 14.

Obovaria subrotunda lens (Lea) 1831. Price 1900: 79 (in *Obliquaria);* Simpson 1914: 293; Danglade 1922: 5; Goodrich and van der Schalie 1944: 318.

Obovaria subrotunda levigata (Rafinesque) 1820. Ortmann 1919: 226.

Pegias fabula (Lea) 1836. Wilson and Clark 1914: 15; Neel and Allen 1964: 440.

Plagiola lineolata Rafinesque, 1820. Price 1900: 78 *(P. securis);* Simpson 1914: 304 *(P. securis);* Wilson and Clark 1914: 14 *(P. securis);* Ortmann 1919: 243; Baker 1928: 231; Clench and van der Schalie 1944: 225; Neel and Allen 1964: 444.

Plethobasus cicatricosus (Say) 1829. Simpson 1914: 807 (in *Pleurobema).*

Plethobasus cooperianus (Lea) 1834. Price 1900: 78 (in *Quadrula);* Wilson and Clark 1914: 15 (in *Quadrula);* Ortmann 1919: 62; Clench and van der Schalie 1944: 225; Neel and Allen 1964: 436.

Plethobasus cyphyus (Rafinesque) 1820. Price 1900: 79 *(Pleurobema aesopus);* Wilson and Clark 1914: 15 *(P. aesopus);* Ortmann 1919: 65; Baker 1928: 110; Neel and Allen 1964: 436; Stansbery 1965: 13.

Pleurobema clava (Lamarck) 1819. Price 1900: 79; Wilson and Clark 1914: 15; Ortmann 1919: 86; Danglade 1922: 5.

Pleurobema cordatum (Rafinesque) 1820. Price 1900: 78 (in *Quadrula*); Simpson 1914: 881; Wilson and Clark 1914: 15 *(Q. obliqua)*; Ortmann 1919: 69; Clench and van der Schalie 1944: 225; Neel and Allen 1964: 436; Stansbery 1965: 13.

Pleurobema cordatum catillus (Conrad) 1836. Price 1900: 78 *(Quadrula solida)*; Simpson 1914: 885 *(Q. solida)*; Wilson and Clark 1914: 15 *(Q. solida)*; Ortmann 1919: 75 *(P. obliquum catillus)*; Danglade 1922: 5 *(Q. solida)*; Clench and van der Schalie 1944: 225.

Pleurobema cordatum coccineum (Conrad) 1836. Price 1900: 78 (in *Quadrula*); Simpson 1914: 833 (in *Quadrula*); Wilson and Clark 1914: 15 (in *Quadrula*); Ortmann 1919: 78 *(P. obliquum coccineum)*; Danglade 1922: 5 (in *Quadrula*); Clench and van der Schalie 1944: 225; Neel and Allen 1964: 438; Stansbery 1965: 13.

Pleurobema cordatum plenum (Lea) 1840. Simpson 1914: 886 (in *Quadrula*); Wilson and Clark 1914: 15 (in *Quadrula*); Neel and Allen 1964: 436.

Pleurobema cordatum pyramidatum (Lea) 1834. Price 1900: 77 (in *Quadrula*); Simpson 1914: 888 (in *Quadrula*); Wilson and Clark 1914: 15 (in *Quadrula*); Ortmann 1919: 84 *(P. obliquum rubrum)*; Clench and van der Schalie 1944: 225; Stansbery 1965: 13.

(?) *Pleurobema edgariana* (Lea) 1840. Price 1900: 79, doubtful.

Pleurobema oviforme (Conrad) 1834. Neel and Allen 1964: 438.

Pleurobema patula (Lea) 1829. Morrison 1943: 16.

Proptera alata Rafinesque, 1820. Price 1900: 78 (in *Lampsilis*); Simpson 1914: 162 (in *Lampsilis*); Wilson and Clark 1914: 14 (in *Lampsilis*); Ortmann 1919: 252; Danglade 1922: 5; Baker 1928: 244; Clench and van der Schalie 1944: 225; Rosewater 1959: 62; Neel and Allen 1964: 444; Stansbery 1965: 14.

Proptera capax (Green) 1832. Simpson 1914: 47 (in *Lampsilis*); Baker 1928: 248.

Proptera laevissima (Lea) 1830. Simpson 1914: 183 (in *Lampsilis*); Baker 1928: 247; Neel and Allen 1964: 444; Stansbery 1965: 14.

Ptychobranchus fasciolare Rafinesque 1820. Price 1900: 79 *(P. phaseolus)*; Simpson 1914: 333 *(P. phaseolus)*; Wilson and Clark 1914: 15 *(P. phaseolus)*; Ortmann 1919: 208 (in *Ellipsaria*); Danglade 1922: 5 *(P. phaseolus)*; Clench and van der Schalie 1944: 225; Rosewater 1959: 62; Neel and Allen 1964: 440; Stansbery 1965: 14.

Ptychobranchus subtentum (Say) 1825. Wilson and Clark 1914: 15.

Quadrula cylindrica (Say) 1817 Price 1900: 78; Simpson 1914: 832; Wilson and Clark 1914: 15; Ortmann 1919: 52; Danglade 1922: 5; Clench and van der Schalie 1944: 225; Neel and Allen 1964: 434; Stansbery 1965: 13.

Quadrula fragosa (Conrad) 1836. Simpson 1914: 843; Wilson and Clark 1914: 15.

Quadrula metanevra Rafinesque, 1820. Price 1900: 78; Simpson 1914: 834; Wilson and Clark 1914: 15; Neel and Allen 1964: 434; Stansbery 1965: 13.

Quadrula nodulata Rafinesque, 1820. Simpson 1914: 856 *(Q. pustulata)*; Danglade 1922: 5 *(Q. pustulata)*; Clench and van der Schalie 1944: 225.

Quadrula pustulosa (Lea) 1831. Price 1900: 78; Simpson 1914: 848; Wilson and Clark 1914: 15; Danglade 1922: 5; Clench and van der Schalie 1944: 225; Rosewater 1959: 62; Neel and Allen 1964: 434; Stansbery 1965: 13.

Quadrula quadrula Rafinesque, 1820 Price 1900: 78 *(Q. lachrymosa)*; Simpson 1914: 841 *(Q. lachrymosa)*; Danglade 1922: 5 *(Q. lachrymosa)*; Clench and van de Schalie 1944: 225; Rosewater 1959: 62; Stansbery 1965: 13.

Simpsoniconcha ambigua (Say) 1825. Simpson 1914: 326 (in *Hemilastena*); Ortmann 1919: 136; Stansbery 1965: 14.

Strophitus rugosus (Swainson) 1822. Price 1900: 79 *(S. edentulus)*; Simpson 1914: 345; Wilson and Clark 1914: 15 *(S. edentulus)*; Ortmann 1919: 197; Danglade 1922: 5 *(S. edentulus)*; Clench and van der Schalie 1944: 225; Rosewater 1959: 62; Neel and Allen 1964: 440; Stansbery 1965: 14 *(S. undulatus)*.

Tritogonia verrucosa (Rafinesque) 1820. Price 1900: 79; Simpson 1914: 318 *(Quadrula tuberculata)*; Wilson and Clark 1914: 15 *(Q. tuberculata)*; Clench and van der Schalie 1944: 225; Rosewater 1959: 62; Neel and Allen 1964: 436; Stansbery 1965: 13.

Truncilla donaciformis (Lea) 1828.

Price 1900: 78(in *Plagiola*); Simpson 1914: 308 (in *Plagiola*); Wilson and Clark 1914: 15 (in *Plagiola*); Ortmann 1919: 241 (in *Amygdalonaias*); Danglade 1922: 5 (in *Plagiola*); Baker 1928: 228; Clench and van der Schalie 1944: 225; Rosewater 1959: 62; Neel and Allen 1964: 444.

Truncilla truncata Rafinesque, 1820. Price 1900: 78 (*Plagiola elegans*); Simpson 1914: 306 (*P. elegans*); Wilson and Clark 1914: 15 (*P. elegans*); Ortmann 1919: 238 (in *Amygdalonaias*); Danglade 1922: 5 (*P. elegans*); Baker 1928: 224; Clench and van der Schalie 1944: 225; Rosewater 1959: 62; Neel and Allen 1964: 444; Stansbery 1965: 14.

Uniomerus tetralasmus (Say) 1830. Simpson 1914: 704.

Villosa fabalis (Lea) 1831. Price 1900: 79 (*Micromya lapillus*); Simpson 1914: 33 (in *Micromya*); Ortmann 1919: 262 (in *Eurynia*); Stansbery 1965: 14.

Villosa iris (Lea) 1830. Price 1900: 78 (in *Lampsilis*); Simpson 1914: 113 (in *Lampsilis*); Ortmann 1919: 265 (in *Eurynia*).

Villosa lienosa (Conrad) 1834. Price 1900: 78(*Lampsilis caliginosus*); Simpson 1914: 100 (in *Lampsilis*); Wilson and Clark 1914: 14 (in *Lampsilis*); Ortmann 1924: 140 (in *Micromya*); Clench and van der Schalie 1944: 225 (in *Micromya*); Rosewater 1959: 62; Stansbery 1966: 14.

Villosa nebulosa (Conrad) 1834. Price 1900: 78 (*Lampsilis cumberlandicus*); Simpson 1914: 119 (in *Lampsilis*); Clench and van der Schalie 1944: 225 (in *Micromya*); Neel and Allen 1964: 446 (in *Micromya*).

Villosa ortmanni (Walker) 1925. Clench 1926: 67 (in *Micromya*); Clench and van der Schalie 1944: 225 (in *Micromya*); Stansbery 1965: 14.

Villosa picta (Conrad) 1834. Wilson and Clark 1914: 14 (in *Lampsilis*); Neel and Allen 1964: 446 (in *Micromya*).

Villosa trabalis (Conrad) 1834. Wilson and Clark 1914: 14 (in *Lampsilis*); Neel and Allen 1964: 446 (in *Micromya*).

Villosa vanuxemensis (Lea) 1838. Price 1900: 78 (in *Lampsilis*); Simpson 1914: 105 (in *Lampsilis*); Walker 1925: 2 (in *Micromya*); Clench 1926: 67 (in *Eurynia*); Neel and Allen 1964: 446 (in *Micromya*).

Sphaeriidae (Fingernail clams)

Pisidium casertanum (Poli) 1791. Bickel 1966: 20.

Pisidium dubium (Say) 1816. Price 1900: 79.

Pisidium fraudulentum Sterki, 1912. Sterki 1916: 451.

Sphaerium fabale (Prime) 1851. Price 1900: 79.

Sphaerium partumeium (Say) 1822. Price 1900: 79.

Sphaerium striatinum (Lamarck) 1818. Sterki 1916: 436 (*S. modestum*); Baker 1928: 324 (*S. solidulum*); Rosewater 1959: 62; Herrington 1962: 28.

Sphaerium sulcatum (Lamarck) 1818. Price 1900: 79.

Sphaerium transversum (Say) 1829. Price 1900: 791 Herrington 1952: 30.

Corbiculidae (Asiatic clam)

Corbicula manilensis Philippi, 1844. Sinclair and Isom 1961: 1 (*C. fluminea*); Bates 1962: 35 (*C. fluminea*); Keup *et al.* 1963: 18 (*C. fluminea*); Bickel 1966: 19.

GASTROPODA

Prosobranchia (Freshwater operculates)

Amnicola cincinnatiensis (Anthony) 1840. Call 1900: 416.

Amnicola emarginata (Küster) 1852. Baker 1928: 126 (in *Cincinnatia*).

Amnicola integra (Say) 1821. Bickel 1965: 17.

Anculosa praerosa (Say) 1824. Goodrich 1929: 10; Goodrich 1940: 20.

Antroselates spiralis Hubricht, 1963. Hubricht 1963b: 138.

Campeloma crassula Rafinesque, 1819. Rosewater 1959: 61 (*C. ponderosa*); Clench 1962a: 277; Bickel 1966b: 106.

Goniobasis costifera (Haldeman) 1841. Goodrich 1940: 15.

Goniobasis curreyana (Lea) 1841. Goodrich 1940: 15.

Goniobasis ebenum (Lea) 1841. Goodrich 1934c: 5; Goodrich 1940: 17.

Goniobasis ebenum emeryensis (Lea) 1864. Goodrich 1940: 18.

Goniobasis laqueata costulata (Lea) 1841. Goodrich 1940: 14.

Goniobasis plicata-striata Wetherby, 1876. Goodrich 1940: 16.

Goniobasis semicarinata (Say) 1829. Goodrich 1938: 9; Goodrich 1940: 18. Rosewater 1959: 61.

Lioplax sulculosa (Menke) 1828. Clench and Turner 1955: 5; Rosewater 1959: 61; Clench 1962b: 288.

Lithasia geniculata Haldeman, 1840. Goodrich 1940: 5.

Lithasia obovata (Say) 1829. Goodrich 1929: 1; Goodrich 1934a: 2; Goodrich 1940: 6; Rosewater 1959: 61.

Lithasia obovata consanguinea (Anthony) 1854. Goodrich 1934a: 3; Goodrich 1940: 6.

Lithasia obovata curvilabris (Anthony) 1854. Goodrich 1934a: 3; Goodrich 1940: 6.

Lithasia obovata depygis (Say) 1830. Goodrich 1934a: 4; Goodrich 1940: 6.

Lithasia obovata microlineata (Goodrich) 1921. Goodrich 1921: 4; Goodrich 1934a: 3; Goodrich 1940: 6.

Lithasia obovata planospira (Anthony) 1854. Goodrich 1934a: 3; Goodrich 1940: 7.

Lithasia obovata sordida (Lea) 1841. Goodrich 1934a: 3; Goodrich 1940: 7.

Lithasia obovata undosa (Anthony) 1854. Goodrich 1934a: 3; Goodrich 1940: 6.

Lithasia plicata Wetherby, 1876. Walker 1918: 150; Goodrich 1940: 7.

Lithasia salebrosa (Conrad) 1834. Goodrich 1940: 4.

Lithasia verrucosa (Rafinesque) 1820. Goodrich 1940: 5.

Nitocris trilineata (Say) 1829. Goodrich 1929: 14 (in *Anculosa*); Goodrich 1940: 20.

Pleurocera acutum Rafinesque, 1831. Rosewater 1959: 61; Dazo 1965: 4.

Pleurocera alveare (Conrad) 1854. Goodrich 1940: 8.

Pleurocera canaliculatum (Say) 1821. Goodrich 1929: 7; Goodrich 1934b: 3; Goodrich 1940: 9; Rosewater 1959: 61.

Pleurocera canaliculatum excuratum (Conrad) 1834. Goodrich 1940: 10.

Pleurocera canaliculatum filum (Lea) 1845. Goodrich 1938: 3.

Pleurocera canaliculatum undulatum (Say) 1829. Goodrich 1937: 6; Goodrich 1940: 9; Goodrich 1941: 7.

Pleurocera curtum (Haldeman) 1841. Goodrich 1940: 7.

Pomatiopsis lapidaria (Say) 1817. Kaplan and Minckley 1960: 65; Browne and Bruder 1963: 53; Hubricht 1964c: 3.

Somatogyrus integer (Say) 1840. Baker 1898: 342.

Somatogyrus subglobosus isogonus (Say) 1829. Baker 1928: 159 *(in Birgella)*; Bickel 1965: 17.

Somatogyrus trothis Doherty, 1878. Walker 1918: 146.

Viviparus georgianus (Lea) 1834. Clench 1962a: 271.

Pulmonata (Freshwater Pulmonates)

Ferrissia fragilis (Tryon) 1863. Bickel 1965: 17.

Ferrissia rivularis (Say) 1819. Price 1900: 77 (in *Ancylus*).

Fossaria dalli (Baker) 1906. Browne and Bruder 1963: 54.

Fossaria humilis (Say) 1822. Price 1900: 76 (in *Lymnaea*); Rosewater 1959: 61 (in *Lymnaea*).

Fossaria modicella (Say) 1825. Browne and Bruder 1963: 53.

Fossaria obrussa (Say) 1825. Browne and Bruder 1963: 53.

Fossaria parva (Lea) 1841. Baker 1911: 243; Baker 1928: 285; Browne and Bruder 1963: 57.

Gyraulus parvus (Say) 1817. Price 1900: 76 (in *Planorbis*).

Helisoma anceps (Menke) 1830. Price 1900: 76 (in *Planorbis*).

Helisoma trivolvis (Say) 1817. Price 1900: 76 (in *Planorbis*).

Physa anatina Lea, 1869. Browne and Bruder 1963: 55.

Physa gyrina Say, 1821. Price 1900: 77.

Physa heterostropha Say, 1819. Price 1900: 77.

Physa integra Haldeman, 1841. Rosewater 1959: 61; Bickel 1965: 17.

Physa pomilia Conrad, 1834. Price 1900: 77.

Promenetus exacuous (Say) 1821. Bickel 1965: 17.

Pseudosuccinea columella (Say) 1817. Rosewater 1959: 61 (in *Lymnaea*)

Rhodacmea elatior (Anthony) 1855. Walker 1918: 122.

(?) Rhodacmea hinkleyi (Walker) 1908. Basch 1963: 415, implied.

Stagnicola desidiosa (Say) 1821. Baker 1898: 267.

Pulmonata (Land Mollusks)

Allogona profunda (Say) 1824. Pilsbry 1940: 877; Browne and McDonald 1960: 175; Browne and Bruder 1963: 55; Hubricht 1964c: 3.

Allogona profunda pleistocenica Baker, 1920. Browne and Bruder 1963: 55.

Anguispira alternata (Say) 1816. Pilsbry 1948: 568, implied; Kaplan and Minckley 1960: 64; Browne and McDonald 1960: 174; Browne and Bruder 1963: 53; Hubricht 1964c: 3.

Anguispira knoxensis (Pilsbry) 1901. Hubricht 1954: 92.

Anguispira kochi (Pfeiffer) 1845. Pilsbry 1948: 591; Conkin 1959: 11; Kaplan and Minckley 1960: 64; Hubricht 1964c: 3.

Bulimulus dealbatus (Say) 1821. Pilsbry 1946: 7.

Carychium exiguum (Say) 1822. Pilsbry 1948: 1052, implied; Kaplan and Minckley 1960: 65; Hubricht 1963a: 108.

Carychium exile H. C. Lea, 1842. Pilsbry 1948: 1058; Browne and Bruder 1963: 54; Hubricht 1964b: 34.

Carychium stygium Call, 1897. Pilsbry 1948: 1054; Hubricht 1960: 35.

Cepaea nemoralis (Linnaeus) 1798. Blakeslee 1945: 45; Reed 1964: 12.

Cionella lubrica morseana Doherty, 1878. Pilsbry 1948: 1049; Kaplan and Minckley 1960: 65.

Columella alticola (Ingersoll) 1875. Browne and McDonald 1960: 174; Browne and Bruder 1963: 53.

(?) Columella edentula (Draparnaud) 1805. Pilsbry 1948: 1002, implied.

Deroceras aenigma Leonard, 1950. Browne and Bruder 1963: 55.

Deroceras laeve (Müller) 1774. Browne and Bruder 1963: 53.

