



## Type Specimens of Hawaiian Land Snails in the Paleontological Research Institution in Ithaca, New York

Authors: Goulding, Tricia C., Strong, Ellen E., Hayes, Kenneth A., Slapcinsky, John, Kim, Jaynee R., et al.

Source: American Malacological Bulletin, 38(1) : 1-38

Published By: American Malacological Society

URL: <https://doi.org/10.4003/006.038.0101>

---

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at [www.bioone.org/terms-of-use](http://www.bioone.org/terms-of-use).

Usage of BioOne Complete content is strictly limited to personal, educational, and non - commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

---

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

## Type specimens of Hawaiian land snails in the Paleontological Research Institution in Ithaca, New York

Tricia C. Goulding<sup>1</sup>, Ellen E. Strong<sup>2</sup>, Kenneth A. Hayes<sup>1,2,3</sup>, John Slapcinsky<sup>4</sup>, Jaynee R. Kim<sup>1</sup>, and Norine W. Yeung<sup>1,2</sup>

<sup>1</sup>Malacology, Bernice Pauahi Bishop Museum, 1525 Bernice St., Honolulu, Hawaii 96817, U.S.A., tc.goulding@gmail.com

<sup>2</sup>Smithsonian Institution, National Museum of Natural History, PO Box 37012, MRC 163, Washington, D.C. 20013, U.S.A.

<sup>3</sup>Pacific Center for Molecular Biodiversity, Bernice Pauahi Bishop Museum, 1525 Bernice St., Honolulu, Hawaii 96817, U.S.A.

<sup>4</sup>Florida Museum of Natural History, 1659 Museum Road, Gainesville, Florida 32611, U.S.A.

**Abstract:** The diversity of Hawaiian land snails was once extraordinary, both in terms of the number of species and the unparalleled levels of endemism. Habitat loss and the establishment of non-native species that prey on native snails have resulted in catastrophic declines in Hawaii's native land snails in the last century, and many are now critically endangered or extinct. Despite these losses, some species persist, and recent surveys have identified remnant populations of several species previously thought extinct. To effectively manage these remaining taxa and to understand what has been lost, the systematics of the land snail fauna of Hawaii needs revision; this will facilitate accurate identification of threatened species, discovery of undescribed species, and a fuller understanding of native land snail evolution and conservation. The development of type catalogs for all major museum collections holding type material of Hawaiian land snails is a necessary first step in this revisionary process. Here we describe the type material at the Paleontological Research Institute (PRI) in Ithaca, New York. Most of the type collection of Hawaiian land snails at PRI was acquired from Wesley Newcomb through the Cornell Museum. Newcomb described 126 species and varieties of endemic Hawaiian land snails, of which the PRI Hawaiian land snail collection contains type material for 74 nominal species-group taxa belonging to the Achatinellidae and Amastridae. Eighteen of these are recognized as primary type material (i.e., syntypes or lectotypes, there are no holotypes or neotypes).

**Key words:** nomenclature, biodiversity, Mollusca, Pacific Island

Land snails in the Hawaiian Islands were once astonishingly diverse, with more than 750 valid species from the remote archipelago (Cowie *et al.* 1995). This level of diversity is remarkable with respect to the land area of the islands and in its uniqueness: more than 99% of these species are endemic to the Hawaiian Islands, and many of them are endemic to single islands (Cowie *et al.* 1995, Yeung and Hayes 2018). Land snails play an important role in Hawaiian ecosystems (Meyer *et al.* 2013), but the flora and fauna of the islands have greatly changed since the first Polynesians arrived in Hawaii, bringing with them new species of plants and animals (Kirch 1982, Stone 1985, Athens 2009). Later introductions of non-native species by Europeans, including large ungulates, accelerated the loss of native vegetation and led to further changes in Hawaiian ecosystems. These ecosystems continue to be threatened by ongoing transportation of plants and animals around the world, and the number of non-native species that have become established in Hawaii has exploded, with more than 60 introduced snail species (Cowie *et al.* 2008, Hayes *et al.* 2007, 2012, Yeung *et al.* unpublished) and more than 2,800 established non-native arthropods (Eldredge 2006).

Hawaii's arboreal snails show preferences for specific species of native plants (Meyer *et al.* 2014, Meyer *et al.* un-

published), and the decline in many native plants resulting from habitat degradation has almost certainly negatively impacted native land snail populations. Such impacts have been compounded by introduced predators resulting in catastrophic declines in native snail diversity and abundance (Solem 1990, Hadfield *et al.* 1993). Rats prey on snails and have caused significant declines in Hawaiian land snail abundance, which was subsequently exacerbated by the intentional introduction of rosy wolf snails (*Euglandina* spp.) for biocontrol efforts in the 1950s (Hadfield *et al.* 1993, Civeyrel and Simberloff 1996, Meyer *et al.* 2017). Native snails are also preyed on by introduced ants (Solem 1990), other introduced snails such as *Oxychilus alliarius* (Curry and Yeung 2013), and vertebrates such as Jackson's chameleons (Chiaverano and Holland 2014). The combined impacts of these predators and habitat loss have resulted in the extinction of as much as 95% of Hawaiian land snails in some families, and 30–70% in others (Solem 1990, Cowie 2001, Lydeard *et al.* 2004, Régnier *et al.* 2015). However, recent efforts to assess the remaining diversity of Hawaiian land snails have uncovered relict populations of snail species previously thought to be extinct (Yeung *et al.* 2015, 2018).

The rapid and continuing declines of snail populations (USFWS 1981, 1993, Gagne and Christensen 1985, Solem 1990,

Yeung and Hayes 2018) have necessitated increased conservation efforts to stave off extinction of the remaining land snails and to begin developing long term restoration plans. Conservation of snail species diversity requires reliable taxonomy, knowledge of species that are still extant, and their biogeography. Examination of type material is the foundation for systematic revisions and the broader understanding needed to study and conserve biodiversity, and one of the first steps in revising the taxonomy of the Hawaiian land snails is to document all type material in museum collections. Hawaiian land snail species were described based primarily on their shells, but because gastropod shells can be highly variable (Welch 1938, Pilsbry and Cooke 1914a: 307, Goodfriend 1986, Bauer 1988, Stankowski 2011), these species will need to be re-evaluated using additional data, such as DNA sequences and comparative anatomy. An annotated type catalog will facilitate the comparison of type material for future revisionary work, so that species names can be synonymized as necessary and undescribed species can be recognized and described.

Here, we document the type collection of Hawaiian land snails at the Paleontological Research Institute (PRI) in Ithaca, New York. This paper is part of a series of manuscripts aimed at compiling an annotated list of all the type material of Hawaiian land snails in museum collections (Cowie *et al.* 2016, Yeung *et al.* 2017). The PRI collection contains type material of 75 Hawaiian nominal species-group taxa belonging to the Achatinellidae and Amastridae, of which 18 are represented by primary type material (i.e., syntypes or lectotypes, there are no holotypes or neotypes). The type collection of Hawaiian land snails at PRI is almost exclusively composed of species described by Wesley Newcomb. Newcomb's collection of shells was first purchased by Ezra Cornell and deposited in the collection at Cornell University when Newcomb arrived to be curator in 1867 (Johnson 1996: 168). Cornell's Malacology Collection, including Newcomb's material, was moved to PRI in 1995 and was officially donated to the institute in 2018, after which it was given new catalog numbers (Hayes and Glaser 2018). In total, Newcomb's collection of shells contained approximately 10,000 gastropod species, including an extensive collection of achatinellid and amastrid shells most of which were collected between 1850 and 1855, when he lived in Honolulu (Clarke 1960).

Newcomb began naming and describing Hawaiian land snail species in 1853, as species of *Achatinella* Swainson, 1828 (but later describing a species in the genus *Tornatellina* as well). Many of Newcomb's species were later moved to the achatinellid genera *Partulina* Pfeiffer, 1854, *Perdicella* Pease, 1870 and *Newcombia* Pfeiffer, 1854, or the amastrid genera *Amastra* Adams and Adams, 1855, *Laminella* Pfeiffer, 1854, *Tropidoptera* Ancey, 1889 and *Leptachatina* Gould, 1847 (Cowie *et al.* 1995). In total, Newcomb established 99 avail-

able names in the species group, 98 at the rank of species and one at the rank of subspecies (originally a variety). Although the descriptions and illustrations of Hawaiian land snail species in PRI were published by Newcomb between 1853 and 1866, Newcomb returned to Hawaii in 1868 to continue collecting. In a letter to Ezra Cornell, Newcomb wrote that he had collected duplicate shells that would be useful "in exchanges" (Clarke 1960: 138). Newcomb's material does not include collection dates, and it cannot be determined which specimens Newcomb obtained after describing each species. Exceptionally, the original descriptions of a few species indicate they were based on a single specimen; in these cases, the specimen used for the original description is the holotype by monotypy and Newcomb's other specimens have no type status. Two species which were described based on a single specimen, *Achatinella baldwini* and *A. elongata*, previously were reported to be represented by a large number of syntypes, suggesting that the type material for other species also includes specimens obtained after the original descriptions were published. We base our type assessment on the Cornell University ledger identifying type material, but we acknowledge that in most cases we cannot identify which specimens were obtained by Newcomb after the original descriptions were published.

In a revision of the genus *Achatinella*, Newcomb (1858) considered 79 species he described as valid and synonymized the names of fourteen of his species. Newcomb did not retain material for nine of those 14 synonymized species under their original names. Following a revision by Pilsbry and Cooke (1911-1916), several additional species names of Newcomb's were synonymized. Presently, 63 of Newcomb's species are recognized as valid species and an additional 12 are considered valid subspecies. Type material was not found at PRI for 15 of Newcomb's species currently considered as valid taxa; these are *A. elongata*, *A. emersonii*, *A. fusoidea*, *A. mastersi*, *A. mucronata*, *A. obesa*, *A. ovata*, *A. pfeifferi*, *A. porcellana*, *A. recta*, *A. solitaria*, *A. splendida*, *A. striata*, *A. zebra* and *Tornatellina striata*. Newcomb considered *A. emersonii* and *A. pfeifferi* to be synonyms of other names, and likely changed the labels on the type material to reflect what he considered to be the valid names. Lots for eight of these species were recorded as "types" in the CU ledger, but they are not recognized here as type material; the primary types for these species are at the Natural History Museum in London (NHMUK). Newcomb's specimens of *A. zebra* at PRI are also not recognized as type material. There remain four of Newcomb's species, for which no specimens were found at PRI: *A. fusoidea*, *A. porcellana*, *A. recta*, *A. solitaria*, and *Tornatellina striata*. Type material for the first three species is at NHMUK (Johnson 1996), but no type material has been found for *T. striata* (Johnson 1996: 198).

Clarke (1960) and Johnson (1996) reported additional type material from Newcomb's collection in the Museum of

Comparative Zoology at Harvard and NHMUK. The Academy of Natural Sciences of Drexel University, Philadelphia, while not holding any of Newcomb's primary types, has material representing 111 species from Newcomb's collection of Hawaiian land snails (Leidy 1856). This material is not detailed here but will be examined in future work.

### Approach and format of accounts

The current taxonomic status of genera and species follows Cowie *et al.* (1995), plus supporting references, but see Schileyko (1998) for alternate generic usages; there are no new taxonomic arrangements. All interpretations follow the *International Code of Zoological Nomenclature* (ICZN 1999), hereafter, the *Code*. Both primary types (i.e., syntypes, and lectotypes; there are no holotypes or neotypes in this collection) and secondary types (i.e., paralectotypes) are listed in this catalog, but only the primary types are illustrated.

The format of the species accounts follows that used in the previous type catalogs of Hawaiian land snails from Muséum national d'Histoire naturelle and the US National Museum (Cowie *et al.* 2016, Yeung *et al.* 2017), as detailed below. Within each family, taxa are arranged alphabetically by species-group name. The heading of each entry consists of the name, author, and date of description, followed by the genus of the original combination, and the species as necessary. The next line of the entry consists of the name as given with the original genus (and the original species for a subspecies) in which it was described, verbatim and using the original orthography as published by the author, even if now considered incorrect according to the *Code* (except that genus and species names are in italic even if printed otherwise in the original publication). The name is followed by its author, date of publication, page number, and plate/figure number(s). Subsequent publications by the same author bearing directly on the original description follow immediately after the bibliographic information, separated by a semicolon. The current taxonomic status is given next, including generic placement, whether a valid taxon, and if not, the current synonymy, as indicated by Cowie *et al.* (1995), plus supporting references. This is followed by a listing of type material with catalog number(s) from Cornell University (CU) and PRI and the number of specimens in each lot. All specimens are dry shells; there is no wet material. The type locality follows within quotation marks, with the original orthography as provided in the original description, or as clarified by reference to other sources (e.g., original labels, original ledger), or as restricted by the designation of a lectotype. Additional type locality information (e.g., clarifications, corrections, information from subsequent publications) is given in square brackets. Other information, including data on type material at other institutions

(not necessarily comprehensive), corrections or additional information, changes in type status, information on lost specimens, and so on, is included in the remarks section. In these remarks, species-group taxa are generally referred to in the generic combination of their original description.

Images of shells with a scale were used to measure shell length (the distance between lines perpendicular to shell axis) using the program ImageJ2 (Rueden *et al.* 2017). Measurements for shells are provided in the figure captions. Measurements made on other *Achatinella* shells with ImageJ are approximately 0.2 mm from those made with digital calipers. Measurements made between apertural and abapertural photos can differ by up to 0.3 mm, therefore measurements are rounded to the nearest millimeter.

### Publication dates

Many of the achatinellid species described and named by Newcomb in 1854 were also published by Pfeiffer in the same year; Pfeiffer (1854) described 58 species and varieties which he attributed to Newcomb, citing the page numbers, and plates and figures from Newcomb's (1854a) paper in the *Zoological Proceedings of London*, and even quoting some of Newcomb's descriptions (Clarke 1958: 149). The question of which author first published the names was resolved by Clarke (1958). Newcomb's paper was published in two different versions; the most widely available edition of Newcomb's paper was published in the *Proceedings of the Zoological Society of London* in November, 1854 (1854b). An earlier version of Newcomb's publication was published before June, 1854 (Newcomb 1854a), although the exact date of publication is unknown (Clarke 1958: 151). Pfeiffer's paper on *Achatinella* species was published in June, 1854, after the early edition (1854a) of Newcomb's paper (Clarke 1958: 151, Cowie *et al.* 1996: 36). Therefore, Newcomb's (1854a) publication before June 1854 was the first published and has priority over Pfeiffer's publication. There are also reprints of Newcomb's 1853 and 1858 publications with different pagination from the journal articles, but these reprints appeared after the journal articles.

### Specimen labels and the Cornell Ledger

Newcomb's types at Cornell University were originally glued to cardboard with labels written by Newcomb. In 1953, the Newcomb collection was removed from storage and the collection was reorganized following modern taxonomic concepts (Clarke 1960). Clarke (1960: 141) indicated that "At that time the shells were removed from their cardboard placques, retaining Newcomb's original label with each lot". At some point after Clarke examined Newcomb's shells at Cornell, Newcomb's labels were separated from the shells and new labels were placed with the specimens. Cardboard plaques from Cornell specimens are in storage at PRI but no inventory of

the labels has yet been made, thus the exact location of Newcomb's labels is unknown. There are now two labels with each lot: the first is a label from Cornell University on light yellow paper. The printed portion of the CU labels indicate the shells are part of the Newcomb Collection from the Paleontological Museum at Cornell University. Species names, localities, and type status are handwritten on the labels in capital letters with a black felt-tip pen or marker, which is clearly distinct from the cursive handwriting in the Cornell ledger. Emendations to the ledger were also made with the same pen and style, indicating that subsequent emendations to the ledger were made by the same person as the CU labels. It is unclear who wrote the CU labels, but they were likely written in the 1950s or 1960s after the collection was removed from storage. The information reported on the CU labels is very similar to what is reported by Clarke (1960) and may have been written by him but we were unable to find an example of Clarke's handwriting to verify this. Shells in many of the lots are marked individually with letters, i.e. "A", "B", "C" etc.; we consider that these shells were marked by Johnson (1996), who designated shells marked "A" as the lectotype for thirteen of Newcomb's species.

The CU labels report species names, localities, and type status for each lot. The island that shells were collected from is reported on the CU labels (with the exception of one, which reports only S.I. for Sandwich Islands), but specific geographic localities are written for less than half of the lots. The labels for six species include precise localities written in square brackets, which is interpreted as being quoted from Newcomb's original description of the species, rather than being determined by an original label with the specimens. The status of each lot is given on the label either as "cotypes" or "idiotypes", or in one case, paratypes. Based on Clarke's (1960) work, specimens labeled as "cotypes" were generally recognized by Clarke as syntypes. Ideotypes (previously spelled as "idiotypes"), are not type specimens as regulated by the ICZN Code, the term was previously used to refer to specimens identified by the author but not from the type locality (Schuchert and Buckman 1905). Some lots are referred to as "idiotypes (probable cotypes)", reflecting confusion about the type locality for some of Newcomb's names.

Newcomb's collection was recorded in a handwritten ledger at Cornell University (Fig. 1) which was moved to PRI along with the shells (referred to as the "CU ledger"). The handwriting in the ledger is not Newcomb's, therefore the ledger was probably written by one of his assistants. The catalog number, taxon name, and locality for each lot are recorded in the ledger, but the locality generally includes only the island and not the specific geographic location reported by Newcomb in his species descriptions. For instance, the original description of *Achatinella buddii* by Newcomb (1854a:

29–30) lists the locality for the species as "Palolo, Oahu", but the locality for Newcomb's type material is listed in the CU ledger only as "Oahu". In some cases, the locality is given only as "Sandwich Islands" (or abbreviated as "SI"), an old name for the Hawaiian Islands.

The ledger indicates whether a lot contains type material (written as "Type" without distinguishing between syntypes or a holotype) but does not indicate the number of specimens. For lots that contain type material, the "remarks" of the ledger generally include a reference to Newcomb's original description or illustration. Species described by Newcomb in 1853 in the *Annals of the Lyceum of Natural History of New York*, generally include a reference to this publication and the page number of the species description (e.g., "Ann. Lyc. l. c. p. 19"). The remarks on these species also frequently note Newcomb's (1854b) subsequent illustrations in the *Proceedings of the Zoological Society of London* (e.g., "Zool. Proc. pl. 23, fig. 26"). Species that were first described by Newcomb in 1854 also include a reference in the ledger to "Zool. Proc." (1854b) and the plate and figure numbers, but no page numbers are listed for the species descriptions. Although Newcomb's figures are specifically referenced for most species illustrated in the 1854 paper, G. Sowerby prepared the illustrations based on shells Newcomb sent to NHMUK, and those shells remain in the Natural History Museum in London. In many cases, Johnson (1996) has already designated a specimen from NHMUK as the lectotype, which he generally indicated to be the "figured type". Nonetheless, in cases where the CU ledger includes a reference to Newcomb's illustrations, the shells in the CU lot are compared to Newcomb's illustration. For species published in Newcomb's 1855 paper in the *Annals of the Lyceum of Natural History of New York*, the CU ledger often refers to the original publication and the page number of the description (e.g., "Ann. Lyc. l. c. p. 145") but does not include a reference to Newcomb's (1866) subsequent illustrations.

### Lectotype fixation and designation

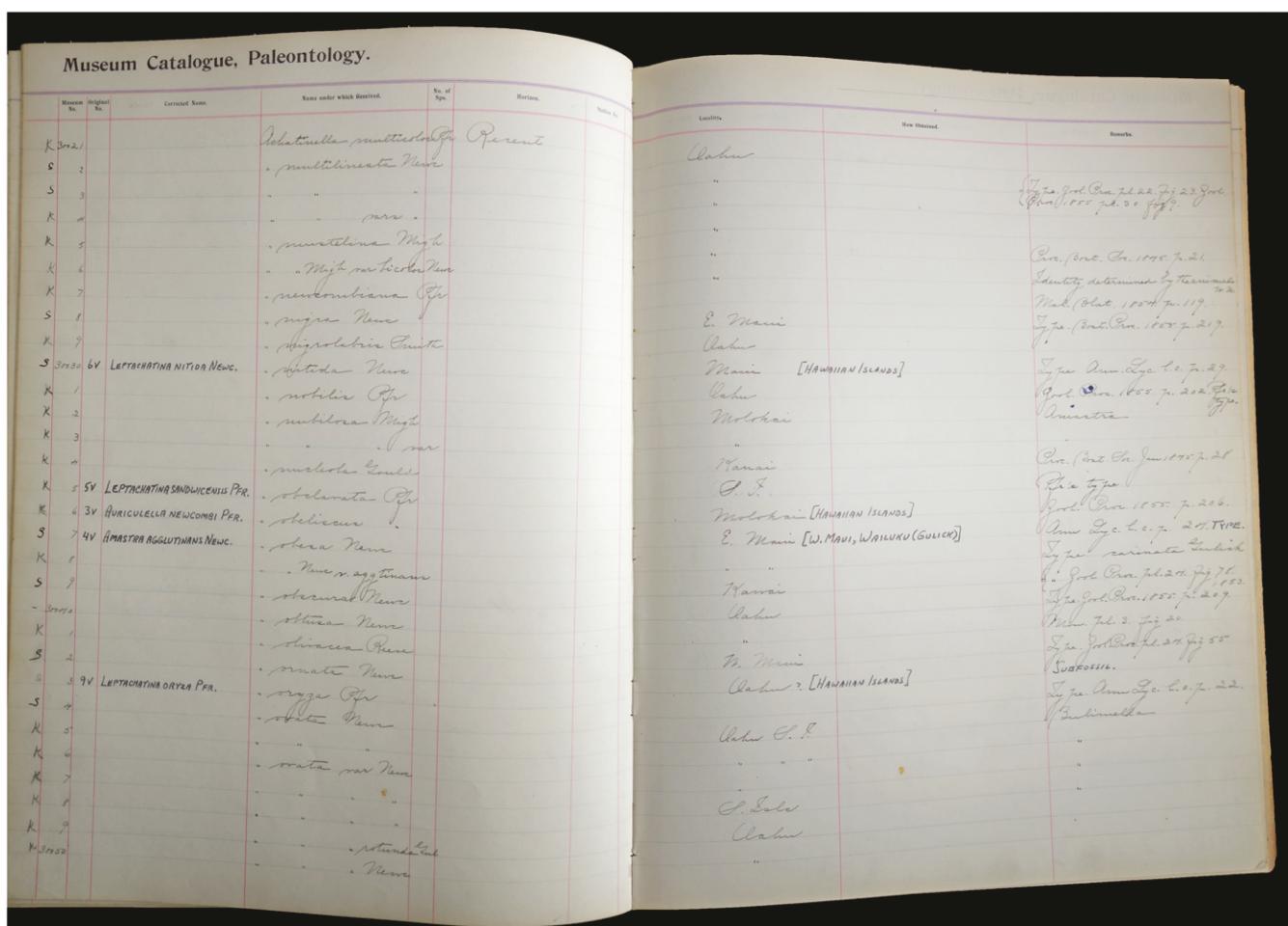
Newcomb did not use "the type" or an equivalent expression when establishing his new taxa, and thus the name-bearing type was not fixed in the original descriptions. However, in some instances, statements by Newcomb have allowed determination of a holotype by monotypy. Lectotypes for most of Newcomb's species have been validly designated by previous authors, including several by Newcomb himself. Pilsbry and Cooke (1914b) and Welch (1938) also included statements about "the type" of some of Newcomb's species; these authors are recognized as having used an equivalent expression to select that specimen as the lectotype (Code Art. 74.6). Welch (1942, 1958) and Johnson (1996), also designated lectotypes by explicitly using the term "lectotype" to "unambiguously select a particular syntype to act as the

unique name-bearing type of the taxon" (Code Art. 74.5), although some of these are determined here to be invalid.

Johnson (1996) studied the type material of many species of Hawaiian land snails for his work on molluscs in the Museum of Comparative Zoology (MCZ). The lectotypes designated by Johnson are not limited to the MCZ collection and include types from the collection at PRI and the Natural History Museum, London (NHMUK, previously referred to as BMNH). Most of the lectotypes Johnson selected for Newcomb's land snails are in the NHMUK collection, but there are also some from the PRI collection. In total, PRI holds primary type material of 18 of Newcomb's species and one named variety, including nine lectotypes validly designated by Johnson. In many instances, Johnson indicated that the type he selected was Newcomb's "figured type", although we have only commented on these statements for the types in the PRI collection. For most lectotypes at CU Johnson reported that the lectotype

was “so marked”; this refers to the letter “A” written on the shell, distinguishing it from the other shells in the lot. In future work on NHMUK and MCZ type material, it will be evaluated if Johnson’s lectotypes from these collections match the illustrations provided by Newcomb.

