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Types of Ampullariidae (Mollusca: Gastropoda) in the National Museum of Natural History, Smithsonian Institution, with Lectotype Designations

*Robert H. Cowie, Kenneth A. Hayes,
and Ellen E. Strong*

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ABSTRACT

Cowie, Robert H., Kenneth A. Hayes, and Ellen E. Strong. Types of Ampullariidae (Mollusca: Gastropoda) in the National Museum of Natural History, Smithsonian Institution, with Lectotype Designations. *Smithsonian Contributions to Zoology*, number 645, iv + 13 pages, 1 figure, 2015.—The caenogastropod family Ampullariidae Gray, 1824, is a family of freshwater snails predominantly distributed in humid tropical and subtropical habitats in Africa, South and Central America, and Asia. The family includes the largest of all freshwater snails and frequently constitutes a major portion of the native freshwater malacofauna of these regions. Ampullariid taxonomy is confused primarily because most species were described on the basis of only shell morphology, which is highly variable within species yet relatively conservative among species within the family. The need for rigorous taxonomic treatment of the group is acute, and a starting point for such research is a comprehensive study of type material. With type or possible type material of 20 nominal species-group taxa of Ampullariidae, belonging to the genera *Afropomus* Pilsbry and Bequaert, 1927 (1 taxon, from Africa), *Felipponea* Dall, 1919 (2, South America), *Forbesopomus* Bequaert and Clench, 1937 (1, Asia), *Lanistes* Montfort, 1810 (2, Africa), *Pila* Röding, 1798 (2, Asia), and *Pomacea* Perry, 1810 (11, South, Central, and North America), as well as 1 incertae sedis taxon in *Pila* or *Pomacea*, the U.S. National Museum of Natural History, Smithsonian Institution, has significant holdings, for which this annotated catalogue is provided. To stabilize the nomenclature, lectotypes are designated for eight species-group taxa. No new synonyms are proposed, other than as a result of the provision of a replacement name for *elongata* Dall, 1921, non d'Orbigny, 1842, nec Rochebrune and Germain, 1904. Accounts are arranged alphabetically by original published species-group name. Information in each account includes original name and combination, citation to the original description, current taxonomic status, type material held by the U.S. National Museum (holotypes, paratypes, syntypes, lectotypes, paralectotypes, and one neotype) with catalogue number(s) and number of specimens in each catalogue lot, type locality, and other remarks or additional information as appropriate. All name-bearing types are illustrated.

Cover images: Apertural and abapertural views of ampullariid shells of (left to right) *Paludina sinistrosa*, *Ampullaria pinei*, *A. superba*, and *A. (Felipponea) neritiniiformis* (from Figure 1J, H, K, F, respectively, herein).

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Types of Ampullariidae (Mollusca: Gastropoda) in the National Museum of Natural History, Smithsonian Institution, with Lectotype Designations

Robert H. Cowie,¹ Kenneth A. Hayes,^{2,3*} and Ellen E. Strong³

INTRODUCTION

The caenogastropod family Ampullariidae Gray, 1824 (junior synonym Pilidae Preston, 1915—Cowie, 1997; ICZN, 1999a; Bouchet and Rocroi, 2005), within the superfamily Ampullarioidea, is placed in the informal group Architaenioglossa, which also includes the Cyclophoroidea Gray, 1847, and Viviparoidea Gray, 1847 (Bouchet and Rocroi, 2005). The Campaniloidea Douvillé, 1904, is closely related, but the relationships among the four superfamilies remain unresolved (Ponder and Lindberg, 1997; McArthur and Harasewych, 2003; Strong, 2003; Simone, 2004; Colgan et al., 2007; Jørgensen et al., 2008; Ponder et al., 2008; Hayes et al., 2009).

Ampullariidae are freshwater snails predominantly distributed in humid tropical and subtropical habitats in Africa, South and Central America, and Asia (Hayes et al., 2015). They include the largest of all freshwater snails (*Pomacea maculata* Perry, 1810, can attain greater than 165 mm in adult shell height; Hayes et al., 2012) and frequently constitute a major portion of the native freshwater mollusc faunas of these regions. Of 14 Neotropical freshwater snail families, Ampullariidae constitute ~20 % of the Recent species (Strong et al., 2008).