(?) Deroceras reticulatum (Müller) 1774. Pilsbry 1948: 534, implied.

Discus cronkhitei (Newcomb) 1865. Pilsbry 1948: 600; Browne and McDonald 1960: 174; Kaplan and Minckley 1960: 64; Browne and Bruder 1963: 54.

Discus cronkhitei catskillensis (Pilsbry) 1898. Browne and Bruder 1963: 53.

Discus patulus (Deshayes) 1830. Pilsbry 1948: 608; Hubricht 1964c: 3.

Euconulus chersinus (Say) 1821. Pilsbry 1946: 239, implied; Kaplan and Minckley 1960: 64.

(?)Euconulus chersinus dentatus (Sterki) 1893. Pilsbry 1946: 242, implied.

Euconulus fulvus (Müller) 1774. Pilsbry 1946: 235, implied; Browne and McDonald 1960: 175; Kaplan and Minckley 1960: 64; Browne and Bruder 1963: 53.

Gastrocopta armifera (Say) 1821. Pilsbry 1948: 874, implied; Browne and McDonald 1960: 174; Kaplan and Minckley 1960: 64; Browne and Bruder 1963: 53.

(?) Gastrocopta armifera abbreviata (Sterki) 1909. Pilsbry 1948: 877, implied.

Gastrocopta contracta (Say) 1822. Kaplan and Minckley 1960: 65; Browne and Bruder 1963: 56; Hubricht 1964b: 34.

(?) Gastrocopta corticaria (Say) 1816. Pilsbry 1948: 894, implied.

Gastrocopta pentodon (Say) 1821. Pilsbry 1948: 866, implied; Kaplan and Minckley 1960: 65; Browne and Bruder 1963: 56.

Gastrocopta procera (Gould) 1840. Pilsbry 1948: 907, implied; Kaplan and Minckley 1960: 65.

Gastrocopta tappaniana (C. B. Adams) 1842. Pilsbry 1948: 889, implied; Kaplan and Minckley 1960: 65; Browne and Bruder 1963: 54.

Guppya sterkii (Dall) 1888. Pilsbry 1946: 245.

Haplotrema concavum (Say) 1821. Pilsbry 1946: 208; Conkin 1959: 11; Browne and McDonald 1960: 175; Kaplan and Minckley 1960: 64; Browne and Bruder 1963: 53.

Havaiia minuscula (Binney) 1840. Pilsbry 1946: 420; Kaplan and Minckley 1960: 64; Browne and Bruder 1963: 53.

Helicodiscus barri Hubricht, 1962. Hubricht 1962a: 105; Hubricht 1964b: 34.

Helicodiscus hadenoecus Hubricht, 1962. Hubricht 1962a: 106; Hubricht 1964b: 34.

Helicodiscus inermis H.B. Baker, 1929. Hubricht 1964b: 34.

Helicodiscus notius Hubricht, 1962. Hubricht 1962a: 104; Hubricht 1964b: 34.

Helicodiscus notius specus Hubricht, 1962. Hubricht 1962a: 105; Hubricht 1964b: 34.

Helicodiscus parallelus (Say) 1821. Pilsbry 1948: 625; Browne and McDonald 1960: 174; Kaplan and Minckley 1960: 64; Browne and Bruder 1963: 53.

Helicodiscus punctatellus Morrison, 1942. Pilsbry 1948: 640; Hubricht 1962a: 106; Hubricht 1964b: 34.

Helicodiscus singleyanus (Pilsbry) 1890. Pilsbry 1948: 636, implied; Kaplan and Minckley 1960: 64.

(?) Helicodiscus singleyanus inermis H.B. Baker, 1929. Pilsbry 1948: 637, implied.

Hendersonia occulta (Say) 1831. Pilsbry 1948: 1087, implied; Browne and McDonald 1960: 175; Browne and Bruder 1963: 53; Hubricht 1964c: 3.

(?) Limax flavus Linnaeus, 1758. Pilsbry 1948: 528, implied.

Mesodon andrewsae normalis (Pilsbry) 1900. Hubricht 1950: 106.

Mesodon appressus (Say) 1821. Pilsbry 1940: 749; Hubricht 1964b: 33; Hubricht 1964c: 3.

Mesodon clausus (Say) 1821. Pilsbry 1940: 712; Kaplan and Minckley 1960: 63; Browne and Bruder 1963: 55; Hubricht 1964c: 3.

Mesodon downieanus (Bland) 1861. Pilsbry 1940: 716.

Mesodon elevatus (Say) 1821. Pilsbry 1940: 727; Conkin 1957: 11; Kaplan and Minckley 1960: 63; Browne and Bruder 1963: 54.

Mesodon inflectus (Say) 1821. Pilsbry 1940: 770; Conkin 1957: 11; Kaplan and Minckley 1960: 63; Browne and Bruder 1963: 55; Hubricht 1964b: 33.

Mesodon mitchellianus (Lea) 1839. Pilsbry 1940: 715.

Mesodon rugeli (Shuttleworth) 1852. Pilsbry 1940: 767; Hubricht 1964b: 33; Hubricht 1964c: 3.

Mesodon sayanus (Pilsbry) 1906. Pilsbry 1940: 762.

Mesodon thyroidus (Say) 1816. Pilsbry 1940: 706, implied; Conkin 1957: 11; Kaplan and Minckley 1960: 63.

Mesodon wetherbyi (Bland) 1873. Pilsbry 1940: 757.

Mesodon zaletus (Binney) 1837. Pilsbry 1940: 722; Kaplan and Minckley 1960: 63; Hubricht 1964c: 3.

Mesomphix anurus Hubricht, 1962. Hubricht 1962b: 2.

Mesomphix cupreus (Rafinesque) 1831. Pilsbry 1946: 333.

Mesomphix cupreus miktus Pilsbry, 1946. Pilsbry 1946: 339.

Mesomphix derochetus Hubricht, 1962. Hubricht 1962b: 4.

Mesomphix friabilis (W.G. Binney) 1857. Pilsbry 1946: 328; Kaplan and Minckley 1960: 64; Hubricht 1964c: 3.

Mesomphix inornatus (Say) 1821. Pilsbry 1946: 307; Kaplan and Minckley 1960: 64.

Mesomphix latior (Pilsbry) 1900. Pilsbry 1946: 321.

Mesomphix latior monticola (Pilsbry) 1911. Pilsbry 1946: 322.

Mesomphix perlaevis (Pilsbry) 1900. Pilsbry 1946: 319; Hubricht 1962b: 5.

Mesomphix ruidus Hubricht, 1958. Hubricht 1958a: 74; Hubricht 1962b: 7.

Mesomphix vulgatus H. B. Baker, 1933. Pilsbry 1946: 324; Kaplan and Minckley 1960: 64; Hubricht 1962b: 1; Hubricht 1964c: 3.

Oxyloma decampi gouldi Pilsbry, 1948. Browne and Bruder 1963: 55.

Oxyloma decampi peoriensis (Walker) 1892. Browne and Bruder 1963: 55.

Oxyloma retusa (Lea) 1834. Kaplan and Minckley 1960: 64.

Pallifera wetherbyi W.G. Binney, 1874. Pilsbry 1948: 769; Hubricht 1950: 106.

Paravitrea capsella (Gould) 1851. Pilsbry 1946: 374.

Paravitrea multidentata (Binney) 1840. Pilsbry 1946: 352; Kaplan and Minckley 1960: 64.

Paravitrea petrophila (Bland) 1883. Pilsbry 1946: 385.

Paravitrea placentula lithodora Pilsbry, 1946. Pilsbry 1946: 371.

Paravitrea tantilla Hubricht, 1963. Hubricht 1963c: 141.

Philomycus carolinianus (Bosc) 1802. Pilsbry 1948: 753.

Philomycus carolinianus flexuolaris Rafinesque, 1820. Pilsbry 1948: 756.

Polygyra fatigiata Say, 1829. Pilsbry 1940: 628.

Polygyra leporina (Gould) 1848. Pilsbry 1940: 611.

Polygyra plicata Say, 1821. Pilsbry 1940: 626; Kaplan and Minckley 1960: 63; Hubricht 1964c: 3.

Punctum minutissimum (Lea) 1841. Pilsbry 1948: 644; Browne and McDonald 1960: 174; Browne and Bruder 1963: 53.

Punctum smithi Morrison, 1935. Pilsbry 1948: 654.

(?) Punctum vitreum H. B. Baker, 1930. Pilsbry 1948: 649.

Pupoides albilabris (C.B. Adams) 1841. Pilsbry 1948: 921, implied; Browne and McDonald 1960: 175; Kaplan and Minckley 1960: 65.

Quickella vermeta (Say) 1817. Hubricht 1958b: 60.

Retinella cf. *R. binneyana* (Morse) 1864. Browne and McDonald 1960: 175.

Retinella cryptomphala (Clapp) 1915. Hubricht 1964b: 33 (in *Glyphyalinia*).

Retinella cryptomphala solida H. B. Baker 1930. Pilsbry 1946: 298.

Retinella cumberlandiana (Clapp) 1919. Pilsbry 1946: 269.

Retinella cumberlandiana roanensis H. B. Baker, 1930. Pilsbry 1946: 271.

Retinella electrina (Gould) 1841. Kaplan and Minckley 1960: 64; Browne and Bruder 1963: 53.

Retinella indentata (Say) 1823. Pilsbry 1946: 288, implied; Kaplan and Minckley 1960: 64; Browne and Bruder 1963: 53; Hubricht 1964c: 3 (in *Glyphyalinia*).

Retinella paucilirata (Morelet) 1851. Pilsbry 1946: 291; Hubricht 1964b: 33 (in *Glyphyalinia*).

Retinella praecox H. B. Baker, 1930. Pilsbry 1946: 299.

Retinella sculptilis (Bland) 1858. Hubricht 1964b: 34 (in *Glyphyalinia*).

Retinella wheatleyi (Bland) 1883. Pilsbry 1946: 273, implied; Kaplan and Minckley 1960: 64.

Stenotrema angellum Hubricht, 1958. Hubricht 1958a: 70; Kaplan and Minckley 1960: 63.

Stenotrema barbatum (Clapp) 1904. Browne and Bruder 1963: 53.

Stenotrema edvardsi (Bland) 1856. Pilsbry 1940: 646.

Stenotrema fraternum (Say) 1824. Pilsbry 1940: 681; Browne and McDonald 1960: 175; Kaplan and Minckley 1960: 63.

Stenotrema hirsutum (Say) 1817. Pilsbry 1940: 662; Kaplan and Minckley 1960: 63.

Stenotrema leai (Binney) 1841. Browne and McDonald 1960: 175.

Stenotrema leai aliciae (Pilsbry) 1893. Pilsbry 1940: 679; Browne and McDonald 1960: 175; Browne and Bruder 1963: 54.

Stenotrema monodon (Rackett) 1821. Browne and Bruder 1963: 53.

Stenotrema stenotrema (Pfeiffer) 1842. Pilsbry 1940: 655; Conkin 1957: 11; Browne and McDonald 1960: 175; Kaplan and Minckley 1960: 63.

Striatura ferrea Morse, 1864. Pilsbry 1946: 497.

Striatura milium (Morse) 1859. Pilsbry 1946: 495; Browne and Bruder 1963: 55.

(?) Strobilops aenea Pilsbry, 1926. Pilsbry 1948: 862, implied.

(?) Strobilops aenea spiralis Pilsbry, 1926. Pilsbry 1948: 865, implied.

(?) Strobilops affinis Pilsbry, 1893. Pilsbry 1948: 860, implied.

Strobilops labyrinthica (Say) 1817. Pilsbry 1948: 854, implied; Kaplan and Minckley 1960: 64; Browne and Bruder 1963: 53.

(?) Succinea aurea Lea, 1846. Pilsbry 1948: 815, implied.

(?) Succinea avara (Say) 1824. Pilsbry 1948: 837, implied.

Succinea grosvenori Lea, 1864. Pilsbry 1948: 819, implied; Browne and McDonald 1960: 175; Browne and Bruder 1963: 54.

Succinea grosvenori gelida (F.C. Baker) 1927. Browne and McDonald 1960: 175; Browne and Bruder 1963: 53.

Succinea ovalis (Say) 1817. Browne

and McDonald 1960: 175; Browne and Bruder 1963: 53; Hubricht 1964a: 3.

Succinea ovalis optima Pilsbry, 1908. Pilsbry 1948: 805.

Triodopsis albolabris (Say) 1816. Pilsbry 1940: 835; Hubricht 1950: 106; Conkin 1957: 11; Kaplan and Minckley 1960: 64; Browne and Bruder 1963: 55; Hubricht 1964c: 3.

Triodopsis denotata (Férussac) 1823. Pilsbry 1940: 821; Kaplan and Minckley 1960: 64; Hubricht 1964c: 3.

Triodopsis fosteri (Baker) 1932. Browne and Bruder 1963: 55.

Triodopsis fraudulenta (Pilsbry) 1894. Conkin 1957: 11; Kaplan and Minckley 1960: 64. (Possibly the subspecies below).

Triodopsis fraudulenta vulgata Pilsbry, 1940. Pilsbry 1940: 805.

Triodopsis multilineata (Say) 1821. Pilsbry 1940: 847, implied; Browne and McDonald 1960: 175.

Triodopsis multilineata algonquinensis Nason, 1906. Browne and Bruder 1963: 54.

Triodopsis obstricta (Say) 1821. Pilsbry 1940: 827.

Triodopsis rugosa anteridon (Pilsbry) 1940. Pilsbry 1940: 803.

Triodopsis tridentata (Say) 1816. Pilsbry 1940: 792; Hubricht 1964c: 3.

Triodopsis tridentata tennesseensis (Walker) 1907. Pilsbry 1940: 797.

Triodopsis vulgata Pilsbry 1940. Hubricht 1964c: 3.

Vallonia albula Sterki, 1893. Browne and McDonald 1960: 175; Browne and Bruder 1963: 53.

Vallonia cyclophorella Sterki, 1892. Browne and Bruder 1963: 55.

(?) Vallonia perspectiva Sterki, 1893. Pilsbry 1948: 1033, implied.

Vallonia pulchella (Müller) 1774. Pilsbry 1948: 1023.

Ventridens acerra (Lewis) 1870. Pilsbry 1946: 463.

Ventridens demissus (Binney) 1843. Pilsbry 1946: 459; Kaplan and Minckley 1960: 64.

Ventridens elliotti (Redfield) 1856. Pilsbry 1946: 471.

Ventridens gularis (Say) 1822. Pilsbry 1946: 443; Hubricht 1964a: 424; Hubricht 1964c: 3.

Ventridens intertextus (Binney) 1841. Pilsbry 1946: 468.

Ventridens lawae (W. G. Binney) 1892. Hubricht 1964a: 422.

Ventridens ligera (Say) 1821. Pilsbry 1946: 465; Kaplan and Minckley 1960: 64; Hubricht 1964c: 3.

Ventridens pilsbryi Hubricht, 1964. Hubricht 1964a: 418.

Ventridens suppressus dividens Pilsbry, 1946. Pilsbry 1946: 440.

Ventridens suppressus virginicus (Vanatta) 1936. Pilsbry 1946: 440.

Ventridens theloides (Walker and Pilsbry) 1902. Hubricht 1964a: 420.

(?) Vertigo bollesiana (Morse) 1865. Pilsbry 1948: 981, implied.

Vertigo gouldi (Binney) 1843. Pilsbry 1948: 971; Browne and Bruder 1963: 53.

Vertigo gouldi paradoxa Sterki, 1900. Browne and Bruder 1963: 53.

(?) Vertigo milium (Gould) 1840. Pilsbry 1948: 944, implied.

Vertigo modesta (Say) 1824. Browne and McDonald 1960: 175; Browne and Bruder 1963: 53.

Vertigo nylanderi Sterki, 1909. Browne and McDonald 1960: 175.

(?) Vertigo ovata Say, 1822. Pilsbry 1948: 952, implied.

Vertigo tridentata Wolf, 1870. Kaplan and Minckley 1960: 65.

Zonitoides arboreus (Say) 1816. Pilsbry 1946: 480; Browne and Bruder 1963: 54; Hubricht 1964: 34.

Zonitoides lateumbilicatus (Pilsbry) 1895. Pilsbry 1946: 486.

(?) Zonitoides nitidus (Müller) 1774. Pilsbry 1946: 476, implied.

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TYPES OF NORTH AMERICAN UNIONIDAE IN THE COLLECTION OF THE CARNEGIE MUSEUM

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The material here revised includes only the primary types: holotypes, syntypes, lectotypes, paratypes; occasionally an allotype, or, when a topotype specimen was revised by the author of the species, a metatype are included. The nomenclature and status of the species have been updated with additional notes and observations. One species from Guatemala and another from Nicaragua were added to complete the list of types of Unionidae in the collection.

Original materials described by Grier, Utterback, and Ortmann as 'varieties,' 'races,' or 'forms' were synonymized under their actual species names in capitals, but listed by their first references. This criterion for dealing with variations is valid for almost all the trinomials used, or introduced by Ortmann (1919 Monogr. Naiades of Pa., Mem. Carnegie Mus. 8). It is evident that these are not subspecies by standards of allopatry. Ortmann was perfectly aware of such conditions on which he often remarked; for example, of *Anodonta grandis* he said, 'a number of [variations] them have received names [but] certainly are not subspecies in the strict taxonomic sense. I shall mention some of these forms with the express understanding that I regard them as individual variations.' Thus, Ortmann used the trinomial as a convenient way to refer to clinal, local, or individual variations, but without taxonomic standing because, as he repeatedly stated 'it is impossible to separate them except by drawing an artificial line.' Consequently, the taxonomic simplification used in this paper is not in conflict with Ortmann's system by inobservance of it.

The species have been arranged into four subfamilies. The conventional division of the North American Naiades of the family Unionidae recognizes three subfamilies: Unioninae, Anodontinae, and Lampsilinae, and occasionally a tribe Alasmidontini. A recent classification by Morrison (Reports Amer. Malac. Union for 1955 and 1966), separates Unionidae (Unioninae, Anodontinae, and Alasmidontinae) from Amblemidae (Ambleminae and Lampsilinae) on some anatomical and embryological basis. Such a system is not a very radical departure from the conventional as it might appear. Comparing with Ortmann's divisions (*op. cit.*, part 1: 335; 1911), we find in his first key (Unioninae), *Quadrula, Rotundaria, Pleurobema,* and *Elliptio,* which correspond to what Morrison places in Amblemidae; the second Ortmann key (Anodontinae) is practically the same as in Morrison, except for *Alasmidonta;* and the third key (Lampsilinae) contains the same genera that Morrison places in the same subfamily but under Amblemidae.

In other confrontation, with Thiele's 'Handbuch' (1935), we find again that the first twelve American genera arranged within the Unioninae correspond to Morrison's Amblemidae(nae), the Lampsilinae are correlated, with the Anodontinae in between. In some more recently published papers, the same correlation exists; in Clench and Turner (Bull. Florida State Museum, 1956), the first six genera listed under Unionidae are Morrison's Amblemidae; and Clarke and Berg (Cornell Univ. Mem. 367, 1959), the first four species under Unioninae are the Ambleminae, and in succession come Alasmidontini and Anodontini and last the Lampsilinae.