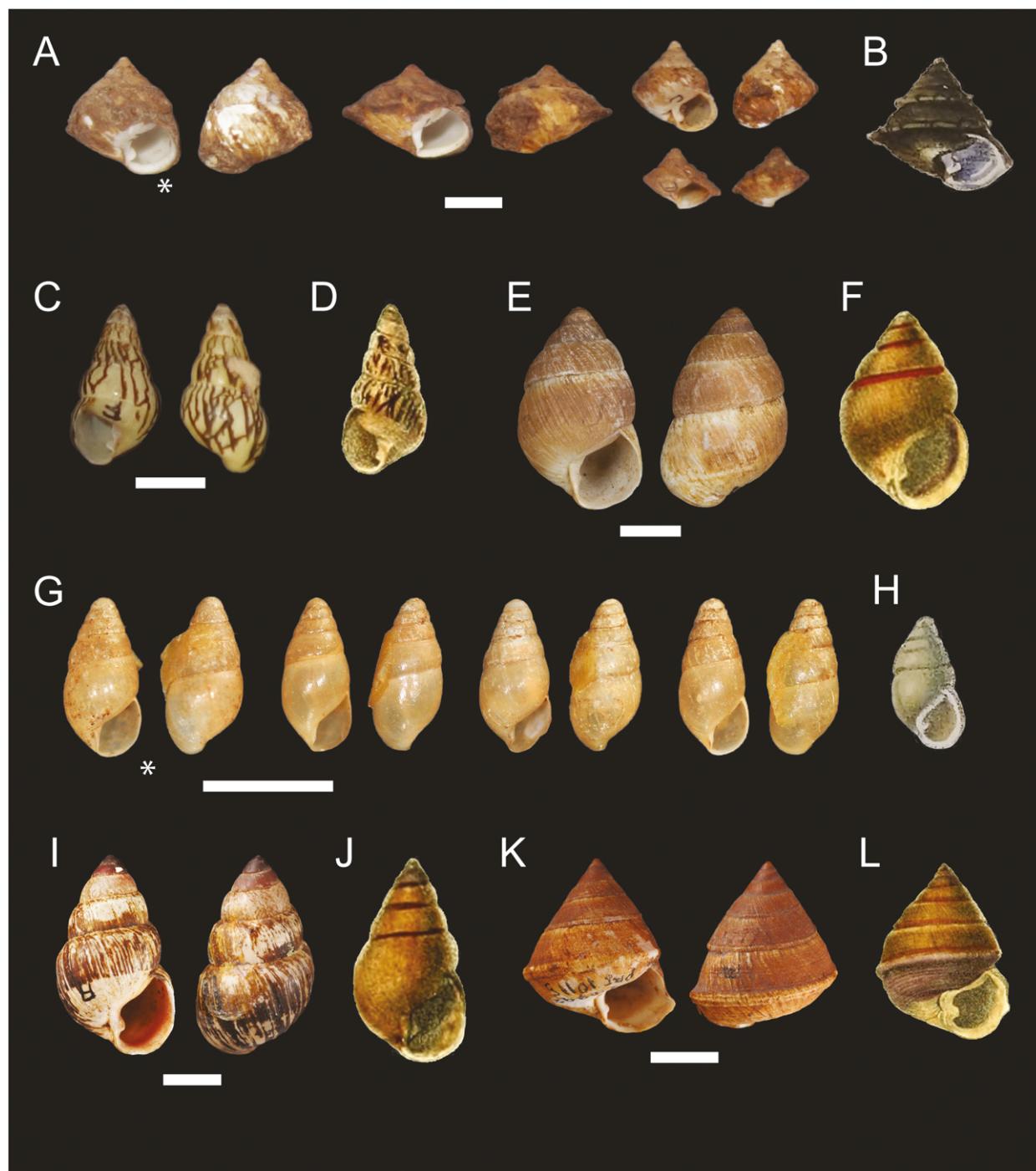
Johnson (1996) reported secondary type material (paralectotypes) from CU, MCZ, and NHMUK but did not report the number of specimens in these lots. The number of specimens per lot and associated collection information for shells in the MCZ collection is available through an on-line database; this information has been digitized from the ledger, and therefore the actual specimen count may vary if specimens have been lost or added since the lot was recorded. In the accounts for each species where secondary type material is listed, the relevant information from MCZ is added. For NHMUK, information on the lots is being digitized but is currently incomplete and will be detailed in future work.



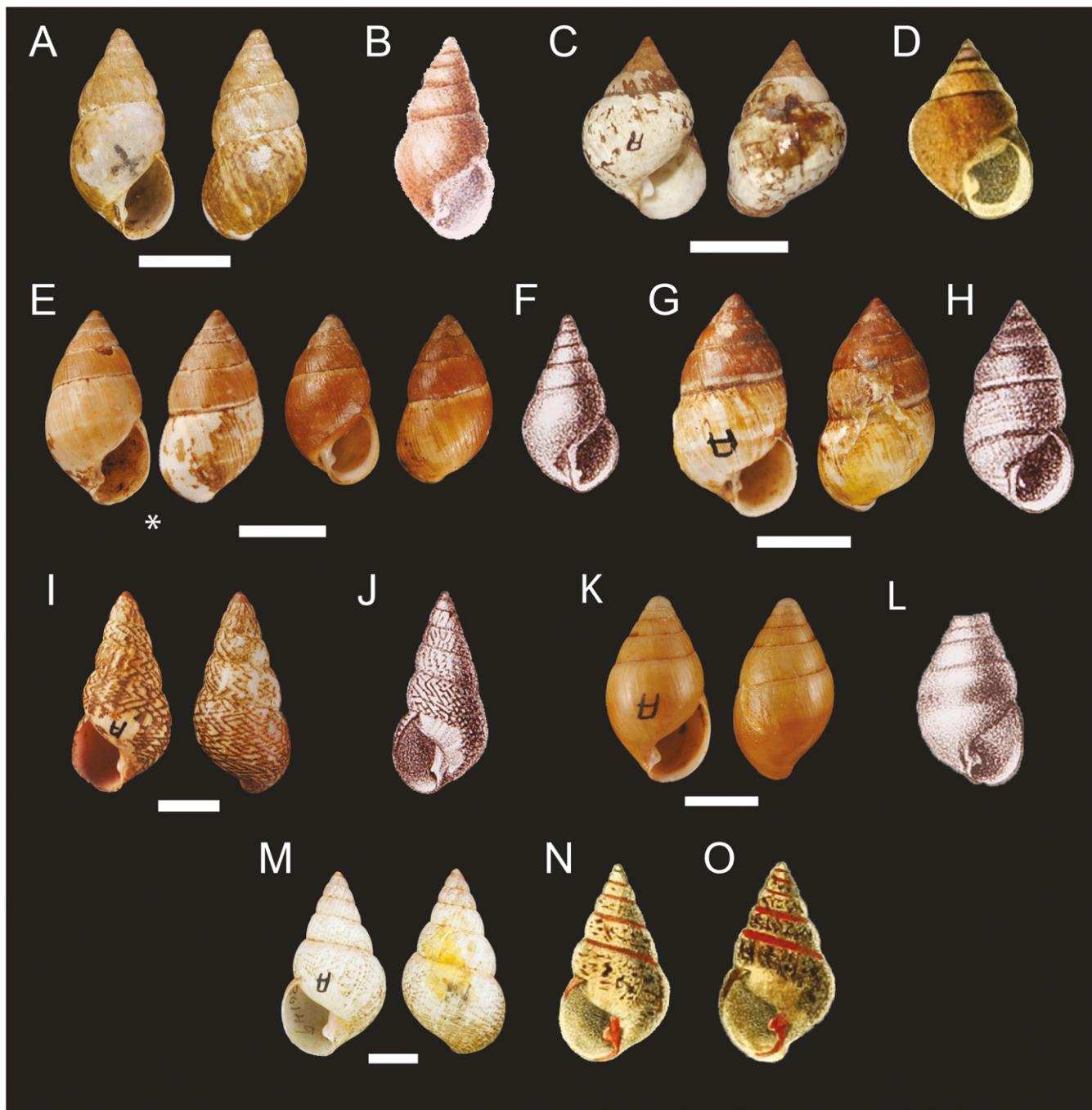
**Figure 1.** Excerpt from the Cornell University Ledger.



**Figure 2.** **A.** Syntype (PRI 10450; 21 mm) of *Achatinella adamsi*. **B.** Newcomb's (1854: pl. 22, fig. 20) figured *Achatinella adamsi*. **C.** Lectotype (PRI 10311, 23 mm) of *Achatinella dwightii*. **D.** Newcomb's (1866: pl. 13, fig. 9) figured *Achatinella dwightii*. **E.** Syntypes (PRI 10117, shell marked with asterisk is 23 mm) of *Achatinella confusa*. **F.** *Achatinella confusa*, figured by Newcomb (pl. 13, fig. 10) as *Achatinella physa* [1866]. **G.** Possible syntypes (PRI 10117) of *Achatinella physa*. **H.** Newcomb's (pl. 24, fig. 64) figured *Achatinella physa* [1854]. **I.** Syntypes (PRI 10232, shell marked with asterisk is 23 mm) of *Achatinella sordida*. **J.** Newcomb's (1854: pl. 23, fig. 27) figured *Achatinella sordida*. **K.** Lectotype (PRI 10126, 14 mm) of *Achatinella undulata*. **L.** Newcomb's (1866: pl. 13, fig. 15) figured *Achatinella undulata*. Scale bars: 5 mm.



**Figure 3.** **A.** Syntypes (PRI 10203, shell marked with asterisk is 8 mm) *Achatinella obesa* var. *agglutinans*. **B.** Newcomb's (1854: pl. 23, fig. 39a) figured *Achatinella obesa* var. *agglutinans*. **C.** Lectotype (PRI 10118, 15 mm) of *Achatinella alexandri*. **D.** Newcomb's (1866: pl. 13, fig. 14) figured *Achatinella alexandri*. **E.** Lectotype (PRI 82751, 17 mm) of *Achatinella anthonii*. **F.** Newcomb's (1866: pl. 13, fig. 2) figured *Achatinella anthonii*. **G.** Syntypes (PRI 10180, shell marked with asterisk is 6 mm) of *Achatinella grana*. **H.** Newcomb's (1854: pl. 23, fig. 46) figured *Achatinella grana*. **I.** Lectotype (PRI 10123, 18 mm) of *Achatinella humilis*. **J.** Newcomb's (1866: pl. 13, fig. 4) figured *Achatinella humilis*. **K.** Possible lectotype (PRI 10114, 27 mm) of *Achatinella kauaiensis*. **L.** Newcomb's (1866: pl. 13, fig. 1) figured *Achatinella kauaiensis*. Scale bars: A–J: 5 mm, K: 1 cm.



**Figure 4.** **A.** Lectotype (PRI 10189, 12 mm) of *Achatinella lineolata*. **B.** Newcomb's (1854: pl. 23, fig. 29) figured *Achatinella lineolata*. **C.** Lectotype (PRI 10128, 19 mm) of *Achatinella nigra*. **D.** Newcomb's (1866: pl. 13, fig. 3) figured *Achatinella nigra*. **E.** Syntypes (PRI 10245, shell marked with asterisk is 11 mm) of *Achatinella petricola*. **F.** Newcomb's (1866: pl. 13, fig. 6) figured *Achatinella petricola*. **G.** Lectotype (PRI 10244, 12 mm) of *Achatinella pusilla*. **H.** Newcomb's (1866: pl. 13, fig. 5) figured *Achatinella pusilla*. **I.** Lectotype (PRI 10247, 18 mm) of *Achatinella remyi*. **J.** Newcomb's (1866: pl. 13, fig. 13) figured *Achatinella remyi*. **K.** Lectotype (PRI 10120, 13 mm) of *Achatinella succincta*. **L.** Newcomb's (1866: pl. 13, fig. 7) figured *Achatinella succincta*. **M.** Lectotype (PRI 10124, 20 mm) of *Achatinella tetrao*. **N.** Newcomb's (1866: pl. 13, fig. 12) figured *Achatinella tetrao*. **O.** Newcomb's (1866: pl. 13, fig. 11) figured *Achatinella tetrao*. Scale bars: **A:** 5 mm, **C:** 1 cm, **E-N:** 5 mm.

## Acronyms and abbreviations

Art.	Article of the <i>Code</i>
ANSP	Academy of Natural Sciences of Drexel University
CU	Cornell University
MCZ	Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts
NHMUK	Natural History Museum, London, UK (formerly BMNH)
PRI	Paleontological Research Institute, Ithaca, New York
SI	Sandwich Islands, old name for the Hawaiian Islands
spm(s)	specimen(s)
var.	variety

## SYSTEMATIC CATALOG

## FAMILY ACHATINELLIDAE

*adamsi* Newcomb, 1853; *Achatinella*

*Achatinella adamsi* Newcomb, 1853: 19; 1854a: 11–12, pl. 22, fig. 20 (as *adamsii*); 1854b: 137–138, pl. 22, fig. 20 (as *adamsii*).

**Current taxonomic status:** Synonym of *Achatinella marmorata* Gould, 1847b, now placed in *Partulina* (*Partulina*) (Cowie *et al.* 1995: 68).

**Type material:** Syntype PRI 10450 *ex* MCZ 294932 (1 spm, Fig. 2A).

**Type locality:** “Makawao, Maui”.

**Remarks:** Newcomb (1853: 19) originally spelled the name as *Achatinella adamsi*; Newcomb’s (1854a) change of the spelling to *A. adamsii* is an incorrect subsequent spelling (*Code* Art. 33.4). The type material was not located in CU by Clarke (1960: 145), but we have located one syntype in the PRI collection (PRI 10450). In addition to the PRI label, there is a label from the Museum of Comparative Zoology (*ex* MCZ 294932) that indicates its status as a syntype from Maui from A.A. Gould’s collection. There are notable differences between Newcomb’s illustration (Fig. 2B) and PRI 10450: the apertural lip is not thickened in PRI 10450, there is little pattern on the shell of PRI 10450 and the basal columellar fold is larger in proportion to the aperture in PRI 10450 than in Newcomb’s illustration. Further study is needed of other syntypes from Gould’s collection in MCZ 294932 (5 spms; A.A. Gould collection) and NHMUK 1995100 (Johnson 1996: 175) before a lectotype can be designated.

*ampla* Newcomb, 1854; *Achatinella*

*Achatinella ampla* Newcomb, 1854a: 11, pl. 22, fig. 19; 1854b: 137, pl. 22, fig. 19.

**Current taxonomic status:** *Achatinella* (*Achatinellastrum*) *fulgens ampla* Newcomb, 1854. Valid subspecies (Cowie *et al.* 1995: 49).

**Type material:** Paralectotypes PRI 10197 [CU 29904] (4 spms).

**Type locality:** “Kolau, Oahu” [*sic*, Koolau].

**Remarks:** The CU ledger indicates that CU 29904 contains type material from “Kolau, Oahu”. The CU label indicates their status as “cotypes”; Clarke (1960: 145) reported that CU 29904 comprised four syntypes. The typed PRI label incorrectly lists the locality as “India, India”. The ledger includes a reference to Newcomb’s (1854a, 1854b) illustration of *Achatinella ampla*. None of the shells in CU 29904 is Newcomb’s figured shell; the figured specimen is dextral and the only dextral syntype CU 29904 differs in the banding pattern. Johnson (1996: 175) validly designated NHMUK 1992210 as the lectotype, which he indicated was Newcomb’s (1854: pl. 22, fig. 19) “figured and only type, *teste* Welch” (although he did not provide a reference to Welch’s work and we could not locate any statement by Welch to this effect). Thus the specimens in PRI 10197 (CU 29904) are paralectotypes.

*buddii* Newcomb, 1854; *Achatinella*

*Achatinella buddii* Newcomb, 1854a: 29–30, pl. 24, fig. 73; 1854b: 155–156, pl. 24, fig. 73; 1858: 333.

**Current taxonomic status:** *Achatinella* (*Achatinellastrum*) *buddii* Newcomb, 1854. Valid species (Cowie *et al.* 1995: 49).

**Type material:** Paralectotypes PRI 10202 [CU 29912] (5 spms).

**Type locality:** “Palolo, Oahu”.

**Remarks:** The CU ledger indicates that the specimens in CU 29912 contain type material from “Oahu” (precise localities are not listed for most of Newcomb’s lots in this collection, see section on “Cornell ledger and specimen labels”). The label with the specimens lists the locality as Palolo, Oahu (written in brackets, see “Cornell ledger and specimen labels”). The notes in the ledger also list the name [*Achatinella*] “*fuscozona* Smith, 1873” in the remarks for this lot, which is considered a synonym of *A. buddii* (Pilsbry and Cooke 1914a: 190, Cowie *et al.* 1995: 51). The CU label indicates their status as “cotypes”; Clarke (1960: 146), indicated CU 29912 comprised five syntypes. All of the shells differ in banding from Newcomb’s figure. Johnson (1996: 178) wrote that he designated NHMUK 1992231/1 as the lectotype, however, this catalog number belongs to type material for *A. rubiginosa*; the correct catalog number for the specimen he examined and separated as the lectotype is NHMUK 1992234/1. Despite the error in reporting the number, the lectotype designation is valid. Johnson (1996: 178) asserted that the lectotype was Newcomb’s (1854: pl. 24, fig. 73) “figured type, *teste* Welch” (although he did not provide a reference to Welch’s work and we could not locate any statement by Welch to this effect). Thus PRI 10202 (CU 29912) are paralectotypes. Additional paralectotypes are in NHMUK 1992234/2, MCZ 294933 (8 spms; A.A. Gould collection) and MCZ 315851 (2 spms) as reported by Johnson (1996: 178).

***casta* Newcomb, 1854; *Achatinella***

*Achatinella casta* Newcomb, 1854a: 8–9, pl. 22, fig. 12; 1854b: 134–135, pl. 22, fig. 12.

**Current taxonomic status:** *Achatinella (Achatinellastrum) casta* Newcomb, 1854. Valid species (Cowie *et al.* 1995: 49).

**Type material:** Paralectotypes PRI 10237 [CU 29920] (8 spms).

**Type locality:** “Ewa, Oahu”.

**Remarks:** The CU ledger does not list CU 29920 as type material, but a CU label accompanying the lot indicates their status as “cotypes”; Clarke (1960: 147) indicated that CU 29920 comprised eight syntypes. The CU label and ledger give the locality of the type material only as “Oahu, S.I.”. Johnson (1996: 178) wrote that he designated NHMUK 1992215/1 as the lectotype, but also referred to the same catalog number (Johnson 1996: 194) as the lectotype of Newcomb’s *A. polita*. The correct catalog number for Newcomb’s *A. casta* is NHMUK 1992269, which is separated as the lectotype validly selected by Johnson. Johnson indicated that the selected specimen was Newcomb’s (1854: pl. 22, fig. 12) “figured and only type, teste Welch” (although he did not provide a reference to Welch’s work and we could not locate any statement by Welch to this effect). Thus the specimens in PRI 10237 (CU 29920) are paralectotypes. Additional paralectotypes are in NHMUK 1992215/2 and MCZ 294924 (9 spm; A.A. Gould collection) as reported by Johnson (1996: 178).

***cestus* Newcomb, 1854; *Achatinella***

*Achatinella cestus* Newcomb, 1854a: 7, pl. 22, fig. 8; 1854b: 132–133, pl. 22, fig. 8.

**Current taxonomic status:** *Achatinella (Achatinella) apexfulva cestus* Newcomb, 1854. Valid subspecies (Cowie *et al.* 1995: 39).

**Type material:** Paralectotypes PRI 10217 [CU 29925] (6 spms).

**Type locality:** “Palolo, Oahu”.

**Remarks:** The CU ledger does not list CU 29925 as type material, but a CU label with the six shells indicates their status as “cotypes”. Clarke (1960: 147) reported that CU 29925 comprised six syntypes. Although the type locality is “Palolo, Oahu”, the only locality recorded in the ledger and on the label with the specimens is the island: “Oahu, S.I.”. Welch (1942: 31) validly designated NHMUK 1992188/1 as the lectotype when he wrote “the lectotype (pl. 4, fig. 9) is marked with an “x” by me”. Clarke (1960: 147) had apparently overlooked this designation when he identified the material in the Cornell University collection as syntypes. As a result of the valid designation of a lectotype, the specimens in PRI 10217 (CU 29925) are paralectotypes. Additional paralectotypes include NHMUK 1992188/2, MCZ 25497 (3 spms; J.G. Anthony) and MCZ 294947 (7 spms; A.A. Gould collection) as reported by Johnson (1996: 179).

***confusa* Sykes, 1900; *Achatinella***

*Achatinella (Partulina) confusa* Sykes, 1900: 312.

**Current taxonomic status:** *Partulina (Baldwinia) confusa* Sykes, 1900. Valid species (Cowie *et al.* 1995: 64).

**Type material:** Syntypes PRI 10117 and PRI 10116 [CU 30072] (4 spms; Fig. 2E).

**Type locality:** “Hawaii” [no additional details].

**Remarks:** Sykes established *Achatinella (Partulina) confusa* by bibliographic reference to Newcomb’s (1855b: 218) subsequent elaboration of *Achatinella physa*, an indication that made the name available (Code Art. 12.2.1). Sykes also referred to Newcomb’s (1866: 214, pl. 13, fig. 10) subsequent illustration as being *A. confusa*. The specimens described (Newcomb 1855) were considered by Sykes to be a distinct species from that originally described as *A. physa* (Newcomb 1854a: 26, pl. 24, fig. 64). Pilsbry (1913a: 105–106) agreed, writing “Dr. C Montague Cooke and Mr. Thaanum, who have gone over the evidence and figures with me, agree in this interpretation of Newcomb’s *A. physa*, confirming the opinion of Mr. Sykes.” By referencing Newcomb’s (1855b) elaboration on *A. physa*, the type material of *A. confusa* is necessarily Newcomb’s material used for the 1855 description (Code Art. 72.4.1). Newcomb (1855b) gave the location for the material he examined as “Hawaii” without providing additional details, which is therefore the type locality for *confusa*.

The CU ledger lists CU 30072 as being from Mouna Kea, Hawaii, the same locality as both the original description of *A. physa* and Newcomb’s (1855) subsequent elaboration on the species. The remarks in the ledger for CU 30072 refer to Newcomb’s (1855b) elaboration on *A. physa* with the additional note “adult”; the lot is not referred to as type material. Because the type material of *Achatinella confusa* Sykes comprises the “mature” shells referred to in Newcomb’s 1855 publication, the shells in CU 30072 are considered as syntypes of *A. confusa*. The ledger does not indicate how many specimens were originally in this lot, but Clarke (1960: 153) reported CU 30072 and 30073 together comprised four syntypes (a single CU label with the lot includes both catalog numbers). The 4 large shells marked “A”, “B”, “C” and “D” are all marked inside the aperture with the number 30072 (Fig. 2E); it therefore appears that Clarke did not examine any specimens from CU 30073 (which would be the type material of *A. physa*). Shell “A” appears to be Newcomb’s figured specimen (Fig. 2F).

***crassa* Newcomb, 1854; *Achatinella***

*Achatinella crassa* Newcomb, 1854a: 29, pl. 24, fig. 71; 1854b: 155, pl. 24, fig. 71.

**Current taxonomic status:** *Partulina (Partulina) crassa* (Newcomb, 1854). Valid species (Cowie *et al.* 1995: 69).

**Type material:** Paralectotypes PRI 10229 [CU 29936] (5 spms).

**Type locality:** "Ranai" [sic, Lanai].

**Remarks:** The CU ledger indicates that CU 29936 contains type material, and the CU label indicates their status as "cotypes". Clarke (1960: 147) indicated that CU 29936 comprised five syntypes. The ledger also references Newcomb's (1854: pl. 24, fig. 71) illustration of *Achatinella crassa* in the remarks. The shells in CU 29936 do not closely match to Newcomb's illustration; the shell marked "D" is the closest match with respect to shell shape, but the columellar lamella of shell D is less prominent than that in Newcomb's illustration. The ledger lists the locality of the shells as "Ranai" [sic, Lanai]. Johnson (1996: 180) validly designated NHMUK 1992233/1 as the lectotype, which he indicated was Newcomb's (1854: pl. 24, fig. 71) "figured type". Thus PRI 10229 (CU 29936) contains paralectotypes. Additional paralectotypes are in NHMUK 1992233/2 and MCZ 294943 (13 spms; A.A. Gould collection) as reported by Johnson (1996: 180).

***cumingi* Newcomb, 1853; *Achatinella***

*Achatinella cumingi* Newcomb, 1853: 25; 1854a: 24, pl. 24, fig. 59 (as *cumingi*); 1854b: 150, pl. 24, fig. 59 (as *cumingii*).

**Current taxonomic status:** *Newcombia cumingi* (Newcomb, 1853). Valid species (Cowie *et al.* 1995: 62).

**Type material:** Paralectotypes PRI 10196 [CU 29941] (4 spms).

**Type locality:** "Hale-a-ka-la, Maui" [= Haleakala].

**Remarks:** Newcomb (1853) originally spelled the name as *Achatinella cumingi*, and Newcomb's [1854] change of the spelling to *A. cumingii* is an incorrect subsequent spelling (Code Art. 33.4). The CU ledger indicates that CU 29941 is type material; no locality information is provided. Clarke (1960: 148) reported that there were four syntypes in CU 29941. The typed label at PRI indicates only that the specimens are from Newcomb's collection from "United States, Hawaii, Hawaii Islands", which specifies the state, but not the island where they were collected (no CU label was found). The ledger also references Newcomb's (1853) original description and his subsequent (1854a, 1854b) figure; although the shells in CU 29941 are similar in appearance to Newcomb's figure, there is no evidence that they were formerly at NHMUK, and none of the shells is considered to be the figured specimen. Johnson (1996: 180) validly designated NHMUK 1992224/1 as the lectotype which he indicated was "the figured type". Thus PRI 10196 (CU 29941) are paralectotypes. Additional paralectotypes are in NHMUK 1992224/2, MCZ 25917 (5 spms), MCZ 135507 (2 spms), and MCZ 294930 (3 spms; A.A. Gould collection) as reported by Johnson (1996: 180).

***curta* Newcomb, 1854; *Achatinella***

*Achatinella curta* Newcomb, 1854a: 18–19, pl. 23, fig. 43; 1854b: 144–145, pl. 23, fig. 43.

**Current taxonomic status:** *Achatinella (Achatinellastrum) curta* Newcomb, 1854. Valid species (Cowie *et al.* 1995: 50).

**Type material:** Paralectotypes PRI 10225 [CU 29942] (6 spms).

**Type locality:** "Waialua, Oahu".

**Remarks:** There are six specimens in the PRI type collection labeled as "cotypes", although Clarke (1960: 148) reported that CU 29942 comprised eight syntypes. The locality in the CU ledger and on the CU label is given only as Oahu. The ledger references Newcomb's (1854a, 1854b) illustration of *Achatinella curta*. Of the three sinistral shells in CU 29942, none is a close match to the banding pattern of Newcomb's figured shell. Johnson (1996: 180) validly designated NHMUK 1992217/1 as the lectotype, which he indicated was Newcomb's (1854: pl. 23 fig. 43) "figured type", thus the specimens in PRI 10225 (CU 29942) are paralectotypes. Additional paralectotypes are in NHMUK 1992217/2 and MCZ 294963 (8 spms; A.A. Gould collection) as reported by Johnson (1996: 180).