Within the Ampullariidae, nine extant genera have been recognized in modern treatments (Cowie, 2015; Hayes et al., 2015). The great majority of the species are referred to just three genera: *Lanistes* Montfort, 1810 (Africa, including Madagascar), with 43 recent species currently considered valid; *Pila* Röding, 1798 (*Ampullaria* Lamarck, 1799, and *Ampullarius* Montfort, 1810, are junior synonyms—Cowie 1997; ICZN 1999a) (Africa and Asia), with 29 species; and *Pomacea* Perry, 1810 (South, Central, and North America) with 97 species (Hayes et al., 2015). The remaining six genera contain only one or a few species: *Afropomus* Pilsbry and Bequaert, 1927, and *Saulea* Gray, 1868 (1 species each) are African; *Asolene* d'Orbigny, 1838 (8 species), *Felipponea* Dall, 1919 (3 species), and *Marisa* Gray, 1824 (2 species) are South American; and *Forbesopomus* Bequaert and Clench, 1937 (1 species) is Asian (Hayes et al., 2015).

Taxonomy within the family is confused and complicated (e.g., Cowie et al., 2006), and delimitation of the genera and assignment of species to genera is in some cases uncertain

¹ Pacific Biosciences Research Center, University of Hawaii, 3050 Maile Way, Gilmore 408, Honolulu, Hawaii, 96822, USA.

² Department of Biology, Howard University, 415 College St. NW, Washington, D.C., 20059, USA.

³ National Museum of Natural History, Smithsonian Institution, P.O. Box 37012, MRC 163, Washington, D.C., 20013, USA.

*Correspondence: kenneth.hayes@howard.edu

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or incorrect and in need of revision (Hayes et al., 2009, 2015). These problems are primarily because most species were described only on the basis of shell morphology, which is highly variable within species yet relatively conservative among species, such that the variable shell morphology of many species appears to overlap that of others. In the light of this confusion and the need for rigorous taxonomic research, it is crucial to study type material. Ascertaining the location of type material and its correct status is the necessary first step.

By far the largest museum collection of ampullariid type material is in the Natural History Museum, London. Other major collections, in roughly decreasing order of total numbers of lots of ampullariid types, include the Muséum national d'Histoire naturelle, Paris (its ampullariid types catalogued by Cowie and Héros, 2012); the Museum of Comparative Zoology, Harvard University; the Museum für Naturkunde, Berlin (its ampullariid types catalogued by Köhler and Glaubrecht, 2006); the Museo Nacional de Historia Natural, Santiago, Chile (its ampullariid type material dominated by the collections of Philippi and noted by Cowie, 2015, and by A. R. Kabat [Harvard University, Museum of Comparative Zoology] and E. V. Coan [Santa Barbara Museum of Natural History, Invertebrate Zoology], unpublished); the Academy of Natural Sciences of Drexel University, Philadelphia (its ampullariid types catalogued by Cowie et al., submitted); the National Museum of Wales, Cardiff; and the Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt-am-Main. The ampullariid type material of the Zoologische Staatssammlung München is dominated by the South American collections of Spix, whose material was catalogued by Fechter (1983) and discussed briefly by Cowie et al. (2004). Many other museum collections, including the U.S. National Museum (USNM) within the National Museum of Natural History, Smithsonian Institution (NMNH), Washington, D.C., house additional type material (Cowie and Thiengo, 2003; Cowie, 2015). The purpose of the present catalogue is to document the type material of Ampullariidae housed in the USNM, following Recommendation 72F.4 of the *International Code of Zoological Nomenclature* (ICZN, 1999b).

APPROACH AND FORMAT OF ACCOUNTS

In this catalogue, taxa are arranged alphabetically by species-group name. The name and original combination are given following the name, verbatim as in the original description, and are followed by the bibliographic details of the original description. Bibliographic details of subsequent publications bearing directly on the original description are provided, as necessary for

clarification, in square brackets. The type locality is as given in the original description, with original orthography within quotation marks, although when needed, changes for capitalization are in square brackets. Also in square brackets is additional type locality information when available.