Thus, the discrepancies among these systems are only a matter of names. What Morrison did was to rank Anodontinae, plus Alasmidontinae in the already known family Unionidae, and separating them from the Amblemidae which includes Lampsilinae. The basis for this - glochidia and gill structure - has a taxonomic value of the same degree Ortmann used in 1911 to separate Margaritidae from Unionidae. But, although the argument is theoretically acceptable, it creates a greater problem than the one it intended to solve; after we have most of the American genera assembled in the Amblemidae (Ambleminae) according to Morrison, a vacuum has been produced, because the Unioninae s. s. are left devoid of genera in America, unless what Morrison really meant was that this subfamily should be restricted to the Old World Unios. An alternative would be to use Ambleminae (or tribe Amblemini) for that group of genera with all the four gills serving as marsupium, which includes *Amblema, Fusconaia,* and *Quadrula,* as a more primitive group, and to reserve Unioninae for those in which only the two outer gills serve as marsupium, with *Rotundaria, Pleurobema,* and *Elliptio.* This will correspond to the old 'Homogenae' and 'Tetragenae' of Simpson; but then, it breaks into two parts Morrison's concept of Amblemidae. The possibility of such arrangement exists (in fact it simply consists in giving names to the main divisions a^1 and a^2 which Ortmann recognized in his key for Unioninae (1919: 6, 7); but it is not truly workable until the system is fully analyzed, with a critical study of all the genera involved to be certain of their relationships, and not in abstract form. Meanwhile, the current system of three subfamilies (four if Alasmidontinae is accepted as a transitional group with reduced hinges, between Unioninae and Anodontinae), will keep us away from confusion. The system then, for all the Naiades of the western hemisphere, is at present as follows:

SUPERFAMILY UNIONACEA
- Family Margaritinidae Ortmann, 1911
- Family Unionidae Rafinesque, 1820
  - Subfamily Unioninae s. s.
  - Subfamily Anodontinae Rafinesque, 1820.
  - Subfamily Lampsilinae, Ihering, 1901
  - Subfamily (?) Alasmidontinae Rafinesque, 1820
- Family Hyriidae Swainson, 1840
  - Subfamily Hyriinae s.s. (restricted Parodiz & Bonetto 1963)
    - Tribe Prisodontini Modell 1942 (transfer. Par. & Bon. 1963)
    - Tribe Castalini Parodiz & Bonetto, 1963)
    - Tribe Diplodontini Parodiz & Bonetto, 1963)

SUPERFAMILY MUTELACEA Parodiz & Bonetto, 1963
- Family Mycetopodidae -ray, 1840
  - Subfamily Monocondylaeinae Modell, 1942
  - Subfamily Anodontinae Modell, 1942
  - Subfamily Leilinae Morretes, 1949

U N I O N I N A E

Fusconaia selecta Wheeler, 1914
= FUSCONAIA FLAVA Raf.

Nautilus 28: 75, pl. 5.

Type loc.: Cache River at Nemo, Craighead Co., Arkansas.

Type lot: One paratype, from Frierson, CM 61.7723. The type was in Wheeler's collection. Other paratypes in Alabama Museum, ANSP.

This form is the same as *Unio trigona* Lea = *flava.*

Fusconaia flava parvula Grier, 1913
= FUSCONAIA FLAVA Raf.

Nautilus 23: 11 (not figured). Ortmann 1919: 21, pl. 2, f 2.

Type loc.: Big Bend, Presque Isle, Erie Co., Pennsylvania.

Type lot: Lectotype (male) here selected corresponding to the one figured by Ortmann and measurements given on page 22; one allotype female; collected Ortmann July 8-12, 1910. CM 61.4513, twelve paratypes including juveniles. There are two more lots bearing the indication 'type lot' collected at different times: five paratypes (plus one sent to the Ohio State Museum) from type loc., coll. June 3, 1908, CM 61.4370, marked type but it does not correspond to the one described, measured and figured, and to it Ortmann put an early label as '*Quadrula rubiginosa,*' and afterwards added '*undata-parvula*' (it is doubtful that Grier had seen this specimen).

This is the ecological, lake form of *flava*, the surface with regular and well marked growth lines (by these markings the lectotype is about 10 years old, and older specimens (60 X 43 mm.) about 15 years old, showing also that the individuals become more elongate with age and darker. *F. flava parvula* forms a localized clinal transition between *flava flava* and *flava undata-trigona*, to the point that it is impossible to draw a dividing line, *flava* disappearing clinally into the others. This shows parallelism of station with the *Fusconaia subrotunda* group. Clarke and Berg (1959) synonymized correctly *undulata, rubiginosa, undata,* and *trigona* under *flava*. The lectotype was originally labelled by Ortmann '*Quadrula undata trigona.*'

Fusconaia cor analoga Ortmann, 1918
= FUSCONAIA EDGARIANA (Lea)

1920 *Fusconaia edgariana analoga*, Ortmann, Proc. Am. Phil. Soc., 59: 286.

Type loc.: Speers Ferry on the Clinch River, Scott Co., Virginia (six miles north of the Tennessee line).

Type lot: Eight syntypes, 4 males and 4 females, CM 61.6526, collected Ortmann, June 8, 1913.

Compared with the description and type (in MCZ) of *Unio cor* Conrad, the form *analoga* is not related whatsoever with that species. Other lots of *analoga* collected and labelled by Ortmann, from Alabama, Tennessee, and southwest Virginia, do not offer substantial differences with *edgariana*; some specimens are flatter as indicated in the description, but accounts for populations which are very variable according to locations up or down streams. All the northern tributaries of the Tennessee River around the Tennessee-Virginia line (Powell, Clinch, Holston) are only ten to fifteen miles apart. Ortmann estimated that 'specimens with diameter less than 50% of the length fall under this var.', but then, in populations of any species variable as this, individuals above or below that 50% are to be expected.

A species closely related to *edgariana* is *cuneolus* Lea, offering the same stational differences (*c. cuneolus* and *c. appressa*). Before describing *analoga* Ortmann wrote on the label '*F. edgariana appressa,*' and the distribution of both is about the same; I think we are dealing here with a superspecies complex which deserves revision.

Fusconaia subrotunda leucogona Ortmann, 1913
= *FUSCONAIA SUBROTUNDA (Lea)*

Nautilus 27: 89 (not figured).

Type loc.: Elk River, Gassaway, Braxton Co., West Virginia.

Type lot: Twelve syntypes (one sent to Ohio State Museum) 7 males of all sizes, and 4 females, CM 61.5239 (not 5399 as indicated in description) collected by Ortmann, July 8, 1911.

The author stated that *leucogona* does not differ substantially from typical *subrotunda*, and the Elk River shells are but a local race. Some of the syntypes approach *subrotunda kirtlandiana* 'to a degree' (Ortmann), but in general are *subrotunda* which has the tendency in headwaters of the Ohio to develop a flat form (*kirtlandiana*) but without distinct allopatry. The young of *leucogona* and *subrotunda* are identical in all stations, and adult females are equal to the females of *kirtlandiana* as figured in Ortmann's 1919 (pl. 1, f. 3) monograph. The individuals become more angulated posteriorly when

they grow older. The series *subrotunda-kirtlandiana-leucogona* are just clinal phases of one and the same species.

Quadrula lananensis Frierson 1901
= *FUSCONAIA LANANENSIS (Fr.)*
Nautilus 15: 75, pl. 4.
Fusconaia escambia Clench and Turner ? 1956: 152, pl. 7, figs. 3, 4.
Type loc. Lanana Creek near Nacogdoches, Nacogdoches Co., Texas.
Type lot: 2 paratypes from type locality, CM 61.5006, coll. by H. G. Askew, Strode, and Frierson, July 1901; from Frierson coll.

Although the original lots from Lanana and Bonita Spring contained, according to Frierson, about 200 specimens, the species seems to be uncommon because it has been seldom mentioned. *Fusconaia escambia* Clench and Turner is very similar in shape and colors; probably it is the same thing as *lananensis* or no more than an eastern subspecies or race, relatively smaller, a little more rounded and with scarcely higher umbos. Between these two forms, *'Unio' askewi* Marshall from Texas seems to be intermediary.

Unio wardii Lea 1863
= *QUADRULA METANEVRA* (Raf.)
Observations 1863, 9: 87.
Quadrula metanevra wardii, Ortmann 1920: 291.
Type loc.: Walhonding River (a tributary of the Tuscarawas in the Upper Ohio Valley), Ohio.
Type lot: 3 specimens, CM 61.1063, from Coal River, Logan Co., Virginia, from ex-Hartmann coll. These specimens were seen and compared by Lea and are considered paratypes. Johnson (Bull. MCZ 115 (4): 142) indicates one paratype in MCZ from Hartmann-Anthony coll,, with acclaration on the label by Lea who recognized it as one of the specimens he gave to Anthony from Coal River (not Tennessee as marked on the label).

Unio wardii was based on some variation in the development of the tuberculae, a character which is not constant in all individuals; it could not even be considered as a race, since all degrees of such development are present in different populations from Pennsylvania; the trinomial is superfluous.

Quadrula quadrula contraryensis Utterback 1916
= *QUADRULA QUADRULA* Raf.
Amer. Midl. Nat. 4 (Reprint): 56, pl. 18, f. 47 (no type selected).
Type loc.: Lake Contrary at St. Joseph, Buchanan Co., Missouri.
Type lot: 3 syntypes, Utterback coll., CM 61.6892. None of the specimens can be identified with the one figured, but the larger one has the same dimensions as the second male mentioned by the author.

This form is the same thing as *Unio fragosus* Conrad (Monogr. 1836: 12, pl. 6, f. 2) from Scioto River, Ohio. Before - or while - describing *contraryensis*, Utterback sent the referred syntypes to Ortmann who labelled them, first as *lachrymosa (=fragosus)*, and afterwards he added Utterback's denomination but remarking (1919: 42) that it is only a 'local phase' of *Q. quadrula (sensu lato)* which is widely distributed in the Mississippi and Lower Ohio drainages, with ample variability among individuals of the same populations, and clinal at different locations. It is very difficult, almost impossible, to separate the forms *contraryensis-fragosa, lachrymosa* from *quadrula quadrula*.

Elliptio waltoni Wright 1888
= *ELLIPTIO PRODUCTUS* (Conrad)
Proc. A.N.S.P. 1888: 114, pl. 2, f. 3.
Simpson, Proc. U.S.N.M., 15: 431, pl. 73, f. 7.
Elliptio cupreus Raf., Ortmann 1919: 110, pl. 8, f. 6.
Elliptio productus (Conrad), Ortmann, 1922, Occ. Papers MZUM 112: 30.
Type loc.: Lake Woodruff, Volusia Co., central E. Florida.
Type lot: One syntype (or paratype?) CM 61.11835 (from L. E. Daniels ex-Wright coll.) The type in A.N.S.P. The specimen at hand is identical in all its features with *E. productus* identified by Ortmann from Alexandria, Virginia; in the Carnegie Museum collection, numerous lots from Pennsylvania, Virginia, and Georgia show

a progressive clinal variation toward more lanceolate forms in southern localities. *E. productus* is becoming rather scarce in the south, and recent reports from extensive collecting in Georgia and Florida (Clench and Turner 1956) do not mention it. The type is at MCZ. It is the same with *'oscari.'*

Unio oscari Wright 1892
= *ELLIPTIO PRODUCTUS* (Conrad)
Nautilus 5: 124; 1895, 19: 122, pl. 2, f. 3.

Type loc.: Lake Osceola, Winter Park, Orange Co., Florida.

Type lot: One paratype CM 61.11808, from Bryant Walker ex-Daniels Coll.) Type in ANSP; other paratypes in MCZ.

This form which Ortmann included within the *aheneus-hazelhurstianus* group is, like *waltoni*, merely a little more obese *E. productus*. The figure in Nautilus shows a specimen abnormally inflated and thickened by gerontism.

Elliptio dilatatus sterkii Grier 1918
= *ELLIPTIO DILATATUS DILATATUS (Raf.)*
Nautilus 32: 9. Ortmann 1919: 101, pl. 8, f. 3.

Type loc.: Big Bend (W. of waterworks), Presque Isle, Erie Co., Pennsylvania.

Type lot: Lectotype, here selected, a male, figured and marked #4 by Ortmann in 1919. Ten paratypes, 5 males and 5 females, CM 61.4648, coll. Ortmann, July 8, 1910.

Ortmann indicated this form as exclusive from Lake Erie, but other records in collection are from Detroit River and Lake Huron. It is only an ecological form of *dilatatus dilatatus*. Before sending the material for description to Grier, Ortmann labelled the specimens as *'Unio gibbosus* Barnes.'

The lectotype is a medium size specimen, 7 years old; the larger paratypes are 13 to 15 years old, and darker.

QUINCUNCINA BURKEI Ortmann & Walker 1922
Nautilus 36: 3, pl. 1, figs. 1-4.

Type loc.: Sikes's Creek (tributary of Choctawhatchee River), Barbour Co., Alabama.

Type lot: Two paratypes from Pea River (5 miles W. of Elamville) Barbour Co., Alabama, CM 61.8623, coll. J A. Burke, April 1915. Another paratype from Choctawhatchee River at Blue Springs, collected by H.H. Smith, May 12, 1915. These three specimens are smaller than the type (in MCZ). The genus *Quincuncina* was based mainly on the anatomy of our specimen from Blue Springs, although the shell type selected by Ortmann and Walker was from Syke's. The species is restricted to the Choctawhatchee drainage and recently Clench and Turner (1956) reported several localities from Alabama and Florida.

ANODONTINAE

ARKANSIA WHEELERI Ortmann & Walker 1912
(= ARCIDENS (ARKANSIA) ?)
Nautilus 25 (9): 98, pl. 8.

Type loc.: 'Old River' branch of Ouachita River, Arkadelphia, Clark Co., Arkansas.

Type lot: 3 paratypes, 2 collected by Wheeler, June 17, 1911; CM 61.5388, male and female; another, coll. June 26, CM 61.5257. There is also a topotype collected by Wheeler, after description, on Feb. 20, 1913, CM 51.6162.

The first three specimens, all about 5 years old, are very much like and approximately the same size as the type figured. The last one is older, about 7 to 8 years old, and 25% longer, with stronger sculpture and lateral teeth very rugose, recalling an *Arcidens* but with the umbonal features as in the other three. In all of them, the folds of the posterior slope are more marked than those in the figure of the type. It is not very unlikely that *Arkansia* might prove to be a subgenus of *Arcidens*. Other paratypes are in MCZ.

Anodonta subinflata Anthony, 1865
= *ANODONTA GRANDIS* Say
Amer. Jour Conchol. 1: 160, pl. 15, f. 1 [sub-inflata].

Type lot: 2 paratypes from type loc. (from MCZ) CM 61.16013.

Van der Schalie, Clarke and other authors have remarked on the many ecological

phases of the protean *Anodonta grandis*, of which *subinflata* represents those of smaller size. Ortmann did not recognize subspecies in *grandis*, since all the variations are recurrent in distant areas of similar conditions; no defined geographical areas can be drawn for any of the forms.

Anodonta showalteri Lea, 1860
= *STROPHITUS SHOWALTERI* (Lea)
Proc. A.N.S.P. 1860: 307.
Type loc.: Big Prairie Creek, Hale Co., Alabama.
Type lot: One paratype collected by E. R. Showalter (from Alabama Geol. Survey Museum) CM 61.8377. Other 2 paratypes from J. Lewis (ex-Hartmann's coll.) 1898, pertaining to the original lot, received in 1902, CM 61.805. In two early labels Ortmann indicated: *'Anodontites ferussacianus'* and *'Strophitus edentulus;'* Walker who examined these specimens decided that *showalteri* is a distinct species. From the generic point of view, however, the conspicuous and well developed pseudocardinal places it, with all probability, within *Strophitus*.

ANODONTA BROOKSIANA van der Schalie 1938
Ann. Carnegie Museum 27 (12): 167. pl. 16, f. 1-3.
Type loc.: Spout Pond Arm, Ferryland District, Southern Shore, Newfoundland.
Type lot: Holotype and 160 paratypes from type locality, collected by S. T. Brooks, 1937 (originally they were of two lots collected on Sept. 17 and 21, but afterwards mixed). Other 74 paratypes from Long Run Pond. Many paratypes were distributed to different museums.
This is a species (or subspecies?) which has been found only in Newfoundland. By its acute angle of the posterior margin it stands between *marginata* and *grandis;* its thinness and fragility also recall *imbecillis*, but differing by its umbo which is not so flat and makes the dorsal line appear less straight; from *cataracta* it differs in the lack of rays and beak sculpture. According to the value of characters given to other species of *Anodonta*, it can be considered a species of the same degree, but it also might represent a northeastern subspecies of *grandis*.

Lasmigona costata ereganensis Grier, 1918
= *LASMIGONA COSTATA (Raf.)*
Nautilus 32:(1): 10. Ortmann 1919: 131. pl. 9 f. 6 (emend. *eriganensis)*
Type loc.: Big Bend (W. of waterworks) Presque Isle Bay, Lake Erie, Erie Co., Pennsylvania.
Type lot: Lectotype, here selected, corresponding to the first specimen measured by Grier (90 X 46 X 31 mm.), and four paratypes, CM 61.4720, collected by Ortmann July 8, 1910. Other 3 paratypes, same locality, collected May 22, 1909, CM 61.4223.
The form *eriganensis*, as well as the species *costata (sensu lato)*, is not a common shell in Lake Erie. Apart from those mentioned above, there are only five other lots from Michigan, and in 1962 Stansbery reported that *L. costata* was only known to him from Lake Erie by three specimens. The paucity of the materials makes the differences indicated by Grier more outstanding but, like many others which show different ecological phases between large rivers and headwaters, and between them and lake forms, it is unlikely that *eriganensis* should be considered an allopatric form.

A L A S M I D O N T I N A E

Alasmidonta marginata susquehanna Ortmann, 1919
= *ALASMIDONTA MARGINATA* (Say)
Monograph; 187, pl. 12, f. 4.
Type loc.: Susquehanna River at Selingrove, Snyder Co., Pennsylvania.
Type lot: One lectotype, male, here selected corresponding to the figured specimen, and 7 paratypes, collected Ortmann, Aug. 14, 1910; two males and 5 females.
Comparing numerous populations of *L. marginata* from eastern and western Pennsylvania, each showing many individual variations, it is not possible to draw a definite line between *marginata s. s.* and

susquehanna. Clarke and Berg (1959: 27) also found that the ratios "distance of beak to anterior end - length of shell" easily overlap when large populations are considered.

LAMPSILINAE

Nephronaias flucki Bartsch 1906
= *ACTINONAIAS FLUCKI* (Bartsch)

Proc. U.S.N.M. 30: 393, pl. 17, f. 2, pl. 18, f 2; pl. 19, figs. 1, 2.

Type loc.: Wounta River, NW of Kukallaya, Nicaragua.

Type lot: Two paratypes collected and received from W.H. Fluck, smaller than the four specimens mentioned in original description (holotype, U.S.N.M. 64 X 27.7 X 17.6 mm.).