***decipiens* Newcomb, 1854; *Achatinella***

*Achatinella decipiens* Newcomb, 1854a: 27–28, pl. 24, fig. 68; 1854b: 153–154, pl. 24, fig. 68; 1858: 332–333.

**Current taxonomic status:** *Achatinella (Bulimella) decipiens* Newcomb, 1854. Valid species (Cowie *et al.* 1995: 56).

**Type material:** Paralectotypes PRI 10236 [CU 29944] (2 spms).

**Type locality:** "Kahana, Oahu".

**Remarks:** No locality is given in the CU ledger for CU 29944. Clarke (1960: 148) reported that CU 29944 comprised five syntypes and the typed PRI label also indicates that the lot includes five specimens. However, only two specimens are now found in CU 29944, labeled "B" and "C"; the other three shells were not located. The CU label indicates the status of these specimens as "cotypes" from Kahana, Oahu (the locality is written in square brackets). The ledger references Newcomb's (1854a, 1854b) illustration of *Achatinella decipiens* in the remarks, but neither of the two remaining specimens is the figured one. The shell marked "B" is similar in shape to Newcomb's illustration but differs in the banding on the shell, and the shell marked "C" is more elongate. Johnson (1996: 181) validly designated NHMUK 1992230/1 as the lectotype, which he indicated was Newcomb's (1854: pl. 24, fig. 68) "figured and only type, teste Welch" (although he did not provide a reference to Welch's work and we could not locate any statement by Welch to this effect). Thus, the specimens in PRI 10236 (CU 29944) are paralectotypes. Additional paralectotypes are in NHMUK 1992230/2 and MCZ 294926 (20 spms; A.A. Gould collection) as reported by Johnson (1996: 181).

***dubia* Newcomb, 1853; *Achatinella***

*Achatinella dubia* Newcomb, 1853: 23; 1854a: 26, pl. 24, fig. 65; 1854b: 152, pl. 24, fig. 65.

**Current taxonomic status:** *Partulina (Baldwinia) dubia* (Newcomb, 1853). Valid species (Cowie *et al.* 1995: 64).

**Type material:** Paralectotypes PRI 10178 [CU 29953] (7 spms).

**Type locality:** "Waianoe, Oahu" [sic, Waianae]. Initially reported as "Oahu" (Newcomb 1853), later refined to "Waianoe, Oahu" (Newcomb 1854a, 1854b).

**Remarks:** The CU ledger indicates that CU 29953 contains type material, and references Newcomb's (1853) original description and (1854a, 1854b) subsequent illustration. The locality of the specimens is given only as "Oahu" in the ledger and the CU label. The label from Cornell indicates the status of the specimens as "cotypes"; Clarke (1960: 148) reported seven syntypes in CU 29953. Two of the shells in CU 29953 are similar in their coloration to that of the shell illustrated by Newcomb, but both of those shells are sinistral while the shell illustrated by Newcomb is dextral. The five dextral shells in CU 29953 do not have the banding on the body whorl present in Newcomb's figured specimen. Johnson (1996: 182) validly designated NHMUK 1992228/1 as the lectotype which he indicated was Newcomb's (1854a: pl. 24 fig. 65) "figured type". The specimens in PRI 10178 (CU 29953) are therefore paralectotypes. Additional paralectotypes are in NHMUK 1992228/2 and MCZ 25797 (3 spms) as reported by Johnson (1996: 182).

#### *dwightii* Newcomb, 1855; *Achatinella*

*Achatinella dwightii* Newcomb, 1855c: 145–146; 1866: 213–214, pl. 13, fig. 9.

**Current taxonomic status:** *Partulina (Partulina) dwightii* (Newcomb, 1855). Valid species (Cowie *et al.* 1995: 69).

**Type material:** Lectotype (Newcomb 1866: 214) PRI 10311 (Fig. 2C); paralectotypes PRI 82753 [CU 29957] (4 spms).

**Type locality:** "Molokai".

**Remarks:** The CU ledger indicates that CU 29957 contains type material and references Newcomb's (1855) original description. Both of Newcomb's publications list the locality only as Molokai, without further details, while the CU ledger and label list the locality of the types as "Kalae, Molokai". The label with the specimens indicates their status as "cotypes"; Clarke (1960: 148) reported CU 29957 comprised five syntypes. Newcomb's measurements from his (1855: 145) original description (length 0.95 inches, width 0.475 in.) closely match the shells marked "B" and "E". Newcomb also described "zig-zag markings of brown, more obscure on the last whorl; aperture and lip of a dingy white", which can clearly be seen on shell "B", but which are barely visible on the worn shell "E". Newcomb (1866: 214) stated that "the type" differed from the figured specimen (Newcomb's fig. 9, Fig. 2D), an equivalent expression that is a valid lectotype designation (Code Art 74.5). Newcomb indicated that the type had a simple suture while the last whorl of the figured specimen was strongly corded; the

shells marked "B", "C", "D", and "E" have a simple suture. Shell "B" is considered here as Newcomb's lectotype. Shell "A" has a corded suture and appears to be Newcomb's figured specimen. Johnson (1996: 182) indicated that shell CU 29957A was Newcomb's "figured type, so marked"; but this lectotype designation is invalid due to the prior designation by Newcomb. The other shells in PRI 82753 (CU 29957) are paralectotypes. No type material is known in either MCZ or NHMUK as reported by Johnson (1996: 182).

#### *elegans* Newcomb, 1854; *Achatinella*

*Achatinella elegans* Newcomb, 1854a: 23–24, pl. 24, fig. 57; 1854b: 149–150, pl. 24, fig. 57.

**Current taxonomic status:** *Achatinella (Bulimella) bulimoides elegans* Newcomb, 1854. Valid subspecies (Cowie *et al.* 1995: 56).

**Type material:** Paralectotypes PRI 10227 [CU 29958] (6 spms).

**Type locality:** "Hauula, Oahu".

**Remarks:** The CU ledger indicates that CU 29958 contains type material, with the locality listed in the ledger and on the CU label as "Oahu". The ledger references Newcomb's (1854a, 1854b) illustration of *Achatinella elegans*. Clarke (1960: 148) recorded six syntypes in CU 29958. None of the shells in CU 29958 is Newcomb's figured shell, they all differ in color pattern. Welch (1958: 134) wrote that "There are three specimens in the type lot in the British Museum and marked X, A, B by me. Specimen X is considered the holotype" and refigured the specimen. Newcomb's original description indicated that it was based on more than one specimen ("...sometimes with a white sutural band..."), so the use of the term "holotype" is an error. Welch's use of the term "holotype" is not a valid lectotype designation because he did not explicitly select the specimen to serve as the name-bearing type (ICZN 1999, Art. 74.5). Welch's usage of the term "holotype" cannot be interpreted as intending a novel selection of the name-bearing type because he also used the term "lectotype" in 1942 to validly designated a lectotype for *A. cestus*, so he clearly understood the distinction (Code, Art. 74.5). Johnson (1996: 182) subsequently validly designated NHMUK 1992189/1 as the lectotype. Given the valid designation of a lectotype, PRI 10227 (CU 29958) contains paralectotypes, which were mistakenly listed by Johnson (1996: 182) as CU 29959 (an unidentified lot of *Achatinella*). Additional paralectotypes are in NHMUK 1992189/2 and MCZ 302450 (2 spms) as reported by Johnson (1996: 182).

#### *fulgens* Newcomb, 1854; *Achatinella*

*Achatinella fulgens* Newcomb, 1854a: 5, pl. 22, fig. 24, fig. 24a?; 1854b: 131, pl. 22, fig. 24, fig. 24a?.

**Current taxonomic status:** *Achatinella (Achatinellastrum) fulgens* Newcomb, 1854. Valid species (Cowie *et al.* 1995: 51).

**Type material:** Paralectotypes PRI 10209 [CU 29967] (5 spms).

**Type locality:** “Niu, Oahu”.

**Remarks:** The CU ledger indicates the status of the specimens as “cotypes”, with Clarke (1960: 149) reporting that CU 29967 comprised five syntypes. The locality of the type material is listed only as Oahu in the ledger, and as “Oahu, S.I.” on the CU label. Newcomb’s original description does not reference a figure; however, two figures (figs. 24 and 24a) in Newcomb’s (1854a, 1854b) publication are not identified, and *Achatinella fulgens* is the only species for which an illustration is not mentioned. The CU ledger references Newcomb’s (1854a, 1854b: pl. 22, fig. 24) illustration. Newcomb (1854a: 5) described the typical coloration of *A. fulgens* as “colour rich chestnut-brown, with a broad white sutural fascia cutting the centre of the last whorl; apex and columella white”. The shell illustrated in fig. 24 is chestnut brown with a white apex and columella, but there are several white bands on the body whorl, none of which is broad in the figured shell. Despite the slight difference between the illustration and the description, fig. 24 is considered to be an illustration of *A. fulgens*. All specimens in CU 29967 are sinistral like Newcomb’s fig. 24, but the banding patterns of the CU shells differ from Newcomb’s illustration, and are not considered to be Newcomb’s figured specimen. Newcomb described two varieties, “Var.  $\alpha$ . White, with broad chestnut bands. Var.  $\beta$  Chestnut-coloured above, yellowish below, with two black and one white band; the columella dark brown”. The shell illustrated in fig. 24a is predominantly green not white, and thus does match variety  $\alpha$ . The shell also lacks the black bands described in variety  $\beta$ . It is likely that fig. 24a refers to the same species as fig. 24 because this is the same format Newcomb (1854a, 1854b) used for several species for which he provided two illustrations. Green shells similar to Newcomb’s figure 24a are identified in the Bishop Museum collection as *A. fulgens*. Nonetheless, it is unclear if Newcomb intended fig. 24a to illustrate one of the varieties of *A. fulgens* he described, so the figure is tentatively included as a potential original figure of *A. fulgens*. According to the *Code* Art. 72.4.1, any specimens representing distinct varieties would be excluded from the type series. Newcomb indicated that variety  $\beta$  was from Makika Valley, but precise locality information is not available for the shells in CU 29967. Since the coloration of the shells in CU 29967 does not match the description of variety  $\alpha$  or  $\beta$ , all are considered to be valid type material of *A. fulgens*. Johnson (1996: 183), referencing Newcomb’s fig. 24, validly designated NHMUK 1992204/1 as the lectotype, which he indicated was Newcomb’s “figured type *teste* Welch”, but he did not provide a reference, and we could not locate any statement by Welch to this effect. Due to the valid designation of a lectotype, PRI 10209 (CU 29967) contains paralectotypes. Additional possible paralectotypes are in the NHMUK and the MCZ; these need to be evaluated to determine if they belong to either of the varieties, and thus

would be excluded from the type material (*Code* Art. 72.4.1). These are NHMUK 1992204/2, MCZ 25575 (3 spms), MCZ 25576 (1 spm), and MCZ 294981 (7 spms; A.A. Gould collection), as reported by Johnson (1996: 183).

***germana* Newcomb, 1854; *Achatinella***

*Achatinella germana* Newcomb, 1854a: 25, pl. 24, fig. 61; 1854b: 151, pl. 24, fig. 61.

**Current taxonomic status:** *Partulina (Eburnella) germana* (Newcomb, 1854). Valid species (Cowie *et al.* 1995: 66).

**Type material:** Paralectotype PRI 10216 [CU 29971] (1 spm).

**Type locality:** “Makawao, Mani” [sic, Maui].

**Remarks:** The CU ledger indicates that CU 29971 is type material, and the label with the specimen indicates its status as a “cotype” from Makawao, Maui (incorrectly spelled as “Mukawao [sic], Maui” in the ledger). Clarke (1960: 149) reported a single syntype from Cornell as type material. The ledger also references Newcomb’s (1854a, 1854b) illustration of *Achatinella germana*. The shell in CU 29971 is similar to Newcomb’s illustration, but does not appear to be the figured shell, which shows thickening of the shell around the aperture not visible in the shell from Cornell. In addition, the white bands on the shell are broader on CU 29971 than in Newcomb’s figure. Johnson (1996: 184) indicated that the lectotype he selected was from NHMUK 1992225, however this catalog number is an error. NHMUK 1992225 is type material for Newcomb’s *Achatinella solitaria*, as Johnson (1996: 197) also reported “Holotype BMNH (= NHMUK) 1992225 is the only specimen” of *A. solitaria*. NHMUK 1992226 consists of Newcomb’s type material of *A. germana* and includes a label indicating that it is the lectotype selected by Johnson. Thus, despite reporting the incorrect catalog number, Johnson (1996: 184) selected a type specimen from NHMUK 1992226, which is clearly identified in the NHMUK collection, and is thus a valid lectotype designation (*Code* Art. 74.5). Johnson indicated that the shell he selected was Newcomb’s (1854: pl. 24, fig. 61) “figured and only type”, but contradicted this by recognizing paralectotypes in CU 29971 (there is only one paralectotype). As the original description does not indicate that the species was based on a single specimen and a holotype was not designated by Newcomb, the NHMUK specimen is not a holotype. The specimen in CU 29971 is a paralectotype as reported by Johnson (1996: 184).

***glabra* Newcomb, 1854; *Achatinella***

*Achatinella glabra* Newcomb, 1854a: 13, pl. 22, fig. 25; 1854b: 139, pl. 22, fig. 25.

**Current taxonomic status:** *Achatinella (Bulimella) bulimoides* *glabra* Newcomb, 1854. Valid subspecies (Cowie *et al.* 1995: 56).

**Type material:** Paralectotypes PRI 10218 [CU 29972] (5 spms).

**Type locality:** “Kolau poko” [sic, Koolaupoko, Oahu] (possible error = “Waiale” teste Welch, 1954: 98).

**Remarks:** The CU ledger indicates the status of CU 29972 as type material (labeled as “cotypes” on the CU label), with Clarke (1960: 149) reporting that CU 29972 comprised five syntypes. The locality for *Achatinella glabra* was listed by Newcomb in the original description as Kolau poko, without specifying the island (Oahu). There is no information about the locality for CU 29972 in the CU ledger, although the CU label lists the locality as “Kolau poko, [Oahu]”, all written apparently at the same time. The ledger also references Newcomb’s illustration (1854a, 1854b; pl. 22, fig. 25). None of the shells in CU 29972 match the banding pattern of the shell in Newcomb’s illustration, thus none of the shells are Newcomb’s figured shell. Welch (1954: 98) indicated that there were two specimens in the “type lot” at the British Museum that were collected from the locality listed by Newcomb (Kolau poko), but that the “holotype” was probably collected from “Waiale” in the district of “Koolauloa”, based on its similarity to specimens collected there by Gulick (there are 3 specimens in NHMUK 1992190). There is no information in the ledger or the labels at the NHMUK or CU indicating that the specimens came from more than one locality, so it cannot be verified if the illustrated shell was collected from a different locality. In addition, no holotype had been fixed because the original description (1854a: 13) reveals that the taxon was based on more than one specimen: “colour bluish slate, much lighter on the upper portion of the whorls; sometimes transversely banded with white or chestnut.” Welch (1954: 97) wrote that the “holotype of *A. b. glabra* (pl. 2, fig. 24) in the British Museum is marked with a red dot of sealing wax.” Welch’s use of the term “holotype” is an invalid lectotype designation under the *Code*, Art. 74.5 because there must be an explicit, intentional statement of selection to validly designate a lectotype. Johnson (1996: 184) fulfilled this requirement (*Code* Art. 74.5) by using the term “lectotype” when he wrote “Lectotype BMNH 1992190/1 figured as the “holotype” selected by Welch”. Thus, NHMUK 1992190/1 was validly designated as the lectotype, and PRI 10218 (CU 29972) contains paralectotypes. Additional paralectotypes are in NHMUK 1992190/2 and MCZ 294941 (7 spms; A.A. Gould collection) as reported by Johnson (1996: 184).

#### *gouldi* Newcomb, 1853; *Achatinella*

*Achatinella gouldi* Newcomb, 1853: 21; 1854a: 4, pl. 22, fig. 1 (as *gouldii*); 1854b: 129–130, pl. 22, fig. 1 (as *gouldii*).

**Current taxonomic status:** *Partulina* (*Partulina*) *talpina* (Gulick, 1853). Valid species (Cowie *et al.* 1995).

**Type material:** Paralectotypes PRI 10193 [CU 29978] (3 spms, labeled as *gouldii*).

**Type locality:** “Wailuku valley, Maui”.

**Remarks:** Newcomb (1853) originally spelled the name as *Achatinella gouldi*, and his (1854) change of the spelling to *A. gouldii* is an incorrect subsequent spelling (*Code* Art. 33.4). Cowie *et al.* (1995: 69, 72) indicated that *Achatinella gouldi* Newcomb, 1853 is a secondary junior homonym of *Bulimus gouldi* Pfeiffer, 1848 [sic; recte 1846]. Indeed, because *Bulimus gouldi* was established by Pfeiffer as a replacement name for *Achatinella radiata* Gould, 1845 (now placed in *Partulina*), the name *gouldi* Pfeiffer refers to a *Partulina* species and a replacement name for *gouldi* Newcomb was needed. Cowie *et al.* substituted *gouldi* Newcomb, with the most senior subjective synonym *Achatinella talpina* Gulick, 1856 (Pilsbry and Cooke 1912: 53). The CU ledger and label both give the locality of the type material as Maui without any additional details, the CU label indicates the status of the specimens as “cotypes”. Clarke (1960: 150) reported that CU 29978 comprised three syntypes. Johnson (1996: 184) validly designated NHMUK 1992202/1 as the lectotype, which he indicated is Newcomb’s “figured type”, thus the shells in PRI 10193 (CU 29978) are paralectotypes. Additional paralectotypes are in NHMUK 1992202/2 and MCZ 294957 (5 spms; A.A. Gould collection) as reported by Johnson (1996: 184).

#### *grisea* Newcomb 1854; *Achatinella*

*Achatinella grisea* Newcomb, 1854a: 26–27, pl. 24, fig. 66; 1854b: 153, pl. 24, fig. 66.

**Current taxonomic status:** *Partulina* (*Baldwinia*) *grisea* (Newcomb, 1854). Valid species (Cowie *et al.* 1995: 65).

**Type material:** Paralectotypes PRI 10442 [CU 29983] (6 spms).

**Type locality:** “Makawao, Mani” [sic, Maui].

**Remarks:** The CU ledger indicates that CU 29983 contains type material of *Achatinella grisea*, and the CU label indicates their status as “cotypes”. Clarke (1960), however, did not list any type material for *Achatinella grisea* in the collection at Cornell University. The ledger and label both list the locality of the lot as “East Maui”. Although the recorded locality of East Maui is less precise than Makawao, it is not in disagreement with the type locality. The ledger also references Newcomb’s (1854a, 1854b) illustration of *Achatinella grisea*. The specimens in CU 29983 are not Newcomb’s figured specimen; most of the shells are broader and none of the shells have the distinctive pattern on the body whorl and a distinct white band seen in Newcomb’s figure. Johnson (1996: 185) validly designated NHMUK 1992229/1 as the lectotype which he indicated could be recognized as Newcomb’s “figured type” despite some damage to the shell. Although Clarke (1960) did not list CU 29983 as type material, the CU ledger and label both report CU 29983 as type material, and Johnson (1996: 185) reported the specimens in CU 29983 (PRI 10442) as paralectotypes. Additional paralectotypes are in NHMUK 1992229/2, MCZ 25869 (1 spm) and MCZ 25870 (1 spm) as reported by Johnson (1996: 185).

***helena* Newcomb, 1853; *Achatinella***

*Achatinella helena* Newcomb, 1853: 27; 1854a: 25–26, pl. 24, fig. 63; 1854b: 151–152, pl. 24, fig. 63.

**Current taxonomic status:** *Perdicella helena* (Newcomb, 1853). Valid species (Cowie *et al.* 1995: 74).

**Type material:** Paralectotypes PRI 10190 [CU 29988] (3 spms).

**Type locality:** “Molokai”.

**Remarks:** The CU ledger indicates that CU 29988 contains type material from Molokai. Newcomb’s three specimens in CU 29988 are accompanied by a label from Cornell University that indicated their status as “cotypes” from Molokai; Clarke (1960: 150) reported that CU 29988 comprised three syntypes. The ledger also references Newcomb’s (1853) original description, and his subsequent (1854a, 1854b) illustration. Although two of the specimens in CU 29988 are similar in markings to Newcomb’s illustration; the white band on the body whorl is wider in these two shells than in Newcomb’s illustration. Johnson (1996: 185) validly designated NHMUK 1992227/1 as the lectotype, which he indicated was Newcomb’s “figured type”. Thus PRI 10190 (CU 29988) are paralectotypes. Additional paralectotypes are in NHMUK 1992227/2, MCZ 156044 (2 spms; C.B. Adams Collection) and MCZ 294976 (2 spms; A.A. Gould Collection) as reported by Johnson (1996: 185).

***johsoni* Newcomb, 1854; *Achatinella***

*Achatinella johsoni* Newcomb, 1854a: 21, pl. 23, fig. 50; 1854b: 147, pl. 23, fig. 50.

**Current taxonomic status:** Synonym of *Achatina stewartii* Green, 1827, now placed in *Achatinella* (*Achatinellastrum*) (Cowie *et al.* 1995: 51).

**Type material:** Paralectotypes PRI 10222 [CU 29991] (3 spms).

**Type locality:** “Kolau, Oahu” [sic, Koolau, Oahu].

**Remarks:** There are three specimens in CU 29991 with a label indicating their status as “cotypes”, as noted by Clarke (1960: 151) who reported that CU 29991 consisted of three syntypes. The locality for CU 29991 is given as S.I. [Sandwich Islands] in the CU ledger and the CU label without additional information. The ledger indicates that CU 29991 contains type material and references two illustrations by Newcomb (1854a, 1854b: pl. 23, figs. 50 and 51). However, only fig. 50 was indicated as being *Achatinella johsoni*, while fig. 51 is of *A. aplustre*. The shells in CU 29991 differ significantly in color and banding pattern from Newcomb’s figured shell. Johnson (1996: 186) validly designated NHMUK 1992221 as the lectotype, which he indicated was Newcomb’s “figured and only type, *teste Welch*” (although he did not provide a reference to Welch’s work and we could not locate any statement by Welch to this effect). The figured specimen is not the “only type”, as CU 29991 were syntypes and Johnson (1996: 186)

used the term “lectotype”. Thus the specimens in PRI 10222 (CU 29991) are paralectotypes.

***melanostoma* Newcomb, 1854; *Achatinella***

*Achatinella melanostoma* Newcomb, 1854a: 6–7, pl. 22, fig. 7; 1854b: 132, pl. 22, fig. 7.

**Current taxonomic status:** Synonym of *Helix byronii* Wood, 1828 or *Achatinella pulcherrima* Swainson, 1828. Pilsbry and Cooke (1913b: 134) included *melanostoma* in the synonymy of both *byronii* and (1913b: 141–142) *pulcherrima* but discussed it only under the latter (Cowie *et al.* 1995: 57).

**Type material:** Possible paralectotypes PRI 10242 [CU 29918] (5 spms).

**Type locality:** “Ewa, Oahu”.

**Remarks:** There are five shells in the collection at PRI with a CU label that says “*Achatinella byroni* Wood” (an incorrect subsequent spelling of *A. byronii*) and “cotypes? of *A. melanostoma* Newcomb”. Unfortunately, the locality for the shells is recorded only as “Oahu, Sandwich Islands” on the CU label and no locality was recorded in the CU ledger. The ledger indicates that the species was identified as “*Achatinella byronii* Gray” (Newcomb (1858: 318) attributed *byronii* to Gray and Cowie *et al.* (1995: 55) reported that *byronii* may have been a manuscript name of Gray’s) but the ledger also references Wood’s illustration of the species (pl. 7 fig. 30, Wood 1828). The ledger did not include an indication that CU 29918 included type material and Clarke (1960: 151) also did not report any type material for *A. melanostoma*. It is likely that the CU ledger does not record CU 29918 as type material of *A. melanostoma* because Newcomb considered the name a synonym of *byronii* by the time the specimens were received by Cornell, as evidenced by his statement (1858: 318) “It gives me great pleasure to relinquish this species to its original author. An examination of Wood’s figure led me to the conclusion that the one I had described was identical with *A. Byronii*. I had the satisfaction of finding the type in the British Museum, and of thus establishing not only the synonym, but also of clearing the group of much of the difficulty by which it was surrounded.” Johnson (1996: 190) validly designated NHMUK 1992208/1 as the lectotype of *A. melanostoma*, which he indicated was Newcomb’s “figured type, *teste Welch*” (although he did not provide a reference to Welch’s work and we could not locate any statement by Welch to this effect). Johnson (1996: 190) reported NHMUK 1992208/2 and MCZ 294946 (3 spms; A.A. Gould collection) as paralectotypes, without listing any CU material (he reported that no material had been found in CU by Clarke). Although precise locality information is unavailable, the specimens in PRI 10242 (CU 29918) are Newcomb’s material and considered here to be possible paralectotypes.

***multilineata* Newcomb, 1854; *Achatinella***

*Achatinella multilineata* Newcomb, 1854a: 12–13, pl. 22, fig. 23; 1854b: 138–139, pl. 22, fig. 23.

**Current taxonomic status:** Synonym of *Achatinella (Achatinella) mustelina* Mighels, 1845 (Cowie *et al.* 1995: 44).

**Type material:** Paralectotypes PRI 10226 [CU 30022 and CU 30023] (4 spms).

**Type locality:** “Kolau poco, Oahu”. [sic, Koolaupoko] (= error? Pilsbry and Cooke reported that locality must have been in Waianae mountains, Oahu).