Only the following type specimens are included in this catalogue: holotypes, syntypes, lectotypes, and one neotype, as well as paratypes and paralectotypes. Other specimens are only discussed as necessary for clarification, including non-type material of one species (*Pomacea zischkai* Blume and Pain, 1952). Catalogue numbers are those of lots in the mollusc collection in the USNM. The number of specimens in each lot is indicated. The current taxonomic status includes generic and subgeneric placement (the latter only if not the nominotypical subgenus), whether a valid taxon, and if not, the appropriate synonymy. Unless otherwise stated, generic placements and synonymies for New World taxa follow Cowie and Thiengo (2003) and for Old World taxa (Africa and Asia) follow Cowie (2015).

All interpretations follow the fourth edition of the *International Code of Zoological Nomenclature* (ICZN 1999b).

ABBREVIATIONS AND ACRONYMS

ANSP	Academy of Natural Sciences of Drexel University, Philadelphia, Pennsylvania, USA
<i>Code</i>	<i>International Code of Zoological Nomenclature</i> (ICZN, 1999b)
FMNH	Field Museum, Chicago, Illinois, USA
MCZ	Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA
MMUE	The Manchester Museum, University of Manchester, Manchester, UK
NMNH	National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA
NMW	National Museum of Wales, Cardiff, UK
n. syn.	new synonymy
USNM	U.S. National Museum (within the NMNH), Washington D.C., USA
ZSM	Zoologische Staatssammlung München, Germany

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We thank Neal Evenhuis for discussion of our interpretations of the *Code* and Norine Yeung for assistance with photography and help locating specimens in the collection. Funding was provided in part by National Science Foundation grant DEB-0949061.

Catalogue of Type Material of Ampullariidae Gray, 1824

***atalanta* Bequaert and Clench, 1937**

Forbesopomus atalanta Bequaert and Clench, 1937:54, pl. 2, figs. 1–7.

Current Taxonomic Status: *Forbesopomus atalanta* Bequaert and Clench, 1937; valid species (Cowie, 2015:10).

Type Material: Paratype USNM 530146 (1 specimen).

Type Locality: “Lake Lanao, Misamis, Mindanao, Philippine Islands.”

Remarks: Only known from the type locality and the type series. Holotype, by original designation, figured, and with dimensions given (Bequaert and Clench, 1937:55, pl. 2, figs. 1–7), in the MCZ; additional paratypes in the MCZ and the NMW (Bequaert and Clench, 1937:55; Cowie, 2015:10). The gender of *Pomus* in Latin, and hence of *Forbesopomus*, is feminine.

***aurostoma* Lea, 1856**

FIGURE 1A

Ampullaria aurostoma Lea, 1856:110.

Current taxonomic status: *Pomacea aurostoma* (Lea, 1856); valid species (Cowie and Thiengo, 2003:57).

Type Material: Lectotype USNM 106299 (1 specimen), here designated; paralectotypes USNM 1270616 (formerly 106299X; 3 specimens); possible paralectotypes USNM 106273 (11 specimens).

Type Locality: “Carthagera” [Colombia].

Remarks: No holotype was designated and there are multiple type specimens, although the specimen (USNM 106299) figured subsequent to the original description by Lea (1866, pl. 22, fig. 4) is labeled “holotype”; based on the banding pattern of the shell, it is the one illustrated, and it bears the corresponding figure number inked on the body whorl. We therefore designate the shell in USNM 106299 as the lectotype to stabilize the name. The paralectotypes (USNM 1270616) were not noted by Cowie and Thiengo (2003:57), who listed the possible paralectotypes in USNM 106273 (labeled “unconfirmed type”) as syntypes. A comment in the original handwritten ledger indicates that the latter lot comprises “fossil shells found 10 ft. below surface.”

***balanoidea* Gould, 1850**

Ampullaria balanoidea Gould, 1850:196.

Current taxonomic status: *Afropomus balanoidea* (Gould, 1850); valid species (Cowie, 2015:10).

Type Material: Paralectotype USNM 611247 (1 specimen).

Type Locality: “Grand Cape Mount, Liberia.”

Remarks: No holotype was designated, nor has it been determined that Gould based his description on only a single specimen. The lectotype (MCZ 169054) was designated by Johnson (1964:45). The gender of *Pomus* in Latin, and hence of *Afropomus*, is feminine.

***canaliculata* Lamarck, 1822**

FIGURE 1B

Ampullaria canaliculata Lamarck, 1822:178.

Current taxonomic status: *Pomacea canaliculata* (Lamarck, 1822); valid species (Cowie and Thiengo, 2003:58; Hayes et al., 2012:737).