The explanation of the figures in the plates is not given in Bartsch's paper; *N. flucki* corresponds to fig. 2 in all plates; pl. 17, fig. 2, may be confused with fig. 1 which is *Diplodon huapensis* Bartsch (=*D. chilensis patagonicus d'Orb.*), but on pl. 18 the differences of their hinges are shown. Figure 3, in all the plates appear to me as entirely different either from *flucki* or from *huapensis*, and it is a shell of the *Actinonaias calamitarum* group, closer to *yzabalensis* F. & C. from Guatemala. Young specimens of *calamitarum* which are always more elongated than the adults, look sometimes like *flucki*.

For comments on the status of *Nephronaias* see next species.

Unio (Nephronaias) ortmanni Frierson, 1913
= *ACTINONAIAS CALAMITARUM ORTMANNI* (Frierson)

Nautilus 27: 14; 28, pl. II.

Elliptio ortmanni (Frierson), Ortmann Nautilus 35: 24.

Type loc.: Estancia Maya, on the Conchins River, Quirigua (Atlantic drainage), Guatemala.

Type lot: 24 syntypes, collected by A. A. Hinkley on Feb. 4 and 6, 1913, CM 61.6196 and 61.6197. The first lot is composed of 16, mostly adult, shells, but smaller than the one figured; the others are 8, even smaller specimens, five females and 3 males; the smallest female (only 24 mm.) was gravid, and being only 29% of the adult size, indicates that the species began sexual activity very early in life.

The anatomy of *ortmanni* is like that of *Elliptio* (those of other species placed in *Nephronaias* are unknown). But, defining *Nephronaias*, Ortmann (1921) said that the anatomy in this group and *Obovaria* are undistinguishable "and all the differences are in the shells," and temporarily placed it within *Lampsilis*; later he said that *Nephronaias* becomes either a synonym of *Elliptio* or a subgenus of it."

The generic type of *Nephronaias* is *Unio plicatulus* Charpentier, but when the genus was created Fischer and Crosse (1900) declared that they had not seen that species, the reference taken from Küster's Conchylien Cabinet. Finally, Ortmann (1922: 147) decided that *Nephronaias* is a synonym of *Actinonaias* while Thiele places *Nephronaias* and *Simonaias* as sections of *Elliptio*.

Frierson's *ortmanni* agrees in all respects with *Unio calamitarum* (Morelet), although it appears more oval and less posteriorly quadrate; but *calamitarum* includes many variations, and Martens (Biol. Centr. Amer., 1901: 505) placed it under *cuprinus* Lea (=*metallicus* Say) which is unlikely. The type of *calamitarum* is from Palenque, Chiapas, Mexico, but the group of its related species ranges from Mexico to Nicaragua. I think that *Elliptio sayanus* and *E. haricoti* Frierson are forms of *calamitarum*.

Considered at most as a southern subspecies, the variations in the type lot of *ortmanni* include: forms from perfectly

oval to reniform; posterior margin subtruncated rounded or pointed; with or without green rays on the posterior slope; interior pearly white, sometimes salmon; exterior olive-green in young specimens, dark brown in gerontic ones. Constant characters: umbos somewhat flattened; deep concentric sulcation very regular in the young, reaching the tip of the umbo, rather rugose in adults; secondary pallial line very conspicuous, especially on the anterior side; pseudocardinals very strong; shell solid.

Unio borealis A. F. Gray, 1882
= *LAMPSILIS RADIATA* (Gm.)

Trans. Ottawa Field-Nat. Club, 1982: 53.

Type loc.: Duck Island, Ottawa River, Carleton Co., Ontario, Canada.

Type lot: one paratype from type loc. CM 61.9926, from Frierson (ex-Latchford coll.). Lectotype in MCZ. Another specimen, topotype, from A. La Rocque, 1937.

Lampsilis ventricosa cohongoronta Ortmann, 1912
= *LAMPSILIS OVATA* (Say)

Type loc.: Potomac River, Hancock, Washington Co., Maryland.

Type lot: one lectotype, here selected, male, CM 61.3999; 15 paratypes, all males; Ortmann separated the females in another lot CM 61.400, of which one is the allotype; all these were collected by Ortmann on Sept. 4, 1909, combining a single lot of 22 specimens. The form is also known from the Shenandoah River at its confluence with the Potomac (about 30 m. S. of Hancock).

Lampsilis ventricosa cohongoronta was neither fully described nor figured; its author never mentioned the form again in subsequent publications, but included *ventricosa* as a form - not subspecies - of *ovata*. The only author who apparently recognized the form in various places of the Potomac was Marshall (Nautilus 31, 32, 34). Ortmann had said that this form of *ventricosa* was 'out of place in the Potomac and it was an artificial introduction, the glochidia being carried by fishes like the 'black bass' which in 1889 was introduced in the Shenandoah, and other fishes in the Potomac and the Chesapeake-Ohio canal in 1894. The reactions during adaptation may have caused the differences found with *ovata ventricosa;* since it could not have been evolved into a subspecies in such a short period. These mussels live long and Ortmann might have found specimens of the first introduced generation. Ortmann dropped the name, evidently for that reason. In 1919, when Ortmann recorded the localities in which he found *ovata ventricosa*, none of the Potomac or Shenandoah localities were listed. All this gives us occasion to ponder how many times such accidental introductions might have occurred with other forms, which systematists are sometimes so quickly moved to name as taxa.

Lampsilis fimbriata Frierson, 1907.

Nautilus 21 (8): 86, pl. 12 (two upper figures and lower left). (The first inner pages of vol. 21, numbers 8 and 8, said by mistake 'vol. 22.')

Type loc.: Valles River, San Luis de Potosi, Mexico.

Type lot: one paratype, male, CM 61.4496, collected by A.A. Hinkley (received from Frierson). Type in A.N.S.P.; 1 paratype in MCZ.

When Ortmann received the specimens he labelled them *'Lampsilis (Proptera)'*, and later added another label under *Leptodea*. This species belongs to the *L. fragilis* group, which is very variable in thickness but is extremely thin. *Leptodea* Raf. 1820 (type by subsequent designation of Hermannssen 1847, *Unio leptodon* Raf.), has priority over *Paraptera* Ortmann 1911; *Lasmonos* Raf. is a synonym. The species described by Simpson in Dall 1908 as *Lampsilis (Proptera) salinasensis* is a synonym of *fimbriata*.

Lampsilis iridella Pilsbry & Frierson, 1908
= *VILLOSA (FRIERSONIA) IRIDELLA* P. & F.
Nautilus 22 (8): 81 (figures in 21, pl. 12, 1907).

Type loc.: The same as *Leptodea fimbriata*.

Type lot: three paratypes, collected by A.A. Hinkley (1906?). One male is 65 mm. long; the smaller 37 mm.) Type in ANSP.

Friersonia was founded on the anatomy, especially the pointed posterior of the marsupium and the recurved ovisacs. Regarding the inner laminae of the inner gills connected with the abdominal sac, the feature is the same as in *Villosa*. The shell, Ortmann observed, 'shows nothing very characteristic.' In the paratypes at hand I found remarkable similarities in shape, internal and external color, rays, lines of growth seen on the inside, with *Villosa iris*. Beak sculpture is the same in *Friersonia* and *Villosa*, although somewhat accentuated in the first.

Micromya Agassiz 1852 was preoccupied for Insects, and replaced by *Villosa* (Frierson) by Clench and Turner 1956, with *Unio villosa* Wright as type. Taking into consideration the light anatomical differences, *Friersonia* should be ranked as a subgenus rather than a genus, with southernmost distribution.

Micromya ortmanni Walker, 1925
= *VILLOSA ORTMANNI* (Walker)
Occ. Papers MZUM 163: 1, pl. 1, figs. 1-6.

Type loc.: Green River, Mammoth Cave, Kentucky.

Type lot: one paratype, female, from type loc. CM 61.11246, collected Ortmann 1921. Other two lots, 2 females and 2 males from Great Onyx Cave, Edmondson Co. also collected by Ortmann in 1922; and 3, 1 male and 2 females from Barren River, Bowling Green. Warren Co., Ky. collected in 1924. All these materials were mentioned by Walker in the description and considered paratypes.

Truncilla walkeri Wilson & Clark 1914
= *DYSNOMIA WALKERI* (W. & C.)

Bureau of Fish. Docum. 781: 46.

Type lot: four paratypes (2 males and 2 females) from Bryant Walker Coll., CM 61. 6769. This lot was labelled by Ortmann *Dysnomia florentina walkeri*.

The species *florentina* differs considerably in its smaller size, short, very solid, stout and very inflated shape, with larger umbonal area. *D. walkeri*, instead, is transitional between *D. rangiana* and *D. capsaeformis*, closer to the first by its colors, internal and external, and to second approaches by its shape, especially when large specimens are compared; it is, nevertheless, a form distinct from these two, and the valuable characteristics are of the same degree as those used to distinguish among other species of *Dysnomia*.

It would require a discussion beyond the scope of this paper to decide upon the subgeneric position of this *Dysnomia*, a matter on which a great deal of confusion prevails. The differences among the seven or more subgenera which have been named, by Rafinesque, Simpson, Ortmann, and Frierson, all appear to me not much above their specific values. There is also the question of priority between *Dysnomia* Agassiz 1859 and *Epioblasma* Rafinesque 1831; the revival of *Epioblasma* by Frierson in 1914 was accepted by Thiele 1935; Ortmann has said (1922: 71) that *E. biloba* Raf., as type of *Epioblasma*, was unrecognizable, but afterwards he and other authors placed *biloba* as a synonym of *foliata-flexuosa*

(type of *Dysnomia*); it is obvious that any species name must be recognized before it is placed into synonymy, since *nomina nuda* do not preoccupy or synonymize. However, the name *Epioblasma* had not been used for 83 years before Frierson tried to revalidate it, while the better known *Dysnomia* was recognized by Simpson 1900, Walker 1918, Ortmann 1922 and Modell 1964. We have here, an identical case as that of *Crenodonta* versus *Amblema* (of which, fortunately, the I.C.Z.N. decided, 1965, that *Amblema* should be the valid name). It is desirable that *Epioblasma* be declared a *nomen oblitum*.

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somewhat like *M. catenaria*, Say, but may be distinguished at once by the number of striæ.— *Lea.*

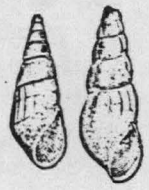
This beautiful species being poorly represented by Mr. Lea's figure I have had drawn a specimen named by Mr. Lea in museum of Mr. Anthony and also a younger shell in museum of Mr. Haldeman.

76. G. difficilis, Lea.

Goniobasis difficilis, Lea, Proc. Acad. Nat. Sci., p 257, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 317, t. 37, f. 163, March, 1863. Obs., ix, p. 139.

Description.—Shell folded, somewhat attenuate, dark olive or brownish, rather thin, without bands; spire attenuate, sharp pointed; sutures regularly impressed; whorls about eight, slightly convex; aperture rather small, ovately rhomboidal, whitish within; outer lip acute, subsinuous; columella bent in, thickened and twisted.

Fig. 387. Fig. 388.



Habitat.— Tennessee; Dr. Edgar.

Diameter, ·31; length, ·82 of an inch.

Observations.— This is one of the *Melania* (*Goniobasis*) *Deshayesiana* group, and is nearly allied to *sparus*, herein described, but may at once be distinguished from that species by being flatter on the whorls, and by being of a darker color. There is but a single adult specimen before me, the apical whorls of which are eroded. Some of the young specimens are perfect to the apex, and the upper whorls present close folds slightly curved and decussate, with revolving striæ. These are hardly perceptible on the adult specimen. In outline it resembles *Melania* (*Goniobasis*) *columella* (nobis), but differs in the color and in the form of the lower part of the columella. The aperture is about one-third the length of the shell.— *Lea.*

This shell is somewhat like *G. glauca*, but the whorls are more convex. Except in the shell being more cylindrical, *baculum* is closely related to it.

77. G. sparus, Lea.

Goniobasis sparus, Lea, Proc. Acad. Nat. Sci., p. 267, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 316, t. 37, f. 162, March, 1863. Obs., ix, p. 138.

Goniobasis cerea, Lea, Proc. Acad. Nat. Sci., p. 268, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 321, t. 38, f. 171, March, 1863. Obs., ix, p. 143.

Description.— Shell folded, somewhat drawn out, pale yellow, somewhat thick, without bands; spire attenuate, sharp-pointed; sutures irregularly impressed; whorls eight, slightly convex; aperture rather large, ovately rhomboidal, white within; outer lip acute, sinuous; columella somewhat bent in, yellow above and white below, twisted.

Fig. 389.

Habitat.— Tennessee; Dr. Currey and President Lindsley.

Diameter, ·28; length, ·74 of an inch.

Observations.— This is a graceful, sharp-pointed species, closely allied to *Deshayesiana* (nobis), but is rather more slender, is a little more inflated below the sutures and is rather more solid in its structure. It has the same striæ along the upper part of the whorls which decussate the folds. It is more ovate in the aperture, the base not being so angular. The folds on the upper whorls are close and well defined, but disappear below. They are slightly curved, and the aperture is about one-third the length of the shell.— *Lea.*

The following is a younger shell.

Goniobasis cerea.— Shell folded, conical, rather thin, wax-colored, without bands; spire conical; sutures impressed; whorls six, somewhat convex, with small folds; aperture rather large, elongately rhomboidal, whitish within; outer lip acute, sinuous; columella bent in and twisted.

Fig. 390.

Habitat.— Tennessee; Prof. Troost: and Duck Creek, Tennessee; J. Clark.

Diameter, ·26; length, ·64 of an inch.

Observations.— Two specimens only are before me. That from Mr. Clark, which I believe was collected by Prof. Christy, is of a lighter color than the other, which is brownish and may even prove to be a distinct species, as it is slimmer and is rather smaller in the aperture. The folds are delicate, inclining to the right, and do not reach to the body-whorl. There are indistinct striæ on the upper part of the whorls decussating the folds. It is about the size and nearly the same outline as *inoscultata*, herein described, but that is a carinate species with a somewhat differently formed aperture. The aperture is more than one-fourth the length of the shell.—*Lea.*

78. G. Thorntonii, LEA.

Goniobasis Thorntonii, LEA, Proc. Acad. Nat. Sci., p. 268, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 320, t. 38, f. 168, March, 1863. Obs., ix, p. 142.

Description.— Shell roughly folded, conical, rather thin, horn-color, without bands; spire conical; sutures irregularly and very much impressed; whorls slightly convex, clothed with distant bent folds; aperture rather large, rhomboidal, white within; outer lip acute, sinuous; columella somewhat bent in and twisted.

Fig 391.

Operculum ovate, thin, brown, with the polar point one-third from the base on the left of the centre.

Habitat.— Tuscumbia; L. B. Thornton, Esq.: Florence, Alabama; Rev. G. White.

Diameter, ·38; length, ·87 of an inch.

Observations.— Some dozen specimens, most of them imperfect are before me. The number of whorls could not be ascertained— probably eight. The folds are large, distant and curving to the right; about the middle of a whorl there is a line which decussates the fold, making a node. It belongs to the group of which *Melania* (*Goniobasis*) *costulata* (nobis), may be considered the type, and it closely resembles *Lindsleyi*, herein described, but differs in not being cylindrical, in having larger and more distinct ribs and and a larger aperture. The aperture is rather more than one-third the length of the shell. I name this after L. B. Thornton, Esq., Attorney at Law, Tuscumbia, who very kindly has sent to me many fine specimens from his vicinity.— *Lea.*

79. G. cancellata, SAY.

Melania cancellata, SAY, New Harmony Disseminator, p. 260, Aug., 1829. SAY'S Reprint, p. 16. BINNEY'S edit., p. 141. BINNEY, Check List, No. 46. DEKAY, Moll., N. Y., p. 93. WHEATLEY, Cat. Shells, U. S., p. 24.
Elimia cancellata, Say, ADAMS, Genera, i, No. 84

Description.— Shell rather slender, attenuated; volutions convex, with about twenty-six, reclivate, longitudinal, elevated lines, crossed by about eighteen revolving ones, the eight or nine towards the base crowded.

Length, more than four-fifths of an inch.

Habitat.— Florida.

Observations.— For this shell I am indebted to Captain Le Conte, who informed me that he obtained it in St. John's River. It differs

from all other species in the numerous, longitudinal and transverse, elevated lines, with the exception of the *catenaria* (nobis), than which it is of a much more elongated and attenuated form.— *Say.*

I have not been able to procure a specimen of this shell. Does it = *curvicostata*, Anthony?

80. G. circincta, LEA.

Melania circincta, LEA, Philos. Proc., ii, p. 15, Feb., 1841. Philos. Trans., viii, p. 187, t. 6, f. 51. Obs., iii, p. 23. DEKAY, Moll., N. Y., p. 99. TROOST, Cat. Shells, Tenn. WHEATLEY, Cat. Shells, U. S., p. 24. CATLOW, Conch. Nomenc., p. 186. BROT, List, p. 31. REEVE, Monog. Melania, sp. 289.
Melania circinnata, Lea. BINNEY, Check List, No. 54.
Juga circinnata, Lea, CHENU, Man. de Conchyl., i, f. 2015. ADAMS, Genera, i, p. 294.

Description.— Shell striate above, turreted, rather thin, pale yellow, banded; spire drawn out; sutures small; whorls nine, slightly convex, carinate in the middle; aperture rather small, elliptical, angular at the base, and white within.

Fig. 392.

Habitat.— Tennessee.

Diameter, ·35; length, ·90 of an inch.

Observations.— This beautiful species is peculiar for its pale yellow ground and broad band, which is placed immediately upon the carina. A very indistinct band may be observed below the carina, where in some individuals may also be observed a few striæ. In some, the striæ on the superior part of the shell are accompanied by indistinct ribs. —*Lea.*

Except in the development of the carina, and in being longer, this species resembles *G. laqueata*, Say.

81. G. athleta, ANTHONY.

Melania athleta, ANTHONY, Ann. Lyc. Nat. Hist. N. Y., vi, p. 83, t. 2, f. 1, March, 1854. BINNEY, Check List No. 23. BROT, List, p. 34. REEVE, Monog. Mel., sp. 258.
Melania glauca, ANTHONY, Proc. Acad. Nat. Sci., p. 57, Feb., 1860. BINNEY, Check List, No. 125. BROT, List, p. 35. REEVE, Monog. Melania, sp. 389.
Goniobasis Lyonii, LEA, Proc. Acad. Nat. Sci., p. 265. Jour. Acad. Nat. Sci., v, pt. 3, p. 313, t. 37, f. 136, March, 1863. Obs., ix, p. 135.

Description.— Shell conical, nearly smooth, dark horn-color; spire much elevated; whorls ten, nearly flat, with faint, longitudinal ribs, most distinct on the upper part of the whorls; sutures well marked;

aperture small, ovate, within whitish, tinged near the base with rose; columella rounded, and forming a slight sinus at base.

Fig. 393.

Diameter, ·40 of an inch (10 millim.); length, 1·35 inches 32 (millim). Length of aperture, ·40 (10 millim.); breadth of aperture, ·23 of an inch (6 millim.).