**Remarks:** Pilsbry and Cooke (1914a: 343) considered Newcomb’s locality “certainly erroneous”, the shell being “from the Waianae mountains, and probably the type came from Mokuleia district”. The CU ledger indicates that CU 30022 contains type material, and both the ledger and the label from Cornell list the locality only as “Oahu”. The CU label indicates that the shells are paratypes, although they should have been labeled syntypes as no holotype had been fixed. Clarke (1960: 151) reported that CU 30022 and CU 30023 included four syntypes and noted that “of the original lot of five specimens the one indicated by Newcomb is missing”. The four shells in PRI 10226 [CU 30022 and CU 30023] are labeled with the letters “B”, “C”, “D”, and “E”, while no shell marked “A” could be located. The recent PRI label for the lot indicates only 4 specimens, which suggest the fifth specimen was removed before the specimens were transferred to PRI. The CU ledger references two illustrations: Newcomb’s (1854a, 1854b) pl. 22, fig. 23 and Pfeiffer’s (1855) pl. 30, fig. 9; however, the illustration in Pfeiffer’s publication was labeled as *Achatinella monacha* Pfeiffer. None of the specimens in PRI 10226 match the shape and banding pattern of Newcomb’s figured shell.

Welch (1938: 19) wrote that the type lot from the Cuming collection (NHMUK 1992191) included two specimens and “One marked with a red spot of sealing wax [...] agrees best in form with Newcomb’s original figure. The color pattern differs in that the bands in Newcomb’s figure are much narrower than those on the actual shell, which may be merely an artist’s error. This specimen, however, agrees so closely that it may be considered the type.” Welch’s statement unambiguously selects the syntype NHMUK 1992191/1 as “the type”, and is therefore a valid lectotype designation (Code Art 74.5). Welch’s use of the term “the type” as an equivalent expression validly designating the lectotype was not recognized by Johnson (1996: 191), who designated the specimen figured by Welch as the lectotype (incorrectly indicating that Welch used the term “holotype”). Due to the designation of the lectotype, the specimens in PRI 10226 (CU 30022 and CU 30023) are paralectotypes. Additional paralectotypes are in NHMUK 1992191/2 and MCZ 294951 (1spm; A.A. Gould collection) as reported by Johnson (1996: 191).

***ornata* Newcomb, 1854; *Achatinella***

*Achatinella ornata* Newcomb, 1854a: 23, pl. 24, fig. 55; 1854b: 149, pl. 24, fig. 55.

**Current taxonomic status:** *Perdicella ornata* (Newcomb, 1854). Valid species (Cowie *et al.* 1995: 74).

**Type material:** Paralectotypes PRI 10239 [CU 30042] (3 spms).

**Type locality:** “E. Mani” [sic, Maui; error for West Maui], “found in a limited locality, in a deep ravine, at the back of Lahaina”.

**Remarks:** The CU ledger indicates that CU 30042 contains type material from West Maui. The label from Cornell University indicates their status as “cotypes”; Clarke (1960: 152) reported that CU 30042 comprised three syntypes. Lahaina is in West Maui, and Pilsbry and Cooke (1914a: 356) considered Newcomb’s statement of the locality as East Maui to be an oversight. The ledger from Cornell University also references Newcomb’s (1854a, 1854b) illustration of *Achatinella ornata*. The shells in CU 30042 lack the distinctive shell pattern illustrated in Newcomb’s figure, and therefore none of the shells are the figured specimen. Johnson (1996: 193) validly designated NHMUK 1992223/1 as the lectotype, which he indicated was Newcomb’s “figured type”, thus the specimens in PRI 10239 (CU 30042) are paralectotypes. Additional paralectotypes are in NHMUK 1992223/2; MCZ 25905 (2 spms) and MCZ 294922 (2 spms; A.A. Gould collection) as reported by Johnson (1996: 193).

***physa* Newcomb, 1854; *Achatinella***

*Achatinella physa* Newcomb, 1854a: 26, pl. 24, fig. 64; 1854b: 152, pl. 24, fig. 64.

**Current taxonomic status:** *Partulina (Baldwinia) physa* (Newcomb, 1854). Valid species (Cowie *et al.* 1995: 66).

**Type material:** Possible syntypes PRI 10117 [CU 30073?] (2 spms, Fig. 2G).

**Type locality:** “Mouna Kea, Hawaii” [= Mauna Kea].

**Remarks:** Newcomb (1855b: 218) indicated that the original description of *A. physa* was based on specimens in an “immature state” and provided details for what he believed to be adult specimens of the species, and an illustration (1866: pl. 13, fig. 10). However, Sykes (1900: 312) considered that Newcomb’s (1855) subsequent elaboration and (1866) illustration (Fig. 2H) were not of *A. physa* but a distinct species he named *Achatinella confusa* Sykes. Pilsbry (1913a: 105–106) wrote “Dr. C Montague Cooke and Mr. Thaanum, who have gone over the evidence and figures with me, agree in this interpretation of Newcomb’s *A. physa*, confirming the opinion of Mr. Sykes.” Therefore, only material used for Newcomb’s (1854) original description and illustration are considered here as type material of *A. physa*.

The CU ledger lists CU 30073 as type material (recorded as “type”) from Mouna Kea, Hawaii and references Newcomb’s

original illustration (1854a, 1854b: pl. 24, fig. 64) with the additional note “young”. CU 30072 is recorded in the ledger from the same locality and includes the note “adult” with the reference to Newcomb’s (1855b) description; CU 30072 was not recorded as type material in the ledger. One lot was found for *A. physa*, which includes a CU label reports the status of the specimens as “cotypes”; this label includes the catalog numbers CU 30072 and 30073. The ledger does not indicate how many specimens were originally in each of these lots. Clarke (1960: 153) reported CU 30072 and 30073 together comprised four syntypes, but there is currently a total of six specimens split between PRI 10117 and 10116. The single specimen in PRI 10116 (shell “D”) is marked with the old catalog number CU 30072 inside the aperture; the same catalog number can also be faintly be seen inside the shells marked “A”, “B” and “C” in PRI 10117. These four marked specimens (22.5 to 25.5 mm long) are all much larger than the measurements provided by Newcomb with the original description of *A. physa* (11/20 inch = 14 mm) but are similar to the measurement provided with Newcomb’s 1855 elaboration on *A. physa* (18/20 inch = 22.9 mm). These four marked specimens are all marked as being from CU 30072, and are recognized here as material Newcomb obtained after the original description was published and are not type material for *A. physa*. Also present in PRI 10117 are the apex of a broken shell and a small, juvenile specimen, but no catalog number was visible on these shells. The broken apex of a shell appears to be similar in size to Newcomb’s measurement of *A. physa* (the apex is approximately 6.5 mm) and may be from CU 30073. The juvenile shell (approximately 4 mm) could also be from CU 30073, although it appears to be a juvenile of *A. confusa*. These two specimens are regarded as possible syntypes of *A. physa*. Johnson (1996: 194) designated CU 30072A as the lectotype of *A. physa*, which he indicated was Newcomb’s “figured type, so marked”. However, the shells in CU 30072 are not type material of *A. physa*, therefore the lectotype designation is not valid and the lectotype loses its status (*Code Art. 74.2*). The four shells from CU 30072 marked “A”, “B”, “C” and “D” are type material of *Achatinella confusa* Sykes (see the section on *confusa* Sykes for additional information).

Newcomb’s (1854: fig. 64) figured shell (Fig. 2H) should be at NHMUK but has not been located. Johnson (1996: 194) reported additional type material as MCZ 154793 (2 spms) and MCZ 294980 (3 spms; A.A. Gould collection). Some of these may include “adult” specimens that are not valid types of *Achatinella physa*; the type status of these possible syntypes will be evaluated in future work.

***polita* Newcomb, 1853; *Achatinella***

*Achatinella polita* Newcomb, 1853: 24; 1854a: 16–17, pl. 23, fig. 37; 1854b: 142–143, pl. 23, fig. 37; 1858: 328.

**Current taxonomic status:** *Partulina (Eburnella) mighelsiana polita* (Newcomb, 1853). Valid subspecies (Cowie *et al.* 1995: 67).

**Type material:** Paralectotypes PRI 10188 [CU 30077] (7 spms).

**Type locality:** “Molokai”.

**Remarks:** The CU ledger indicates that CU 30077 contains type material and the CU label indicates the status of the specimens as “cotypes” from “Molokai, S.I.”; Clarke (1960: 153) reported that CU 30077 consisted of seven syntypes. The ledger also references Newcomb’s (1853) original description and subsequent (1854b) illustration. Although the shells in CU 30077 are similar in appearance to Newcomb’s figure, there is no evidence that they were formerly at NHMUK, and they are not considered to be the figured specimen. The original description (1853: 24) refers to “examination of a large number” of specimens “(some containing young)”, and one shell in CU 30077 includes an embryonic specimen inside it.

Additional embryonic specimens should be present in other lots of type material. Johnson (1996: 194) validly designated NHMUK 1992215/1 as the lectotype, which he indicated was Newcomb’s (1854: fig. 37) “figured type”, thus the specimens in PRI 10188 (CU 30077) are paralectotypes. Additional paralectotypes are in NHMUK 1992215/2, MCZ 25845 (4 spms) and MCZ 294964 (3 spms) as reported by Johnson (1996: 194).

***redfieldi* Newcomb, 1853; *Achatinella***

*Achatinella redfieldi* Newcomb, 1853: 22; 1854a: 6, pl. 22, fig. 5; 1854b: 131–132, pl. 22, fig. 5; 1858: 325.

**Current taxonomic status:** *Partulina (Partulina) redfieldi* (Newcomb, 1853). Valid species (Cowie *et al.* 1995: 72).

**Type material:** Paralectotypes PRI 10194 [CU 30090] (5 spms).

**Type locality:** Makakupia [*sic*, Makakupaia], Molokai based on the collection locality of the lectotype (Johnson 1996: 195). Initially stated as “Wailuku, Maui” (Newcomb 1853), later corrected to “Molokai and E. Mani [*sic*, Maui] (Newcomb 1854a, 1854b).

**Remarks:** The CU ledger indicates that CU30091 contains type material from Molokai, but the name under which it was received is also listed as “*Achatinella redfieldii* Newcomb var.”, while CU 30090 is listed as “*Achatinella redfieldii* Newcomb” (both are an incorrect subsequent spelling of *redfieldi*). The lot includes a label from Cornell University indicating their status as “cotypes” from Molokai (consistent with Newcomb’s (1854a, 1854b) updated type locality). Clarke (1960: 153) reported CU30091 (incorrectly listed as CU 30090) consisted of five syntypes. Johnson (1996: 195) validly designated the lectotype as NHMUK 1992206/1, from Makakupia, Molokai (misspelled as Makakupia). Thus the

type locality of *P. redfieldi* is the locality of the lectotype. The specimens in PRI 10194 (CU 30090) are therefore paralectotypes. Additional paralectotypes are in NHMUK 1992206/2 and MCZ 294921 (7 spms; A.A. Gould collection) as reported by Johnson (1996: 195).

***rubiginosa* Newcomb, 1854; *Achatinella***

*Achatinella rubiginosa* Newcomb, 1854a: 28, pl. 24, fig. 69; 1854b: 154, pl. 24, fig. 69.

**Current taxonomic status:** Synonym of *Achatinella (Bulimella) taeniolata* Pfeiffer, 1846 (Cowie *et al.* 1995: 59).

**Type material:** Paralectotypes PRI 10204 [CU 30103] (5 spms).

**Type locality:** "Palolo, Oahu".

**Remarks:** The ledger and label from Cornell University both indicate that CU 30103 is from Oahu without mentioning Palolo. The CU ledger indicates that CU 30103 contains type material, and the label indicates their status as "cotypes". Clarke (1960: 154) reported that CU 30103 consisted of five syntypes. Johnson (1996: 196) designated as the lectotype a specimen, which he reported was in NHMUK 1992213/1. However, the correct catalog number for the type material of *A. rubiginosa* is NHMUK 1992231/1. This was clearly a mistake by Johnson in reversing the order of the last two digits of the catalog number; he later (1996: 200) correctly reported the same number as the lectotype of *A. tessellata*. NHMUK 1992231/1 is labeled as Johnson's lectotype, and despite the incorrect reporting of the catalog number, is a valid lectotype designation. Johnson (1996: 196) indicated that the shell he designated as the lectotype was Newcomb's "figured type *teste Welch*" (although he did not provide a reference to Welch's work and we could not locate any statement by Welch to this effect). The specimens in PRI 10204 (CU 30103) are paralectotypes. Additional paralectotypes are in NHMUK 1992231/2 and MCZ 294961 (2 spms; A.A. Gould collection) as reported by Johnson (1996: 196).

***rufa* Newcomb, 1853; *Achatinella***

*Achatinella rufa* Newcomb, 1853: 21; 1854a: 4–5, pl. 22, fig. 3; 1854b: 130, pl. 22, fig. 3; 1858: 324.

**Current taxonomic status:** *Partulina (Partulina) rufa* (Newcomb, 1853). Valid species (Cowie *et al.* 1995: 72).

**Type material:** Paralectotypes PRI 10185 [CU 30105] (2 spms).

**Type locality:** "Molokai".

**Remarks:** The CU ledger indicates that CU 30105 contains type material from Molokai and references Newcomb's (1853) original description (it does not reference Newcomb's illustration published in 1854). The Cornell University label with CU 30105 indicates that they are "cotypes" from Molokai; Clarke (1960: 154) reported that CU 30105 consisted of two syntypes. Johnson (1996: 196) validly designated

NHMUK 1992203/1 as the lectotype, which he indicated was Newcomb's "measured and figured type". Thus the specimens in PRI 10185 (CU 30105) are paralectotypes. Additional paralectotypes are in NHMUK 1992203/2, MCZ 25820 (20 spms; Pease Collection), MCZ 25821 (3 spms), MCZ 25822 (2 spms) and MCZ 294938 (4 spms; A.A. Gould collection) as reported by Johnson (1996: 196).

***rugosa* Newcomb, 1854; *Achatinella***

*Achatinella rugosa* Newcomb, 1854a: 12, pl. 22, figs. 22, 22a; 1854b: 138, pl. 22, figs. 22, 22a.

**Current taxonomic status:** *Achatinella (Bulimella) byronii rugosa* Newcomb, 1854. Valid subspecies (Cowie *et al.* 1995: 59).

**Type material:** Paralectotypes PRI 10215 [CU 30109] (5 spms).

**Type locality:** "Ewa, Oahu".

**Remarks:** The CU ledger indicates that CU 30109 contains type material, and both the CU label and the ledger give the locality as Oahu (without additional locality information). The CU label identifies the specimens as "cotypes"; Clarke (1960: 154) reported that CU 30109 consisted of five syntypes. The Cornell University ledger also references Newcomb's (1854a, 1854b) illustration of *Achatinella rugosa*. The shells in CU 30109 are similar in color to Newcomb's fig. 22 but differ in banding pattern and are not the figured shell. Johnson (1996: 196) validly designated NHMUK 1992212/1 as the lectotype, which he indicated was Newcomb's "figured type (fig. 22)". He also indicated that NHMUK 1992212/2 is the "figured paralectotype" (pl. 22, fig. 22a). Thus the specimens in PRI 10215 (CU 30109) are paralectotypes. Additional paralectotypes are in MCZ 25726 (2 spms) and MCZ 294968 (14 spms; A.A. Gould collection) as reported by Johnson (1996: 196).

***rutila* Newcomb, 1854; *Achatinella***

*Achatinella rutila* Newcomb, 1854a: 12, pl. 22, fig. 21; 1854b: 138, pl. 22, fig. 21; 1858: 326.

**Current taxonomic status:** Synonym of *Achatinella (Bulimella) viridans* Mighels, 1845 (Cowie *et al.* 1995: 59).

**Type material:** Paralectotypes PRI 10228 [CU 30113] (6 spms).

**Type locality:** "Niu, Oahu".

**Remarks:** The CU ledger and the CU label indicate the status of the specimens in CU 30113 as "cotypes" from Oahu. Clarke (1960: 154) reported that CU 30113 consisted of six syntypes. The ledger also references Newcomb's (1854a, 1854b) illustration. Most of the shells in CU 30113 differ in banding pattern from Newcomb's figure, only the shell "D" is similar in shell shape and banding to the illustration; however, there is no evidence that CU 30113 were formerly at NHMUK, and we do not consider it to be

Newcomb's figured specimen. Johnson (1996: 196–197) validly designated NHMUK 1992211/1 as the lectotype, which he indicated was Newcomb's "figured type". Thus the specimens in PRI 10228 (CU 30113) are paralectotypes. Additional paralectotypes are in NHMUK 1992211/2 and MCZ 25696 (4 spms; ex J. G. Anthony) as reported by Johnson (1996: 196–197).

***semicarinata* Newcomb, 1854; *Achatinella***

*Achatinella semicarinata* Newcomb, 1854a: 30, pl. 24, fig. 76; 1854b: 156, pl. 24, fig. 76.

**Current taxonomic status:** *Partulina (Eburnella) semicarinata* (Newcomb, 1854). Valid species (Cowie *et al.* 1995: 72).

**Type material:** Paralectotypes PRI 10419 [CU 30116] (4 spms).

**Type locality:** "Island of Ranai" [sic, Lanai].

**Remarks:** The CU ledger indicates that CU 30116 contains type material from "Ranai" [sic, Lanai]. CU 30116 was not located in the CU collection by Clarke (1960: 154) but was located in the general PRI collection by us. Johnson (1996: 197) validly designated NHMUK 1992236/1 as the lectotype, which he indicated was Newcomb's "figured type". Thus the specimens in PRI 10419 (CU 30116) are paralectotypes. The specimens in NHMUK 1992236/2 are also paralectotypes, as reported by Johnson (1996: 197).

***sordida* Newcomb, 1854; *Achatinella***

*Achatinella sordida* Newcomb, 1854a: 13–14, pl. 23, fig. 27; 1854b: 139–140, pl. 23, fig. 27.

**Current taxonomic status:** *Achatinella (Achatinella) mustellina sordida* Newcomb, 1854. Valid subspecies (Cowie *et al.* 1995: 46).

**Type material:** Syntypes PRI 10232 [CU 30118] (5 spms, Fig. 2I).

**Type locality:** "Lettui, Oahu" [sic, Lihue].

**Remarks:** The CU ledger indicates that CU 30118 contains type material and references Newcomb's (1854a, 1854b) illustration of *Achatinella sordida*. There are five shells in CU 30118 (Fig. 2I) from "Lettui, Oahu" (sic, Lihue teste Pilsbry and Cooke 1914a: 349) referred to as "cotypes" on the CU label. Clarke (1960: 154) reported that CU 30118 consisted of five syntypes. All of the syntypes in PRI 10232 [CU 30118] differ in their banding pattern from Newcomb's (1854: fig. 27) illustration (Fig. 2J). Welch (1938: 31) also concluded that CU 30118 did not include Newcomb's figured shell; in fact, he reported that specimen "A" from CU 30118 was "definitely" Newcomb's *Achatinella multilineata* based on "the color of the last two whorls chocolate, spirally lined with pinkish buff". However, shell "A" is considered here to be more similar in shape to *A. sordida*. Additional syntypes are in MCZ 294942 (4 spms; A.A. Gould collection) as reported by Johnson (1996: 197–198).

***subvirens* Newcomb, 1854 *Achatinella***

*Achatinella subvirens* Newcomb, 1854a: 10–11, pl. 22, fig. 18; 1854b: 136–137, pl. 22, fig. 18.

**Current taxonomic status:** Synonym of *Achatinella (Bulimella) viridans* Mighels, 1845 (Cowie *et al.* 1995: 60).

**Type material:** Paralectotypes PRI 10205 [CU 30130] (5 spms).

**Type locality:** "Niu, Oahu".

**Remarks:** The CU ledger and label indicate that CU 30130 contains type material from Oahu. Clarke (1960: 154) reported that CU 30130 comprised five syntypes. Newcomb's (1854a: 11) description of the species states "colour of epidermis light green, interspersed with a lighter shade arranged longitudinally; columella, lip and aperture white." Newcomb also recognized two varieties of the species: "Var.  $\alpha$ : Pure white. Var.  $\beta$ . Brown or chestnut replacing the green colour." The shells in PRI 10205 are all green or yellow-green and would not have been attributed by Newcomb to either of the varieties he described; therefore, none of the shells are excluded from the type material (Code Art. 72.4.1). The ledger also references Newcomb's (1854a, 1854b) illustration of *Achatinella subvirens*. Although the shell "C" in CU 30130 is similar in color and pattern to Newcomb's figure, there is no evidence that the lot was formerly at NHMUK, and none of the shells is considered to be Newcomb's figured specimen. Johnson (1996: 199) validly designated NHMUK 1992209/1 as the lectotype, which he indicated was "Newcomb's measured and figured type". Thus the specimens in PRI 10205 (CU 30130) are paralectotypes. Additional paralectotypes are in NHMUK 1992209/2, MCZ 25692 (3 spms) and MCZ 294931 (17 spms; A.A. Gould collection) as reported by Johnson (1996: 199). Some of these paralectotypes may represent one of the two distinct varieties that Newcomb recognized; the type status of these possible paralectotypes remains uncertain, pending future work.

***terebra* Newcomb, 1854; *Achatinella***

*Achatinella terebra* Newcomb, 1854a: 18, pl. 23, fig. 40; 1854b: 144, pl. 23, fig. 40.

**Current taxonomic status:** *Partulina (Partulina) terebra* (Newcomb, 1854). Valid species (Cowie *et al.* 1995: 73).

**Type material:** Paralectotypes PRI 10233 [CU 30144] (8 spms).

**Type locality:** "W. Mani" [sic, Maui].

**Remarks:** The CU ledger indicates that CU 30144 contains type material from Maui and the CU label indicates the status of the shells in CU 30144 as "cotypes" from Maui. Clarke (1960: 155) reported that CU 30144 consisted of eight syntypes. The ledger also references Newcomb's (1854a, 1854b) illustration of *Achatinella terebra*. Although the shell marked "C" has similar markings to the figured shell, it is not considered to be the figured type, which should be at NHMUK.

Johnson (1996: 199–200) validly designated NHMUK 1992216/1 as the lectotype, which he indicated was Newcomb's "figured type". The specimens in PRI 10233 (CU 30144) are paralectotypes. Additional paralectotypes are in NHMUK 1992216/2 and MCZ 294955 (14 spms; A.A. Gould collection), as reported by Johnson (1996: 199).

***tessellata* Newcomb, 1853; *Achatinella***

*Achatinella tessellata* Newcomb, 1853: 19; 1854a: 13, pl. 23, fig. 26; 1854b: 139, pl. 23, fig. 26; 1858: 327.

**Current taxonomic status:** *Partulina (Partulina) tessellata* (Newcomb, 1853). Valid species (Cowie *et al.* 1995: 73).

**Type material:** Paralectotypes PRI 10182 [CU 30147] (7 spms).

**Type locality:** "Molokai".

**Remarks:** The CU ledger indicates that CU 30147 contains type material from Molokai. The label for CU 30147 indicates the status of the specimens as "cotypes" from Molokai; Clarke (1960: 155) reported that this lot consisted of seven syntypes. The ledger also references Newcomb's (1853) original description as well as his (1854a, 1854b) subsequent illustration. The shells in CU 30147 are fairly similar in appearance to Newcomb's figure, but each shell differs slightly in banding pattern from the illustration and none are considered to be the figured specimen. Johnson (1996: 200) validly designated NHMUK 1992213/1 as the lectotype, which he indicated was Newcomb's "figured type". Thus the specimens in PRI 10182 (CU 30147) are paralectotypes. Additional paralectotypes are in NHMUK 1992213/2, MCZ 25816 (3 spms; ex Newcomb), MCZ 186537 (3 spms; C.B. Adams collection) and MCZ 294956 (6 spms; A.A. Gould collection) as reported by Johnson (1996: 200).

***turgida* Newcomb, 1854; *Achatinella***

*Achatinella turgida* Newcomb, 1854a: 8, pl. 22, figs. 10, 10a; 1854b: 134, pl. 22, figs. 10, 10a.

**Current taxonomic status:** *Achatinella (Achatinella) turgida* Newcomb, 1854. Valid species (Cowie *et al.* 1995: 47).

**Type material:** Paralectotypes PRI 10234 [CU 30154] (5 spms).

**Type locality:** "Ewa, Oahu".

**Remarks:** The CU ledger indicates that CU 30154 contains type material from Ewa, Oahu. The label from Cornell University indicates their status as "cotypes" from Oahu (Ewa was evidently added later as it is written in brackets). Clarke (1960: 155) reported that CU 30154 contained five syntypes. The ledger also references one of Newcomb's (1854a, 1854b) illustrations (fig. 10). The shells in CU 30154 differ slightly in the banding pattern from Newcomb's figures, and none are considered to be the specimens illustrated by Newcomb figs. 10 and 10a. Welch (1942: 68) validly designated NHMUK 1992192/1 as the lectotype, which he indicated was the

specimen illustrated in Newcomb's fig. 10. Thus the specimens in PRI 10234 (CU 30154) are paralectotypes. Additional paralectotypes are in NHMUK 1992192/2, MCZ 25540 (4 spms) and MCZ 294936 (8 spms; A.A. Gould collection) as reported by Johnson (1996: 200–201).

***undulata* Newcomb, 1855; *Achatinella***

*Achatinella undulata* Newcomb, 1855b: 218; 1866: 216, pl. 13, fig. 15.

**Current taxonomic status:** Synonym of *Achatinella (Achatinellastrum) curta* Newcomb, 1854 (Cowie *et al.* 1995: 54).

**Type material:** Lectotype (Johnson 1996: 201) PRI 10126 [CU 30160A] (Fig. 2K); paralectotypes PRI 10127 [CU 30160] (3 spms).