Type Material: Neotype USNM 1185844 (1 specimen, in ethanol).

Type Locality: “Palermo, Buenos Aires, Argentina.”

Remarks: Hayes et al. (2012:741) considered the original type material to be lost and therefore designated a neotype. The original type locality was “les rivières de la Guadeloupe,” which may have been Lago Guadalupe (also referred to as Laguna Guadalupe, but now known as Laguna Setúbal) in Argentina and not the island of Guadeloupe, although this is conjecture (Pain, 1946:58; Hylton Scott, 1958:300; Thiengo et al., 1993:68; Cazzaniga, 2002:74; Cowie and Thiengo, 2003:58). However, in designating a neotype the type locality was fixed as above.

***columellaris* Gould, 1848**

FIGURE 1C

Ampullaria columellaris Gould, 1848:74.

Current taxonomic status: *Pomacea columellaris* (Gould, 1848); valid species (Cowie and Thiengo, 2003:60).

Type Material: Holotype USNM 5547, by monotypy.

Type Locality: “Province of Maynas, Peru.”

Remarks: No holotype was designated in the original publication. However, Gould (1852:128) implied that the original description was based on a single specimen (“the shell”), which he illustrated (Gould, 1852: pl. 9, figs. 147, 147a). The specimen in USNM 5547 is the shell illustrated, based on both the shell banding pattern and the configuration of repair scars, especially the prominent scar on the early part of the body whorl. We accept this specimen as the holotype by monotypy (Code, Article 73.1.2). The reference by Johnson (1964:57) to this specimen as the “figured holotype” was taken incorrectly by Cowie and Thiengo (2003:60) as fixation of a lectotype, citing Article 74.6 and Recommendation 73F of the Code.

***dalli* Cowie, Hayes, and Strong,
*nomen novum***

FIGURE 1D

Felipponea dalli Cowie, Hayes, and Strong, *nomen novum pro elongata* Dall, 1821 (see also *elongata* Dall).

Current taxonomic status: *Felipponea dalli* Cowie, Hayes, and Strong, 2015; valid species (Cowie and Thiengo, 2003:49, as “*elongata* Dall”).

Type Material: Lectotype USNM 333024 (1 specimen), here designated.

Type Locality: “Uruguay River, Dept. of Paysandú” (Dall, 1921:133, as “*elongata*”).

Remarks: The name *elongata* Dall is a junior primary homonym of *elongata* d’Orbigny and of *elongata* Rochebrune and Germain (Cowie and Thiengo, 2003:49; Cowie, 2015:35). There is no available and potentially valid synonym of *elongata* Dall, so a new substitute name, *dalli* Cowie, Hayes, and Strong, is here provided (Code, Article 60.3). The name honors William Healey Dall, American naturalist, malacologist, honorary curator at the NMNH, and the author of *elongata* Dall. No holotype of *elongata* Dall was designated, nor has it been determined for certain that Dall based his description on only a single specimen, although he provided dimensions of only one shell and a catalogue number (USNM 333024) of a lot, labeled “holotype,” that contains only one shell. On the basis of the label, Cowie and Thiengo (2003:49) listed this shell as the holotype; their listing did not constitute designation of the specimen as a lectotype. We here avoid assumption of a holotype (Code, Recommendation 73F) and formally designate the shell in USNM 333024 as the lectotype to stabilize the name. This specimen is automatically also designated as the lectotype of *elongata* Dall (Code, Article 72.7).

***elongata* Dall, 1921**

Ampullaria (*Felipponea*) *elongata* Dall, 1921:133.

Current nomenclatural and taxonomic status: Junior primary homonym of *Ampullaria fasciata* variété *elongata* d’Orbigny, 1842, and of *Ampullaria kordofana* variété *elongata* Rochebrune and Germain, 1904, replaced here by *dalli* Cowie, Hayes, and Strong (see *dalli*, above); objective synonym of *dalli* Cowie, Hayes, and Strong (Code, Article 72.7); **n. syn.**

Type Material: Lectotype USNM 333024 (1 specimen), here designated.

Type Locality: “Uruguay River, Dept. of Paysandú” (Dall, 1921:133).