Habitat.— Tennessee.

Observations.—A stout species, and one of the most beautiful with which I am acquainted. The ribs are not strongly expressed, and on the lower whorls are nearly obsolete, having there the appearance of striæ of growth merely; body-whorl a little angulated at base.— *Anthony.*

Figured from the type specimen.

Melania glauca.— Shell conical, folded, of a green color in the lower whorls, often modified by a brown tinge on the upper ones; whorls ten, slightly convex, with prominent longitudinal ribs, obsolete on the body-whorl; sutures well defined, but not deeply marked; aperture ovate, livid within and with occasionally a faint, rosy tinge there; columella angulated at the middle; sinus well defined.

Fig. 394.

Habitat.— Tennessee.

Observations.— A stout species, with prominent, curved ribs on all the upper whorls, those on the body-whorl being less clearly defined or else absolutely wanting. Color a beautiful apple-green, relieved by a broad, yellow band near the suture; and this color often passes into a yellowish-brown on the upper whorls. Near the apex, the folds are often traversed by four or five prominent striæ, which pass over without being interrupted by the longitudinal ribs. May be compared with *M. viridula* (nobis) as to color, but is less slender, and the ribs at once distinguish it.— *Anthony.*

The figure, which is a very poor one, represents the type specimen. The species is better illustrated by the figure of *G. Lyonii*, which is a synonyme. The following is a description of the latter

Goniobasis Lyonii.— Shell folded, striate above, carinate at the apex, yellowish, very thin, very much drawn out; spire attenuate, sharp-pointed; sutures irregularly impressed; whorls nine, slightly

convex; aperture rather small, subrhomboidal, whitish within; outer lip acute, sinuous; columella bent in, thickened and slightly twisted.

Habitat.— Grayson County, Kentucky; S. S. Lyon.

Diameter, ·30; length, ·92 of an inch.

Fig. 395.

Observations.— A single specimen of this species was among the *Melanidæ* collected by Mr. Lyon in the geological survey of Kentucky. It was accompanied by *Melania* (*Goniobasis*) *Deshayesiana* (nobis), to which it is closely allied in some of its characters. It differs in having two or three more whorls, in being more cancellate above, by the striæ decussating the longitudinal ribs, and particularly in the lower part of the columella being nearly straight, while that part in *Deshayesiana* is oblique to the right. The ribs are pretty close and slightly curved, the inner margin of the outer lip is slightly thickened. The aperture is rather less than one-third the length of the shell. I dedicate this with great pleasure to Mr. Lyon, civil engineer and state geologist.— *Lea.*

82. G. curvicostata, ANTHONY.

Melania curvicostata, ANTHONY, MSS. REEVE, Monog. Melania, sp. 462. BROT, List, p. 35.
Melania densecostata, REEVE, Monog. Melania, sp. 465. BROT, List, p. 35.

Description.— Shell ovately turreted, livid olive, encircled towards the apex with a reddish line, whorls convex, longitudinally, plicately ribbed, ribs curved, gradually fading towards the aperture; aperture ovate, slightly effused at the base, interior tinged with purple.

Fig. 396.

Habitat.— Florida, United States.— *Reeve.*

Fig. 397.

The following appears to me to be the same species.

Melania densicostata.— Shell subulately turreted, burnt olive, whorls eight to nine, rather flat, longitudinally, densely plicately ribbed, the last obtusely angled; aperture rather small, ovate, interior very faintly tinged with purple.

Habitat.— Florida, United States.

This interesting little species is of the same type as *M. curvicostata*, just described, but the ribs are stout and comparatively straight, ending abruptly on an obtuse angle of the last whorl.— *Reeve.*

83. G. striatula, Lea.

Melania striata, Lea, Philos. Proc., ii, p. 15, Feb., 1841. Philos. Trans., viii, p. 186, t. 6, f. 49. Obs., iii, p. 24. Troost, Cat. Shells, Tenn. Wheatley, Cat. Shells, U. S., p.

Juga striata, Lea, Chenu, Man. de Conchyl., i. f. 2013. Adams, Genera, i, p. 304.

Melania striatula, Lea, Philos. Proc., ii, p. 237, Dec., 1842. Philos. Trans., viii, p. 248, Obs., iii, p. 83. DeKay, Moll. New York, p. 99. Jay, Cat. 4th edit., p. 273. Binney, Check List, No. 219. Catlow, Conch. Nomenc., p. 188. Reeve, Monog. Melania, sp. 466. Brot, List, p. 35.

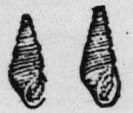
Description.—Shell striate, conical, rather thin, dark brown, carinate above; spire somewhat elevated; sutures impressed; whorls eight, convex; aperture small, elliptical, within reddish.

Habitat.—Tennessee.

Diameter, ·21; length, ·49 of an inch.

Observations.—Rather a small species of a dark reddish-brown. In some individuals the folds are numerous. In others the striæ predominate and cover nearly all the whorls. The aperture is rather more than one-third the length of the shell.—*Lea.*

Fig. 398. Fig. 399.



This shell was originally described under the name of *striata*, but finding that name to be preoccupied, Mr. Lea subsequently changed it to *striatula*. Mr. Reeve's figure is not a good representation of the shell.

84. G. tripartita, Reeve.

Melania tripartita, Reeve, Monog. Melania, sp. 364, Dec., 1860. Brot, List, p. 37.

Description.—Shell acuminated, olive; whorls eight to nine, somewhat rounded, spirally, distantly ridged, the first few strongly keeled, then longitudinally, plicately ribbed, afterwards smooth; aperture small, semilunar.

Fig. 400.

Habitat.— ——?

Observations.—This is without doubt, a United States species, but I know of none with which it can be satisfactorily identified.—*Reeve.*

The figure is copied from Mr. Reeve's plate. I do not recognize the species, although it approaches closely to several others of the present group.

85. G. decora, Lea.

Melania decora, Lea, Philos. Proc., ii, p. 14, Feb., 1841. Philos. Trans., viii, p 181, t. 6, f. 38. Obs., iii, p. 19. DeKay, Moll., N. Y., p. 98. Binney, Check List, No. 85. Troost, Cat. Shells, Tenn. Wheatley, Cat. Shells, U. S., p. 25. Reeve, Monog. Melania, sp. 292. Catlow, Conch. Nomenc., p. 186. Brot, List, p. 35.

Description.—Shell folded, acutely turreted, rather thin, horn-color, above striate; spire acute, elevated; sutures impressed; whorls nine, rather flattened; aperture small, elliptical, whitish.

Fig. 401.

Habitat.—Tennessee: Green River, Kentucky.

Diameter, ·26; length, ·82 of an inch.

Observations.—This species resembles *M. costulata*, herein described. It is, however, more elevated in the spire, and the folds are closer. On the two lower whorls the folds become obsolete.—*Lea.*

Reeve's figure is either a very poor one or it does not represent this species. It is scarcely necessary to add that his locality "Niagara" is entirely wrong, as no plicate species is found there.

86. G. crebricostata, Lea.

Melania crebricostata, Lea, Philos. Proc., ii, p. 13, Feb., 1841. Philos. Trans., viii, p. 179, t. 6, f. 35. Obs., iii, p. 17. DeKay, Moll., New York, p. 97. Jay, Cat. 4th edit., p. 273. Troost, Cat. Shells, Tenn. Wheatley, Cat. Shells, U. S., p. 24. Reeve, Monog. Melania, sp. 374. Binney, Check List, No. 74. Brot, List, p. 35.

Melasma crebricostata, Lea, Chenu, Man. de Conchyl., i, f. 1999. Adams, Genera, i, p. 300.

Description.—Shell closely folded, conical, rather thick, horn-color; spire elevated; sutures linear; whorls seven, flattened; aperture small, elliptical, below angular, bluish.

Fig. 402.

Habitat.—Robinson County, Tennessee.

Diameter, ·28; length, ·90 of an inch.

Observations.—This is rather a slender shell, and is peculiar for its numerous folds, which are slightly curved and parallel. They extend over the whole shell, except the inferior half of the body-whorl. The aperture is about one-third the length of the shell.—*Lea.*

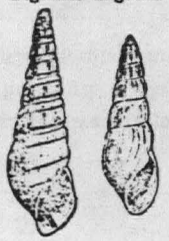
The species is a common one. Dr. Brot suggests that this species should, perhaps, be united with *M. costulata*; I think, however, that they are sufficiently distinct.

87. G. comma, CONRAD.

Melania comma, CONRAD, New Fresh-Water Shells, p. 53, t. 8, f. 7, 1834. WHEATLEY, Cat. Shells, U. S., p. 24. REEVE, Monog. Melania, sp. 107. BINNEY Check List, No. 61. DEKAY, Moll., New York, p. 95. JAY, Cat. 4th edit., p. 273. BROT, List, p. 35. CATLOW, Conch. Nomenc., p. 185. MÜLLER, Synopsis, p. 45.
Melasma comma, Conrad, ADAMS, Genera. i, p. 300.

Description.— Shell subulate, much elongated, slender; whorls eight or nine, flattened, indented at the sutures, with longitudinal, distant, slightly arcuated ribs, disappearing on the lower volutions; labrum thin; aperture elliptical, produced at base; color olive, with a dark band above the middle of each whorl.

Fig. 403. Fig. 404.



Habitat.— Inhabits rivulets which are tributary to the Black Warrior in mountain districts in Alabama.

Observations.— It is greatly elongated, and the ribs are separated by an indented space at the sutures.— *Conrad.*

A slender variety, which we have figured, occurs in Tennessee. The first figure is from the type in collection of Acad. Nat. Sci., Philadelphia. Mr. Haldeman possesses an author's example.

88. G. acuta, LEA.

Melania acuta, LEA, Philos. Trans., iv, p. 101, t. 15, f. 32. Obs., i, p. iii. TROOST. Cat. Shells, Tennessee. WHEATLEY, Cat. Shells, U. S., p. 24. BINNEY, Check List, No. 4. BROT, List, p. 3. REEVE, Monog. Melania, sp. 274.
Ceriphasia acuta, Lea, ADAMS, Genera, i, p. 297.

Description.— Shell acutely turreted, thin, horn-colored; apex acute; whorls eight, carinate immediately above the suture, longitudinally undulated and transversely lineated; base angulated: aperture white, and one-fourth the length of the shell.

Fig. 405.

Habitat.— Tennessee River; Prof. Vanuxem.

Diameter, five-twentieths; length, thirteen-twentieths of an inch.

Observations.— I have seen no described species to which this bears a close resemblance. Its delicate form, furnished with undulations and transverse lines, will easily distinguish it.— *Lea.*

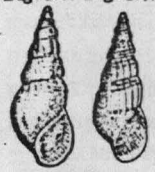
Mr. Say (cover of No. 6 Am. Conch.) says this equals his *Melania semicarinata*, but I can see no good reason to unite them, as that shell has not the longitudinal folds of *acuta*. The specimen figured by Mr. Lea, and here copied, is evidently not mature. A shell closely allied to this species inhabits the Great Lakes, etc., and Mr. Lea and other conchologists labeled it *acuta*. It is *never* plicate and I have described it under the name of *Haldemani*.

89. G. subcylindracea, LEA.

Melania subcylindracea, LEA, Philos. Proc., ii, p. 12, Feb., 1841. Philos. Trans., viii, p. 169, t. 5, f. 14. Obs., iii, p. 7. DEKAY, Moll., New York, p. 94. TROOST, Cat. Shells, Tenn. BINNEY, Check List, No. 253. WHEATLEY, Cat. Shells, U. S., p. 27. CATLOW, Conch. Nomenc., p. 188. BROT, List, p. 39, REEVE, Monog. Melania, sp. 399.
Potadoma subcylindracea, Lea, ADAMS. Genera, i, p. 299.

Description— Shell smooth, subcylindrical, somewhat thick, horn-color; spire obtusely elevated; sutures impressed; whorls convex; aperture small, ovate, whitish.

Fig. 406. Fig. 407.



Habitat.— Tennessee; Dr. Troost.

Diameter, ·32; length, ·85 of an inch.

Observations.— This is a club-shaped species with an aperture about the third of the length of the shell. All the specimens sent by Dr. Troost are more or less decollate.— *Lea.*

Figured from Mr. Lea's plate. Some specimens are more lengthened and cylindrical than the type specimen.

90. G. baculum, ANTHONY.

Melania baculum, ANTHONY, Ann., N. Y. Lyc. Nat. Hist., vi, p. 98, t. 2, f. 16, March 1854. BINNEY, Check List, No. 27. BROT, List, p. 34. REEVE, Monog. Melania, sp. 431.

Description.— Shell conical, thick; of a dull, reddish-brown color, with a lighter shade near the upper part of each whorl. Spire much elevated, not diminishing rapidly as it ascends, and with nearly a rectilinear outline; whorls eight remaining, and with an appearance of having lost several by truncation; hardly convex and with a deeply impressed suture; aperture small, broadly ovate, light red within; columella rounded, indented, with a small sinus.

Diameter, ·48 of an inch (12 millim.); length, 1·28 inches (33 millim.). Length of aperture, ·35 of an inch (9 millim.); breadth of aperture, ·20 of an inch (5 millim.).

Fig. 408.

Observations.—The most striking characteristic of this species is its robust, cylindrical form, combined with its pale sutural region; compared with *M. teres*, Lea, it is much less slender and turreted, much more plicate, and the whorls are less inflated. *M. rufa* is not folded, and is a more acutely elevated species. The curve in the columella resembles that of *M. columella*, Lea, but that shell is much less elongated, has only six whorls, and is destitute of distinct folds.—*Anthony.*

91. G. concinna, Lea.

Melania concinna, Lea, Philos. Proc., ii, p. 14, Feb., 1841. Philos. Trans., viii, p. 183, t, 6, f. 43. Obs., iii, p. 21. DeKay, Moll., New York, p. 98. Troost, Cat. Shells, Tennessee. Wheatley, Cat. Shells, U. S., p. 24. Catlow, Conch. Nomenc., p. 186. Binney, Check List, No. 63. Brot, List, p. 34.
Melasma concinna, Lea, Adams, Genera, i, p. 300.

Description.—Shell folded, acutely turreted, thin, brown; spire drawn out; sutures impressed; whorls nine, carinate, flattened; aperture small, elliptical, angular at base, whitish.

Fig. 409.

Habitat.—Tennessee.

Diameter, ·25; length, ·75 of an inch.

Observations.—A single individual only was received from Dr. Troost. Its mouth is about one-fourth the length of the shell. It is remarkably flattened on the whorls, and the superior part is transversely striate.—*Lea.*

This species resembles *baculum*, but is narrower, smaller, and the plications are closer. It has been extensively distributed by Mr. Anthony as a variety of *comma*. Allied to *eliminata*, but differs in the plicæ, being smaller, also in the form of the mouth: the shell is rather stouter and the body-whorl more angular.

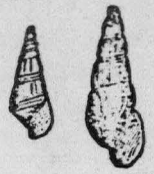
92. G. eliminata, Anthony.

Melania eliminata, Anthony, Ann. New York. Lyc. Nat. Hist., vi, p. 97, t. 2, f. 15, Mar., 1854. Binney, Check List, No. 98. Brot, List, p. 34.

Description.—Shell conic, thin, brownish; spire slender, elevated; whorls about eight, convex, with transverse folds and spiral striæ,

both of which, however, disappear towards the lower portion of each whorl, and are hardly visible on the last whorl; sutures deeply impressed; aperture small, ovate, within translucent, exhibiting the exterior coloring through its substance; columella but little rounded, except near its base, where with the much curved lip it forms a sharp, narrow sinus.

Fig. 410. Fig. 411.



Diameter, ·24 of an inch (6 millim.); length, ·80 of an inch (21 millim.). Length of aperture, ·26 of an inch (7 millim.); breadth of aperture, ·15 of an inch (4 millim.).

Habitat.—Kentucky, near Owenborough.

Observations.—This is a very slender and elevated species, resembling in this respect *M. comma*, Con., from which it differs very materially by the character of its folds and striæ, which are more decided, being nearly as prominent, though less distant than in *M. curreyana*, Lea; the striæ revolve round the whorls and over the ribs without being interrupted by them; differs from *M. Edgariana*, Lea, by its brown color, more slender form, less convex whorls, and thinner texture; it is more slender than *M. decora* or *costulata*, and less acute, the whorls tapering more gradually to the apex; on the upper whorls there are about five striæ, the lowest of which is much more elevated than the others, and the folds are arrested by it near the suture. The penultimate whorl is often subangulated at its base.—*Anthony.*

93. G. teres, Lea.

Melania teres, Lea, Philos. Proc., ii, p. 13, Feb., 1841. Philos. Trans., viii, p. 176. t. 5, f. 27. Obs., iii, p. 14. DeKay, Moll., New York, p. 96. Troost, Cat. Shells, Tenn. Wheatley, Cat. Shells, U. S., p. 27. Binney, Check List, No. 269. Jay, Cat. 4th edit., p. 275. Catlow, Conch. Nomenc., p. 189. Brot, List, p. 35.
Melania terebralis, Lea, Philos. Proc., ii, p. 13, Feb., 1841. Philos. Trans., viii, p. 178, t. 6, f. 32. Obs., iii, p. 16. DeKay, Moll., New York, p. 96. Troost, Cat. Shells, Tenn. Wheatley, Cat. Shells, U. S., p. 27. Binney, Check List, No. 268. Catlow, Conch. Nomenc., p. 189. Brot, List, p. 36.

Description.—Shell folded, acutely turreted, thin, horn-colored; spire drawn out; sutures impressed; whorls nine, convex; aperture small, elliptical, whitish within.

Habitat.—Tennessee.

Diameter, ·25; length, ·87 of an inch.

Observations.—This is a remarkably elevated species, with the

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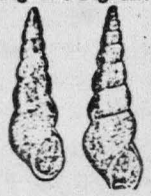
whorls much inflated, and the last whorl very small. Some of the specimens before me are but obscurely folded.—*Lea.*

Fig. 412. Fig. 413.



Figured from Mr. Lea's plate. This is a very distinct species, on account of the great convexity of the whorls.

The following description and figure represents half grown specimens:—

Melania terebralis. — Shell folded, acutely turreted, rather thin, shining, reddish-brown; spire much elevated; sutures much impressed; whorls nine, convex, carinate above; aperture small, elliptical, whitish.

Fig. 414.

Habitat.— Tennessee.

Diameter, ·24; length, ·67 of an inch.

Observations.— This species differs in the form of the folds from any which have come under my notice. These folds are from each other, but slightly raised, and give the shell a distant varicose appearance. The mouth is about the fifth part of the length of the shell.—*Lea.*

94. G. gracillima, Anthony.

Melania gracillima, Anthony, Proc. Acad. Nat. Sci., p. 62, Feb., 1860. Binney, Check List, No. 129. Brot, List, p. 36. Reeve, Monog. Melania, sp. 437.

Description.— Shell conic, thin, brownish; spire very slender, elevated, composed of eight, convex whorls, the upper ones folded and striate, the lower ones smooth, the striæ being replaced by indistinct, slender, brown lines; sutures very deeply impressed, a sharp carina on the lower portion of each whorl, rendering them quite distinct; aperture small, ovate, banded inside; columella indented; sinus small.