**Type locality:** "Waialua, Oahu".

**Remarks:** The CU ledger indicates that CU 30160 contains type material and references Newcomb's (1855) original description. The label from Cornell University indicates their status as "cotypes" from Waialua, Oahu (the locality is written in brackets). Clarke (1960: 155) reported that CU 30160 consisted of five syntypes. Newcomb (1866: 216) indicated that the shell he illustrated is shorter than the measured shells in his description, "and is more obese in consequence". Johnson (1996: 201) validly designated the shell marked "A" from CU 30160 as the lectotype, with the new catalog number CU 30160A (= PRI 10126), which he indicated was Newcomb's "figured type". However, the lectotype (Fig. 2K) labeled "A?" is more elongate than Newcomb's (1866: fig. 15) illustration (Fig. 2L), and the pattern on the upper whorls of the shell also differs from the illustration and we do not consider it to be the figured specimen. As a result of the valid designation of a lectotype, the three shells in PRI 10127 (CU 30160) labeled "B?", "C", and "D" are paralectotypes. The paralectotypes also differ from Newcomb's figure. The shell marked "D" is the closest in appearance to the figure, but differs in its banding and is dextral, while the figured specimen is sinistral. Shell C is much more elongate and also differs in banding. Johnson (1996: 201) reported additional paralectotypes as MCZ 294966 (6 spms).

***variabilis* Newcomb, 1854; *Achatinella***

*Achatinella variabilis* Newcomb, 1854a: 28, pl. 24, fig. 70; 1854b: 154, pl. 24, fig. 70.

**Current taxonomic status:** *Partulina (Eburnella) variabilis* (Newcomb, 1854). Valid species (Cowie *et al.* 1995: 67).

**Type material:** Paralectotypes PRI 10238 [CU 30164] (6 spms).

**Type locality:** "Ranai" [sic, Lanai].

**Remarks:** The CU ledger and label indicate that CU 30164 contains type material from "Ranai" [sic, Lanai], and the CU label indicates the status of the shells "cotypes". Clarke (1960:

155) reported that CU 30164 comprised six syntypes. The ledger also references Newcomb's (1854a, 1854b) illustration of *Achatinella variabilis*. All of the shells in CU 30164 are sinistral, and therefore are not the figured shell, which is dextral. Johnson (1996: 201) validly designated NHMUK 1992232/1 as the lectotype, which he identified as Newcomb's "figured type". Thus PRI 10238 (CU 30164) are paralectotypes. Additional paralectotypes are in NHMUK 1992232/2, MCZ 25856 (9 spms) and MCZ 294979 (12 spms; A.A. Gould collection) as reported by Johnson (1996: 201).

#### FAMILY AMASTRIDAE

##### *affinis* Newcomb, 1854; *Achatinella*

*Achatinella affinis* Newcomb, 1854a: 16, pl. 23, fig. 35; 1854b: 142, pl. 23, fig. 35.

**Current taxonomic status:** *Amastra (Amastra) affinis* (Newcomb, 1854). Valid species (Cowie *et al.* 1995: 90).

**Type material:** Paralectotypes PRI 10198 [CU 29901] (5 spms).

**Type locality:** "Kula, E. Mani" [sic, Maui].

**Remarks:** The CU ledger indicates that CU 29901 contains type material, and the label from Cornell University indicates the type status as "cotypes"; Clarke (1960: 145) reported that CU 29901 comprised five syntypes. The ledger also references Newcomb's (1854a, 1854b) illustration of *Achatinella affinis*. None of the shells in CU 29901 appear to be Newcomb's figured shell, they all differ slightly in shell color. Newcomb listed the type locality as Kula, E. Mani" [sic, Maui], while the Cornell University ledger lists the locality of CU 29901 as Haleakala, Maui. Kula is a region of Haleakala, Maui, and it is likely that these two sources refer to the same locality. Johnson (1996: 175) validly designated NHMUK 1992252/1 as the lectotype, which he indicated is Newcomb's "figured type". The specimens in PRI 10198 (CU 29901) are regarded as paralectotypes because the slight difference in locality name for the lot does not conflict with the type locality. Additional paralectotypes are in NHMUK 1992252/2, MCZ 142823 (5 spms) and MCZ 294934 (8 spms; A.A. Gould collection) as reported by Johnson (1996: 175).

##### *agglutinans* Newcomb, 1854; *Achatinella obesa*

*Achatinella obesa* var. *agglutinans* Newcomb, 1854a: 17, pl. 23, fig. 39a; 1854b: 143–144, pl. 23, fig. 39a.

**Current taxonomic status:** *Amastra (Cyclamastra) agglutinans* (Newcomb, 1854). Valid species (Cowie *et al.* 1995: 100).

**Type material:** Syntypes PRI 10203 [CU 30037] (Fig. 3A) (4 spms).

**Type locality:** Not indicated.

**Remarks:** Newcomb originally described *Achatinella agglutinans* as a variety of his *obesa*. The Code Art. 45.6.4 states that

a variety described before 1961 is to be regarded as subspecific (unless its author expressly gave it infrasubspecific rank or the work shows unambiguously that it is an infrasubspecific entity). Thus, the name *agglutinans* is available as a species-group name, and is currently recognized as referring to a valid species (Cowie *et al.* 1995: 100). Newcomb provided two illustrations (1854a, 1854b: figs. 39 and 39a) with his redescription of *Achatinella obesa* and the original description of *agglutinans* but he did not explicitly indicate which of the illustrations was *agglutinans*. Regardless, Newcomb's fig. 39a (Fig. 3B) is identified as matching the description (1854b: 143) of *agglutinans*: "Shell somewhat carinated on the last two whorls, with the keel extended by agglutinations, giving it a pagoda-like form". The CU ledger did not originally list CU 30037 as type material. Initially, CU 30037 was listed as *A. obesa* from East Maui, with a reference to Newcomb's (1853) original description of *A. obesa*. The entry for CU 30037 in the CU ledger was later amended (written with a different pen and handwriting) to add the word "type", the species name "*Amastra agglutinans*", and the locality "W. Maui, Wailuku (Gulick)" (locality written in square brackets). The label from Cornell University also indicates that the shells in CU 30037 are "cotypes" of *Achatinella agglutinans* from East Maui. This may have coincided with Clarke (1960: 145) reporting that CU 30037 contained four syntypes of *Achatinella obesa* var. *agglutinans*. No locality was given by Newcomb in his description for the variety *agglutinans*. There are four shells in PRI 10203 (CU 30037), none of which appear to be the figured specimen. The shells marked "B" and "D" (Fig. 3A) are carinated with an extended keel consistent with Newcomb's description of *agglutinans*. Newcomb's figured type has not been located at NHMUK, but other Newcomb material is in ANSP 450387, illustrated by Hyatt and Pilsbry (1911b: pl. 36, figs. 11–12). Another lot in Newcomb's collection, CU 30038 (PRI 10191), is recorded in the CU ledger as *A. obesa* v. *agglutinans* as type material from East Maui. There is a slight discrepancy between the ledger and the CU label, with the label from Cornell University indicating that they are "Idiotypes (probable cotypes)" of *A. obesa*. The specimens in CU 30038 are listed by Clarke (1960: 192) as "idiotypes" of *A. obesa* without explanation, but examination of the specimens shows they match Newcomb's description and illustration of *A. obesa*; CU 30038 is therefore not recognized as type material. The remarks in the ledger also list the name *Amastra carinata* Gulick, the name that was created to replace Newcomb's variety *agglutinans*. Gulick (in Gulick and Smith 1873: 83) considered that the variety *agglutinans* was a species distinct from *A. obesa* and created a new name, *Amastra carinata* (1873) for specimens from Wailuku, West Maui, and explicitly indicated it was Newcomb's variety *agglutinans*. According to the Code Art 72.7, because *A. carinata* was described expressly as

a replacement name for *agglutinans*, *A. carinata* is an objective synonym of *agglutinans* and the two taxa share the same name-bearing types. Hyatt and Pilsbry (1911: 283) considered the type locality of *A. agglutinans* to be Wailuku, West Maui (attributed to Gulick), although the locality Wailuku, West Maui was never reported by Newcomb. The locality in the Cornell University ledger was subsequently amended to “[W. Maui, Wailuku (Gulick)]”.

***albolabris* Newcomb, 1854; *Achatinella***

*Achatinella albo-labris* Newcomb, 1854a: 23, pl. 24, fig. 56; 1854b: 149, pl. 24, fig. 56.

**Current taxonomic status:** *Amastra (Metamastra) albolabris* (Newcomb, 1854). Valid species (Cowie *et al.* 1995: 105).

**Type material:** Paratypes PRI 10199 [CU 29902] (4 spms).

**Type locality:** “Waianoe, Oahu” [sic, Waianae].

**Remarks:** The CU ledger indicates that CU 29902 contains type material but the locality is given only as “Oahu” in both the ledger and the label from Cornell University. The label indicates the status of the specimens as “cotypes”; Clarke (1960: 145) reported that CU 29902 contained four syntypes. The original ledger also references Newcomb’s (1854a, 1854b) illustration. Although the shell marked “B” in CU 29902 is similar in appearance to Newcomb’s figure, there is no evidence that any of these shells were formerly at NHMUK, and none are considered to be Newcomb’s figured shell. Johnson (1996: 175) validly designated NHMUK 1992261/1 as the lectotype, which he indicated was Newcomb’s “figured type”. Thus the shells in PRI 10199 (CU 29902) are paratypes. Additional paratypes are in NHMUK 1992261/2 and MCZ 294944 (4 spms; A.A. Gould collection) as reported by Johnson (1996: 175).

***alexandri* Newcomb, 1865; *Achatinella***

*Achatinella alexandri* Newcomb, 1865: 182; 1866: 216, pl. 13, fig. 14.

**Current taxonomic status:** *Laminella (Laminella) alexandri* (Newcomb, 1865). Valid species (Cowie *et al.* 1995: 114).

**Type material:** Lectotype (Johnson 1996: 175) PRI 10118 [CU 29903A] (Fig. 3C); paratypes PRI 10119 [CU 29903] (5 spms).

**Type locality:** “at an elevation of 7,500 feet, on West Maui”.

**Remarks:** The CU ledger indicates that CU 29903 contains type material from West Maui. Clarke (1960: 145) reported that CU 29903 contained six syntypes. Johnson (1996: 175) validly designated shell labeled “A” (Fig. 3C) in PRI 10118 (CU 29903A) as the lectotype, although he did not indicate that the lectotype was “so marked”, we consider this to be an oversight. Johnson suggested that the lectotype was slightly smaller than Newcomb’s (1866: fig. 14) figured specimen (Fig. 3D), but the illustration may be expected to vary slightly

in size from the figured shell. The shell marked “A” has the same shape, coloration and shell pattern as Newcomb’s illustration, and is considered here to be the figured specimen. The shell marked “F” had previously been erroneously separated as the lectotype. The five specimens in PRI 10119 (CU 29903) are paratypes.

***anthonii* Newcomb, 1861; *Achatinella***

*Achatinella anthonii* Newcomb, 1861: 93; 1866: 210, pl. 13, fig. 2.

**Current taxonomic status:** *Amastra (Amastra) anthonii* (Newcomb, 1861). Valid species (Cowie *et al.* 1995: 96).

**Type material:** Lectotype (Johnson, 1996: 176) PRI 82751 [CU 29905A] (Fig. 3E); paratypes PRI 82752 [CU 29905] (3 spms, marked); possible paratypes PRI 82752 [CU 29905] (2 spms, unmarked).

**Type locality:** “Kauai”.

**Remarks:** The CU ledger indicates that CU 29905 contains type material from Kauai, and as did Clarke (1960: 146) who reported CU 29905 comprised four syntypes. Johnson (1996: 176) validly designated the lectotype as CU 29905A (Fig. 3E) from the syntypes in CU 29905 and indicated that it was Newcomb’s “figured type”. Newcomb (1866: 210) indicated that the specimen he “selected for figuring is more obese than usual, and less elongated” (Newcomb’s figure (1866: pl. 13, fig. 2) refers to the species as “*anthonyi*”, an incorrect subsequent spelling). The lectotype is globose, but it cannot be definitively matched to Newcomb’s illustration (Fig. 3F): the upper whorls of the shell appear broader, and the columellar lamella is less prominent. The three large specimens in PRI 82752 (CU 29905) are paratypes, and do not appear to be the figured specimen. There are also two, small shells in CU 29905 that are unmarked. As these were not included in the number reported by Clarke, they are considered here only as possible paratypes. Additional paratypes are in MCZ 141330 (5 spms; J.G. Anthony collection) as reported by Johnson (1996: 176).

***assimilis* Newcomb, 1854; *Achatinella***

*Achatinella assimilis* Newcomb, 1854a: 22, pl. 23, fig. 53; 1854b: 148, pl. 23, fig. 53.

**Current taxonomic status:** *Amastra (Amastra) assimilis* (Newcomb, 1854). Valid species (Cowie *et al.* 1995: 90).

**Type material:** Paratypes PRI 10207 [CU 29907] (5 spms).

**Type locality:** “W. Mani” [sic, Maui].

**Remarks:** The CU ledger indicates that CU 29907 contains type material, which Clarke (1960: 146) reported comprised five syntypes. The ledger from Cornell University and the label both give the locality for CU 29907 as simply “Maui”. The ledger also references Newcomb’s (1854a, 1854b) illustration of *Achatinella assimilis* in the remarks. Although one

of the shells in PRI 10207 (CU 29907) is similar in shape and color pattern to Newcomb's figure, it is not Newcomb's figured shell, which is at NHMUK. Johnson (1996: 176) validly designated NHMUK 1992259/1 as the lectotype, which he indicated was Newcomb's "figured type". Thus the specimens in PRI 10207 (CU 29907) are paralectotypes. Additional paralectotypes are in NHMUK 1992259/2 and MCZ 142903 (2 spms) as reported by Johnson (1996: 176).

***biplicata* Newcomb, 1854; *Achatinella***

*Achatinella biplicata* Newcomb, 1854a: 30, pl. 24, fig. 75; 1854b: 156, pl. 24, fig. 75.

**Current taxonomic status:** *Amastra (Amastra) biplicata* (Newcomb, 1854). Valid species (Cowie *et al.* 1995: 91).

**Type material:** Paralectotypes PRI 10201 [CU 29911] (7 spms).

**Type locality:** "Ranai, Sandwich Islands" [sic, Lanai].

**Remarks:** The CU ledger indicates that CU 29911 contains type material ("cotypes" according to the label). Clarke (1960: 146) reported CU 29911 consisted of seven syntypes. The ledger also references an illustration of *Achatinella buddii* by Newcomb (1854a, 1854b: pl. 24, fig. 73), probably by mistake; Newcomb's illustration of *Achatinella biplicata* is pl. 24, fig. 75. The ledger does not indicate the locality for CU 29911, although the label from Cornell University lists "Ranai (= Lanai, Hawaiian Islands)". Johnson (1996: 177) validly designated a syntype in NHMUK as the lectotype, although he listed it as NHMUK 1992246/1 instead of NHMUK 1992264/1. Johnson indicated that the lectotype was Newcomb's "figured type". Thus the shells in PRI 10201 (CU 29911) are paralectotypes. Additional paralectotypes are in NHMUK 1992264/2 (misreported as 1992246/2 by Johnson (1996: 177)), MCZ 141486 (4 spms) and MCZ 294953 (12 spms; A.A. Gould collection) as reported by Johnson (1996: 177).

***concinna* Newcomb, 1854; *Achatinella***

*Achatinella concinna* Newcomb, 1854a: 31, pl. 24, fig. 79; 1854b: 157, pl. 24, fig. 79.

**Current taxonomic status:** *Laminella (Laminella) concinna* (Newcomb, 1854). Valid species (Cowie *et al.* 1995: 114).

**Type material:** Paralectotypes PRI 10200 [CU 29932] (5 spms).

**Type locality:** "Island of Ranai" [sic, Lanai].

**Remarks:** The CU ledger indicates that CU 29932 contains type material from "Ranai", and the CU label indicates their status as "cotypes" from "Ranai" (Lanai is written in brackets). Clarke (1960: 147) reported that CU 29932 contained five syntypes. The ledger also references Newcomb's (1854a, 1854b) illustration of *Achatinella concinna*. None of the shells in PRI 10200 (CU 29932) have the same shape and coloration as the figured shell. Johnson (1996: 179) validly designated

NHMUK 1992267/1 as the lectotype, which he indicated was Newcomb's "figured type". Thus the shells in PRI 10200 (CU 29932) are paralectotypes. Additional paralectotypes are in NHMUK 1992267/2 and MCZ 294973 (2 spms; A.A. Gould collection), as reported by Johnson (1996: 179).

***cornea* Newcomb, 1854; *Achatinella***

*Achatinella cornea* Newcomb, 1854a: 15, pl. 23, fig. 32; 1854b: 141, pl. 23, fig. 32.

**Current taxonomic status:** *Amastra (Metamastra) cornea* (Newcomb, 1854). Valid species (Cowie *et al.* 1995: 105).

**Type material:** Paralectotypes PRI 10206 [CU 29933] (5 spms)

**Type locality:** Oahu.

**Remarks:** No locality was given for *A. cornea* in the original description, but Johnson (1996: 180) inferred that the type locality is "Oahu: Waialua" without explanation. The CU ledger indicates that CU 29933 contains type material from Oahu. The CU label indicates the status of CU 29933 as cotypes from Oahu. Clarke (1960: 147) reported that CU 29933 consisted of five syntypes. The ledger also references Newcomb's (1854a, 1854b) illustration of *Achatinella cornea*. The shell "A" in PRI 10206 (CU 29933) is similar in shape and color to Newcomb's figure (although the apex appears more pointed in the figure), there is no evidence that the shell was formerly at NHMUK, and it is not considered to be the figured shell. Johnson (1996: 180) validly designated NHMUK 1992249/1 as the lectotype, which he indicated was Newcomb's "figured type". Thus the shells in PRI 10206 (CU 29933) are paralectotypes. Additional paralectotypes are in NHMUK 1992249/2 and MCZ 294929 (4 spms; A.A. Gould collection) as reported by Johnson (1996: 180).

***crassilabrum* Newcomb, 1854; *Achatinella***

*Achatinella crassilabrum* Newcomb, 1854a: 15, pl. 23, fig. 31; 1854b: 141, pl. 23, fig. 31.

**Current taxonomic status:** *Amastra (Metamastra) crassilabrum* (Newcomb, 1854). Valid species (Cowie *et al.* 1995: 105).

**Type material:** Paralectotypes PRI 10210 [CU 29940] (5 spms).

**Type locality:** "Waianoe, Oahu" [sic, Waianae, Oahu].

**Remarks:** The CU ledger indicates that CU 29940 contains type material, but the locality is given only as "Oahu". Clarke (1960: 147) reported that CU 29940 contained five syntypes. Johnson (1996: 180) validly designated NHMUK 1992248/1 as the lectotype, which he indicated was Newcomb's "figured type"; thus the shells in PRI 10210 (CU 29940) are paralectotypes. Additional paralectotypes are in NHMUK 1992248/2, MCZ 294939 (4 spms; A.A. Gould collection) and MCZ 294975 (7 spms; A.A. Gould collection) as reported by Johnson (1996: 180).

***cylindrica* Newcomb, 1854; *Achatinella***

*Achatinella cylindrica* Newcomb, 1854a: 8, pl. 22, fig. 11; 1854b: 134, pl. 22, fig. 11; 1858: 325.

**Current taxonomic status:** *Amastra (Paramastra) cylindrica* (Newcomb, 1854). Valid species (Cowie *et al.* 1995: 108).

**Type material:** Paralectotypes PRI 10208 [CU 29943] (3 spms).

**Type locality:** "Waianoe, Oahu" [sic, Waianae, Oahu].

**Remarks:** The CU ledger and label indicate that CU 29943 contains type material from Oahu; the CU label indicates the status of CU 29943 as "cotypes". Clarke (1960: 148) reported that CU 29943 consisted of three syntypes. The ledger was amended to add that the locality is "[Waianae (Newc.)]". Johnson (1996: 181) validly designated NHMUK 1992239/1 as the lectotype, which he indicated was Newcomb's "figured type", thus the shells in PRI 10208 (CU 29943) are paralectotypes. Additional paralectotypes are in NHMUK 1992239/2, MCZ 141438 (2 spms) and MCZ 294952 (1 spm; A.A. Gould collection) as reported by Johnson (1996: 181).

***flavescens* Newcomb, 1854; *Achatinella***

*Achatinella flavescens* Newcomb, 1854a: 25, pl. 24, fig. 62; 1854b: 151, pl. 24, fig. 62.

**Current taxonomic status:** *Amastra (Amastrella) flavescens* (Newcomb, 1854). Valid species (Cowie *et al.* 1995: 97)

**Type material:** Paralectotypes PRI 10214 [CU 29964] (4 spms).

**Type locality:** "Hawaii".

**Remarks:** The CU ledger indicates that CU 29964 contains type material from Hawaii (marked "cotypes" from Hawaii on the label); Clarke (1960: 149) reported that CU 29964 consisted of four syntypes. In the notes on CU 29964 in the ledger, Newcomb's (1854a, 1854b) illustration of *Achatinella flavescens* is referenced. None of the shells in PRI 10214 (CU 29964) is Newcomb's figured shell, as they all lack the banding pattern of the figured shell. Johnson (1996: 183) validly designated NHMUK 1992262/1 as the lectotype, which he indicated was Newcomb's "figured type". Thus the specimens in PRI 10214 (CU 29964) are paralectotypes. Additional paralectotypes are in NHMUK 1992262/2, MCZ 141487 (4 spms; Anthony) and MCZ 294945 (10 spms; A.A. Gould collection) as reported by Johnson (1996: 183).

***fumosa* Newcomb, 1854; *Achatinella***

*Achatinella fumosa* Newcomb, 1854a: 14, pl. 23, fig. 28; 1854b: 140, pl. 23, fig. 28.

**Current taxonomic status:** Synonym of *Achatinella cingula* Mighels, 1845, now placed in *Leptachatina (Leptachatina)* (Cowie *et al.* 1995: 122).

**Type material:** Paralectotypes PRI 10212 [CU 29969] (6 spms).

**Type locality:** "Manoa, Oahu".

**Remarks:** The CU ledger indicates that CU 29969 contains type material but the locality was originally left blank. The ledger was later updated as "No locality [Manoa, Oahu]". The label with CU 29969 indicates that the shells were "cotypes"; Clarke (1960: 149) reported that CU 29969 consisted of six syntypes. The ledger also references Newcomb's (1854a, 1854b) illustration of *Achatinella fumosa*. Although the shells in PRI 10212 (CU 29969) are all similar in appearance to Newcomb's figure, there is no evidence that they were formerly at NHMUK, and none of the shells is considered to be the figured specimen. Johnson (1996: 184) validly designated NHMUK 1992245/1 as the lectotype, which he indicated was Newcomb's "figured type", thus the shells in PRI 10212 (CU 29969) are paralectotypes. Additional paralectotypes are in NHMUK 1992245/2, MCZ 142992 (10 spms; ex Newcomb) and MCZ 294982 (1 spm; A.A. Gould collection) as reported by Johnson (1996: 184).

***fusca* Newcomb, 1853; *Achatinella***

*Achatinella fusca* Newcomb, 1853: 28; 1854a: 19, pl. 23, fig. 44; 1854b: 145, pl. 23, fig. 44.

**Current taxonomic status:** *Leptachatina (Ilikala) fusca* (Newcomb, 1853). Valid species (Cowie *et al.* 1995: 119).

**Type material:** Paralectotypes PRI 10183 [CU 29970] (6 spms).

**Type locality:** "Manoa, Oahu". Initially reported simply as "Oahu" (Newcomb 1853), and later refined to "Manoa, Oahu" (Newcomb 1854a, 1854b).

**Remarks:** Newcomb originally gave the locality as Oahu with no further details, but he later (1854a, 1854b) indicated that the locality was Manoa, Oahu. The CU ledger indicates that CU 29970 contains type material from Oahu and references Newcomb's original (1853) description. The ledger was later updated to include Newcomb's refined locality "Manoa, Hawaiian Islands". Clarke (1960: 149) reported that CU 29970 contains six syntypes, and did not report any other type material. Johnson (1996: 184) reported additional type material, and wrote that he designated NHMUK 1992255 as the lectotype, but also reported (1996: 190) that the same catalog number was the lectotype for *A. melanosis*. The correct catalog number for Newcomb's type is NHMUK 1992257, which is separated as the lectotype selected by Johnson. Johnson indicated that this lot was the "only specimen intact and suitable for lectotype designation" (at NHMUK) citing a personal communication from F. Naggs. The specimens in PRI 10183 (CU 29970), which are intact, are paralectotypes. Additional paralectotypes are in MCZ 142993 (1 spm) as reported by Johnson (1996: 184), and in ANSP 57793 (6 spm; one figured as a syntype by Schileyko, 1998).

***grana* Newcomb, 1853; *Achatinella***

*Achatinella grana* Newcomb, 1853: 29–30; 1854a: 20, pl. 23, fig. 46; 1854b: 146, pl. 23, fig. 46.

**Current taxonomic status:** *Leptachatina* (*Leptachatina*) *grana* (Newcomb, 1853). Valid species (Cowie *et al.* 1995: 123).

**Type material:** Syntypes PRI 10180 [CU 29981] (4 spms, Fig. 3G).

**Type locality:** “E. Maui”.

**Remarks:** The CU ledger indicates that CU 29981 contains type material of *A. grana* and references Newcomb’s (1853) original description, as well as his subsequent (1854a, 1854b) illustration. No locality was originally listed in the ledger, but “Hawaiian Islands” was later added. The CU label with the specimens indicates that Newcomb’s shells are “cotypes” from East Maui. Clarke (1960: 150) reported that CU 29981 comprised four syntypes. These syntypes (Fig. 3G) do not have the prominent columellar lamella visible in Newcomb’s (1854: fig. 46) illustration (Fig. 3H). Further research is needed on type material from other museum collections before a lectotype can be designated. Additional syntypes are in MCZ 142970 (2 spms) and MCZ 156308 (29 spms) as reported by Johnson (1996: 184–185).

***humilis* Newcomb, 1855; *Achatinella***

*Achatinella humilis* Newcomb, 1855c: 143; 1866: 211, pl. 13, fig. 4.

