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On the identity of several Queensland camaenids: a reappraisal of their type specimens, accuracy of type localities and their association with extant populations (Eupulmonata: Camaenidae: *Figuladra*).

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ABSTRACT

Species assigned to *Figuladra* Köhler & Bouchet, 2020 (Camaenidae) described prior to 1900 were originally diagnosed entirely on shell morphology, particularly colour and banding pattern. This historical reliance on such highly variable shell characters, together with type localities that were either very broad or sometimes completely erroneous, have created confusion about the correct application of their names to living populations of many *Figuladra* species. This is evident in both the 19th century and contemporary scientific literature. Species here investigated comprised *Helix incei* Pfeiffer, 1846; *Helix lessoni* Pfeiffer, 1846; *Helix curtisiana* Pfeiffer, 1864; *Helix* (*Camaena*) *praetermissi* Cox, 1868; *Helix* (*Camaena*) *aureedensis* Brazier, 1872; and *Helix* (*Camaena*) *challisi* Cox, 1873. This study resolved these historical inconsistencies through a re-examination of type materials as listed by Smith (1992) and their correlation with original descriptions and illustrations, a re-assessment of associated type localities and a consideration of historical events that may have contributed to past inaccuracies. In some cases, purported type specimens bore no resemblance to original descriptions and illustrations and in some instances type localities were completely erroneous or had subsequently been wrongly designated. As a consequence, a number of names have historically been wrongly applied to populations of snails. We provide a reappraisal of the type materials and reassessment of the accuracy of the type localities for the species under consideration.

□ *Eupulmonata, Camaenidae, Figuladra, type species, type localities, eastern Queensland.*

Figuladra Köhler & Bouchet, 2020 (type species. *Helix curtisiana* Pfeiffer, 1864) is a genus of large camaenid land snails that is particularly speciose in south-east Queensland and central Mackay coast. The genus was introduced by Iredale (1933) and later synonymised under *Varohadra* Iredale, 1933 by Iredale (1937) without reason. Smith (1992) synonymised the

genus under *Sphaerospira* Mörch, 1867 along with a number of other Iredalean genera citing Bishop's (1978) anatomical study of *S. fraseri* Griffith and Pidgeon, 1833 as the reason for this taxonomic decision. However, our investigations show that the Bishop study makes no mention of these genera and their possible synonymy. *Figuladra* was re-

elevated to generic status by Stanisic *et al.* (2010) citing differences in animal colour as a key differentiating feature; a red mantle in *Figuladra* species compared to a black mantle in *Sphaerospira* species. Stanisic (2010) included ten species and three subspecies in *Figuladra*. All the usages of *Figuladra* to this time (2010), were deemed to be *nomina nuda* by Köhler & Bouchet (2020) who re-diagnosed the taxon thus making it an available name.

Considerable confusion has surrounded the identity and origin of species, described prior to 1900, that have traditionally been included in this genus. This resulted from a reliance on a taxonomy based solely on shell colour and banding pattern which are known to vary extensively within species in this group of land snails. The confusion was compounded by the lack of accuracy and errors in assigned type localities. The species concerned are *Helix incei* Pfeiffer, 1846; *Helix lessoni* Pfeiffer, 1846; *Helix curtisiana* Pfeiffer, 1864; *Helix (Camaena) praetermissi* Cox, 1868; *Helix (Camaena) aureedensis* Brazier, 1872; and *Helix (Camaena) challisi* Cox, 1873. Smith (1992) made a number of taxonomic decisions concerning these species, and their synonyms, that were based on 'original descriptions and examination of type material'. In doing so he altered the existing taxonomy of Iredale (1937) to a major extent but without detailed explanation. Smith did not have access to a large and geographically extensive collection of contemporary material with which to compare type specimens and judge the accuracy of their type localities. Instead, he relied on dubious identifications of what was then a relatively small subset of local museum specimens for verification.

The Queensland Museum has a sizeable, well curated collection of described and putative *Figuladra* species accumulated over the last 40 years. The geographic coverage of the collection is extensive and shows species and their associated colour morphs appear to be fairly circumscribed in distribution. This has allowed for a thorough re-assessment of the validity of problematic type specimens and their type localities and the correct association of names with living populations. The results

of this study show that the decisions of Smith (1992) regarding these six species were flawed in a number of significant aspects. The study also shows that there are historical issues surrounding the type materials that Smith (1992) should have considered when assessing the veracity of types and their type localities. These uncertainties have had a profound and lasting influence on certain species concepts within *Figuladra* as is evidenced by incorrect identifications having been universally applied in museum collections.

Hence, the primary aim of this study was to ensure the correct association of these six species' names with extant populations through the reappraisal of type materials and type locality data. While this process may be more rightly considered an integral part of a more expansive revision of the genus, the detailed and sometimes painstaking resolution of these complex nomenclatural issues merits particular documentation.