Fig. 415. Fig. 416.

Habitat.— South Carolina.

Observations.—A peculiarly slender, graceful species, in form somewhat like *M. strigosa*, Lea, but more folded and more slender. The striæ on the upper whorls are very distinct where they intersect the folds, and give the shell a tuberculous appearance; the folds are arrested by the carina which is elevated. The brown lines on the body-whorl are often slightly elevated, but nevertheless, indistinct and are about four in number. A faint line or band of a yellow color revolves around the upper portion of the two lower whorls.— *Anthony.*

95. G. Clarkii, Lea.

Melania Clarkii, Lea, Philos. Trans., x, p. 297, t. 30. f. 4. Obs., v, p. 53. Binney, Check List, No. 56. Brot, List, p. 34. Reeve, Monog. Melania, sp. 356.

Description.— Shell folded, club-shaped, rather thin, dark brown; spire elevated, drawn out; sutures somewhat impressed; whorls flattened; aperture small, rather elliptical, at the base angular, within dark; columella twisted.

Fig. 417.

Habitat.— Duck Creek, Tennessee.

Diameter, ·23; length, ·73 of an inch.

Observations.— The form of this species is more attenuate than usual, with the clavate forms. It has about ten whorls; those above the body-whorl being disposed to be both plicate and striate. Towards the apex they are all thickly striate. On all the specimens before me, on the lower whorls, there are irregular, oblique striæ, somewhat similar to those on the *M. Ocoëensis* (nobis), which give them a mallcate character. On the upper margin of the whorls, along the sutures, there is usually an indistinct, light line. The outer lip is broken.— *Lea.*

Figured from Mr. Lea's plate. Specimens before me differ somewhat in the closeness of the plicæ. Some are even more attenuately lengthened than Mr. Lea's figure. This is the narrowest species inhabiting North America. In collection of Mr. Gould are specimens from Lee County, Georgia.

96. G. De Campii, Lea.

Goniobasis De Campii, Lea, Proc. Acad. Nat. Sci., p. 154, May, 1863.

Description.— Shell plicate, striate below, greatly attenuated, thin, corneous, without bands; spire subulate; sutures linear, impressed; whorls fully ten, subconvex, above with slightly bent plicæ; aperture very small, subrhomboidal, whitish within; lip acute, somewhat sinuous; columella whitish, incurved and twisted.

Fig. 418.

Habitat.— Huntsville, Alabama; Wm. H. De Camp, M.D., surgeon, United States army.—*Lea.*

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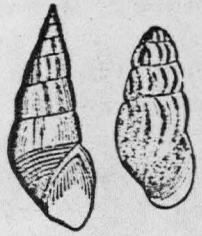
97. G. plicifera, Lea.

Melania plicifera, Lea, Philos. Trans., vi, p. 93, t. 23, f. 90. Obs., ii, p. 93. Wheatley, Cat. Shells, U. S., p. 26. Jay, Cat., 4th edit., p. 274. Binney, Check List, No. 211. Reeve, Monog. Melania, sp. 284. Cooper, Report, p. 374. Brot, List, p. 36. Gould, Moll. Expl. Exped., p. 143, f. 165. Troschel, Archiv, fur Naturgesch., ii, p. 227.

Melasma plicifera, Lea, Chenu, Manuel, i, f. 2001. Adams, Genera, i, p. 300.

Description.— Shell acutely turreted, rather thick, nearly black; spire full of folds; apex truncate; whorls somewhat convex, the last being smooth above and striate below; aperture white.

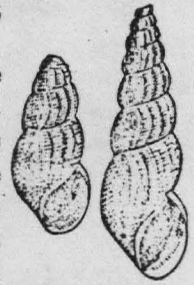
Fig. 419. Fig. 420.



Habitat.— Wahlamat, near its junction with the Columbia River; Prof. Nuttall.

Diameter, ·4 of an inch; length, 1·1 inches.

Fig. 421. Fig. 422.



Observations. — Among the fine shells brought by Prof. Nuttall from beyond the Rocky Mountains, was this single species of *Melania*. It is remarkable for its numerous folds, or ribs, which fill the superior whorls. The inferior whorl is entirely without these ribs, but the inferior portion is furnished with transverse striæ. I am indebted to Prof. Nuttall for many specimens of this shell, all of which are more or less truncate at the apex. The most perfect one, which is small, has nine whorls.— *Lea.*

This is an exceedingly common and variable species, and I give several figures of its most usual forms. Occasionally the shell is thickly striate, with folds on the upper whorls only.

Dr. Gould, in the Mollusca of the United States Exploring Expedition says of this species:—

"This shell seems to be subject to great variety, or else these are several allied species. The typical shell has the spire elongated, pointed, and the whorls flattened, with coarse, longitudinal folds. Others are surrounded by numerous, raised lines, and are nearly destitute of folds. A variety from Lake George (Oregon) must be very corpulent. It is much decollated, and is light and thin. Whorls convex; aperture rounded, ovate; lip very flexuous, having a sinus posteriorly, and a very deep one at the point of the columella; color pale olive-green. Even the little *M. siliqua* may be only a starved specimen of the Nisqually variety. All have a varix half a volution from the mouth."

Fig. 422, Lake George specimen.

98. G. silicula, Gould.

Melania silicula Gould, Bost. Proc., ii, p. 224, June, 1847. Otia Conchologica, p. 46. Moll. Expl. Exped., p. 141, f. 164, 164a. Cooper, Report, p. 374. Binney, Check List, No. 243. Brot, List, p. 52.

Juga silicula, Gould, Adams, Genera, i, p. 304.

Melania Shastaensis, Lea, Proc. Acad. Nat. Sci., viii, p. 80, April, 1856. Binney, Check List, No. 242. Cooper, Report, p. 374.

Goniobasis Shastaensis, Lea, Jour. Acad. Nat. Sci., v, pt. 3, p. 337, t. 38, f. 199, March, 1863. Obs., ix, p, 159.

Melania rudens, Reeve, Monog. Melania, sp. 224, May, 1860. Brot, List, p.

Description.— A small, slender, nearly cylindrical species, covered with a somewhat clouded, dark chestnut epidermis. There are about four, entire whorls, several others being lost from the tip; they are well rounded, and marked with numerous, fine, revolving threads, and all but the two largest ones are longitudinally plaited. The aperture is small, rounded-ovate, scarcely produced in front, and about one-fourth the length of the shell. The throat has a pale violet tint. The last whorl has a dark, narrow band around it, just at the junction of the lip of it.

Fig. 423.

Length, one-half; breadth, one-fifth of an inch.

Habitat.— Nisqually, Oregon.

Observations.— It resembles *M. proxima*, Say, which is less cylindrical and without folds.— *Gould.*

Melania silicula.— Shell small, graceful, subcylindrical, truncated; epidermis chestnut-brown; spire of four remaining whorls, rounded, spirally lirate, the upper longitudinally plicate; the last whorl banded with brown; sutures well impressed; aperture roundly ovate, scarcely produced in front; pale violaceous.

Longitude one-half; latitude, one-fifth poll.

Habitat.— Nisqually, Oregon.— *Gould.*

This species differs much from *plicifera* in being more narrowly cylindrical, the whorls, generally, but not always, more convex, and especially in the broad band. It is a beautiful and numerous species, extending to all parts of Oregon and California. Dr. Gould's description refers to a young shell, of which *G. Shastaensis*, Lea is the adult. *Melania rudens* of

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Reeve is a more rugose variety of the same species. The *M. Shastaensis* of Reeve, sp. 318, is a good figure of *G. occata*, Hinds.

Melania Shastaensis.—Shell striate, subcylindrical, rather thin, dark horn-color, banded; spire elevated, folded at the apex; sutures very much impressed; whorls convex; aperture small, ovate, white within; columella smooth, incurved and recurved.

Operculum ovate, the polar point being near the left side and below the middle.

Habitat.—Shasta and Scott Rivers, California; Dr. Trask: and Fort Umpqua, O. T., Smithsonian Institution.

Diameter, ·34 of an inch; length, 1·05 inches.

Observations.—Nearly thirty specimens of this species were kindly sent to me by Dr. Trask. The form and size of this species is very much the same as *Melania* (*Goniobasis*) *Virginica*, Say. It differs in the form of the aperture, in having but a single, revolving, wide band, and in being more cylindrical. The *Shastaensis* varies like the *Virginica*, in being very uncertain as to striation. Some of the specimens are covered with minute, revolving striæ, while others are almost entirely destitute of them. In every specimen before me there is a broad, revolving, brown band on the middle of the whorls, more or less distinct, and always with more intense color on the superior whorls. This band often becomes obsolete on the inferior whorls, but when that is not the case it may be seen within the aperture also. A few of the specimens have the columella slightly purple. Every specimen in my possession has the apex eroded, so that the number of whorls cannot be with certainty stated. I should suppose the number to be nine or ten. Some of them are sufficiently perfect to show several upper whorls with regular folds. The aperture is probably rather more than one-fourth the length of the shell.—*Lea.*

Fig. 424.

Fig. 425.

Melania rudens.—Shell narrowly turriculated, dull olive; whorls rounded, constricted at the sutures, spirally ridged, striated, the first strongly, concentrically plicated; aperture small, rounded.

Habitat.— ——?

Observations.—Strongly characterized by the constricted sutures and by the rib-like plications of the earlier whorls.—*Reeve.*

99. G. nigrina, Lea.

Melania nigrina, Lea, Proc. Acad. Nat. Sci., p. 80, April, 1836.
Goniobasis nigrina, Lea, Jour. Acad. Nat. Sci., v, pt. 3, p. 302, t. 37, f. 137, March, 1863. Obs., ix, p. 121. Binney, Check List, No. 177.

Description.—Shell smooth, small, conical, rather thin, nearly black, polished; spire somewhat elevated; sutures impressed; whorls regularly convex; aperture small, ovate, angular above, dark purple within; columella incurved, purple.

Operculum dark brown, the polar point being low down and near to the left margin.

Habitat.—Clear Creek, Shasta County, California; Dr. Trask.

Diameter, ·23; length, ·67 of an inch.

Observations.—A number of good specimens, with their opercula, were sent to me by Dr. Trask. In form, size and color this species is very like to *Melania semicarinata*, Say, from Georgia and South Carolina. It may be distinguished at once by not having the carination of that species, which is usually strongly marked. It is not quite so high in the spire, and the aperture is more rounded at the base. In all the specimens of *nigrina*, which I received, the apex is worn off. In the half grown ones I can see no disposition to carination or plication in the upper whorls. I should suppose that in perfect specimens the number of whorls would be found to be about seven, and that the aperture would be about the third of the length of the shell. In some of the specimens there is a disposition to put on a few, fine striæ, and in most of them there is a very small, angular line running below the suture. I am not acquainted with Dr. Gould's *Melania silicula* and *bulbosa* from Oregon, described in the Proc. Boston Soc. Nat. Hist., July, 1847; but from the descriptions I have no doubt that they are different from both species therein described.—*Lea.*

Fig. 426.

The upper whorls of this species are sometimes plicate. The shell is like *silicula* in form, but is rather more cylindrical, of a darker color, shaded with red internally. It is particularly distinguished by the carinated upper whorls.

This is not the *nigrina* of Reeve's Conch. Icon., that species being the *nigrocincta*, Anth., as Mr. Reeve states in his "errata."

100. G. rubiginosa, LEA.

Goniobasis rubiginosa, LEA, Proc. Acad. Nat. Sci., p. 270, 1862. Journ. Acad. Nat. Sci., v, pt. 3, p. 333, t. 38, f. 193, March, 1863. Obs., ix, p. 155.

Description.— Shell carinate, somewhat awl-shaped, rather thin, shining, reddish, obscurely banded; spire subattenuate; sutures very much impressed; whorls about six, convex; aperture very small, subrhomboidal, pale reddish and obscurely double-banded within; outer lip acute, sinuous; columella slightly bent in and twisted.

Operculum broadly ovate, dark brown, with the polar point near the left margin above the base.

Habitat.— Oregon; W. Newcomb, M.D.

Diameter, ·27; length, ·74 of an inch.

Observations.— Two specimens only were sent to me by Dr. W. Newcomb. The four upper whorls are carinate, and a small, thread-like line below runs parallel with the more raised one. The two obscure bands are near to each other and are in the middle of the whorl. In outline it is near to *Melania* (*Goniobasis*) *nigrina* (nobis), but it is a larger species with a less polished surface and of a very much lighter color. It differs entirely in being carinate. In both these specimens the whorls are slightly depressed below the suture, which modifies the outer lip. One of the specimens has an obscure, brownish spot inside at the base of the columella. The aperture is about two-sevenths the length of the shell.— *Lea.*

Fig. 427. Fig. 428.

Mr. Lea's figure, of which the accompanying one (Fig. 427) is a copy, does not exhibit plicæ on the spire, nor does his description mention their existence, still I am convinced that when specimens with more perfect spires are discovered, they will, in common with the other lengthened species, exhibit this character. Except in the character of the carinated upper whorls this shell is allied to *Shastaensis*.

101. G. Bairdiana, LEA.

Goniobasis Bairdiana, LEA, Proc. Acad. Nat. Sci., p. 267, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 317, t. 37, f. 164, March, 1863. Obs., ix, p. 139, t. 37, f. 164.

Description.—Shell folded, somewhat drawn out, dark brown, rather thick, single-banded; whorls subattenuate, sharp-pointed; sutures impressed; whorls eight, slightly convex; aperture rather small, ovately rhomboidal, whitish within and single-banded; outer lip scarcely sinuous; columella bent in, somewhat thickened and very much twisted.

Habitat.— Columbia River at Fort George, Oregon; J. Drayton.

Diameter, ·26; length, ·66 of an inch.

Observations.— In size, color and outline this is nearly allied to *Draytonii*, herein described, but may at once be distinguished by that species having no folds, and in being more convex in the whorls. It cannot be confounded with *Melania* (*Goniobasis*) *Newberryii* (nobis), which is shorter, more inflated, and has two bands. The *Bairdiana* has five or six apical whorls, furnished with close, regular, well formed, perpendicular folds. The lower whorls have two or three very minute, revolving striæ immediately below the suture, where the color is lighter. There is a disposition to thickening on the inner margin of the outer lip, and along this edge a little coloring of brown is observable. The aperture is nearly the third of the length of the shell. I have great pleasure in dedicating this interesting little species to my friend, Prof. Spencer F. Baird of the Smithsonian Institution, to whom I am greatly indebted for many kind services, and who has done so much for the advancement of the Natural Sciences of our country.— *Lea.*

Fig. 429.

This species differs very much in form from the others inhabiting the Pacific States.

D. *Shell angulate.*

102. G. trochiformis, CONRAD.

Melania trochiformis, CONRAD, New Fresh-Water Shells, p. 56, t. 8, f. 11, 1834. DEKAY, Moll., New York, p. 100. WHEATLEY, Cat. Shells, U. S., p. 27. BINNEY, Check List, No. 275. BROT, List, p. 31. MÜLLER, Synopsis, p. 47.

Description.— Shell short, conical, ventricose, turreted; two spiral, prominent lines on each whorl, the intervening spaces concave; summit of the whorls flattened, angulated; body-whorl angular, with the periphery carinated; base flattened; aperture small; labrum angulated in the middle.

Fig. 430.

Habitat.— Streams in North Alabama.

Observations.— A species easily recognized by its strong ribs, or by its sulci, and its trochiform shape.— *Conrad.*

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The figure is a copy of that in Mr. Conrad's work. It is evidently a very poor one, however. It is probable this will prove to be identical with Mr. Anthony's *T. cristata*.

103. G. cristata, ANTHONY.

Melania cristata, ANTHONY, Ann. Lyc. Nat. Hist. N. Y., vi, p. 108, t. 3, f. 8, March, 1854. BINNEY, Check List, No. 77. BROT, List, p. 32. REEVE, Monog. Melania, sp. 413.

Description.— Shell carinate on the body-whorl, rhomboidal; thin, horn-colored; upper whorls not carinate, but somewhat shouldered; whorls five, flat, slightly concave, diminishing rapidly to the apex; sutures not remarkable; body-whorl with a strong, well developed carina, extending from the upper part of the aperture, and revolving round so as to be at its centre when it reaches the mouth again. The carina and a smaller one below it are indicated in the interior by a grooved channel with a dark band running through it; aperture rhomboidal, banded within; columella straight, with an acute sinus at base.

Fig. 431. Fig. 432.

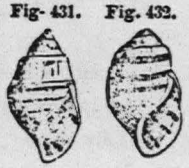

Fig. 433. Fig. 434.

Habitat.— Alabama.

Diameter, ·34 (9 millim.); length, ·50 of an inch (13 millim.). Length of aperture, ·30 (8 millim.); breadth of aperture, ·16 of an inch (4 millim.)

Observations.— Only one specimen of this remarkable species has come under my notice, but it is so widely different from all others that no one can for a moment doubt its distinctive character. The upper whorls are obscurely banded near the suture.— *Anthony.*

Fig. 434 is from the type specimen. It is not an adult, and is also a malformation. The succeeding figures represent different varieties and ages. The carination appears to be lost in an obscure angle on the periphery of the adult shell.

104. G. cruda, LEA.

Goniobasis cruda, LEA, Proc. Acad. Nat. Sci., p. 270, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 332, t. 38, f. 190, March, 1863. Obs., ix, p. 151.

Description.— Shell carinate, subfusiform, rather thin, shining, dark brown, obscurely banded; spire obtuse; sutures slightly impressed; whorls flattened above, the last one large; aperture rather large, rhomboidal, dark within; outer lip acute, scarcely sinuous; columella slightly incurved, scarcely thickened.

Habitat.—Tennessee River; Dr. Spillman.

Diameter, ·38; length, ·68 of an inch.

Observations.— Only two specimens were received from Dr. Spillman, both much worn at the apex. Two of the lower whorls only are perfect. The bands on both are imperfect and obscure. They may be considered to be three, one being on the periphery of the whorl. One is much darker in the interior than the other, and has a dark purple mark at the base of the columella. It has very much the form of *Melania* (*Goniobasis*) *perfusca* (nobis), but differs in size, in aperture and in carination. The character of the upper whorls cannot be ascertained by these specimens, nor the proportion of the aperture, but it must be nearly one-half the length of the shell.— *Lea.*

Fig. 435.

105. G. Whitei, LEA.

Goniobasis Whitei, LEA, Proc. Acad. Nat. Sci., p. 266, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 310, t. 37, f. 151, March, 1863. Obs., ix, p. 132.

Description.— Shell smooth, fusiform, thick, very much inflated, yellowish-brown, bright, three-banded; spire very obtuse, sutures somewhat impressed; whorls five, flattened above, the last being ventricose; aperture very large, widely rhomboidal; outer lip acute, straight; columella bent in, thickened and twisted.

Habitat.— Georgia; Rev. George White.

Diameter, ·35; length, ·61 of an inch.