**Current taxonomic status:** *Amastra* (*Amastra*) *humilis* (Newcomb, 1855). Valid species (Cowie *et al.* 1995: 92).

**Type material:** Lectotype (Johnson 1996: 185–186) PRI 10123 [CU 29989] (1 spm, Fig. 3I); paralectotypes PRI 82750 [CU 29989] (2 spms).

**Type locality:** “Kalai, Molokai” [sic, Kalae].

**Remarks:** The CU ledger indicates that CU 29989 contains type material from Molokai and references Newcomb’s (1855) original description of *Achatinella humilis*. The CU label indicates the status of the specimens as “cotypes”. Clarke (1960: 150) reported that CU 29989 consisted of three syntypes. Johnson (1996: 185–186) validly designated the shell (marked “A”) in CU 29989 (PRI 10123) as the lectotype, which he indicated was Newcomb’s “figured type”. The shell (Fig. 3I) is similar in overall shape and color to Newcomb’s (1866: fig. 4) illustration (Fig. 3J). Additional paralectotypes are in MCZ 141451 (4 spms) and MCZ 294971 (1 spm; A.A. Gould collection) as reported by Johnson (1996: 185–186).

***intermedia* Newcomb, 1854; *Achatinella***

*Achatinella intermedia* Newcomb, 1854a: 9, pl. 22, fig. 13; 1854b: 135, pl. 22, fig. 13.

**Current taxonomic status:** Synonym of *Achatinella cylindrica* Newcomb, 1854, now placed in *Amastra* (*Paramastra*) (Cowie *et al.* 1995: 109).

**Type material:** Paralectotypes PRI 10211 [CU 29990] (4 spms).

**Type locality:** “Waianoe, Oahu” [sic, Waianae].

**Remarks:** The CU ledger indicates that CU 29990 contains type material from “Waianae, Oahu”. The Cornell label indicates the status of CU 29990 as “cotypes”; Clarke (1960: 150) reported that CU 29990 comprised four syntypes. The ledger also references Newcomb’s (1854a, 1854b) illustration of *Achatinella intermedia*. None of the shells in PRI 10211 (CU 29990) are Newcomb’s figured shell; all of the shells differ markedly from the color of Newcomb’s figured shell, and none is a close match to the shape of the figured shell. Johnson (1996: 186) validly designated NHMUK 1992240/1 as the lectotype, which he indicated was Newcomb’s “figured type”. Thus the shells in PRI 10211 (CU 29990) are paralectotypes. Additional paralectotypes are in NHMUK 1992240/2, MCZ 141437 (4 spms; ex J.G. Anthony) and MCZ 294923 (9 spms; A.A. Gould collection) as reported by Johnson (1996: 186).

***kauaiensis* Newcomb, 1860; *Achatinella***

*Achatinella kauaiensis* Newcomb, 1860: 145–146; 1866: 209, pl. 13, fig. 1.

**Current taxonomic status:** *Amastra* (*Kauaia*) *kauaiensis* (Newcomb, 1860). Valid species (Cowie *et al.* 1995: 104).

**Type material:** Possible lectotype. Lectotype validly designated by Newcomb (1866: 209) PRI 10115 [CU 29992] (Fig. 3K) (1 spm); paralectotypes (3 spms).

**Type locality:** “Kauai, Ins. Sandwich”.

**Remarks:** The CU ledger indicates that CU 29992 contains type material from Kauai and references Newcomb’s (1860) original description. The CU label indicates the status of the specimens as “cotypes” from Kauai; Clarke (1960: 151) reported that CU 29992 consisted of four syntypes. Newcomb (1866: 209) stated that his illustration (1866: pl. 13, fig. 1; reproduced in Fig. 3L), which was provided several years after the original description, is not of the type he used for the original description: “The specimen selected for the figure varies from the type in being provided upon the back of the last whorl with three instead of but one keel”. Newcomb’s statement about “the type” is a valid lectotype designation (Code Art. 74.5). Johnson (1996: 187) indicated that CU 29992A was Newcomb’s “figured type” and designated it as the lectotype, but the designation is invalid since a lectotype was already designated by Newcomb. The shell selected by Johnson differs from Newcomb’s original description (1860: 146) in having three keels while Newcomb indicated that the species had a single keel, with the last whorl having “a cord-like keel in the middle”. Of the three specimens in PRI 10115 (CU 29992) only shell “B” (Fig. 3K) appears to have a single keel; however, since other specimens from Newcomb’s collection are in NHMUK and MCZ may also potentially have a single keel, the specimen is considered only as a possible

lectotype. Johnson (1996: 187) reported additional type material as MCZ 141331 (14 spms) and NHMUK 1995102 (ex MCZ 141331).

***labiata* Newcomb, 1853; *Achatinella***

*Achatinella labiata* Newcomb, 1853: 27; 1854a: 15, pl. 23, fig. 33; 1854b: 141, pl. 23, fig. 33.

**Current taxonomic status:** *Leptachatina (Labiella) labiata* (Newcomb, 1853). Valid species (Cowie *et al.* 1995: 119).

**Type material:** Paralectotypes PRI 10186 [CU 29993] (6 spms).

**Type locality:** "Lehui, Oahu". Initially reported simply as "Oahu" (Newcomb 1853), later refined to "Lehui, Oahu" (Newcomb 1854a, 1854b).

**Remarks:** The CU ledger indicates that CU 29993 contains type material, which was also reported by Clarke (1960: 151). The ledger also includes a reference to Newcomb's (1853) original description of *Achatinella labiata*. The locality for CU 29993 is given in the ledger only as "S.I.", to which "Hawaiian Islands" was later added. The label with CU 29993 from Cornell University gave the locality as "[Lehui, Oahu]", but the brackets suggest that this information was added later based on Newcomb's [1854] more specific locality. Johnson (1996: 188) validly designated NHMUK 1992250/1 as the lectotype, which he indicated was Newcomb's "figured type". Thus the specimens in CU 29993 are paralectotypes. Additional paralectotypes are in NHMUK 1992250/2, MCZ 142994 (1 spm), MCZ 142998 (3 spms), and MCZ 294948 (14 spms; A.A. Gould collection) as reported by Johnson (1996: 188).

***lineolata* Newcomb, 1853; *Achatinella***

*Achatinella lineolata* Newcomb, 1853: 29; 1854a: 14, pl. 23, fig. 29; 1854b: 140, pl. 23, fig. 29.

**Current taxonomic status:** *Amastra (Amastra) lineolata* (Newcomb, 1853). Valid species (Cowie *et al.* 1995: 92–93).

**Type material:** Lectotype (Pilsbry and Cooke 1914b: 44) PRI 10189 (1 spm, Fig. 4A); paralectotypes PRI 83921 [CU 29995 and 29996] (3 spms).

**Type locality:** "Hawaii". Initially reported as "Maui" [1853], but later corrected to "Hawaii" [specifically the island of Hawaii and not the Hawaiian Islands with the island unspecified] (Newcomb 1854, Pfeiffer 1854).

**Remarks:** Newcomb (1853) indicated in the original description that the locality was Maui, but in subsequent (1854a, 1854b) publications the locality was listed as the island of Hawaii. The CU ledger indicates that CU 29995 contains type material from Hawaii and references Newcomb's (1853) original description of *Achatinella lineolata*. CU 29996, also from Hawaii, was not listed as type material in the ledger; however, a single label from Cornell University lists both CU 29995 and 29996 together as "cotypes"; Clarke (1960: 151)

reported that CU 29996 consisted of four syntypes, but only three shells were found in the lot. Pilsbry and Cooke (1914b: 44) also reported only three specimens in Newcomb's collection, indicating that the fourth specimen had been "been broken off, probably to send to London for illustration in his paper of 1853" (as the fourth specimen from Newcomb's collection remains at NHMUK, it is unclear why Clarke reported four syntypes in CU). In his original (1853) description, Newcomb indicated that the shell was yellowish but that the last whorl was "thickly marked with longitudinal umber-colored zig-zag lines". There are no such markings in his subsequent illustration (1854b: 140, pl. 23, fig. 29; reproduced in Fig. 4B), leading Pilsbry and Cooke (1914b: 44–45) to conclude that the shell at NHMUK did not have these markings; in fact, the periostracum of the shell at NHMUK is worn off the aperture side, which is why the markings were not visible in Newcomb's illustration (markings are present on the other side of the shell). Pilsbry and Cooke (1914b: 44) examined the shells now at PRI and, believing that the shell at NHMUK lacked brown markings, wrote "One shell has the 'umber colored zigzag lines' and must therefore be the type." By specifying "the type", Pilsbry and Cooke used an equivalent expression to validly designate a lectotype (*Code Art. 74.5*). One shell (Fig. 4A) in PRI 10189 (CU 29995 and 29996) has the brown pattern on the shell described by Newcomb and is marked with an "X", presumably by Pilsbry. This shell is also a match to Pilsbry and Cooke's illustration of the specimen that they "take to be the type" (1914b: pl. 7, figs. 18 and 19), and is identified as the lectotype. Johnson (1996: 189) did not realize that a lectotype had been designated by Pilsbry and Cooke and subsequently selected NHMUK 1992246 as the lectotype, which he indicated was Newcomb's "figured and only type" (although he also listed CU 29996 as paralectotypes). Although the shell in NHMUK 1992246 appears to be Newcomb's figured shell, because Pilsbry and Cooke (1914b: 44) validly designated a lectotype from CU, Johnson's lectotype designation is invalid. Pilsbry and Cooke (1914b: 45) indicated that the shell figured by Newcomb (pl. 23, fig. 29) does not match his description of *A. lineolata*, and identified it as *Amastra neglecta*, but they did not examine the specimen, and the lack of brown bands due to the missing periostracum may have misled them in their identification. Pilsbry and Cooke (1914b: 45) also considered that the remaining two shells in PRI 83921 (CU 29995 and CU 29996), which they did examine, were misidentified by Newcomb; these two shells are paralectotypes.

***melanosis* Newcomb, 1854; *Achatinella***

*Achatinella melanosis* Newcomb, 1854a: 18, pl. 23, fig. 41; 1854b: 144, pl. 23, fig. 41.

**Current taxonomic status:** *Amastra (Amastrella) melanosis* (Newcomb, 1854). Valid species (Cowie *et al.* 1995: 98).

**Type material:** Paralectotype PRI 10223 [CU 30014] (1 spm).  
**Type locality:** "Hawaii".

**Remarks:** Newcomb reported that the species was from Hawaii, which refers specifically to the island by that name as the archipelago would have been referred to at that time as the "Sandwich Islands". The CU ledger indicates that CU 30014 contains type material from "Mouna Loa Hawaii" [sic, = Mauna Loa], which Clarke (1960: 151) reported to be a single syntype. The ledger also references Newcomb's (1854a, 1854b) illustration of *Achatinella mastersi*. The shell in PRI 10223 (CU 30014) is similar in appearance in shape and color to Newcomb's figure, but is not Newcomb's figured type. Hyatt and Pilsbry (1911c: 312) indicated that "Probably the type colony has not been rediscovered. The locality is unknown, but probably somewhere in the Hamakua district, north from Mauna Kea." Pilsbry and Cooke examined a shell from CU 30014 and provided an illustration (Pilsbry and Cooke 1914b: pl. 1, fig. 17) consistent with the shell currently in PRI 10223. They stated that Newcomb's description was based on immature specimens, "corresponding exactly" with an immature shell illustrated by Hyatt and Pilsbry (1911c: pl. 47, figs. 1, 2); that shell is from ANSP 104710 collected by Baldwin and recorded from Hamakua. Following this statement, Pilsbry and Cooke (1915a: 49) stated "These shells were from Mr. Baldwin, labeled *Hamakua* [...] Newcomb's label however says 'Mauna Loa, Hawaii.' Very little importance is to be attached to this, since Newcomb himself did not collect the shells, and it is very doubtful whether such an *Amastra* occurs on Mauna Loa unless so far down as to rob the term of any definite geographical significance." It is ambiguous if by "these shells" Pilsbry and Cooke are still referring to "the shells" in the ANSP lot, or if it also refers to the shell from CU. Newcomb did not state in the original description the species was based on material received from another collector. It seems unlikely that Pilsbry and Cooke would have compared the two labels unless they referred to the same lot, so it seems that Pilsbry and Cooke's account casts doubt on Mauna Loa as the locality for the type specimens at PRI. Due to this ambiguity, Cowie *et al.* (1995: 98) concluded that "the exact type locality requires future research." Johnson (1996: 190) validly designated NHMUK 1992255 as the lectotype which he indicated was Newcomb's "figured and only type", citing personal communication from F. Naggs. The locality of NHMUK 1992255 is recorded only as "Hawaii", which is therefore the type locality (which may be refined in the future if the origin of that specimen can be traced to a particular locality). The shell in CU 30014 is a paralectotype (although it was referred to as plural "paralectotypes" by Johnson (1996: 190)).

***moesta* Newcomb, 1854; *Achatinella***

*Achatinella moesta* Newcomb, 1854a: 31, pl. 24, fig. 77; 1854b: 157, pl. 24, fig. 77.

**Current taxonomic status:** *Amastra* (*Amastra*) *moesta* (Newcomb, 1854). Valid species (Cowie *et al.* 1995: 93).

**Type material:** Paralectotypes PRI 10224 [CU 30018] (3 spms).

**Type locality:** "Island of Ranai" [sic, Lanai].

**Remarks:** The CU ledger indicates that CU 30018 contains type material from "Ranai", which Clarke (1960: 151) reported comprised three syntypes. The ledger also references Newcomb's (1854b) illustration of *Achatinella moesta*. The shells in CU 30018 lack the "black zigzag lines" described by Newcomb, and are not the figured shell. Johnson (1996: 190) validly designated NHMUK 1992265 as the lectotype which he indicated was Newcomb's "figured and only type", citing a personal communication from F. Naggs. Although Johnson did not report CU 30018 as type material, it was recognized as type material by Clarke. There is no evidence that the specimens in PRI 10224 (CU 30018) were not part of Newcomb's collection at the time he described the species, thus the specimens in CU 30018 are paralectotypes.

***nigra* Newcomb, 1855; *Achatinella***

*Achatinella nigra* Newcomb, 1855b: 219; 1866: 210, pl. 13, fig. 3.

**Current taxonomic status:** *Amastra* (*Amastra*) *nigra* (Newcomb, 1855). Valid species (Cowie *et al.* 1995: 94).

**Type material:** Lectotype (Johnson 1996: 191) PRI 10128 [CU 30028A] (Fig. 4C); paralectotypes PRI 10129 [CU 30028] (4 spms).

**Type locality:** "E. Maui".

**Remarks:** The CU ledger indicates that CU 30028 contains type material from East Maui and references Newcomb's (1855) original description (listed as "Bost. Proc. 1853", although the year of publication is in fact 1855). Clarke (1960: 151) reported that CU 30028 comprised five syntypes. Johnson (1996: 191) validly designated shell "A" of CU 30028 (separated as CU 30028A) as the lectotype, which he indicated was Newcomb's "figured type, so marked". Newcomb (1866) did not mention whether the specimen figured was a type, but the shell of the lectotype (Fig. 4C) is not thickened at the aperture and is very worn (with most of the periostracum missing), while Newcomb's (1866 fig. 3) color illustration is of a brown shell with a thickened apertural lip (Fig. 4D). Regardless, the shells in PRI 10129 (CU 30028) are paralectotypes (three are entire, one is in pieces). Additional paralectotypes are in MCZ 142799 (3 spms; ex Newcomb) MCZ 294954 (4 spms; A.A. Gould collection), and NHMUK 1995103 (1 spm; ex MCZ 294954) as reported by Johnson (1996: 191).

***nitida* Newcomb, 1853; *Achatinella***

*Achatinella nitida* Newcomb, 1853: 29; 1854a: 14–15, pl. 23, fig. 30; 1854b: 140–141, pl. 23, fig. 30.

**Current taxonomic status:** *Leptachatina (Leptachatina) nitida* (Newcomb, 1853). Valid species (Cowie *et al.* 1995: 125).

**Type material:** Paralectotypes PRI 10187 [CU 30030] (6 spms).

**Type locality:** “E. Maui”.

**Remarks:** The CU ledger indicates that CU 30030 contains type material from Maui, marked as “cotypes” on the label from Cornell University. Clarke (1960: 152) reported that CU 30030 comprised six syntypes. The ledger also includes a reference to Newcomb’s (1853) original description. Johnson (1996: 192) validly designated NHMUK 1992247/1 as the lectotype, which he indicated was Newcomb’s “figured type”. Thus, the specimens in CU 30030 are paralectotypes. Additional paralectotypes are in NHMUK 1992247/2, MCZ 45185 (3 spms; ex Newcomb), MCZ 142957 (5 spms; ex Newcomb), MCZ 294920 (10 spms; ex Newcomb), and MCZ 315849 (4 spms; C.B. Adams collection) as reported by Johnson (1996: 192).

***obscura* Newcomb, 1854; *Achatinella***

*Achatinella obscura* Newcomb, 1854a: 31, pl. 24, fig. 78; 1854b: 157, pl. 24, fig. 78.

**Current taxonomic status:** *Amastra (Amastra) moesta obscura* (Newcomb, 1854). Valid subspecies (Cowie *et al.* 1995: 94).

**Type material:** Probable paralectotypes PRI 10220 [CU 30039] (5 spms).

**Type locality:** “Island of Ranai” [sic, Lanai].

**Remarks:** The CU ledger indicates that CU 30039 contains type material and references Newcomb’s (1854a, 1854b) figure of *Achatinella obscura*. Although the shell marked with the letter “A” is similar in overall shape to Newcomb’s illustration, and is also marked with an “x” (it is unclear by whom), the specimens are not considered to be Newcomb’s figured shell, which should be in NHMUK. The locality given for CU 30039 in the ledger and the label from Cornell University are clearly written as Kauai. We conclude that this is probably an error due to confusion when reading Newcomb’s original label of “Ranai” as “Kauai”. Clarke (1960: 152) reported that CU 30039 comprised five syntypes from Kauai. Johnson (1996: 192) validly designated NHMUK 1992266/1 as the lectotype, which he indicated was Newcomb’s “figured type”. Because the inconsistency in locality is considered to be an error, the specimens in CU 30039 are treated here as probable paralectotypes. Additional paralectotypes are in NHMUK 1992266/2, MCZ 142801 (4 spms; ex Newcomb) and MCZ 294937 (3 spms; A.A. Gould collection) as reported by Johnson (1996: 192).

***petricola* Newcomb, 1855; *Achatinella***

*Achatinella petricola* Newcomb, 1855c: 143–144; 1866: 211, pl. 13, fig. 6.

**Current taxonomic status:** *Amastra (Amastrella) petricola* (Newcomb, 1855). Valid species (Cowie *et al.* 1995: 98).

**Type material:** Lectotype (Johnson 1996: 194) [CU 30069A] and paralectotype PRI 10245 [CU 30069] (2 spms; Fig. 4E).

**Type locality:** “Molokai, or [on] the rocky sides of a Pali or precipice”.

**Remarks:** Pilsbry (*in* Hyatt and Pilsbry 1911c: 254) suggested that Newcomb’s material of *A. petricola* included specimens of *Achatinella umbilicata* Pfr.: “The two species [*A. umbilicata* and *A. petricola*] were mixed in material sent out by Newcomb, and both were included in his several descriptions, though the *umbilicata* form only incidentally, in the two phrases ‘sometimes the last one inflated’ and ‘often with an umbilicus.’” Pilsbry and Cooke (1914b: 23) also mentioned this, referencing material at ANSP from Molokai without specifying which lot. *Laminella umbilicata* (Pfeiffer) is currently recognized as a valid species (Cowie *et al.* 1995: 103). The CU ledger indicates that CU 30069 contains type material of *Achatinella petricola* from Molokai, and references Newcomb’s (1855) original description. The label from Cornell University indicates their status as “cotypes” from Molokai; Clarke (1960: 152) reported that CU 30069 comprised two syntypes. Both of the syntypes appear to be *A. petricola*, consistent with Hyatt and Pilsbry’s illustrations (1911b: pl. 36, figs. 4 and 5) of the species, and distinct from *A. umbilicata* (Hyatt and Pilsbry 1911b: pl. 36, figs. 6 and 7, Pilsbry and Cooke 1914b: pl. 2, figs. 5–7).

Johnson (1996: 194) designated CU 30069A as the lectotype which he indicated “appears to be the figured type”. The specimen Johnson selected has not been separated from the paralectotype and neither shell is marked (only two syntypes were recorded by Clarke in CU 30069, so one of the two shells should be the lectotype Johnson selected). Although the shell is not physically separated, by indicating it is the specimen from Newcomb’s figure, Johnson validly designated the lectotype (Code Art 74.5). Both of the specimens in PRI 10245 (CU 30069) (Fig. 4E) are more globose with a much broader spire than Newcomb’s (1866: fig. 6) illustration (Fig. 4F); the specimens in the NHMUK lot also differ from the illustration in this respect. The shell figured in Newcomb’s illustration has a slightly thickened lip; of the two shells in PRI 10245 (CU 30069), the smaller, darker shell has a thickened lip while the larger shell does not. This shell is also remarkably similar to Hyatt and Pilsbry’s (1911b: pl. 36, figs. 4 and 5) illustration of *A. petricola* (ANSP 57734). The smaller shell is considered here to be the most similar to Newcomb’s figure and may be the lectotype designated by Johnson, although this remains uncertain. Johnson (1996: 194) also reported no type material was found in MCZ, or in ANSP by Baker (1963). ANSP

apparently received specimens from Newcomb as *Achatinella petricola* (ANSP 57792) from Molokai, although Pilsbry (in Hyatt and Pilsbry 1911a: pl. 17, fig. 8) reidentified 2 of the 4 as *Amastra pusilla*. The other two specimens from ANSP 57792 have not been located. Johnson did not mention type material from NHMUK, but type material of *Achatinella petricola* from Molokai was located by us (no catalog number, 3 spms).

***porphyrea* Newcomb, 1854; *Achatinella***

*Achatinella porphyrea* Newcomb, 1854a: 10, pl. 22, fig. 16; 1854b: 136, pl. 22, fig. 16.

**Current taxonomic status:** Synonym of *Achatinella cylindrica* Newcomb, 1854, now placed in *Amastra* (*Paramastra*) (Cowie *et al.* 1995: 109).

**Type material:** Paralectotypes PRI 10221 [CU 30078] (3 spms).

**Type locality:** "Waianoe, Oahu" [sic, Waianae].

**Remarks:** The CU ledger indicates that CU 30078 contains type material from Oahu, which Clarke (1960: 153) reported comprised three syntypes. The ledger also references Newcomb's (1854a, 1854b) illustration. None of the shells in CU 30078 closely match the coloration of the figured shell. Johnson (1996: 194) validly designated NHMUK 1992243/1 as lectotype which he indicated was Newcomb's "figured type". Thus the shells in CU 30078 are paralectotypes. Additional paralectotypes are in NHMUK 1992243/2 and MCZ 294970 (2 spms; A.A. Gould collection) as reported by Johnson (1996: 194).

***pupoidea* Newcomb, 1854; *Achatinella***

*Achatinella pupoidea* Newcomb, 1854a: 18, pl. 23, fig. 42; 1854b: 144, pl. 23, fig. 42.

**Current taxonomic status:** Synonym of *Achatinella affinis* Newcomb, 1854, now placed in *Amastra* (*Paramastra*) (Cowie *et al.* 1995: 94).

**Type material:** Paralectotypes PRI 10219 [CU 30086] (2 spms).

**Type locality:** "E. Mani" [sic, Maui].

**Remarks:** The CU ledger indicates that CU 30086 is type material from W. Maui, and the CU label indicates the status of the specimens as "cotypes"; Clarke (1960: 153) reported that CU 30086 comprised two syntypes from West Maui. Johnson (1996: 195) validly designated NHMUK 1992256/1 as the lectotype which he indicated was Newcomb's "figured type". Johnson also reported that the specimens in CU 30086 and in NHMUK 1992256 were "all labeled as from West Maui". The type locality of *Achatinella pupoidea* was reported by Newcomb as East Maui ("E. Mani" [sic, Maui]). All records of *Achatinella pupoidea* and *Achatinella affinis* (*A. pupoidea* is a junior synonym of *A. affinis*) in the Bishop Museum, Honolulu are from East Maui, with the exception of one lot

(unpublished data). The locality in the ledger was later amended with "[E. Maui (Newc.)]". As Newcomb indicated the species was from East Maui specifically (not simply Maui), we consider that the locality of West Maui for his specimens in NHMUK and CU are probably in error. The shells in CU 30086 are therefore recognized as paralectotypes. Additional paralectotypes are in NHMUK 1992256/2 and MCZ 294967 (5 spms; A.A. Gould collection) as reported by Johnson (1996: 195).

***pusilla* Newcomb, 1855; *Achatinella***

*Achatinella pusilla* Newcomb, 1855c: 144–145; 1866: 211, pl. 13, fig. 5.

**Current taxonomic status:** *Amastra* (*Paramastra*) *pusilla* (Newcomb, 1855). Valid species (Cowie *et al.* 1995: 95).

**Type material:** Lectotype (Johnson 1996: 195) PRI 10244 [CU 30087A] (Fig. 4G); paralectotypes PRI 82754 [CU 30087] (3 spms).

**Type locality:** "Ranai" [sic, Lanai].

**Remarks:** The CU ledger indicates that CU 30087 contains type material from "Ranai", which Clarke (1960: 153) reported comprised four syntypes. The ledger also includes a reference to Newcomb's (1855) original description of *Achatinella pusilla*, in which he recognized two varieties, "var. major" and "var. minor". Newcomb did not provide separate descriptions for the two varieties, each was identified only by a single set of measurements; therefore, Newcomb explicitly gave the name *Amastra pusilla* var. *major* to a large specimen, and the name *Amastra pusilla* var. *minor* to a small specimen. As such the names *minor* and *major* are of infrasubspecific rank (Code Art. 45.6.1), and since neither *major* nor *minor* was adopted for a species or subspecies before 1985 they are both unavailable (Code Art. 45.6.4.1). Johnson (1996: 195) wrote that he designated a CU 30087A as the lectotype which he indicated was Newcomb's "figured type". Johnson's designation of specimen "A" as the lectotype is valid (Code Art 74.5). The shell labeled "A" (Fig. 4G) appears slightly broader than Newcomb's (1866: fig. 5) illustration (Fig. 4H), but does have the narrow white band near the suture seen in Newcomb's black and white figure. Thus the other three specimens of CU 30087 are considered to be paralectotypes, and are separated as PRI 82754. Additional paralectotypes are in MCZ 294974 (2 spms; A.A. Gould collection) as reported by Johnson (1996: 195).