ABBREVIATIONS

General. I, Island; MEQ, Mideastern Queensland; NP, National Park; SEQ, Southeastern Queensland; SF, State Forest.

Museums. AM, Australian Museum, Sydney; HMNT, Hancock Museum, Newcastle on Tyne, University of Newcastle, UK; MCZ, Harvard Museum of Comparative Zoology; NHMUK, British Museum of Natural History; QM, Queensland Museum, Brisbane; SAMA, South Australian Museum, Adelaide; ZMB, Museum für Naturkunde, Leibniz-Institut für Evolutions- und Biodiversitätsforschung, Germany.

MATERIAL AND METHODS

This study is based on type and putative type specimens held by the AM, HMNT, MCZ, NHMUK, SAMA and ZMB. Those in the AM and NHMUK were personally sighted by the authors while images of other specimens were provided by the relevant institutions. These specimens and images were assessed against their original descriptions, illustrations and

subsequent literature citations. Following this assessment, they were compared with specimens in the QM's large and comprehensive collection of *Figuladra* material.

The generic limits of some of the taxa under consideration in this paper are uncertain, so that when we compare extant populations to described taxa, we have elected to use their original combinations.

BACKGROUND

Species that were described in the nineteenth century and are now included in *Figuladra* Köhler & Bouchet, 2020 have a convoluted history. Early conchologists differed in their opinions as to the identities of these species, and these uncertainties persist to the present day (Reeve 1854; Cox 1868; Pilsbry 1890; Iredale 1937; Smith 1992; Stanisic *et al.* 2010). Many of these early species were collected on voyages of survey ships such as the H.M.S. *Fly* (Jukes 1847) and H.M.S. *Rattlesnake* (Macgillivray 1851) and due to the lack of detailed mapping of the Queensland coast at the time, localities were often listed as 'Australia' or 'Northern Australia'. Port Denison (Bowen) and 'Torres Strait' were often used for locations along the coastline north of Port Curtis (Gladstone). Many of these species, including those dealt with herein, were described from the private collections of Hugh Cuming, George French Angas and William Hargraves. The following account details some of the history surrounding their collections and their deposition in accredited institutions.

In the nineteenth century, Hugh Cuming (1791-1865) was an avid shell collector. Few contributed as much to the material advance of natural history as he did. Cuming's collection was more extensive than that of the British Museum who refused to purchase it when offered in 1846. Subsequently many duplicate specimens from Cuming's collection were sold at auction and some were acquired by other museums such as the ZMB. Finally in 1866, the trustees of the British Museum did purchase the collection, comprising 82,922 shells, for £6000 at the time when John Gray was the Keeper of

Zoology. Currently the British Museum houses several unregistered *Figuladra* specimens from Hugh Cuming's collection and there is considerable confusion surrounding some of the Cuming collection material and its provenance (pers. obs.). Dance (1980) cites the possible source of this confusion:

'There can be no doubt, however, that Gray's wife Maria did more to reduce the scientific value of the collection than anyone else. Shortly after its arrival in the museum she removed the eighty-three thousand specimens from the drawers lined with sheet wool on which Cuming had kept them and glued them on to wooden tablets, a standard practice then. But in the process she carried them drawer by drawer across an open courtyard and many labels were blown into wrong places and consequently gummed to the wrong tablets' (p. 501).

Hedley (1912) also commented on the British Museum's management of its conchological collection from his visit in that year, expressing shock that the museum exhibited their entire shell collection including types on public display and any conchologist working on the shells did so in a dimly lit hall in full view of the public. The specimens themselves were glued to wooden tablets and if they came loose over time, as the gum became brittle, were likely to be misplaced on their return.

George French Angas (1822-1886) was an English malacologist, painter and author. Angas is particularly well known for his shell collecting in South Australia and amassed an extensive private collection of shells. For some time, he worked in Sydney where he held an exhibition of his watercolours. In 1853, Angas was appointed to a position at the Australian Museum in Sydney, eventually becoming secretary and staying a total of seven years. During this period, he supervised the work of classifying and arranging the first public collection of Australian specimens, especially shells, which would have also given him access to the AM collections and collectors of the time

(Morgan 1966). His publications focus more on marine species and nudibranchs than land snails (for example, Adams & Angas 1864, Angas 1865, Adams & Angas 1865, Angas 1867, 1878). He made a donation of 298 shells to the AM (Bramley *et al.* 2008). Part of his private collection was sold in London in 1869. He presented many marine specimens (about 1500) including types to the Natural History Museum (London, UK), but his land snail collection was bequeathed to the HMNT in his native city of Newcastle on Tyne (Hedley 1913, Poppe & Poppe 1994). While Angas had visited Queensland, according to his journal articles on both marine and land shells, he had only collected as far north as Port Stephens, New South Wales (Iredale 1959).