Observations.— Two specimens were received among Mr. White's shells, but the part of Georgia was not designated from where he obtained them, probably towards the north. In outline it closely resembles *Nicklíniana*, as well as *Vauxiana*, herein described. It is rather more obtuse in the apex than *Nicklíniana*, and not so round

at the base, and it has bands which the other has not. Both the specimens are furnished with three, equidistant, brown bands, obscure outside, but well defined inside. The older of these two has a thickening inside of the outer lip, and the bands do not extend to the margin. The aperture is more than the half the length of the shell. I dedicate this species to the Rev. George White, who has done so much to elucidate a knowledge of the mollusca of his State. — *Lea.*

Fig. 436.

The figure copied does not represent the three bands referred to; but they are present on all the specimens before me.

106. G. expansa, Lea.

Melania expansa, Lea, Trans. Am. Philos. Soc., ix. p. 23.

Description.— Shell smooth, somewhat fusiform, rather thick, yellowish; spire obtusely conical; sutures somewhat impressed; whorls five, slightly convex; aperture large, expanded, whitish.

Habitat.— Alabama.

Diameter, ·43; length, ·63 of an inch.

Observations.— A solitary specimen of this was among the shells sent by Dr. Foreman. In form it resembles *M. variabilis* (nobis), but may be distinguished from that species in being larger, and having a larger proportionate aperture, which is more expanded. The aperture is full one-half the length of the shell. The specimen under examination has four bands, and the yellow epidermis is nearly covered with a deposit of the oxide of iron.— *Lea.*

This shell has not been figured. The species is unknown to me.

107. G. casta, Anthony.

Melania casta, Anthony, Ann. N. Y. Lyc. Nat. Hist., vi, p. 100, t. 2, f. 19, March, 1854. Binney, Check List, No. 50. Brot, List, p. 32. Reeve, Monog. Melania, sp. 381.

Description.— Shell conical, nearly smooth, thick; spire obtusely elevated; whorls 6–7, nearly flat; sutures well impressed; upper whorls smooth, or only modified by the lines of growth, which are coarse and distinct; body-whorl with five prominent striæ below the middle, of which the lower three also revolve within the aperture

on the columella; aperture small, elliptical, within whitish, subnacreous; columella not indented; sinus small.

Habitat.— Alabama.

Fig. 437. Fig. 438.

Diameter, ·30 (8 millim.); length, ·75 of an inch (19 millim.). Length of aperture, ·33 (8 millim); breadth of aperture, ·17 of an inch (4 millim.).

Observations.—**A singularly pale, greenish-white species, the distinguishing marks of which are its regular, subcylindric form, and the smooth spire, combined with the prominent striæ at the base of the shell. These are characters which I do not recognize on any other species so combined. There is also a distinct carina on the penultimate whorl, near the top of the aperture, above which may be observed a faint, interrupted line.— *Anthony.***

Another specimen in Mr. Anthony's collection has not the angulation so well developed and is covered with slight striæ. The type specimen is figured, figure 438.

108. G. rhombica, Anthony.

Melania rhombica, Anthony, Ann. N. Y. Lyc. Nat. Hist., vi, p. 116, t. 3, f. 16, March, 1854. Binney, Check List, No. 228. Brot, List, p. 38. Reeve, Monog. Melania, sp. 347.

Description.—Shell conic, rather thin, brown; spire regularly pyramidal; not elevated; whorls about six, flat, regularly and very distinctly striate; body-whorl angulated about the middle, nearly smooth, except as modified by the lines of growth, which are quite distinct, the concentric striæ being nearly obsolete on the body-whorl; sutures inconspicuous; aperture rather large, ovate, whitish within; columella very slightly rounded, with little or no sinus.

Fig. 439.

Habitat.— Alabama.

Diameter, ·22 (5½ millim.); length, ·43 of an inch (11 millim.). Length of aperture, ·20 (5 millim.); breadth of aperture, ·12 of an inch (3 millim.).

Observations.— This cannot well be confounded with any known species; its short spire, flat, striated whorls, regularly and rapidly decreasing to the apex, the prominent, acute carina, which encircles it near the top of the aperture, beneath which the striæ, so prominent above are hardly discernible, and its rather broad form, will

readily distinguish it from *M. striatula*, Lea, to which it might seem allied by form and color; it has somewhat the form of *M. vicina* (nobis), but that shell is more slender, less distinctly carinated, and has not the striation of the present species.—*Anthony*.

A very distinct and not uncommon species, remarkably uniform in form and ornamentation. One of Mr. Anthony's types is figured. In younger specimens the striæ are more strongly developed.

109. G. angulata, ANTHONY.

Melania angulata, ANTHONY, Ann. N. Y. Lyc. Nat. Hist., vi, p. 117, t. 3, f. 17, March, 1854. BINNEY, Check List, No. 14. BROT, List, p. 37. REEVE, Monog. Melania, sp. 386.
Melania cinnamomea, Anthony, REEVE, Monog. Melania, sp. 379. BROT, List, p. 35.
Goniobasis intercedens, LEA, Proc. Acad. Nat. Sci., p. 265, 1862. Journ. Acad. Nat. Sci., v, pt 3, p. 305, t. 37, f. 143. Obs., ix, p. 127.

Description.—Shell acutely conic, smooth, brown, rather thick; spire not remarkably elevated, but tapering regularly with a rectilinear outline to the apex, which is entire and acute; whorls eight, nearly flat, upper ones carinate, and with a well defined suture; body-whorl with a distinct angle, more distinct where it revolves near the top of the aperture; below this the base is rather concave on the columella side; aperture moderate, narrow, ovate, whitish or faintly tinged with red within; columella slightly curved, not indented; sinus slight, but well defined.

Fig. 440.

Habitat.—Tennessee.

Diameter, ·25 (6 millim.); length, ·56 of an inch (14 millim.). Length of aperture, ·25 (6 millim.); breadth of aperture, ·13 of an inch (3 millim.).

Observations.—A singularly neat, precise looking shell. Its trim appearance, its pale color, unornamented by any band, and its sharp, well defined angle, amounting almost to a carina, will serve to distinguish it from all others.—*Anthony*.

The above description is that of the juvenile shell. In the adult state it has been described by both Mr. Anthony and Mr. Lea as follows:

Melania cinnamomea.—Shell ovately conoid, cinnamon-brown, with a narrow, chestnut zone at the sutures; whorls 6-7, slopingly ven-

tricose, longitudinally wrinkle striated, last whorl irregularly transversely wrinkled; aperture ovate, effused at the base.

Fig. 441.

Habitat.—Alabama.

Observations.—An obese, cinnamon-colored shell, encircled by a narrow, chestnut band at the sutures. The surface is sculptured with longitudinal, close-set striæ and transverse, interrupted, keel-like wrinkles.—*Reeve*.

Goniobasis intercedens.—Shell smooth, fusiform, rather thin, yellow, honey-bright without bands; spire conoidal, sharp-pointed, carinate at the apex; sutures linear; whorls eight, flattened, varicose; aperture rather large, rhomboidal, whitish within; outer lip acute, scarcely sinuous; columella slightly bent in, somewhat thickened, nearly straight below.

Habitat.—Cahawba River, Alabama; E. R. Showalter, M.D.

Diameter, ·30; length, ·69 of an inch.

Observations.—This species is very closely allied to *Melania* (*Goniobasis*) *mellea* and *Bridgesiana*, herein described. It is the same color, but may be distinguished by its being more slender and having a higher spire. It has also a less twisted columella. In the interior there is a slight disposition to yellowness. Neither of the two specimens before have any appearance of bands. The larger of the two is not complete on the outer lip, but the smaller one is perfectly so, and shows a disposition to thickening on the inner edge. The aperture is about one-half of the length of the shell.—*Lea*.

Fig. 442.

110. G. Bridgesiana, LEA.

Goniobasis Bridgesiana, LEA, Proc. Acad. Nat. Sci., p. 265, 1862. Jour. Acad. Nat. Sci., v, pt. 3, p. 305, t. 37, f. 142, March, 1863. Obs., ix, p. 173, t. 37, f. 142.

Description—Shell smooth, fusiform, somewhat inflated, rather thin, honey-yellow, without bands; spire obtusely conical, carinate at the apex; sutures linear; whorls about seven, flattened; aperture large, subrhomboidal, whitish within; outer lip acute, scarcely sinuous; columella somewhat bent in, thickened above and below and slightly twisted.

Fig. 443.

Habitat.—Cahawba River, Alabama; E. R. Showalter, M.D.

Diameter, ·40; length, ·83 of an inch.

Observations.—A single specimen only was received from Dr. E. R. Showalter. It was considered by him to be *Melania gravida*, Anth.,

but it does not answer to his description. It is allied to *Melania* (*Goniobasis*) *mellea* (nobis), but differs in being more regularly fusiform, in not being so much inflated, nor having so sharp an apex, and the whorls are flatter. The interior of this specimen is slightly disposed to yellowness. There is no appearance of bands on this specimen, and I doubt if it will be found banded. The aperture is nearly one-half the length of the shell. I dedicate this species to my friend, R. Bridges, M.D., who has done so much to promote the knowledge of our zoology.— *Lea.*

I doubt whether this is more than an adult form of *angulata*, Anth.

111. G. cubicoides, Anthony.

Melania cubicoides, Anthony, Proc. Acad. Nat. Sci., p. 60, Feb., 1860. Binney, Check List, No. 78. Brot, List, p. 39. Reeve, Monog. Melania, sp. 445.

Description.— Shell ovate, smooth, thick; whorls 6–7, flat, the upper ones rapidly enlarging to the body-whorl, which is broad and acutely angulated; sutures distinct, rendered more so by a sharp carination on the lower part of each whorl; aperture broadly ovate, within whitish; columella deeply indented; sinus small.

Fig. 444.

Habitat.— Wabash River, Indiana.

Observations.—One of the short, thick species, in form not unlike *M. cuspidata* (nobis), but differing by its sharp, carinated body-whorl and imbricated spire; the body-whorl is also strongly striate and obscurely ribbed; these longitudinal ribs are very faint, but sufficiently distinct at the sharp carina, near the summit of the aperture to modify its outline into a waving, subnodulous line.— *Anthony.*

Figured from Mr. Anthony's type. The longitudinal ribs alluded to by Mr. Anthony are very indistinct in his type specimen, and do not exist in other specimens; both old and young, before me.

112. G. Spillmanii, Lea.

Goniobasis Spillmanii, Lea, Proc. Acad. Nat. Sci., p. 264, 1862. Journ. Acad. Nat. Sci., v, pt. 3. p. 302, t. 37, f. 138, March, 1863. Obs. ix, p. 134.

Description— Shell smooth, fusiform, thin, greenish horn-color, shining, without bands; spire obtusely conical; sutures linear;

whorls about six, flattened, somewhat impressed below the sutures; aperture large, rhomboidal, diaphanous within; outer lip acute, slightly sinuous; columella slightly bent in and thin.

Fig. 445.

Habitat.— Tennessee River; W. Spillman, M.D.

Diameter, ·39; length, ·94 of an inch.

Observations.— Only three specimens were received from Dr. Spillman, two of which are little more than half grown. In outline it is near to *Melania* (*Goniobasis*) *gracilis* (nobis), but it is more *fusiform*, rather larger and not so thick. The color is very nearly the same. There is a slight disposition to angulation on the periphery of the whorls. The aperture is about four-tenths the length of the shell. I dedicate this species to Dr. Spillman, who has done so much to elucidate the natural history of the Southern States.— *Lea.*

113. G. pallidula, Anthony.

Melania palliaula, Anthony, Ann. N. Y. Lyc. Nat. Hist., vi, p. 115, t. 3, f. 15, March, 1854. Binney, Check List, No. 197. Brot, List, p. 38. Reeve, Monog. Melania, sp. 417.

Description.— Shell elongate-ovate, smooth, moderately thick; of a pale, horn-color, with a faint, brown, narrow band on the penult whorl, increased to two on the body-whorl, and obsolete on the apical ones; spire obtusely elevated, with a rather convex outline and a well defined suture; whorls four remaining, with indications of two more lost by truncation; body-whorl angulate, and rather coarsely striate longitudinally; aperture rather large, ovate, pale within, ornamented with the two bands of the body-whorl, which do not reach the outer edge, a broad, plain area intervening; columella curved, with a very slight sinus at base.

Fig. 446.

Habitat.— Tennessee.

Diameter, ·25 (6 millim.); length, ·50 of an inch (12 millim.). Length of aperture, ·27 (7 millim.); breadth of aperture, ·15 of an inch (4 millim.).

Observations.— This is a very neat, pretty species, whose affinity with any other is not so strong as to endanger its being easily confounded; from *M. angulata* (nobis) it differs in being broader, less angulated, paler in color, less elongated, and by its brown bands, that species being entirely plain.— *Anthony.*

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114. G. vicina, ANTHONY.

Melania vicina, ANTHONY, Ann. N. Y. Lyc. Nat. Hist., vi, p. 114, t. 3, f. 14, March, 1854. BINNEY, Check List, No. 288. BROT, List, p. 39. REEVE, Monog. Melania, sp. 291.

Description.—Shell conical, smooth, rather thick, yellowish-brown; spire short; whorls six, upper ones subconvex, with a brown band immediately above the suture; body-whorl a little shouldered beneath the suture, and angulated in the middle, surrounded by two narrow bands, one above and the other below the angle; sutures impressed; aperture ovate, banded within; columella much curved, with hardly a perceptible sinus at base.

Fig. 447.

Habitat.—Alabama.

Diameter, ·21 (5 millim.); length, ·45 of an inch (11 millim.). Length of aperture, ·20 (5 millim.); breadth of aperture, ·12 of an inch (3 millim.).

Observations.—A small, not inelegant species, which may be compared with *M. ovoidea*, Lea, and *M. depygis*, Say, as its nearest congeners. The former species I have never seen, but judging from the description this differs from it in many particulars; its form is proportionately broader, the bands are more distinct; the body-whorl has a distinct angle, which is also apparent on the penultimate whorl, amounting there to a carination. The aperture also is much smaller. The same particulars apply with equal force to *Melania depygis*, Say, the two being so nearly alike in description that the *M. ovoidea* may prove to be only a variety of Mr. Say's *depygis*.—*Anthony.*

Except in the striæ not being present, the shell resembles *G. rhombica*, Anth. All the specimens before me are labelled "Kentucky" by Mr. Anthony.

115. G. Spartenburgensis, LEA.

Goniobasis Spartenburgensis, LEA, Proc. Acad. Nat. Sci., p. 265, 1862. Jour. Acad. Nat. Sci., 2d ser., v, pt. 3, p. 307, t. 37, f. 147, March, 1863. Obs. ix, p. 129.

Description.—Shell smooth, fusiform, rather thin, greenish horn-color, bright, banded or without bands; spire acutely conical, carinate at the apex; sutures impressed; whorls eight, flattened, aperture rather large, elongately rhomboidal, white within; outer lip acute, scarcely sinuous; columella slightly bent in, thickened below.

Operculum ovate, thin, brown, with the polar point near to the base on the left margin.

Habitat.—Spartanburg District, South Carolina; Prof. L. Vanuxem: Marietta, Ohio; Dr. Hildreth: Wabash River, Ind.; H. C. Grosvenor.

Diameter, ·23; length, ·54 of an inch.

Observations.—I have seven specimens from Spartanburg, seven from Marietta and two from the Wabash. This small, graceful species has a wide, geographical distribution. I can see very little difference between the specimens of the different habitats. The two from the Wabash are very much smaller and thinner, and may be much younger, but they differ in having a purplish columella which is not observable in the others. One of them has a remarkable row of brown spots under the sutures on the body-whorl. The other is without spots or bands. Usually this species has two bands; six of the seven from Marietta are two-banded. Of the seven from Spartanburg two only are double-banded. The others are without bands. The species is very nearly allied to *Melania* (*Goniobasis*) *ovoidea* (nobis), but it is more elongate and the aperture is less effuse. The aperture is not quite half the length of the shell.—*Lea.*

Fig. 448.

I fear the specimens mentioned as from Marietta, Ohio, and Wabash River, Ind., are not distinct from *depygis*, Say.

116. G. Gerhardtii, LEA.

Goniobasis Gerhardtii, LEA, Proc. Acad. Nat. Sci., p. 270, 1862. Journ. Acad. Nat. Sci., v, pt. 3, p. 330, t. 38, f. 187, March, 1863. Obs., ix, p. 152.
Goniobasis infuscata, LEA, Proc. Acad. Nat. Sci., p. 270, 1862. Journ. Acad. Nat. Sci., v, pt. 3, p. 330, t. 38, f. 188, March, 1863. Obs. ix, p. 152.

Description.—Shell carinate, fusiform, thin, shining, yellowish-green, four-banded; spire regularly conical; aperture small, rhomboidal, whitish and banded within; outer lip acute, slightly sinuous; columella bent in, slightly thickened below.

Operculum ovate, thin, dark brown, with the polar point on the left above the base.

Habitat.—Chattanooga River, Georgia; Alexander Gerhardt: Coosa River, Alabama; Dr. Spillman.

Diameter, ·36; length, ·72 of an inch.

Observations.—From the two habitats I have a number of specimens, nearly all of which are young. The largest, one of which will

be figured, were from the Smithsonian Institution, kindly sent to me by Prof. Henry, the Secretary, having been received from Mr. Gerhardt. Those from Dr. Spillman were smaller, and generally much darker. It is a beautiful, regular and graceful species. The young are very acutely angular, having on the periphery a very dark, raised line. There are four bands which are remarkably uniform, being nearly the same in every specimen. The two middle ones are close together, the upper of the two being the larger. The upper one is near to the suture above; the lower one is broad and near the base. At the base of the columella the area is usually quite yellow. A few young ones from the Coosa are without bands. In the number and position of the bands we are reminded of *Melania* (*Goniobasis*) *suavis* (nobis) and *Melania* (*Goniobasis*) *grata*, Anth., but this is a much thinner and a carinate species. The aperture is about half the length of the shell. I name this after Mr. Alexander Gerhardt, who has done much to elucidate the zoology of his district in North Georgia.—*Lea.*

Fig. 449.

The following is the description of the adult form of this species:—

Goniobasis infuscata.—Shell carinate, fusiform, rather thin, shining, dark, nearly black, three-banded; spire conical, sutures impressed; whorls about six, flattened above, the last one large; aperture rather large, rhomboidal, whitish or brown, and three-banded within; outer lip acute, slightly sinuous; columella bent in, slightly thickened below.

Fig. 450.

Habitat.—Georgia; Rev. G. White: Coosa River, Alabama; Dr. Spillman.

Diameter, ·37; length, ·82 of an inch.

Observations.—A single specimen only from each of the habitats was received. That from Mr. White is the larger and is not so dark, the epidermis being olive-brown, and the interior being whitish with the three bands well defined. That from Dr. Spillman is of so dark a brown that it has the appearance of being entirely black, but in the inside, the three bands may be distinguished, but the exterior is totally and intensely dark. In outline it is nearly the same with *Gerhardtii*, herein described, but differs in the number and character of the bands. The aperture is not quite half the length of the shell.—*Lea.*

E. *Whorls very strongly carinated.*

117. G. acutocarinata, Lea.

Melania acutocarinata, Lea, Philos. Proc., ii, p. 14, Feb., 1841. Philos. Trans., viii, p. 184, t. 6, f. 46. Obs. iii, p. 22. DeKay, Moll. N. Y., p. 99. Troost, Cat. Shells, Tenn. Wheatley, Cat. Shells, U. S., p. 24. Binney, Check List, No. 5. Catlow, Conch, Nomenc., p. 135. Brot, List, p. 36.