Remarks: The name-bearing type (lectotype) of both *elongata* Dall and *dalli* Cowie, Hayes, and Strong is the same specimen (Code, Article 72.7). *Ampullaria elongata* Bennett, 1831, is a *nomen nudum*, so unavailable, and therefore does not enter homonymy; it was noted by Cowie and Thiengo (2003:81) as not being an ampullariid.



FIGURE 1. Shells (apertural and abapertural views) of selected Ampullariidae species discussed herein. Dimensions given for each are shell height (length) in millimeters measured with digital calipers parallel to the columella. (A) *Ampullaria aurostoma* Lea, 1856, lectotype USNM 106299, 28.9 mm; (B) *A. canaliculata* Lamarck, 1822, neotype USNM 1185844, 54.1 mm; (C) *A. columellaris* Gould, 1848, holotype USNM 5547, 63.8 mm; (D) *A. (Felipponea) dalli* Cowie, Hayes, and Strong, *nomen novum pro Ampullaria (Felipponea) elongata* Dall, 1921, lectotype USNM 333024, 27.6 mm; (E) *A. gracilis* Lea, 1856, lectotype USNM 106323, 35.4 mm; (F) *A. (Felipponea) neritiniiformis* Dall, 1919, lectotype USNM 332780, 33.1 mm; (G) *A. palmeri* Marshall, 1930, holotype USNM 380696, 66.2 mm; (H) *A. pinei* Dall, 1898, lectotype USNM 152699, 59.8 mm; (I) *Pomacea cumingii sanjosensis* Morrison, 1946, holotype USNM 542136, 44.4 mm; (J) *Paludina sinistrosa* Lea, 1838, lectotype USNM 106348, 32.0 mm; (K) *A. superba* Marshall, 1926, holotype USNM 362863, 52.0 mm; (L) *A. tubaeformis* Lea, 1856, holotype USNM 106329, 33.1 mm; (M) *A. turbinis* Lea, 1856, lectotype USNM 106341, 61.9 mm; and (N) *Pomacea zeteki* Morrison, 1946, holotype USNM 542137, 40.5 mm. Scale bar = 1 cm.

***gracilis* Lea, 1856**

FIGURE 1E

Ampullaria gracilis Lea, 1856:110.

Current taxonomic status: *Pila gracilis* (Lea, 1856); valid species (Cowie, 2015:37).

Type Material: Lectotype USNM 106323 (1 specimen), here designated; paralectotype USNM 1272906 (formerly 106323a) (1 specimen).

Type Locality: “Siam” [Thailand].

Remarks: No holotype was designated and the description was based on two specimens (Lea, 1866:113). The specimen (USNM 106323), figured subsequent to the original description by Lea (1866, pl. 22, fig. 1), is labeled “holotype”; based on the banding pattern of the shell, it is the one illustrated, and it bears the corresponding figure number inked on the body whorl. We here designate this specimen (USNM 106323) as the lectotype to stabilize the name.

meridaensis* Pain, 1950Pomacea (Limnopomus) meridaensis* Pain, 1950:109.

Current taxonomic status: Synonym of *Pomacea camena* Pain, 1949 (Pain, 1957:175; Cowie and Thiengo, 2003:69).

Type Material: Paratypes USNM 595032 (2 specimens).

Type Locality: “Merida, Venezuela.”

Remarks: The holotype, designated by Pain (1950:110), is the specimen figured by Alderson (1925: pl. 11, fig. 7), the whereabouts of which is not known to us. Additional paratypes are in various museum collections (Cowie and Thiengo, 2003:69); one of them may in fact be the holotype.

miamiensis* Pilsbry, 1899Ampullaria miamiensis* Pilsbry, 1899:365 [1927:252, pl. 22, figs. 5 (lectotype), 6, 7].

Current taxonomic status: Synonym of *Pomacea paludosa* (Say, 1829).

Type Material: Possible paralectotypes USNM 160193 (2 specimens).

Type Locality: “[I]n a creek flowing from the Everglades near Miami, Dade County, in southeastern Florida.”