William Hargraves (1838-1925) was the son of Edward Hargraves renowned for his discovery of gold near Bathurst in 1851. William Hargraves worked in the New South Wales State Government Equity Office but spent most of his spare time amassing a sizeable private shell collection which was sold to the Australian Museum, Sydney in 1877 for £800. In 1901, he became a trustee of the museum, a position he held until his death. Through collecting, purchase, exchange and personal persuasion this passionate conchologist stopped at nothing in pursuit of the next desirable specimen. Hargraves did not collect in northern Queensland and relied on others (e.g. ship captains) to collect for him on their journeys, paying them for their shells. As a result, the localities of some specimens could be considered less than trustworthy. John Stanisic (co-author) personally curated the Australian Museum's land snail collection in the late 1970s, and came to the general conclusion that the Hargraves material was consistently beset with problems concerning the provenance of specimens.

From the above historical accounts, an understanding of how and why confusion over the correct application of names for some species, to living populations may have arisen.

In the following investigation, six species described prior to 1900 were considered to

belong to *Figuladra*, the species were treated in chronological order of their descriptions. Species accounts feature a discussion of their history from time of collection to their description and deposition in reputable institutions including subsequent literature citations and illustrations. Every attempt has been made to clearly present evidence supporting the decisions made herein, primarily about type material and type localities. No attempt has been made to resolve the synonymies of taxa in Smith (1992) but major inconsistencies were discussed within the limits of this study.

NOMENCLATURAL MATTERS

Helix incei Pfeiffer, 1846 (Figs 1–6)

Helix incei Pfeiffer, 1846 was described in the *Proceedings of the Zoological Society of London* (Part 13) with a publication date of February, 1846 (Pfeiffer 1846a: 126). This was in the same year and month as Philippi (1846 ('1845')) published his book containing the description of taxa from many authors including Pfeiffer. Philippi and other nineteenth century authors such as Cox (1868) and Pilsbry (1890) attributed authorship of this species to Pfeiffer. Since that time, Iredale (1937), Smith (1992) and Stanisic *et al.* (2010) incorrectly listed Philippi as the author. The authorship is corrected herein.

Pfeiffer's description was based on a shell collected by Lieutenant Ince, RN and purchased by Hugh Cuming. This was explicitly stated in Philippi (1846). No illustration was given by Pfeiffer however, Philippi (1846: pl, 7, Figure 3) illustrated the species in his publication (Fig. 1A).

Pfeiffer's description was translated from the original Latin by Reeve (1854) and depicted the shell as:

'umbilicated, depressedly globose, rather solid, striated, white, beneath a light fulvous epidermis, encircled with narrow chestnut bands; spire raised, rather sharp; convex, 7 whorls, the last rather compressed around the umbilicus, which is middling and open; columellar arched; aperture very oblique,

lunar-oval; lip white, thin, slightly thickened inwardly, right margin a little expanded; basal margin reflected, columellar margin dilated into a triangular lamina which half conceals the umbilicus. Diameter 38 mm, height 28 mm' (p. 113). The locality is given as 'Northern Australia'.

Reeve (1854) stated that there were colour variations in the shell of this species and illustrated two forms, one banded and one darker where much of the shell is covered by a brown suffusion (Fig. 1B). Following comparison with contemporary material collected from the Percy Islands, Reeve's illustrations are considered a true representation of *Helix incei*.

Cox (1868) recognised Pfeiffer as the author of *H. incei* and recorded the species as occurring from Ipswich through to Port Curtis (Gladstone), MEQ. Cox commented that the shell was 'subject to considerable variation' and could vary with locality (1868: 55); understandably so, since this range now includes multiple species previously all recognised as *H. incei*. Cox (1868) illustrated two specimens, one of unknown origin (pl. 5, Figure 5), and another from Wide Bay (pl. 18, Figure 1) showing a dark lip dissimilar to *H. incei* figured in Philippi (1846) and Reeve (1854). Both images were referenced by Hedley (1888) under his listing of *H. incei*. The former Cox image is an indeterminate species and does not fit the original description of *H. incei*. The latter image was also recognised as an error by Tryon (1888:134) who correctly stated that this image was of the species *Helix (Hadra) bayensis* Brazier, 1875 now recognised as *Figuladra bayensis* from the Wide Bay area, SEQ.

Pilsbry (1890) portrayed *H. incei* as a light buff shell with spiral bands of chestnut with one wider band just under the suture. Pilsbry stated (1890), '*Helix incei* is found in every part of Queensland in the open forest country' (p. 166). This would suggest an early confusion with *Figuladra mattea* (Iredale, 1933) which is a spirally banded, widespread species living in open woodland, unlike *H. incei* which is found in vine thicket.