Elimia acutocarinata, Lea, Chenu, Manuel de Conchyl., i, f. 1979. Adams, Genera, i, p. 300.

Melania pagodiformis, Anthony, Ann. N. Y. Lyc. Nat. Hist., vi, p. 106, t. 3, f. 6, March, 1854. Binney, Check List, No. 195. Brot, List, p. 36. Reeve, Monog. Melania, sp. 260.

Melania torulosa, Anthony, Ann. N. Y. Lyc. Nat. Hist., vi, p. 110. t. 3, f. 10, March 1854. Binney, Check List, No. 273. Brot, List, p. 37. Reeve, Monog. Melania, sp. 370.

Description.—Shell carinate, conical, rather thick, shining, dark brown; spire obtusely elevated; sutures impressed; whorls six; aperture rather large, elliptical, angular at base, purplish within.

Fig. 451. Fig. 452.

Habitat.—Tennessee.

Diameter, ·30; length, ·66 of an inch.

Observations.—I received a single specimen only of this species. It seems to be distinct in its large carina, which extends over all the whorls, but is scarcely distinct on the last. The columella is remarkably indented. The aperture is nearly one-half the length of the shell.—*Lea.*

This shell is believed by Prof. Haldeman to be a variety of *simplex*, but I doubt if they are the same, as this species is acutely carinate in some specimens, smooth in others, but as it appears to me *always* narrowly lengthened.

The following is the description of:—

Melania pagodiformis.—Shell conical, thin, brownish-olive; spire obtusely elevated; whorls 7–8, smooth; the upper ones are surrounded by a sharp, elevated keel just above the suture; the body-whorl is angulated in the middle by two keels, of which the upper is the more prominent; sutures deeply impressed; aperture ovate, ending in an acute angle below, whitish within; columella rounded, produced into a narrow, but slight sinus.

Fig. 453.

Habitat.—Battle Creek, Tennessee.

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Diameter, ·28 (7 millim.); length, ·50 of an inch (13 millim.). Length of aperture, ·26 (7 millim.); breadth of aperture, ·14 of an inch (3½ millim.).

Observations.— Bears some resemblance to *M. acuto-carinata*, Lea, but differs from it in many particulars. It is of a much lighter color, has the carina on every whorl, the body-whorl not excepted, its columella is not remarkably indented as in that species, and it is altogether a thinner and broader shell. The aperture is generally uncolored, but some specimens present a faint tinge of violet there.— *Anthony.*

M. torulosa, Anth., is only a variety of the above, a number of specimens before me exhibiting every gradation between the two species. The following is the description :—

Melania torulosa.— Shell conic, chestnut-colored, rather thick; spire little elevated, acute; whorls 7–8, strongly carinated a little above the suture; sutures linear; aperture not large, broad, ovate, purplish within; columella regularly but not remarkably curved, with a small sinus.

Habitat.— Tennessee.

Diameter, ·28 (7 millim.); length, ·58 of an inch (15 millim.). Length of aperture, ·23 (6 millim): breadth of aperture, ·15 of an inch (4 millim.).

Observations.— But a single specimen of this species is before me, but it differs so much from all others that I cannot hesitate to place it among well established species. *M. acuto-carinata*, Lea, is the only one with which it may be compared, but that species has the carina obsolete on the body-whorl, the very point where it is most remarkably developed in this; the whorls also in the *M. torulosa* diminish much more rapidly to an acute apex, which in *M. acuto-carinata* is said to be *obtusely* elevated; the *M. torulosa* is remarkable for its acute elevation from the broad base of the carina on the body-whorl. In the columella too of the present species there is no indentation, while in *M. acuto-carinata* it is "remarkably indented."— *Anthony.*

Fig. 454.

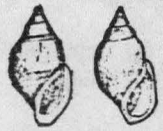
F. *Body whorl by-multiangulated.*

118. G. tabulata, ANTHONY.

Melania tabulata, ANTHONY, Ann. N. Y. Lyc. Nat. Hist., vi, p. 113, t. 3, f. 18, March, 1854. BINNEY, Check List, No. 262. BROT, List, p. 39.

Description.— Shell ovate-conic, smooth, thin, of a dark brown color externally; spire not remarkably elevated, with a rather concave outline; whorls about five, upper ones convex, penult whorl flat, body-whorl subangulated into several planes, with a distinctly impressed suture; aperture rather large, ovate, within of a beautiful, reddish-purple; columella slightly curved, indented, and with a narrow, recurved sinus at base.

Fig. 455. Fig. 455a.



Habitat.— Tennessee.

Diameter, ·34 (8½ millim.); length, ·62 of an inch (16 millim.). Length of aperture, ·31 (8 millim.); breadth of aperture, ·17 of an inch (4 millim.).

Observations.— I know of no species with which this is liable to be confounded; its ample body-whorl, the broad, angular, and shelving shoulder on the body and penult whorls, while the upper ones are wanting in this character, and above all the tabulation of the penult whorl are its most striking characteristics, and will at once distinguish it from all other species; the lines of growth are rather coarse, curved and approximate.— *Anthony.*

119. G. pulcherrima, ANTHONY.

Melania pulcherrima, ANTHONY, Proc. Acad. Nat. Sci., p. 53, Feb., 1860. BINNEY Check List, No. 222. BROT, List, p. 37. REEVE, Monog. Melania, sp. 336.

Description.— Shell conical, carinate, elevated, acute; whorls 6–8, flat, upper ones obscurely ribbed, longitudinal; body-whorl sharply angulated, with a dark brown band directly upon the carina, and two or three below it, of which one is very near the carina; upper whorls with two bands each, widely separated; sutures distinct, rendered more so by the neighboring carina; aperture ovate, within three or four banded; columella rounded and indented; sinus small.

Habitat.— North Carolina.

Observations.— A small, but remarkably beautiful species; its

bright yellow ground, and conspicuous, dark lines give, by contrast, a lively and pleasant character to the shell. Compared with *M. nigrocincta* (nobis) it is a larger species, its colors are more decided, and its carina is also a prominent mark of difference. *M. clara* (nobis) is a larger and more globose species its bands are broader, and it has no carina. It seems to be an abundant species, varying occasionally in some of its characters, but always easily recognized. More than one hundred specimens are before me.—*Anthony.*

Fig. 456.

120. G. subangulata, ANTHONY.

Melania subangulata, ANTHONY. Ann. N. Y. Lyc. Nat. Hist., vi, p. 91, t. 2, f. 9, March, 1854. BINNEY, Check List, No. 252. BROT, List, p. 37. REEVE, Monog. Melania, sp. 242.

Description.—Shell conical, smooth, rather thick; spire obtusely elevated; whorls about six, convex, subangulated below the middle, brown banded; sutures deeply impressed, and situated in a deep furrow formed by the inclination of two whorls towards each other at that part; lower band below the angulation, upper one midway between it and the suture above; body less angulated, with about six, reddish-brown bands, the upper and lower of which are distinct and distant, the central ones confluent, more distinct in the interior, aperture small, long-ovate, within reddish and banded; columella regularly curved, purplish, no sinus at base.

Fig. 456*a*.

Habitat.—Alabama.

Diameter, ·30 (7½ millim.); length, ·62 of an inch (17 millim.) Length of aperture, ·30 (7½ millim.); breadth of aperture, ·17 of an inch (4 millim.).

Observations.—Somewhat allied to *M. rufescens*, Lea in general form, but that species has regularly, convex whorls and no bands, and has at least two more whorls. The number of whorls in this species cannot, however, with certainty be determined, since in all my specimens, seventy or eighty in number, every one is decollate, but the form does not indicate the loss of more than two whorls at most, and only four are present. *M. rufescens* is described as having eight. A few of the specimens are irregularly and strongly striate on the body-whorl.—*Anthony*

121. G. paula, LEA.

Melania paula, LEA, Proc. Acad. Nat. Sci., p. 122, 1861. Jour. Acad. Nat. Sci., v, pt. 3, p. 244, t. 35, f. 48, March, 1863. Obs., ix, p. 66.

Description.—Shell carinate, conical, thin, diaphanous, reddish horn-color; spire subelevated; sutures slightly impressed; whorls six, acutely carinate above, the last subcarinate; whorls rather small, widely elliptical, whitish within; outer lip acute; columella either whitish or reddish, obtusely angular at the base.

Habitat.—Cahawba River, Alabama; E. R. Showalter, M.D.

Diameter, ·27; length, ·66 of an inch.

Observations.—A very small species, about two-thirds of an inch long. Four specimens are before me, nearly all of the same size and color. This species is very closely allied to *Melania* (*Goniobasis*) *bicincta*, Anth., but it is not much more than half the size, and the carina below that on the middle of the whorl is more indistinct. In the aperture they also differ, the *bicincta* having it larger and more disposed to be rhombic, and having indistinct bands within, which this has not. In all the specimens the carina is sharp. The aperture is about two-fifths the length of the shell. It reminds one also of *Melania* (*Goniobasis*) *rhombica*, Anth., being about the same length, but that species has a single sharp carina, with a less exserted spire and a larger mouth.—*Lea.*

Fig. 457.

Differs from *vittata*, Anth., in the more rounded aperture and outer lip.

122. G. symmetrica, HALDEMAN.

Melania symmetrica, HALDEMAN, Monog. Lim., No. 4, p. 2 of cover, October 5, 1841. BINNEY, Check List, No. 261. JAY, Cat. 4th ed., p. 275. BROT, List, p. 35. REEVE, Monog. Melania, sp. 328.

Ceriphasia symmetrica, Haldeman. ADAMS, Genera, i, p. 297.

Melania imbricata, ANTHONY, Ann. N. Y. Lyc. Nat. Hist., vi, p. 105, t. 3, f. 5, March, 1854. BINNEY, Check List, No. 142. BROT, List, p. 36. REEVE, Monog. Melania, sp. 259.

Melania bicincta, ANTHONY, Proc. Acad. Nat. Sci., p. 56, Feb., 1860. BINNEY, Check List, No. 31. BROT, List, p. 36. REEVE, Monog. Melania, sp. 327.

Melania assimilis, ANTHONY, Proc. Acad. Nat. Sci., p. 60, Feb., 1860. BROT, List, p. 36. REEVE, Monog. Melania, sp. 464.

Melania assimilis, Lea (mistake), BINNEY, Check List, No. 22.

Goniobasis Ucheénsis, LEA, Proc. Acad. Nat. Sci., p. 270, 1862. Journ. Acad. Nat. Sci., v, pt. 3, p. 334, t. 38, f. 194, March, 1863. Obs. ix, p. 156.

Goniobasis Barrattii, LEA, Proc. Acad. Nat. Sci., p. 271, 1862. Journ. Acad. Nat. Sci., v, pt. 3, p. 335, t. 38, f. 196, March, 1863. Obs. 9, p. 57.

Goniobasis Catabœa, HALDEMAN, Amer. Jour. Conch., vol. 1, No. 1, Feb. 25, 1865.

Description.— Shell olivaceous, turreted, with eight or nine convex whorls, separated by a deep suture; apex carinated anterior to the middle of the whorls; aperture ovate.

Habitat.— Roanoke River, Virginia.

Length, ¾ of an inch.

Observations.— Less ponderous than the preceding species, *M. uncialis*, and distinguishd from *M. Virginica* by the carinated apex.— *Haldeman.*

Fig. 453.

This is a variable species inhabiting from Virginia to Georgia, Alabama and Tennessee. In some localities the carinæ of the body-whorl are better developed, and the color differs from light to dark brown, which has caused the species to be described several times. The largest *symmetrica* I have seen attains to over one inch.

The following is the description of

Melania imbricata. — Shell conical, nearly smooth, rather thick light horn-colored; spire elevated, but not acutely so; whorls 8-9, flat; lines of growth distinct, having almost the appearance of ribs; two lines, distant, slightly visible, surround each whorl, and from these the whorls incline towards each other to form a broad groove between them; sutures well impressed; aperture small, narrow, ovate, within whitish; columella much indented and curved, forming a slight sinus at base.

Habitat.—Alabama.

Diameter, ·30 (8 millim.); length, ·88 of an inch (23 millim.). Length of aperture, ·33 (8 millim.); breadth of aperture, ·21 of an inch (5 millim.).

Observations.—A fine, symmetrical shell, some of its varieties approaching *M. sordida*, Lea, in form, but differing in every other respect. The whorls enlarge regularly, and the lower raised line on the whorls being consequently more prominent; the spire has somewhat an imbricated appearance, giving rise to its specific name. The specimens before me, twelve in number, are all decollate. The upper whorls are often rather prominently ribbed, and the concentric lines thereby rendered crenulous.— *Anthony.*

It is doubtful whether this species came from Alabama, as stated above, or Georgia, as Mr. Anthony's specimens have

the latter locality attached to the label. I do not observe the ribs mentioned by Mr. Anthony, in the numerous suite of specimens before me.

Melania bicincta.— Shell conical, elevated; spire very acute; whorls seven, upper ones bicarinate, and body-whorl encircled by three or four carinæ, the upper two of which are carinate, while the lower two are of ten striæ merely; color dark olive-brown, very shining, and relieved by a faint or yellow, narrow band near the suture; sutures distinct; aperture ovate, and brown within; columella deeply indented.

Fig. 458a.

Habitat.— Tennessee.

Observations.— A beautifully distinct and well marked species of that group which *M. bella*, Conrad may be considered most fitly to represent. May be distinguished from *M. bella* by its broader and more acute form, more distinct carination and absence of the beaded line so characteristic of that species; lines of growth conspicuous and crowded. Differs from *M. bicostata* (nobis) by its less robust form, darker color and by the form of its spire, which diminishes more rapidly towards the apex.— *Anthony.*

All the specimens of *bicincta* before me, including Mr. Anthony's type, are labelled by him "North Carolina," and this shell certainly belongs to a group of species characterizing that State.

Melania assimilis.— Shell small, short, conic, not thick; spire acute composed of about seven, flat whorls; sutures very distinct, of a light horn-color; aperture small, ovate, dusky within; columella indented; body-whorl angulated; sinus not broad, but well formed.

Fig. 458b.

Habitat.— Tennessee.

Observations.— A small, delicate species; compared with *M. pallidula* (nobis) it is more slender and elevated, has a greater number of whorls, and is devoid of bands. From *M. angulata* (nobis) it differs in being more slender, more carinate and having a more elevated spire.— *Anthony.*

The above description applies, of course, to young shells of *symmetrica*, in which the carinæ are well developed.

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Goniobasis Uchéensis.— Shell carinate, obtusely conical, rather thin, horn-color, without bands; spire obtuse; sutures impressed; whorls about six, flattened; aperture rather large, ovately rhomboidal, whitish within; outer lip acute, somewhat sinuous; columella bent in and somewhat twisted.

Operculum ovate, light brown, with the polar point near to the left margin above the base.

Habitat.— Little Uchee River, below Columbus, Ga.; G. Hallenbeck. Diameter, ·24; length, ·58 of an inch.

Observations.— This is a very small species, nearly allied to *Melania* (*Goniobasis*) *proxima*, Say, but may be distinguished by its smaller size, its lighter color, its shorter spire, and its having a raised line above and below the carina on the upper whorls. The aperture is rather more than one-third the length of the shell.—*Lea.*

Fig. 459.

Goniobasis Barrattii.— Shell carinate, subfusiform, rather thin, greenish or reddish horn-color, obscurely banded, or without bands; spire obtusely conical; sutures very much impressed; whorls seven, slightly convex, folded at the apex; aperture rather large, subrhomboidal, whitish or obscurely banded within; outer lip acute, scarcely sinuous; columella somewhat bent in and twisted.

Habitat.— Abbeville District, South Carolina; J. P. Barratt, M.D. Diameter, ·25; length, ·53 of an inch.

Observations.— A number of specimens were sent to me by Dr. Barratt many years since. In outline all the specimens are very much the same, but they differ in some having the apical whorls obscurely plicate, while others are only carinate. All the specimens are carinate down to the last whorl. In very few specimens can the bands be seen on the outside, but usually two bands are visible on the inside near the middle. In some specimens four bands are observable. Usually the four apical whorls are obscurely plicate. The aperture is more than one-third the length of the shell. It is nearly allied to *Melania* (*Goniobasis*) *tenebrosa* (nobis), but it is more slender, has higher carinæ and is plicate. I dedicate this to the late Dr. Barratt, from whom I have formerly received many interesting specimens of the mollusca of South Carolina and Georgia.— *Lea.*

Fig. 460.

Goniobasis Catawbœa.— Shell short, conic, inflated; the whorls flat, the body convex, bright green polished; sutures well impressed; whorls five or six, encircled in the middle with two raised lines;

aperture ovate, bluish and translucent within, acuminate below; columella nearly straight. Some of the specimens are marked in the centre of the body-whorl with two, very narrow, dark, approximate bands.

Fig. 460a.

Habitat.— Catawba River, near Morgantown, N. Carolina. Length, ·63; width, ·34 of an inch. Length of aperture, ·3; width of aperture, ·17 of an inch.

Observations.— This species is nearest related to *G. proxima*, Say, which inhabits the same river. It is, however, a wider, more inflated species than G. *proxima*.— *Haldeman.*

123. G. iota, Anthony.

Melania iota, Anthony, Ann. Lyc. Nat. Hist., vi, p. 86, t. 2, f. 4, March, 1854. Brot, List, p. 36. Binney, Check List, No. 153.

Description.— Shell conical, smooth, greenish horn-colored; spire acutely elevated; whorls about ten, lower ones convex, upper with a strong carina below the middle; sutures impressed; aperture pyriform, small, within whitish; columella but little rounded, not indented; sinus very small.

Fig. 460b.

Habitat.— ———?

Diameter, ·25 (6 millim.); length, ·78 of an inch (20 millim.). Length of aperture, ·26 (7 millim.); breadth of aperture, ·15 of an inch (4 millim.).

Observations.— A beautiful, slender, graceful species, in form not unlike *M. percarinata*, Con., and *perangulata*, Con., but differs from both in coloring, in the want of a crenulated or beaded line on the volutions, and in other respects. The upper whorls are often obscurely folded down to the carina on each, where they are arrested; below the carina the whorls shelve towards the suture, which thus becomes situated in a deep furrow. It cannot be confounded with *M. elevata*, Say, which has flat whorls, a dark epidermis, and a totally different aperture. The columella of the present species is faintly tinged with purple. I am not quite sure as to the habitat of this species, but think it an Ohio shell.—*Anthony.*

124. G. nigrocincta, Anthony.

Melania nigrocincta, Anthony, Ann. N. Y. Lyc. Nat. Hist., vi, p. 90, t. 2, f. 8, March, 1854. Brot, List, p. 36. Binney, Check List.

Description.— Shell conical, smooth, not much or acutely elevated;