Remarks: Use of the term “type” by Pilsbry (1927:253, pl. 22, figs. 5–7) for a specimen in the ANSP constitutes a valid lectotype designation according to the *Code* (Article 74.5); see also Baker (1964:168) and Cowie and Thiengo (2003:69). Additional paralectotypes are in various museum collections (Cowie and Thiengo, 2003:69). Treated by Clench and Turner (1956:122) as a “local population” of *Pomacea paludosa* (Say, 1829), which we here consider to constitute synonymy, although Cowie and Thiengo (2003:69) retained it noncommittally as an infraspecific taxon of that species. Cowie and Thiengo (2003:69) erroneously noted only one specimen in USNM 160193.

neavei* Melvill and Standen, 1907Lanistes neavei* Melvill and Standen, 1907:6, unnumbered pl., fig. 1.

Current taxonomic status: *Lanistes neavei* Melvill and Standen, 1907; valid species (Cowie, 2015:21).

Type Material: Syntype USNM 708877 (1 specimen).

Type Locality: “Kapopo” [southwest of Ndola, Zambia (Neave, 1907: unnumbered pl.)].

Remarks: USNM 708877 is labeled “paralectotype,” but no lectotype appears to have been designated. Other syntypes are in various museums (Cowie, 2015:21), and the specimen figured in the original publication (MMUE EE.7815) is the best candidate for future designation as the lectotype (*Code*, Recommendation 74B).

***neritiniiformis* Dall, 1919**

FIGURE 1F

Ampullaria (Feliipponea) neritiniiformis Dall, 1919:10.

Current taxonomic status: *Feliipponea neritiniiformis* (Dall, 1919); valid species (Cowie and Thiengo, 2003:49).

Type Material: Lectotype USNM 332780, here designated; paralectotypes USNM 1270739 (formerly 332780X; 3 specimens).

Type Locality: “Rio Uruguay, Department of Paysandu” [Uruguay].

Remarks: The original description was based on more than one specimen and Dall did not designate a holotype, although he provided dimensions of only one shell and a single catalogue number (USNM 332780) of a lot (labeled “holotype”) that contains only one shell. Cowie and Thiengo (2003:49) listed this shell as the holotype, based on the label; their listing did not constitute fixation of the specimen as a lectotype. We designate the shell in USNM 332780 as the lectotype to stabilize the name. According to the handwritten ledger there was also a radula preparation derived from the original lot, but it could not be located.

oligista* Pilsbry and Olsson, 1953Pomacea (Effusa) oligista* Pilsbry and Olsson, 1953:98, pl. 6, fig. 6.

Current taxonomic status: *Incertae sedis* in *Pomacea (Effusa)*.

Type Material: Paratypes USNM 605847 (3 specimens).

Type Locality: “[O]n the road . . . from Cartagena to Barranquilla . . . a fresh-water lake known as the Cienaga de Luruaco” [Colombia].

Remarks: The holotype (by original designation) and additional paratypes are in ANSP (Baker 1964:168; Cowie and Thiengo, 2003:55). Synonymized by Pain (1956:76–77) with *Pomacea (Effusa) planorbula* (Philippi, 1852), which he treated as a valid species but which Cowie and Thiengo (2003:55) retained as only an infraspecific taxon following Baker (1930:12, 24) and Pilsbry (1933:72), the latter considering *Ampullaria planorbula* Philippi, 1852 “to be the young stage of some variety of *P. (Effusa) glauca* (L.).” Pending further research, we retain *oligista* Pilsbry and Olsson, 1953, as an infraspecific taxon of undetermined status and specific affinity.

palmeri Marshall, 1930

FIGURE 1G

Ampullaria palmeri Marshall, 1930:4, pl. 1, figs. 5, 8.

Current taxonomic status: *Pomacea palmeri* (Marshall, 1930); valid species (Cowie and Thiengo, 2003:71).

Type Material: Holotype USNM 380696, by original designation; paratypes USNM 380697 (4 specimens).

Type Locality: “[S]mall stream in a dense jungle, 13 kilometers south of Puerto Santos, Province of Santander del Norte, Republic of Colombia.”

Remarks: The USNM catalogue number and dimensions of the holotype were given by Marshall (1930:5), who also noted three paratypes as USNM 380697 (in fact there are four specimens in this lot). The lot (USNM 380698; 133 specimens) described by Marshall (1930:5) as “embryonic shells” is not type material, as its listing separately from the “type” and “paratypes” expressly excludes it from the type series (*Code*, Article 72.4.6).

pinei Dall, 1898

FIGURE 1H

Ampullaria pinei Dall, 1898:75.