Iredale (1937) assigned *H. incei* to *Varohadra* Iredale, 1933. The type locality cited by Pfeiffer (1946a) was 'Northern Australia' and Iredale (1933), knowing that *H. incei* was collected by Lieutenant Ince on the voyage of the H.M.S. *Fly*, surmised the type locality to be Port Denison (Bowen). There is however, no record of this shell from the Port Denison in the log of the *Fly*. Later, Iredale (1937) observed that although this name had also been used for specimens found around Port Curtis, Macgillivray on the voyage of H.M.S. *Rattlesnake* had logged a specimen of *H. incei* collected from the largest of the Percy Islands (3 December, 1847). As a result, Iredale (1937) correctly restricted the type locality for *H. incei* to the Percy Islands noting:

'Though this specific name has been used for shells from Port Curtis, it had been collected by Ince, who did not visit that locality. I noted that Port Denison was a better locality, but Forbes, from the personal knowledge of Macgillivray, recorded "Percy Isles, Keppel Is., Port Molle". The figure shows an elevated shell, and specimens from the Keppel Isles and Port Molle are both depressed, so "Percy Isles" is here designated as type locality of *incei*' (Iredale 1937: 33).

Smith (1992) reclassified *Varohadra incei* as *Sphaerospira incei* but split the species into three subspecies: viz. *S. incei incei* (Pfeiffer, 1846), *S. incei lessoni* (Pfeiffer, 1846) and *S. incei curtisiana* (Pfeiffer, 1864). Smith's decision, as stated in the catalogue, was based on 'original descriptions and the examination of types' (p. 156). No other details were given. The distribution of *S. incei incei* was stated as ranging from Gympie to Mackay, Qld, with a list of questionable synonyms which Smith considered were mere colour morphs whose status was yet to be resolved.

More recently, Stanisic *et al.* (2010) followed the classification of Smith (1992) but reassigned the three subspecies to *Figuladra*. The accompanying illustrations of *Figuladra incei incei* (Pfeiffer, 1846) comprise a pale shell from Shoalwater Bay, MEQ, and a banded shell from the Yeppoon area, MEQ (Fig. 1C). However,