***remyi* Newcomb, 1855; *Achatinella***

*Achatinella remyi* Newcomb, 1855c: 146; 1866: 215, pl. 13, fig. 13

**Current taxonomic status:** *Laminella* (*Laminella*) *remyi* (Newcomb, 1855). Valid species (Cowie *et al.* 1995: 116).

**Type material:** Lectotype (Johnson 1996: 195) PRI 10247 [CU 30093] (Fig. 4I); paralectotype PRI 82755 [CU 30093] (1 spm).

**Type locality:** “Ranai” [sic, Lanai].

**Remarks:** The CU ledger indicates that CU 30093 contains type material from “Ranai” and references Newcomb’s (1855) original description of *Achatinella remyi*. Clarke (1960: 154) reported two syntypes in CU 30093. Hyatt and Pilsbry (1911: 335) also reported that Newcomb’s type was “in Newcomb coll., Cornell University Mus.” Johnson (1996: 195) validly designated CU30093A as the lectotype which he stated was Newcomb’s “figured type, so marked”. Although shell “A” was validly designated as the lectotype, it should be noted that the shell marked “B” (Fig. 4I) appears to be Newcomb’s figured specimen (1866: fig. 14) (Fig. 4J), based on the raised columellar lip and the wear on the body whorl near the aperture.

***reticulata* Newcomb, 1854; *Achatinella***

*Achatinella reticulata* Newcomb, 1854a: 22, pl. 24, fig. 54; 1854b: 148, pl. 24, fig. 54.

**Current taxonomic status:** *Amastra (Metamastra) reticulata* (Newcomb, 1854). Valid species (Cowie *et al.* 1995: 107).

**Type material:** Paralectotypes PRI 10240 [CU 30095] (3 spms).

**Type locality:** “Waianoe, Oahu” [sic, Waianae].

**Remarks:** The CU ledger indicates that two lots include type material of *Achatinella reticulata*: CU 30095 from “Oahu” and CU 30094 (no locality listed). The ledger references Newcomb’s (1854a, 1854b) original illustration in the remarks on CU 30094, but does not for CU 30095. Clarke (1960: 153) reported CU 30095 comprised three syntypes. CU 30094 was not located at PRI, so it is unknown if any locality information is written on the CU label. Because Clarke did not reference CU 30094 in his catalog of type material, CU 30094 may have been lost before he examined the collection. Johnson (1996: 196) validly designated NHMUK 1992260/1 as the lectotype which he indicated was Newcomb’s “figured type”. Thus the specimens in CU 30095 are paralectotypes. Additional paralectotypes are in NHMUK 199260/2 and MCZ 294962 (1 spm; A.A. Gould collection) as reported by Johnson (1996: 196).

***sanguinea* Newcomb, 1854; *Achatinella***

*Achatinella sanguinea* Newcomb, 1854a: 9–10, pl. 22, fig. 15; 1854b: 135–136, pl. 22, fig. 15; 1858: 326.

**Current taxonomic status:** *Laminella (Laminella) sanguinea* (Newcomb, 1854). Valid species (Cowie *et al.* 1995: 116).

**Type material:** Paralectotypes PRI 10231 [CU 30114] (4 spms).

**Type locality:** “Lehui, Oahu”.

**Remarks:** The CU ledger from Cornell University indicates that CU 30114 contains type material from Oahu; the CU label gives the locality as Lehui, Oahu. Clarke (1960: 154) reported that CU 30114 comprised four syntypes. The ledger

also references Newcomb’s (1854a, 1854b) illustration of *Achatinella sanguinea*. Although the shell marked “B” is similar in shape and markings to Newcomb’s figure, it is not the figured shell. Johnson (1996: 197) validly designated NHMUK 1992242/1 as the lectotype, which he indicated was Newcomb’s “measured and figured type”. Thus the specimens in CU 30114 are paralectotypes. Additional paralectotypes are in NHMUK 1992242/2, MCZ 141213 (1 spm) and MCZ 294927 (6 spms; A.A. Gould, A1465) as reported by Johnson (1996: 197).

***soror* Newcomb, 1854; *Achatinella***

*Achatinella soror* Newcomb, 1854a: 17, pl. 23, fig. 36 and 38; 1854b: 143, pl. 23, figs. 36, 38.

**Current taxonomic status:** *Amastra (Heteramastra) soror* (Newcomb, 1854). Valid species (Cowie *et al.* 1995: 104).

**Type material:** Paralectotypes PRI 10243 [CU 30119] (5 spms).

**Type locality:** “Mani” [sic, Maui].

**Remarks:** The CU ledger indicates that CU 30119 contains type material from “E. Maui”. Clarke (1960: 154) reported that CU 30119 comprised six syntypes, but there are currently seven specimens in the lot. Newcomb indicated that *Amastra soror* is sinistral, but the smallest specimen in the lot is dextral, and thus cannot be one of Newcomb’s types (the shell appears to belong to a *Leptachatina* species, not *Amastra*). This smaller shell is thus excluded from the type series. The ledger also includes a reference to Newcomb’s (1854a, 1854b) illustration (pl. 23, fig. 38) of *Achatinella soror*. Five of the shells in PRI 10243 (CU 30119) are similar in shape and color pattern (light colored body whorl, other whorls brown) to Newcomb’s figured shell (the shell marked “B” is broader and darker colored). Newcomb (1858: 328) indicated that both fig. 36 and fig. 38 (1854a, 1854b) were illustrations of *A. soror* (he mistakenly included two illustrations of *Achatinella soror* and did not include an illustration of *A. acuta*). Newcomb described the color of *Achatinella soror* as “dark corneous above and light corneous below”, while variety  $\alpha$  was characterized as “last whorl white, shell solid” and variety  $\beta$  as “shell thin, dark corneous, polished”. Because Newcomb provided three sets of measurements and three descriptions, these are recognized as “distinct” varieties (Code Art 72.4.1), and specimens attributable to either variety  $\alpha$  or  $\beta$  should be excluded from the type series. The shell marked “B” in PRI 10243 (CU 30119) is darker than the other shells, and appears to be the variety  $\beta$  described by Newcomb and is excluded from the type series. Johnson (1996: 198) validly designated NHMUK 1992253/1 as the lectotype, which he indicated was illustrated in Newcomb’s fig. 36. Thus the shells in CU 30119 are paralectotypes. Additional paralectotypes are in NHMUK 1992253/2, MCZ 88128 (7 spms; ex Newcomb) and MCZ 294928 (9 spms; A.A. Gould collection) as reported by Johnson (1996: 198).

***succincta* Newcomb, 1855; *Achatinella***

*Achatinella succincta* Newcomb, 1855b: 220; 1866: 213, pl. 13, fig. 7.

**Current taxonomic status:** *Leptachatina* (*Leptachatina*) *succincta* (Newcomb, 1855). Valid species (Cowie *et al.* 1995: 127).

**Type material:** Lectotype (Johnson 1996: 199) PRI 10120 [CU 30132A] (Fig. 4K); paralectotypes PRI 10121 [CU 30132] (3 spms).

**Type locality:** "Ewa, Oahu".

**Remarks:** The CU ledger indicates that CU 30132 contains type material from Oahu, which Clarke (1960: 154) indicated comprised four syntypes. The ledger also includes a reference to Newcomb's (1855) description of *Achatinella succincta*. The locality was later updated in the ledger as "Ewa (Newc.)" (written in brackets). Johnson (1996: 199) validly designated the shell CU 30132A as the lectotype (Fig. 4K), which he indicated was Newcomb's (1866: fig. 7) "figured type, so marked" (Fig. 4L). However, Newcomb's illustration is of a shell that is missing the upper part of the spire. The lectotype designated by Johnson still has the upper whorls intact, but a paralectotype (marked "C") is missing these whorls and appears to be the shell illustrated by Newcomb. Additional paralectotypes are in MCZ 142990 (1 spm; ex Newcomb), MCZ 143004 (1 spm; ex Newcomb), and MCZ 294972 (2 spms; A.A. Gould's collection) as reported by Johnson (1996: 199).

***tetrao* Newcomb, 1855; *Achatinella***

*Achatinella tetrao* Newcomb, 1855a: 311; 1855b: 219; 1866: 214, pl. 13, figs. 11, 12; 1858: 334.

**Current taxonomic status:** *Laminella* (*Laminella*) *tetrao* (Newcomb, 1855). Valid species (Cowie *et al.* 1995: 116).

**Type material:** Lectotype (Johnson 1996: 200) PRI 10124 [CU 30149A] (Fig. 4M); paralectotypes PRI 10125 [CU 30149] (4 spms).

**Type locality:** "Ranai" [sic, Lanai].

**Remarks:** The CU ledger indicates that CU 30132 contains type material from "Ranai" [sic, Lanai], and references Newcomb's (1855b: 219) description. Clarke (1960: 155) indicated that CU 30149 comprised five syntypes. Johnson (1996: 200) validly designated CU 30149A (PRI 10124) as the lectotype (Fig. 4M), which he indicated was Newcomb's "figured type, so marked." However, Newcomb (1866) provided figures of two specimens of *Achatinella tetrao* in pl. 13, figs. 11 and 12, and Johnson did not specify which figure was an illustration of the lectotype. Shell "A" (Fig. 4M) is similar in overall shell shape and patterning to Newcomb's lighter-colored shell illustrated in pl. 13, fig. 12 (Fig. 4N). We consider that this is the specimen Johnson designated when he wrote CU 30149A; it is unclear why the shell marked "B" had been separated as the lectotype at

PRI. Shell "B" is similar to Newcomb's (1866) pl. 13, fig. 11 (Fig. 4O), but shells marked "C" and "D" are also similar. Thus the specimens marked "B", "C" "D" and "E" in PRI 10125 (CU 30149) are paralectotypes. Additional paralectotypes are in MCZ 141211 (3 spms) as reported by Johnson (1996: 200).

***violacea* Newcomb, 1853; *Achatinella***

*Achatinella violacea* Newcomb, 1853: 18; 1854a: 9, pl. 22, fig. 14; 1854b: 135, pl. 22, fig. 14.

**Current taxonomic status:** *Amastra* (*Amastra*) *violacea* (Newcomb, 1853). Valid species (Cowie *et al.* 1995: 95).

**Type material:** Paralectotypes PRI 10181 [CU 30174] (5 spms).

**Type locality:** "Molokai".

**Remarks:** The CU ledger indicates that CU 30174 contains type material from Molokai, which Clarke (1960: 155) indicated comprised five syntypes. The ledger from Cornell University also includes a reference to Newcomb's (1853) original description of *Achatinella violacea*. Johnson (1996: 202) validly designated NHMUK 1992241/1 as the lectotype, which he indicated was Newcomb's "figured type". Thus the specimens in CU 30174 are paralectotypes. Additional paralectotypes are in NHMUK 1992241/2, MCZ 141459 (3 spms; Anthony, ex Newcomb) and MCZ 156035 (3 spms; C.B. Adams collection) as reported by Johnson (1996: 202).

***vitrea* Newcomb, 1854; *Achatinella***

*Achatinella vitrea* Newcomb, 1854a: 16, pl. 23, fig. 34; 1854b: 142, pl. 23, fig. 34.

**Current taxonomic status:** Synonym of *Achatinella cingula* Mighels, 1845, now placed in *Leptachatina* (*Leptachatina*) (Cowie *et al.* 1995: 128).

**Type material:** Paralectotypes PRI 10235 [CU 30181] (6 spms).

**Type locality:** "Manoa, Oahu".

**Remarks:** The CU ledger indicates that CU 30181 contains type material from Oahu and references Newcomb's (1854a, 1854b) illustration of *Achatinella vitrea*. The label from Cornell University indicates that CU 30181 were "cotypes"; Clarke (1960: 155) reported that CU 30181 contained six syntypes. The shells in CU 30181 are all similar in color and shape to Newcomb's figure, but the figured shell is at NHMUK. Johnson (1996: 202) validly designated NHMUK 1992251/1 as the lectotype, which he indicated was Newcomb's "figured type". Thus the shells in CU 30181 are paralectotypes. Additional paralectotypes are in NHMUK 1992251/2, MCZ 142991 (4 spms) and MCZ 294965 (4 spms; A.A. Gould collection) as reported by Johnson (1996: 202).

## Lots previously reported to include types

## FAMILY ACHATINELLIDAE

*mauiensis* Pfeiffer, 1856; *Achatinella*

*Achatinella maniensis* Pfeiffer, 1856: 207; 1859d: 563 (as *mauiensis*) [emendation deemed to be justified under Art. 33.2.3.1].

**Current taxonomic status:** *Perdicella mauiensis* (Pfeiffer, 1856). Valid species (as *maniensis*, Cowie *et al.* 1995: 74).

**Type material:** None at PRI. The lectotype designation by Johnson (1996: 190) is invalid.

**Type locality:** “Mani” [sic, Maui].

**Remarks:** Pfeiffer was the first to publish a description for the species, which was originally a Newcomb manuscript name. Newcomb (1866: pl. 13, fig. 16) later provided an illustration for the species (as “*Achatinella mauiensis* Newcomb”). The name as “*maniensis*, Newcomb” was published by Pfeiffer in 1856 (1856c: 207), but later (Pfeiffer 1859: 563) corrected to *mauiensis*: “*Achatinella Mauiensis* Newc. in the Proc. Zool. Soc. 1855. p. 207 (err. typ. *Maniensis*)”. Pfeiffer’s *maniensis* is a *lapsus calami* (Clarke 1960: 151, Johnson 1996: 190) because the type locality was given as “Mani”, and thus *maniensis* cannot be considered an incorrect original spelling under *Code* Art. 32.5. Pfeiffer’s emendation to *mauiensis* is therefore an unjustified emendation under Art. 33.2, a position followed by Cowie *et al.* (1995: 74). However, Pilsbry and Cooke (1912: 20) used *mauiensis* in their heading for the species, cited both the original and the changed spelling, and explained that *maniensis* was considered a typographical error; according to the *Code* (Art. 33.2.1) “when both the original and the changed spelling are cited and the latter is adopted in place of the former” this is a “demonstrably intentional change”, and a justified emendation. Pilsbry and Cooke therefore validly emended the name to *mauiensis*. Even if Pilsbry and Cooke’s emendation were not to be considered justified, the *Code* indicates that unjustified emendations that are attributed to the original author and date and are in prevailing usage are deemed justified (*Code* Art. 33.2.3.1). Prevailing usage is defined in the *Code* as “usage of the name which is adopted by at least a substantial majority of the most recent authors concerned with the relevant taxon, irrespective of how long ago their work was published”. The literature indicates that *mauiensis* has been used by Newcomb (1858: 334), Gulick (1873: 91), Hartman (1888: 40) and the majority of authors since Pilsbry and Cooke’s (1912: 20) publication, including Neal in Pilsbry *et al.* (1928: 42), Caum (1928: 17), Clarke (1960: 151), Cooke and Kondo (1961: 8), and Baillie and Groombridge (1996). It is only after Cowie *et al.* (1995: 74) indicated that Pfeiffer’s emendation was unjustified that the spelling *maniensis* has been used, e.g., Johnson (1996: 190) and Severns (2011: 154). We consider that Pilsbry and Cooke’s emendation is demonstrably intentional (Art. 33.2.1),

and that *mauiensis* has been in prevailing usage and attributed to Pfeiffer (1856), and is thus a justified emendation (*Code* Art. 33.2.3.1).

The CU ledger indicates that CU 30013 contains type material, and the label from Cornell University indicates the status of CU 30013 as “cotypes”; Clarke (1960: 151) reported that CU 30013 comprised four syntypes. Johnson (1996: 190) designated CU 30013A as the lectotype, which he indicated was the “type figured by Newcomb”. Although the Cornell University ledger references Pfeiffer’s (1856) publication, Pfeiffer’s description of *Achatinella maniensis* was based on specimens in the Cuming Collection collected by Newcomb. The four specimens in PRI 10312 (CU 30013A and CU 30013) are from Newcomb’s collection, and although perhaps collected by Newcomb at the same time and place as the specimens sent to Cuming and described by Pfeiffer, there is no evidence that Pfeiffer was aware of the existence of additional material outside of the Cuming collection, and therefore they have no type status. The lectotype (CU 30013A) selected by Johnson (1996: 190) is thus determined not to have been a syntype, and loses its status as lectotype (*Code* Art. 74.2). Consequently, the specimens from the Cuming Collection in NHMUK 1996062 are not paralectotypes but syntypes.

*ovata* Newcomb, 1853; *Achatinella*

*Achatinella ovata* Newcomb, 1853: 22–23; 1854a: 4, pl. 22, figs. 2, 2a; 1854b: 130, pl. 22, figs. 2, 2a; 1858: 324.

**Current taxonomic status:** *Achatinella bulimoides ovata* Newcomb, 1853. Valid subspecies of *bulimoides* Swainson, 1828 (Cowie *et al.* 1995: 58).

**Type material:** None; the specimens in PRI 10179 (CU 30044) are not type material.

**Type locality:** “Waiauai, Oahu” [sic, Waianae]. Later (Newcomb 1854a: 4) erroneously reported as “Kahana, Koolan, Oahu” [sic, Koolau, Oahu] (Cowie *et al.* 1995: 58).

**Remarks:** The CU ledger indicates that CU 30044 contains type material and references Newcomb’s (1853) original description. No locality is recorded in the ledger from Cornell University, but on the CU label the locality is given as “Kahana, Koolau, Oahu”. Newcomb’s publication of Kahana as the type locality for *Achatinella ovata* was considered an error by Cowie *et al.* (1995: 58). This locality was reported by Newcomb in his 1854 (1854a, 1854b) publication, and this locality (given in brackets) was evidently added to the Cornell label later based on Newcomb’s publication.

The color of *Achatinella ovata* was described by Newcomb (1853: 23) as, “...light flesh-colored above, two last [whorls] white obscurely banded with light brown”. Newcomb also identified a variety  $\alpha$ , which he described as “Shell white, bluish white above, without coloring or bands.” There are five of Newcomb’s shells in PRI 10179 (CU 30044) with a label indicating their status as “cotypes”, although Clarke (1960: 152)

reported that CU 30044 consisted of only three syntypes. The shells in PRI 10179 (CU 30044) are all white without any color or banding, and would probably have been referred by Newcomb to variety  $\alpha$ . Because these shells belong to a distinct variant, they are excluded from the type series (*Code Art* 72.4.1). Welch (1958: 186) validly designated NHMUK 1992193/1 (refigured in his pl. 14, fig. 8) as the lectotype when he wrote “The specimen marked X by me matches Newcomb’s figure 2, plate 22, and is considered the lectotype”. Paralectotypes are in NHMUK 1992193/2, MCZ 294977 (6 spms; A.A. Gould Collection) and MCZ 315852 (3 spms) as reported by Johnson (1996: 193). Some of these paralectotypes may be referred to the distinct variety that Newcomb recognized; the type status of these possible paralectotypes remains uncertain, pending future work.

***splendida* Newcomb, 1853; *Achatinella***

*Achatinella splendida* Newcomb, 1853: 20; 1854a: 5, pl. 22, fig. 4; 1854b: 131, pl. 22, fig. 4.

**Current taxonomic status:** *Partulina (Partulina) splendida* (Newcomb, 1853). Valid species (Cowie *et al.* 1995: 72).

**Type material:** None; the specimens in PRI 10195 (CU 30122) are not type material.

**Type locality:** “Wailuku, Maui”.

**Remarks:** The CU ledger indicates that CU 30122 contains type material and references Newcomb’s (1853) original description. The locality in the ledger is recorded only as “S.I.”. The CU label indicates the status of the shells in CU 30122 as “cotypes” from Wailuku, Maui (written in square brackets); Clarke (1960: 154) reported that this lot comprised five syntypes. The original description (1853: 20) indicates that the shells have “two upper whorls tessellated with chestnut and white, lower whorl with numerous chestnut-colored transverse lines and fillets traced on a polished white ground; markings correctly lined superiorly and irregularly serrated inferiorly.” Newcomb also described a variety  $\alpha$  as “Bright chestnut, banded with white”. The shells in PRI 10195 (CU 30122) are chestnut with white bands and would have been attributed by Newcomb to variety “ $\alpha$ ”. Because these shells belong to a distinct variety, they are excluded from the type series (*Code Art* 72.4.1). Johnson (1996: 198) validly designated NHMUK 1992205/1 as the lectotype which he indicated was Newcomb’s “figured type”. Paralectotypes are in NHMUK 1992205/2 and MCZ 294925 (26 spms; A.A. Gould collection) as reported by Johnson (1996: 198). Some of these paralectotypes may represent the distinct variety that Newcomb recognized; the type status of these possible paralectotypes remains uncertain, pending future work.

***swiftii* Newcomb, 1854; *Achatinella***

*Achatinella swiftii* Newcomb, 1854a: 7–8, pl. 22, fig. 9; 1854b: 133, pl. 22, fig. 9; 1858: 325.

**Current taxonomic status:** Synonym of *Achatinella (Achatinella) turgida* Newcomb, 1854 (Cowie *et al.* 1995: 47).

**Type material:** None; the specimens in PRI 10230 (CU 30134) are not type material.

**Type locality:** “District of Ewa” [Oahu].

**Remarks:** Clarke (1960: 155) reported that CU 30134 included three syntypes. The locality of CU 30134 is not included in the ledger, but is included on the label from Cornell University as “Ewa, Oahu” (written in square brackets). Newcomb described two varieties in his description: “Var  $\alpha$ . With a broad fascia cutting the body whorl. Var  $\beta$ . Yellowish ground colour, with few markings.” There are two figures listed by Newcomb with the original description of *Achatinella swiftii*. Newcomb’s plate 22, fig. 9 matches the description of *swiftii*: the “three first whorls [are] white, the lower with very fine and numerous markings of black and white arranged longitudinally to the shell, giving it a greyish aspect; fine obsolete white lines traverse the shell transversely, and a white sutural line is traced on the last two whorls.” Newcomb’s second illustration, plate 22, fig. 9a, is a clear match to his variety  $\alpha$  (the broad fascia cutting the body whorl); figure 9a is therefore excluded from the list of illustrations for *A. swiftii* (*Code Art* 72.4.1). The shells in PRI 10230 (CU 30134) match Newcomb’s description of variety  $\beta$ ; because these shells belong to a distinct variety, they are excluded from the type series (*Code Art* 72.4.1). Newcomb (1858: 325) wrote “Unfortunately the type figured in the Zoological Proceedings is not the usual pattern of the shell, but is one of the more uncommon varieties.” By writing “the type”, Newcomb validly designated the shell illustrated (1854a, 1854b: pl. 22, fig. 9) as the lectotype (*Code Art* 74.5). Newcomb’s lectotype is expected to be in NHMUK; Johnson (1996: 199) indicated that NHMUK 1992214/1 was Newcomb’s “figured type”, and re-designated it as the lectotype (Johnson’s designation is invalid due to the designation by Newcomb). Paralectotypes are in NHMUK 1992214/2, MCZ 25549 (3 spms; ex J.G. Anthony) and MCZ 294978 (1 spm; A.A. Gould collection) as reported by Johnson (1996: 199). Some of these paralectotypes may represent one of the two distinct varieties that Newcomb recognized; the type status of these possible paralectotypes remains uncertain, pending future work.

**FAMILY AMASTRIDAE**

***acuta* Newcomb, 1854; *Achatinella***

*Achatinella acuta* Newcomb, 1854a: 16; 1854b: 142.

**Current taxonomic status:** Synonym of *Achatinella elongata* Newcomb, 1853, now placed in *Amastra* (*Heteramastra*) (Cowie *et al.* 1995: 103). Primary junior homonym of *acuta* Swainson 1828: 84 (Cowie *et al.* 1995: 103).

**Remarks:** No types located. See discussion of *Amastra elongata* Newcomb.

***baldwinii* Newcomb, 1854; *Achatinella***

*Achatinella baldwinii* Newcomb, 1854a: 29, pl. 24, fig. 72; 1854b: 155, pl. 24, fig. 72.

**Current taxonomic status:** Synonym of *Achatinella magna* Adams, 1851, now placed in *Amastra* (*Amastra*) (Cowie *et al.* 1995: 90).

**Type material:** None; the specimen in PRI 10451 is not type material.

**Type locality:** "Ranai" [sic, Lanai].

**Remarks:** No types were located in Cornell University by Clarke (1960: 146), who reported three lots of syntypes in MCZ. One of these lots, MCZ 294958 originally consisted of six syntypes from A.A. Gould's collection, but one specimen from this lot is now at PRI (PRI 10451, no CU number). However, Newcomb (1854a, 1854b: 29) indicated in the original description that "There has been but one specimen of this species as yet obtained," which is therefore the holotype by monotypy. The shell in PRI 10451 does not match the figured specimen in coloration and hence is not the holotype. One syntype reported by Johnson (1996: 177) at NHMUK is also from MCZ 294958 (NHMUK 1995101); further research is needed to locate Newcomb's figured type specimen.

***elongata* Newcomb, 1853; *Achatinella***

*Achatinella elongata* Newcomb, 1853: 26.