Current taxonomic status: Synonym of *Pomacea paludosa* (Say, 1829) (Clench and Turner, 1956:120; Cowie and Thiengo, 2003:71).

Type Material: Lectotype USNM 152699 (1 specimen), here designated; paralectotypes USNM 1270740 (formerly 152699X; 11 specimens).

Type Locality: “Homosassa River, Florida.”

Remarks: A label, noted by Cowie and Thiengo (2003:72), indicated that USNM 152699 was the figured “type,” although Dall (1898:75–76) did not designate or figure a type, and there are multiple type specimens. We designate the shell in USNM 152699 as the lectotype to stabilize the name.

sanjosensis Morrison, 1946

FIGURE 1I

Pomacea cumingii sanjosensis Morrison, 1946:6, pl. 1, fig. 1.

Current taxonomic status: *Pomacea cumingii sanjosensis* Morrison, 1946; valid subspecies (Cowie and Thiengo, 2003:74).

Type Material: Holotype USNM 542136, by original designation; paratypes USNM 588458 (19 specimens), USNM 588459 (10 specimens, 4 operculae), USNM 588511 (3 specimens), USNM 598924 (25 specimens), USNM 599037 (12 specimens).

Type Locality: “[T]hree small streams (not of contiguous drainage) on the west side of San José island” [Panama; the catalogue ledger entry associated with USNM 599037 indicates “about ¼ mi. from mouth” but does not specify which stream.]

Remarks: Morrison (1946:7) gave the USNM catalogue number and dimensions of the “type”; although he also gave dimensions of

the “largest of many specimens seen” (according to the ledger, the “largest specimens measured” were from USNM 588511) and of the “smallest adult shell,” he was not more explicit in identifying the paratypes. There are 10 specimens in USNM 588459 but only 9 recorded in the ledger, although the lot includes several hatchlings, one of which could have been easily overlooked. The catalogue ledger notes 27 specimens in USNM 598924; the two missing specimens were not located in adjacent lots.

sinistrosa Lea, 1838

FIGURE 1J

Paludina sinistrosa Lea, 1838: 90, pl. 23, fig. 78.

Current taxonomic status: *Lanistes sinistrosus* (Lea, 1838); valid species (Cowie, 2015:26).

Type Material: Lectotype USNM 106348 (1 specimen), here designated.

Type Locality: “East Indies.”

Remarks: No holotype was designated, although USNM 106348 was labeled “holotype.” Lea obtained from a Miss Hodges “one of the two specimens which were in her fine cabinet” and noted both his own and her cabinet as repositories. Thus, the description may or may not have been based on just the one specimen actually given to him. We avoid assumption of a holotype (*Code*, Recommendation 73F) and designate USNM 106348 as the lectotype to stabilize the name. This rather nondescript shell has the catalogue number and “type” written on the inside of its aperture and is consistent with the original figure of Lea (1838:fig. 78), but it bears no distinguishing features or figure number inked on the body whorl to conclusively deem it as such. Pilsbry and Bequaert (1927:195) placed it in *Lanistes*, which is African only, and considered the original locality erroneous, having seen specimens from Gabon and Mozambique (though it seems unlikely that these would belong to a single species) and mentioning possible records from Tanzania. The genus *Lanistes* in Latin is masculine.

superba Marshall, 1926

FIGURE 1K

Ampullaria superba Marshall, 1926:3, pl. 1, fig. 9.

Current taxonomic status: *Pomacea superba* (Marshall, 1926); valid species (Cowie and Thiengo, 2003:75).

Type Material: Holotype USNM 362863, by original designation.

Type Locality: “Cienaga Totuma, Department of Atlantico, United States of Columbia” [Colombia].

Remarks: The “type” was figured and its USNM catalogue number and dimensions were given by Marshall (1926:4, pl. 1, fig. 9). The shell has the catalogue number and “type” written on the inside of its aperture. The original handwritten ledger indicates that it is the figured type, and the pattern of banding on the shell matches that in the illustration precisely.

***tubaeformis* Lea, 1856**

FIGURE 1L

Ampullaria tubaeformis Lea, 1856:110.

Current taxonomic status: *Incertae sedis* in Ampullariidae; valid species (Cowie, 2015:56).

Type Material: Holotype USNM 106329, by monotypy.

Type Locality: Unknown.