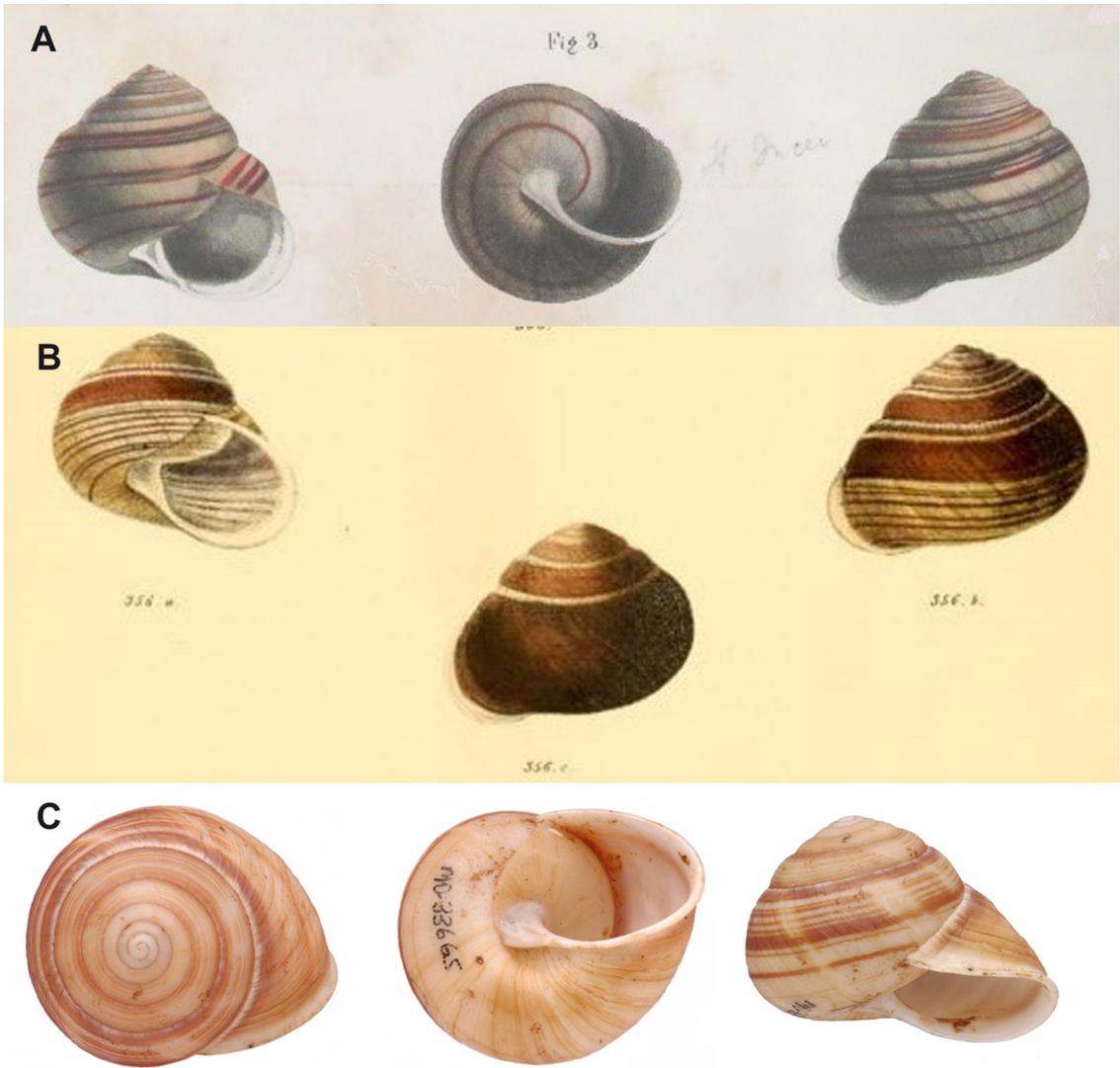


FIG. 1. **A**, *Helix incei* Pfeiffer, 1846: pl. 7, figure 3. **B**, *Helix incei* as illustrated by Reeve (1854) showing two forms. **C**, *Figuladra incei incei* illustrated erroneously in Stanisic *et al.* (2010), QMMO33665, Shoalwater Bay, MEQ). Image C: from Stanisic *et al.* (2010).

investigations into the true type locality of *Helix incei* (below) prove that the images from these localities are misidentifications and instead are images of an unidentified population from the Shoalwater Bay area resembling *Helix (Camaena) praetermissi* Cox, 1868 (uppermost image) and a banded morph of *Helix (Camaena) aureedensis* Brazier, 1872 from Yeppoon (lower

image) respectively (see below under these species).

Smith (1992) deferred to Iredale's (1937) designation of the Percy Isles as the type locality of *Helix incei* but cited a 'doubtful holotype' from the South Australian Museum (Fig. 2A). The specimen (SAMAD14513) is labelled as coming from Brisbane, SEQ with the rider '= Percy Is,?'

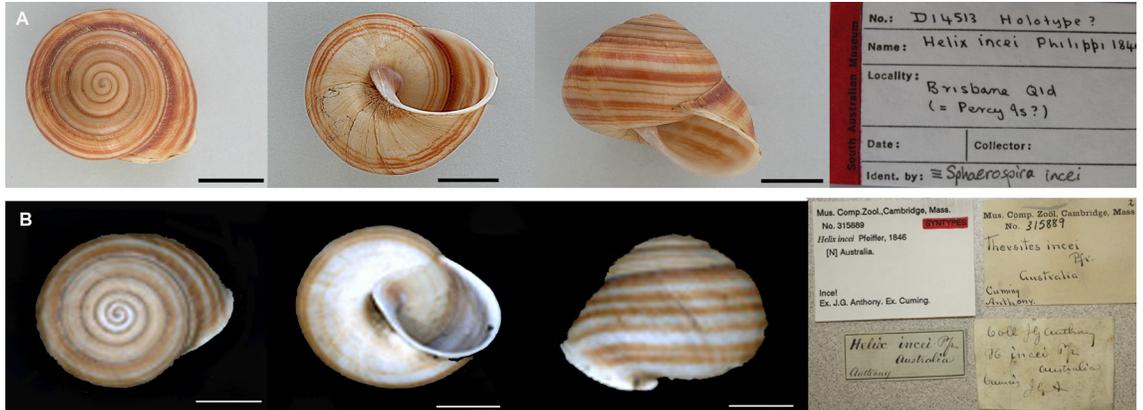


FIG. 2. Mis-identified species of *Figuladra mattea* (Iredale, 1933). **A**, labelled as ‘probable holotype’, *Helix incei*, SAMA D14513, Brisbane, SEQ. **B**, labelled as a syntype, *Helix incei*, MCZ315889, Northern Australia, ex J.G. Anthony. Scale bars: 10 mm. Images: A, SAMA; B, MCZ.