**Current taxonomic status:** *Amastra elongata* (Newcomb, 1853). Valid species (Cowie *et al.* 1995: 103)

**Type material:** None; the specimens in PRI 10184 (CU 29960) are not type material.

**Type locality:** "Oahu"

**Remarks:** The CU ledger indicates that CU 29960 contains type material from Oahu and references Newcomb's (1853) original description. Newcomb (1858: 328) explained that he had originally planned to name this species *Achatinella acuta*, but was informed that the name was preoccupied by *Achatinella acuta* Swainson, 1828. He was not able to make changes to his manuscript on the "New species of *Achatinella*" in the Proceedings of the Zoological Society of London prior to publication, so he described the same specimen again as *Achatinella elongata*. Ultimately, the name *A. elongata* was published in 1853, before the description of *A. acuta*, which was not published until the following year (Newcomb 1854a: 16). Thus, the name *A. acuta* is an objective junior synonym of *A. elongata*, and the type material of *A. acuta* (a holotype by monotypy) is the same as that of *A. elongata*. Newcomb (1858: 328) indicated that the figure (Newcomb 1854a, 1854b: pl. 23, fig. 36) he provided for *A. acuta* was not of a shell of this species but of *Achatinella soror* (the same illustration as fig. 38 on the plate); thus Newcomb did not provide an illustration of this species. Hyatt and Pilsbry (1911b: 231) reported that the type of *A. elongata* was in the Newcomb collection at Cornell University but no type was located. The

label from Cornell University indicates that the specimens in CU 29960 are "idiotypes" from Oahu, as Clarke (1960: 148) and Johnson (1996: 182) subsequently reported. The three shells in PRI 10184 (CU 29960) are all smaller than Newcomb's measured type, and have no type status. Hyatt and Pilsbry (1911b: 230–231) questioned the presence of this species on Oahu, but Christensen (Cowie *et al.* 1995: 103) considered that specimens that had been recently collected along the Waianae coast of Oahu may be referable to it. Hyatt and Pilsbry (1911b: 231) reported that Newcomb's specimens in the Bishop Museum collection, identified here as BPBM 329 (Garrett collection, ex Newcomb), were obtained by Newcomb after the original description. Additional specimens of *A. elongata* obtained by Newcomb are in BPBM 42000.

***hartmani* Newcomb, 1888; *Leptachatina***

*Leptachatina hartmani* Newcomb in Hartman, 1888: 54, pl. 1, fig. 12.

**Current taxonomic status:** Objective junior synonym of *extincta* Pfeiffer, 1856; unnecessary replacement name.

**Type material:** None; the specimens in PRI 10313 (CU 29987) are not type material.

**Type locality:** Oahu.

**Remarks:** The name of this species was spelled by Hartman as *hartmani* on page 54, and as *hartmanii* on page 56; of which Cowie *et al.* (1995: 101) selected *hartmani* as the correct original spelling. Hartman wrote that it was Newcomb who selected the name *hartmani* as a replacement name for *Achatinella extincta*, Pfeiffer, 1856. Hartman explained Newcomb's justification for re-naming the species was that Newcomb had recent samples of the species, and that "*extincta*" was thus a misnomer. Therefore, Newcomb is the author for the name *hartmani* (Code Art 50.1.1). Although Hartman indicated in the caption of his illustration that the illustrated specimen was the "type", the name-bearing type for *hartmani* is the same as that of *extincta* and Hartman's statement about the type must be disregarded (Code Art. 72.7). PRI 10313 (CU 29987) is recorded in the CU ledger as "A. *hartmani* Newc." but not as type material; the remarks in the ledger only indicate "*extincta* Pfr. misnomer – not extinct". The label from Cornell University with the specimens of *A. hartmani* has an error in the catalog number of the lot, it is written as CU 29981 instead of CU 29987. The label indicates the shells are "idiotypes" or "possible cotypes" of *A. hartmani* from Kauai. Since the type locality of *A. extincta* is Oahu, PRI 10313 is not type material.

Hyatt and Pilsbry (1911b: 160) considered that the name *L. hartmani* referred to a distinct species from *A. extincta* (i.e., that the two were not conspecific), because Hartman published a figure of a shell that was broader and umbilicate. This should be considered as a misidentification by Hartman.

***mastersi* Newcomb, 1854; *Achatinella***

*Achatinella mastersi* Newcomb, 1854a: 27, pl. 24, fig. 67; 1854b: 153, pl. 24, fig. 67; 1858: 332.

**Current taxonomic status:** *Amastra mastersi* (Newcomb, 1854). Valid species (Cowie *et al.* 1995: 93).

**Type material:** None; the specimens in PRI 10213 (CU 30012) are not type material.

**Type locality:** "Mani" [sic, Maui].

**Remarks:** Newcomb listed the locality as Mani [sic, Maui]. The CU ledger indicates that CU 30012 contains type material from Molokai and references Newcomb's (1854a, 1854b) illustration of *A. mastersi*. The label from Cornell University indicates the status of the specimens as "cotypes"; Clarke (1960: 151) reported that CU 30012 consisted of six syntypes from Molokai. Johnson (1996: 190) determined that the specimens in CU 30012 are actually specimens subsequently identified by Newcomb from a locality other than the type locality (referred to as "idiotypes"). The specimens in PRI 10213 (CU 30012) therefore have no type status. Johnson (1996: 190) validly designated NHMUK 1992263/1 as the lectotype which he indicated was Newcomb's "figured type" from Maui. Additional paralectotypes from Maui are in NHMUK 1992263/2 and MCZ 142798 (3 spms; J.G. Anthony collection) as reported by Johnson (1996: 190).

***mucronata* Newcomb, 1853; *Achatinella***

*Achatinella mucronata* Newcomb, 1853: 28; 1854a: 20–21, pl. 23, fig. 49; 1854b: 146–147, pl. 23, fig. 49.

**Current taxonomic status:** *Amastra mucronata* (Newcomb, 1853). Valid species (Cowie *et al.* 1995: 93).

**Type material:** None; the specimens in PRI 10192 (CU 30019) are not type material.

**Type locality:** "Molokai". Subsequently (1854a, 1854b) erroneously indicated as "Mani" [sic, Maui] (Pilsbry and Cooke 1914b, Cowie *et al.* 1995, Johnson 1996).

**Remarks:** Molokai was listed by Newcomb as the type locality in the original description (1853), but he subsequently (1854a, 1854b) listed the locality as "Mani" [sic, Maui]. However, Pilsbry and Cooke (1914b: 35) stated that "probably Mapulehu [Molokai] is the type locality" (Cowie *et al.* 1995: 93), which may be due to the similarity in color and markings between Newcomb's illustration and shells Pilsbry and Cooke examined (1914b: pl. 3, figs. 1–3) collected by Mr. Thaanum from that area. The CU ledger indicates that CU 30019 contains type material from East Maui and references Newcomb's (1853) original description and his (1854a, 1854b) subsequent illustration. Johnson (1996: 191) validly designated NHMUK 1992258/1 from Molokai as the lectotype, which he indicated was Newcomb's "figured type". Thus the type locality of *Amastra mucronata* is fixed definitively as Molokai. The label from Cornell University with the specimens indicates that CU 30019 were considered "cotypes"

from East Maui. Clarke (1960: 151) reported that CU 30019 comprised three syntypes, also giving "E. Maui" as the locality. However, because East Maui is not the original type locality, Johnson (1996: 191) reported that the shells in CU 30019 are "idiotypes". There is also the possibility that Newcomb's change of locality from Molokai to E. Maui between 1853 and 1854 was simply a mistake that was repeated in the CU ledger and label, and that the specimens in CU 30019 are actually from Molokai. Hyatt and Pilsbry (1911c: 268) pointed out that "In his article in the P.Z.S., Newcomb gives the locality for *mucronata* as Mani – possibly an error, as he has stated that he did not see proofs of that article. It must be noted, however, that some very similarly marked shells occurring at Wailuku, West Maui, have been identified by Gulick as *A. mucronata*". The only information currently available about the locality for the shells in CU 30019 suggests they are from Maui, and as other authors have identified the species as present in Maui, we cannot dispute the CU records that indicate that these shells are from Maui. As ideotypes are not name-bearing types and are not regulated by the *Code*, PRI 10192 (CU 30019) is regarded here as non-type material. Additional paralectotypes are in NHMUK 1992258/2, MCZ 141450 (2 spms; ex Newcomb) and MCZ 141460 (2 spms; ex Newcomb), all from Molokai, as reported by Johnson (1996: 191). He also noted specimens identified by Newcomb in MCZ 294949 (6 spms, A.A. Gould collection,) from Maui (as "idiotypes").

***obesa* Newcomb, 1853; *Achatinella***

*Achatinella obesa*, Newcomb, 1853: 24; 1854a: 17–18, pl. 23, fig. 39; 1854b: 143, pl. 23, fig. 39; 1858: 329.

**Current taxonomic status:** *Amastra obesa* (Newcomb, 1853). Valid species (Cowie *et al.* 1995: 102).

**Type material:** None; the specimens in PRI 10191 (CU 30038) are not type material.

**Type locality:** "Hale-a-ka-la, Maui" [= Haleakala].

**Remarks:** Two figures of *Achatinella obesa* were provided by Newcomb (1854a, 1854b: pl. 23, figs. 39, 39a), of which fig. 39a illustrates the new "Var. *agglutinans*" Newcomb, 1854 (see *obesa* var. *agglutinans*, above). The label from Cornell University with CU 30038 indicates that they are "Idiotypes" of *A. obesa* from East Maui, but also says "(probable cotypes)". Clarke (1960: 152) also reported that CU 30038 comprised three "idiotypes". The type locality of Haleakala is in East Maui, and the CU specimens may be from the type locality. The CU ledger indicates that CU 30038 is type material of *A. obesa* v. *agglutinans* and references the name "*carinata* Gulick", a replacement name for *A. agglutinans*, but the specimens in CU 30038 are consistent with Newcomb's description of *A. obesa*. Johnson (1996: 192) validly designated NHMUK 1992254/1 as the lectotype, which he indicated was Newcomb's figured type. Paralectotypes are in NHMUK

1992254, MCZ 142800 (4 spms; ex Newcomb), MCZ 156036 (2 spms; C.B. Adams collection) and MCZ 294969 (4 spms; A.A. Gould collection) as reported by Johnson (1996: 192).

### ACKNOWLEDGMENTS

We would like to acknowledge the staff (especially Leslie Skibinski) in Malacology at the Paleontological Research Institute for hosting us during our visit. High resolution scans of Newcomb's color illustrations were graciously provided by the Bishop Museum (BPBM) library. We also thank Kimberly Lactaoen (BPBM, University of Hawaii) for her work with shell images. Rob Cowie and Gary Rosenberg provided detailed reviews that greatly improved this contribution. This work was partially funded by NSF ARTS grant #1656254 to N. Yeung, J. Slapcinsky, and K. Hayes and by the Jessie D. Kay Foundation. This is Contribution No. 2020-007 to Bishop Museum Hawaii Biological Survey.

### LITERATURE CITED

Athens, J. S. 2009. *Rattus exulans* and the catastrophic disappearance of Hawai'i's [sic] native lowland forest. *Biological Invasions* 11(7): 1489–1501.

Baker, H. B. 1963. Type Land Snails in the Academy of Natural Sciences of Philadelphia Part II. Land Pulmonata, Exclusive of North America North of Mexico. *Proceedings of the Academy of Natural Sciences of Philadelphia* 115: 191–259.

Bauer, B. 1988. Microgeographical variation in shell size of the land snail *Chondrina clienta*. *Biological Journal of the Linnean Society* 35(3): 247–259.

Chiaverano, L. M., and Holland, B. S. 2014. Impact of an invasive predatory lizard on the endangered Hawaiian tree snail *Achatinella mustelina*: a threat assessment. *Endangered Species Research* 24: 115–123.

Civeyrel, L., and Simberloff, D. 1996. A tale of two snails: is the cure worse than the disease? *Biodiversity and Conservation* 5(10): 1231–1252.

Clarke, A. H., Jr. 1958. Status of Newcomb's achatinellid names. *The Nautilus* 71(4): 148–151.

Clarke, A. H., Jr. 1960. Catalogue and Illustrations of Mollusks described by Wesley Newcomb, with a biographical resume. *Bulletins of American Paleontology* 41(188): 135–160, pl. 17.

Cooke, C. M. Jr., and Kondo, Y. 1961. Revision of Tornatellinidae and Achatinellidae (Gastropoda, Pulmonata). *Bernice P. Bishop Museum Bulletin* 221: 1–303.

Cowie, R. H. 2001. Invertebrate invasions on Pacific islands and the replacement of unique native faunas: a synthesis of the land and freshwater snails. *Biological Invasions* 3: 119–136.

Cowie, R. H., Evenhuis, N.L., and Christensen, C.C. 1995. *Catalog of the Native Land and Freshwater Molluscs of the Hawaiian Islands*. Backhuys Publishers, Leiden. vi + 248 p.

Cowie, R. H., Hayes, K. A., Tran, C. T., and Meyer, W. M. III. 2008. The horticultural industry as a vector of alien snails and slugs: widespread invasions in Hawaii. *International Journal of Pest Management* 54: 267–276.

Cowie, R. H., Héros, V., Yeung, N. W., and Hayes, K. A. 2016. Annotated catalogue of types of Hawaiian land and freshwater snails (Mollusca: Gastropoda) in the Muséum national d'Histoire naturelle, Paris, with lectotype designations. *Zoosystema* 38: 245–266.

Curry, P. A., and Yeung, N. W. 2013. Predation on endemic Hawaiian land snails by the invasive snail *Oxychilus alliarius*. *Biological Invasions* 22: 3165–3169.

Eldredge, L. G. 2006. Numbers of Hawaiian Species for 2003 – 2005. *Bishop Museum Occasional Papers* 88: 62–79.

Gagne, W. C. and Christensen, C. C. 1985. Conservation status of native terrestrial invertebrates in Hawai'i. In: Stone, C. P. and Scott M. K. (eds) *Hawaii's terrestrial ecosystems: preservation and management*. University of Hawaii Press, Honolulu: 105–126.

Goodfriend, G. A. 1986. Variation in land-snail shell form and size and its causes: a review. *Systematic Biology* 35: 204–223.

Gulick, J. T., and Smith, E. A. 1873 [June]. Descriptions of new species of Achatinellidae. *Proceedings of the Zoological Society of London* 1873: 73–89, pls. 9–10.

Hadfield, M. G., Miller, S. E., and Carwile, A. H. 1993. The decimation of endemic Hawai'iian [sic] tree snails by alien predators. *American Zoologist* 33: 610–622.

Hartman, W. D. 1888 [24 April]. A bibliographic and synonymic catalogue of the genus *Achatinella*. *Proceedings of the Academy of Natural Sciences of Philadelphia* 1888: 16–56.

Hayes M. and Glaser L.B. 2018. Mollusk collection moves to PRI, internet. Availbel at: <https://news.cornell.edu/stories/2018/11/mollusk-collection-moves-pri-internet> 1 - October 2019.

Hayes, K. A., Tran, C. T., and Cowie, R. H. 2007. New records of alien Mollusca in the Hawaiian Islands: nonmarine snails and slugs (Gastropoda) associated with the horticultural trade. *Bishop Museum Occasional Papers* 96: 54–63.

Hayes, K. A., Yeung, N. W., Kim, J. R., and Cowie, R. H. 2012. New records of alien Gastropoda in the Hawaiian Islands: 1996–2010. *Bishop Museum Occasional Papers* 112: 21–28.

Hyatt, A., and Pilsbry, H. A. 1910–1911. *Manual of Conchology. Structural and systematic. With illustrations of the species. Second series: Pulmonata*. Vol. XXI. Achatinellidae (Amastrinae). Academy of Natural Sciences, Philadelphia. xxii + 387 p., 56 pls.

Published in parts as follows:

Part	Pages	Plates	Date of publication
81	1–64	1–9	30 July 1910
82	65–128	10–23	14 March 1911a
83	129–240	24–36	23 August 1911b
84	241–387, i–xxii	37–56	December 1911c

ICZN (International Commission on Zoological Nomenclature). 1999. *International Code of Zoological Nomenclature*, 4th ed. London: International Trust for Zoological Nomenclature.

Johnson, R. I. 1996. Types of land and freshwater mollusks from the Hawaiian Islands in the Museum of Comparative Zoology. *Bulletin of the Museum of Comparative Zoology* 155: 159–214.

Kirch, P. V. 1982. The Impact of the Prehistoric Polynesians on the Hawaiian Ecosystem. *Pacific Science* 36: 1–13.

Leidy, J. 1857. Report of the curators for 1856. *Proceedings of the Academy of Natural Sciences of Philadelphia*. **8**: 325–326.

Lydeard, C., Cowie, R. H., Ponder, W. F., Bogan, A. E., Bouchet, P., Clark, S. A., Cummings, K. S., Frest, T. J., Gargominy, O., Herbert, D. G., and Hershler, R. 2004. The global decline of nonmarine mollusks. *BioScience* **54**: 321–330.

Meyer, W. M., Gary, D. T., Yeung, N. W., Dirks, C., Leung, K., Léon, J. A., Ressler, D.T.B., Curry, P.A., and Hayes, K. A. 2014. Native arboreal land snails in the Mt Kaala Natural Area Reserve, Oahu, Hawaii, have similar plant preferences: implications for conservation. *Journal of Molluscan Studies* **80**: 469–472.

Meyer, W. M. III, Ostertag, R., and Cowie, R.H. 2013. Influence of terrestrial molluscs on litter decomposition and nutrient release in a Hawaiian rain forest. *Biotropica* **45**: 719–727.

Meyer, W. M. III, Yeung, N. W., Slapcinsky, J., and Hayes, K. A. 2017. Two for one: inadvertent introduction of *Euglandina* species during failed bio-control efforts in Hawaii. *Biological Invasions* **19**: 1399–1405.

Newcomb, W. 1853 [May]. Descriptions of new species of *Achatinella* from Sandwich Islands. *Annals of the Lyceum of Natural History of New York* **6**: 18–30.

Newcomb, W. 1854a. Descriptions of seventy-nine new species of *Achatinella*, (Swains) a genus of pulmoniferous mollusks, in the collection of Hugh Cuming, Esq. *Zoological Society of London*: 3–31, 3 pls. [preprint of Newcomb 1854b]

Newcomb, W. 1854b. Descriptions of seventy-nine new species of *Achatinella*, Swains., a genus of pulmoniferous mollusks, in the collection of Hugh Cuming, Esq. *Proceedings of the Zoological Society of London* **21**: 128–157, pls. 22–24.

Newcomb, W. 1855a. Abstract of descriptions of some animals of *Achatinella*, and other remarks. *Proceedings of the Zoological Society of London* **22**: 310–311.

Newcomb, W. 1855b. [Five species of *Achatinella*]. *Proceedings of the Boston Society of Natural History* **5**: 218–220.

Newcomb, W. 1855c. Descriptions of new species of *Achatinella*. *Annals of the Lyceum of Natural History of New York* **6**: 142–147.

Newcomb, W. 1858. Synopsis of the genus *Achatinella*. *Annals of the Lyceum of Natural History of New York* **6**: 303–336.

Newcomb, W. 1860. Descriptions of new species of the genera *Achatinella*, and *Pupa*. *Annals of the Lyceum of Natural History of New York* **7**: 145–147.

Newcomb, W. 1861. [Descriptions of new shells]. *Proceedings of the California Academy of Natural Sciences* **2**: 91–94.

Newcomb, W. 1865. Description of a new species of land shells. *Proceedings of the California Academy of Natural Sciences* **3**: 179–182.

Newcomb, W. 1866. Descriptions of *Achatinellae*. *American Journal of Conchology* **2**: 209–217.

Pfeiffer, L. 1854. Skizze einer Monographie der Gattung *Achatinella* Swains. *Malakozoologische Blätter* **1**: 112–144.

Pfeiffer, L. 1855. Descriptions of twenty-seven new species of *Achatinella*, from the collection of H. Cuming, Esp., collected by Dr. Newcomb and by Mons. D. Frick, late Consul-general of France at the Sandwich Islands. *Proceedings of the Zoological Society of London* **23**: 1–7, pl. 30.

Pfeiffer, L. 1856. Descriptions of sixteen new species of *Achatinella*, from Mr. Cuming's collection, collected by Dr. Newcomb in the Sandwich Islands. *Proceedings of the Zoological Society of London* **23**: 207–210.

Pilsbry, H. A., and Cooke, C. M., Jr. 1912–1914. *Manual of Conchology. Structural and systematic. With illustrations of the species. Second series: Pulmonata*. Vol. XXII. *Achatinellidae*. Academy of Natural Sciences, Philadelphia. lviii + 428 p., 63 pls.

Published in parts as follows:

Part	Pages	Plates	Date of publication
85	1–64	1–12	21 November 1912
86	65–112	13–26	9 October 1913a
87	113–176	27–39	10 December 1913b
88	177–428, i–lviii	40–63	May 1914a

Pilsbry, H. A., and Cooke, C. M., Jr. 1914–1916. *Manual of Conchology. Structural and systematic. With illustrations of the species. Second series: Pulmonata*. Vol. XXIII. *Appendix to Amastridae, Tornatellinidae. Index, vols. XXI–XXIII*. Academy of Natural Sciences, Philadelphia. xi + 302 p., 55 pls.

Published in parts as follows:

Part	Pages	Plates	Date of publication
89	1–48	1–13	23 October 1914b
90	49–128	14–23	4 August 1915a
91	129–256	24–38	1 December 1915b
92	257–302, i–xi	39–55	February 1916

Pilsbry, H. A., Cook, C. M., and Neal, M. C. 1928. Land Snails from Hawaii, Christmas Island, and Samoa. *Bernice P. Bishop Museum Bulletin* **47**: 3–49.

Régnier, C., Bouchet, P., Hayes, K. A., Yeung, N. W., Christensen, C. C., Chung, D. J., Fontaine, B., and Cowie, R. H. 2015. Extinction in a hyperdiverse endemic Hawaiian land snail family and implications for the underestimation of invertebrate extinction. *Conservation Biology* **29**: 1715–1723.

Rueden, C. T.; Schindelin, J. and Hiner, M. C., DeZonia, B. E., Walter, A. E., Arena, E. T. and Eliceiri, K. W. 2017. ImageJ2: ImageJ for the next generation of scientific image data. *BMC Bioinformatics* **18**: 529.

Schileyko, A. A. 1998. Treatise on Recent terrestrial pulmonated molluscs. *Ruthenica Supplement* 2, Part 1: 3–127.

Solem, A. 1990. How many Hawaiian land snail species are left? And what we can do for them. *Bishop Museum Occasional Papers* **30**: 27–40.

Schuchert, C., and Buckman, S.S. 1905. The nomenclature of types in natural history. *Annals and Magazine of Natural History* 7th ser. **16**: 102–104.

Stankowski, S. 2011. Extreme, continuous variation in an island snail: local diversification and association of shell form with the current environment. *Biological Journal of the Linnean Society* **104**: 756–769.

Stone, C. P. 1985. Alien animals in Hawaii's native ecosystems: toward controlling the adverse effects of introduced vertebrates. In: Stone, C. P. and Scott M. K. (eds) *Hawaii's terrestrial ecosystems: preservation and management*. University of Hawaii Press, Honolulu: 251–297.

Sykes, E. 1900. Fauna Hawaiensis. Volume II, Part IV, Mollusca. p. 271–412.

USFWS (United States Fish and Wildlife Service) 1981. Endangered and threatened wildlife and plants; listing the Hawaiian (Oahu) tree snails of the genus *Achatinella* as endangered species.

Prepared by the U.S. Department of Interior, Fish and Wildlife Service. *Federal Register* **46**: 3178–3182.

USFWS (United States Fish and Wildlife Service) 1993. Recovery plan for the Oahu tree snails of the genus *Achatinella*. US Department of the Interior, US Fish and Wildlife Service, Portland, Oregon.

Welch, d'A. A. 1938. Distribution and variation of *Mustelina* Mighels in the Waianae Mountains, Oahu. *Bernice P. Bishop Museum Bulletin* **152**: 3–164, 13 pls.

Welch, d'A. A. 1942. Distribution and variation of the Hawaiian tree snail *Achatinella apexfulva* Dixon in the Koolau Range, Oahu. *Smithsonian Miscellaneous Collections* **103**: 236 p., 12 pls.

Welch, d'A. A. 1954. Distribution and variation of the Hawaiian tree snail *Achatinella bulimoides* Swainson on the leeward and northern slopes of the Koolau Range, Oahu. *Proceedings of the Academy of Natural Sciences, Philadelphia* **106**: 63–107, pls. 1–2.

Welch, d'A. A. 1958. Distribution and variation of the Hawaiian tree snail *Achatinella bulimoides* Swainson on the windward slope of the Koolau Range, Oahu. *Proceedings of the Academy of Natural Sciences, Philadelphia* **110**: 123–211, pls. 10–14.

Wood, W. 1828. Supplement to the Index Testaceologicus; or a catalogue of shells, British and foreign. W. Wood, London, iv. + [i] + 59 p., 8 pls.

Yeung, N. W., Chung, D., Sischo, D. R., and Hayes, K. A. 2015. Rediscovery of *Auriculella pulchra* Pease, 1868 (Gastropoda: Pulmonata: Achatinellidae). *Bishop Museum Occasional Papers* **116**: 49–51.

Yeung, N. W., Bustamente, K. M., Sischo, D. R., and Hayes, K. A. 2018. Rediscovery of *Newcombia canaliculata* (Baldwin, 1895) (Gastropoda: Achatinellidae) and *Laminella venusta* (Mighels, 1845) (Gastropoda: Amastridae). *Bishop Museum Occasional Papers* **123**: 31–36.

Yeung, N. W., Cowie, R. H., Hayes, K. A., and Strong, E. E. 2017. Type specimens of Hawaiian land snails in the Smithsonian Institution, National Museum of Natural History, with lectotype designations. *Smithsonian Contributions to Zoology* **647**: 1–34.

Yeung, N. W. and Hayes, K. A. 2018. Biodiversity and extinction of Hawaiian land snails: how many are left now and what must we do to conserve them—A Reply to Solem (1990). *Integrative and Comparative Biology* **58**: 1157–1169.

**Submitted:** 11 November 2019; **accepted:** 4 June 2020; **final revisions received:** 22 June 2020