Remarks: The original publication neither stated nor implied that the description was based on a single specimen. However, Lea (1866:114) subsequently indicated that it was indeed based on only a “single specimen” and USNM 106329 (labeled “holotype”), based on the banding pattern and the clear repair scar, is the specimen illustrated by Lea (1866: pl. 22, fig. 3); it bears the corresponding figure number inked on the body whorl. We accept this specimen as the holotype by monotypy (*Code*, Article 73.1.2). Although Lea (1856:110) gave no locality, he subsequently (Lea, 1866:114) said that the specimen “came with many other shells from India,” and notes associated with the specimen and the original accession ledger (as “India?”) also suggest this to be the case. However, the original ledger entry was crossed out and replaced with “Brazil” by J. P. E. Morrison and dated September 1955; a note with the specimen written by Morrison at the same time indicates, “probably from Rio di [sic] Janeiro or Brazil near Bahia.” The location also has been suggested as “Siam” (Gaudion 1880:41). The shell appears more like that of a species of *Pomacea* (New World) than of *Pila* (Old World), but its correct generic placement and possible synonymy require further research. Not listed by Sowerby (1909:358, 1910:61, 1916:73) or by Cowie and Thiengo (2003).

***turbinis* Lea, 1856**

FIGURE 1M

Ampullaria turbinis Lea, 1856:110.

Current taxonomic status: Synonym of *Pila ampullacea* (Linnaeus, 1758) (Habe, 1964:49 [as “*ampullaria*”], Brandt, 1974:49; Ng et al., 2014:32; Cowie, 2015:50).

Type Material: Lectotype USNM 106341, here designated; paralectotypes USNM 1270744 (formerly 106341X; 2 specimens).

Type Locality: “Siam” [Thailand].

Remarks: No holotype was designated, although USNM 106341 was labeled “holotype,” and the description was based on three specimens (one adult, two young), according to the later description of Lea (1866:114). The shell in USNM 106341 is the shell illustrated by Lea (1866: pl. 22, fig. 2), based both on the banding pattern and the very clear repair scars or growth arrests, especially that at the start of the body whorl; it bears the corresponding figure number inked on the body whorl. We here designate this shell as the lectotype to stabilize the name. The paralectotypes (USNM 1270744, formerly 106341X), which are indeed smaller than the lectotype, were considered not conspecific with the lectotype, according to a note associated with the lot by J. P. E. Morrison, but this issue requires further research as the paralectotypes could simply be young individuals of the same species, as stated by Lea (1866:14).

***zeteki* Morrison, 1946**

FIGURE 1N

Pomacea zeteki Morrison, 1946:8, pl. 1, fig. 3.

Current taxonomic status: *Pomacea zeteki* Morrison, 1946; valid species (Cowie and Thiengo, 2003:77).

Type Material: Holotype USNM 542137, by original designation; paratypes USNM 542138 (36 specimens).

Type Locality: “Chagres River near Gatuncilla, Republic of Panamá.”

Remarks: Additional material, listed as paratypes by Cowie and Thiengo (2003:77) and Cowie (2015:65), is present in various other museum collections.

Material Previously Considered as Types

***zischkai* Blume and Pain, 1952**

Pomacea zischkai Blume and Pain, 1952:267, pl. 7.

Current taxonomic status: *Pomacea zischkai* Blume and Pain, 1952; valid species (Cowie and Thiengo, 2003:77).

Type Material: None.

Type Locality: “Chapara Region, at 400 m. Bolivia tropica.”

Remarks: The holotype, designated by Blume and Pain (1952:268), was reported by them as in Blume’s collection; it is now in the ZSM (Cowie and Thiengo, 2003:77). Blume and Pain (1952:268) also listed five paratypes, one in Pain’s collection (now in NMW) and four in the FMNH (Cowie and Thiengo, 2003:77). Blume and Pain (1952:268) noted that “the whole series examined” (they did not say “type” series) included “some 340 examples.” Many of these were curated or cited as paratypes and noted as present in the ZSM and other museums by Cowie and Thiengo (2003:77) and as possible paratypes by Cowie (2015:65). However, all this additional material (presumably including those in USNM 667036, 2 specimens) was mentioned separately by Blume and Pain (1952:268) from their explicit designation of the holotype and five paratypes in their table, thereby expressly excluding them from the type series (*Code*, Article 72.4.6).

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