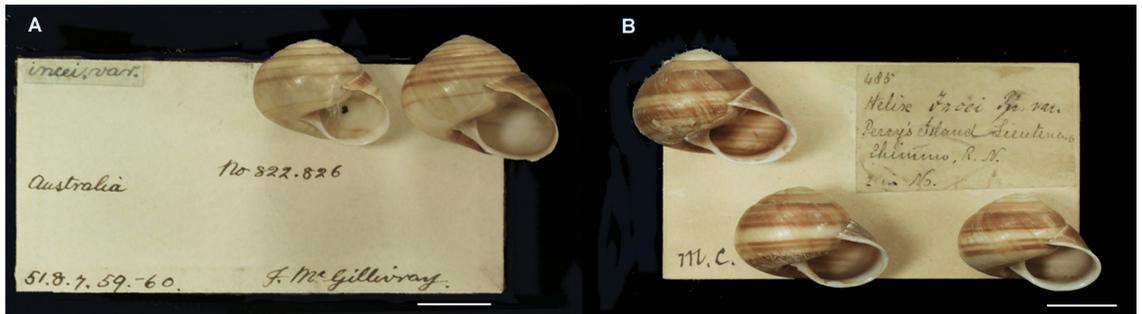


FIG. 3. **A**, NHMUK51.8.7.59 and NHMUK51.8.7.59, specimens collected on the voyage of the H.M.S *Rattlesnake* in 1847. **B**, three unregistered specimens from the Percy Islands, MEQ collected by Lieutenant Commander Chimmo R.N., from the Cuming collection (probably in Pfeiffer’s handwriting). Scale bars: 10 mm. Images: JS courtesy of NHMUK.

which appears to be a recent addition to the data label. This shell does not match the original description of the species nor Reeve’s images of the shell. Furthermore, no species resembling the SAMA specimen have been found on the Percy Islands. Following examination of the image of the SAMA specimen, we conclude that it is *Figuladra mattea* (Iredale, 1933) which occurs in the Brisbane area.

The MCZ also claims to have a syntype of *H. incei* (MCZ315889) assumed to have been collected by Commander Ince and donated by American collector, John G. Anthony ex. Hugh Cuming collection. The specimen is recorded

as coming from ‘Northern Australia’ (Fig. 2B). This specimen is very similar to the SAMA specimen and we also consider it to be *Figuladra mattea*.

Absent from the NMHUK is designated type material of *H. incei* (J. Ablett, pers. com.) remarkable, considering the material collected on the Fly expedition should have been lodged at that institution. Personal inspection revealed however, that a number of specimen lots labelled *H. incei* exist in the general collection. These comprise of two specimens collected by John Macgillivray on the Voyage of the *Rattlesnake* in 1847 (from Northern Australia) and three



FIG. 4. *Helix incei* Pfeiffer, 1846. NHMUK20200001 from the Cuming collection collected by Lieutenant Ince in the Percy Islands, MEQ. Scale bar: 10 mm. Image: NHMUK.

specimens from the Percy Islands collected by Lieutenant Commander Chimmo RN (Figs 3A, B). Chimmo was captain of the steamer H.M.S *Torch*, that sailed to the Percy Islands to retrieve the bodies of Frederick Strange and his companions following their murder during the voyage of the ketch *Vision* (Moreton Bay Courier, Chimmo RN 1855).

The most noteworthy of the NHMUK specimens, in the general collection, is one labelled 'collected by Commander Ince' on the Voyage of the H.M.S. *Fly*. In February, 1843, when the H.M.S. *Fly* was anchored at 'Port Denison' and the coastline was explored as far south as Broadsound and Shoalwater Bay, Ince was sent to the Percy Islands to find water (Jukes 1847: 32). The provenance of this specimen would suggest that this was one of

the original shells from Cuming's collection used by Pfeiffer for his description. Given the associated locality of 'Northern Australia' (cited by Pfeiffer), we consider this specimen (recently registered as NHMUK20200001) to be part of the original type series that Pfeiffer studied and, in the absence of any other type material, it should be designated as the lectotype of *H. incei* as per the ICZN (2012) (see Fig. 4).

There are three additional unregistered lots purportedly of *H. incei* from the collection of Hugh Cuming in the NHMUK (Fig. 5). However, personal inspection of these specimens revealed they belong to three possibly unrelated species.

An inspection of the Percy Islands camaenids in the collections of both QM and AM reveal specimens matching Pfeiffer's (1846a) original description and both forms depicted in



FIG. 5. NHMUK specimens identified as *Helix incei* Pfeiffer, 1846 but not this species. **A**, *Bentosites coxi* (Crosse, 1866) from the Whitsunday area, MEQ; **B**, *Figuladra mattea* (Iredale, 1933); **C**, *Helix* (*Camaena*) *aureedensis* Brazier, 1872. Scale bars: 10 mm. Images: J. Ablett, NHMUK.



FIG. 6. *Figuladra incei incei* (Pfeiffer, 1846). **A**, AMSC132840, South Percy I, MEQ. **B**, QMMO19146, Pine Islet, MEQ. Scale bars: 10 mm. Image A: JS courtesy of QM; Image B: John Stanisic.

Reeve's (1854) illustration with the dark, broad subsutural band and a brown suffusion on the latter part of the body whorl (Figs 6A, B). Specimens collected more recently on South Percy I by Catherine Radclyffe (March, 2020) also correspond to the illustrations provided by Philippi (1846) and Reeve (1854). Furthermore, the QM collections illustrate that similar shell colour morphs occur only in the Percy Island snails and may be indicative of an isolated population or restricted species. The only other camaenid occurring on the islands appears to be the widespread *Xanthonelon pachystylum* (Pfeiffer, 1845).

We consider therefore, that the name *Helix incei* Pfeiffer, 1846 should apply only to the populations on the Percy Islands, until such time as additional research proves otherwise.

***Helix lessoni* Pfeiffer, 1846**
(Figs 7-9)

Pfeiffer (1846b: 71) described *Helix lessoni* as:

'a shell with covered umbilicus, globular, minutely striated, solid, chestnut, paler base; spire turbinate, obtuse, six whorls, slightly convex, last inflated, deflected in front; aperture lunar-rounded, lilac within; lip expanded throughout, white, columellar margin broadly dilated, thickened, white, partly covering umbilicus. D = 35 mm, H = 25 mm. Pfeiffer (1846b) provided 'Australia' as the type locality for *Helix lessoni*.'

Reeve (1854: species 754) translated Pfeiffer's description from Latin but omitted the detail of the paler base (Fig. 7A). This single omission has ramifications for the ultimate identity of this species as the taxonomic decisions of Cox (1868) and Iredale (1937) were based on an understanding that the species had a solid chestnut shell with a dark base. In contrast, Smith (1992) cited purported syntypes of the species that comprised a series of yellowish shells (see below).

Cox (1868) described and illustrated a blackish-chestnut 'variable shell usually to be recognised at once among its allies by its

comparatively small size' (p. 55). However, in his description he stated, 'apex sometimes spirally lined, base convex frequently showing traces of spiral lines and bands especially within the mouth'. His description of *H. lessoni* does not conform entirely with that of Pfeiffer's (1846b) original description in that the banding element in the spire and umbilicus were additions. These additional characters suggest that Cox's shell was most likely an undescribed species found in the Mt Larcom area which is west of Port Curtis. Cox also named the type locality of *H. lessoni* as Port Curtis, stating that this species could be found from Miriam Vale to Port Curtis. This is consistent with the known range of the species.

Pilsbry (1890) agreed with Cox's description also referring to 'the spire yellowish or lighter brown, often showing spiral brown lines' and the spiral bandings inside the base. The shells he described and figured (pl. 33, figs 61-63) (Fig. 7B) agree with what was universally recognised as *H. lessoni* at the time. Pilsbry commented that Pfeiffer's (1846b) description indicated a smaller form, differing somewhat in colouration and Pilsbry (1890) figured what he said were Pfeiffer's representations on pl. 35, figs 14, 15 (Fig. 7C). Pilsbry also nominated Port Curtis as the type locality for *Helix lessoni*.

Hedley and Musson (1892) considered the species to be a variant *viz.* *H. incei* var. *lessoni* and indicated that he (Musson) had also collected shells of *H. lessoni* on Facing I, Boyne I and in Rockhampton. Hedley and Musson (1892) however, did not mention other species considered to extend the Port Curtis area (e.g. *Helix curtisiana* Pfeiffer, 1864).

Iredale (1933) realised that *H. incei*, *H. lessoni* and *H. curtisiana* were often mistaken for one another. He also commented that *H. lessoni* and *H. curtisiana* could possibly be the same species, with *H. lessoni* being the 'anterior' name (senior synonym). Iredale recognised that *H. lessoni* appeared to be the common shell at Port Curtis and also occurred on Boyne Island. However, he included no further discussion or conclusions. Iredale noted similar confusion with *Helix (Camaena) aureedensis* Brazier, 1872,

stating that ‘the mainland shell recently known as *aureedensis*’ is a relative of ‘*lessoni*’ but is more elevated, darker coloured, with a broad, pale, circum-umbilical patch’ (Iredale, 1933, p. 45). Subsequently, Iredale (1933) assigned *Helix lessoni* to a new genus *Varohadra*. Iredale (1937) decided that *H. lessoni* may have come from the islands north of Port Curtis and restricted the type locality of *Helix lessoni* to the Percy Islands assuming that the shell might have been collected on the Voyage of the H.M.S. *Fly*.

Smith (1992) reclassified *Varohadra lessoni* as *Sphaerospira incei lessoni* (Pfeiffer, 1846). Smith’s decision as stated in the catalogue was based on ‘original descriptions and the examination of types’. No other details were given. The distribution of *S. incei lessoni* was given as ‘Queensland’ with two questionable synonyms, discussed below. Smith also deferred to Iredale’s (1937) incorrect assertion that the Percy Isles were the type locality of this taxon.

Stanisic *et al.* (2010) followed Smith (1992) in regarding *H. lessoni* as a subspecies of *H. incei* which they placed in *Figuladra*. The accompanying illustration of *Figuladra incei lessoni* featured a shell from Yeppoon, MEQ, with a dark spire and pale yellow base. While this specimen was then considered to represent *H. lessoni* in QM and AM collections, investigations show that it is in fact the dark morph of *Helix (Camaena) aureedensis* Brazier, 1872 from the greater Yeppoon area, MEQ (Fig. 7D) (see discussion under that species below).

A holotype of *H. lessoni* was not nominated by Pfeiffer although Philippi mentions the repository as being the British Museum. Smith (1992) cited specimens (NHMUK1844.12.6.70-71, NHMUK1859.3.11.3) as syntypes but wrongly indicated four specimens when the registration details indicate that only three are represented. These three specimens were borrowed in the early 1990s by JS for an intended taxonomic study of large Queensland camaenids. Consequently, one of the putative syntypes was labelled as the lectotype (NHMUK1844.12.6.70) and the remaining two as paralectotypes (NHMUK1844.12.6.71, NHMUK1859.3.11.30) of *H. lessoni*, prior to the material being returned

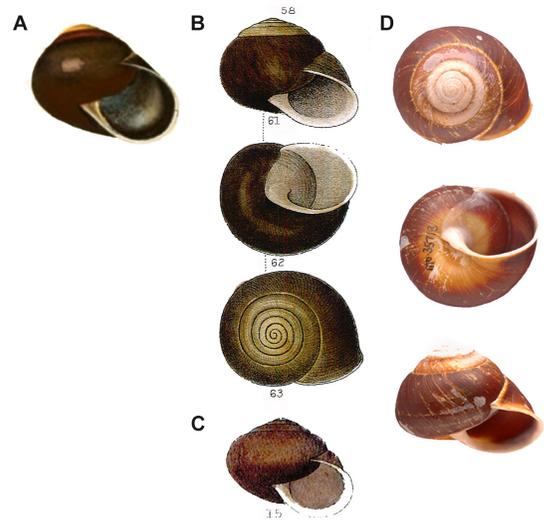


FIG. 7. *Helix lessoni* Pfeiffer, 1846. **A**, as illustrated by Reeve (1854). **B**, as illustrated in Pilsbry (1890 pl. 33, figs 61-63) showing fine banding on the protoconch and in the umbilicus. **C**, as represented by Pfeiffer (1846) but illustrated by Pilsbry (1890, pl. 35, figs 13-15). **D**, as erroneously illustrated in Stanisic *et al.* (2010), QMMO35713, Yeppoon, MEQ. Image D: from Stanisic *et al.* (2010).

to NHMUK. The subsequent designations by JS, were based solely on Smith’s citation of specimens as syntypes of *H. lessoni*. In hindsight, reference to Pfeiffer’s original description would have flagged an error in identification of these specimens as *H. lessoni*. The three supposed syntypes all have a yellowish to light brown spire with a yellowish base unlike Pfeiffer’s description of a blackish, chestnut-coloured shell with a paler base (Figs 8A–C).

A note by Fred Naggs (scientific associate of the NHMUK) in December 1985, is attached to this series of shells and states, ‘there are apparently 2 lots mixed here but both could have been seen by Pfeiffer, originally 5 specimens’. This note might have strengthened Smith’s belief that these specimens were part of the original type series but the contents of the note also introduce an element of doubt as to their status. Given the shell specimens lack records on type status, provenance (how they came to the



FIG. 8. Putative syntype specimens of *Helix lessoni* Pfeiffer, 1846 erroneously cited by Smith (1992). A, lectotype NHMUK1844.12.6.70. (*H. aureedensis*). B, paralectotype, NHMUK1844.12.6.71. C, paralectotype, NHMUK1859.3.11.30. Scale bars: 10 mm. Images: J. Ablett, NHMUK.

collection) nor match the original descriptions, we do not consider them part of the original type series. These shells, labelled from 'Australia', were from the collection of the Earl of Derby, the then President of the Linnaean Society (1828-1833) a noted naturalist and collector (Figs 8B, C). Accompanying labels indicate that some of these shells were acquired from John Macgillivray whose extensive log of travels did not mention finding *H. lessoni* in his journal listing of species collected on his expeditions. A thorough inspection of the NHMUK collections, that were cited as the repository of Pfeiffer's original specimens (Pfeiffer, 1846b), did not locate any putative type material of *H. lessoni*. This was in spite of the fact that Reeve's (1854) reference to *H. lessoni* was based on a specimen from the Cuming collection that was acquired by the NHMUK.

Pfeiffer's personal collection was housed in the Stettin Museum, Poland, which was destroyed in World War II. However, prior to the war, specimens had been exchanged with the ZMB.

The ZMB has two shells from the type series of *H. lessoni* (ZMB Moll. 65914) originating from Pfeiffer's own collection (Fig. 9). These specimens are labelled cotypes and align with Pfeiffer's original description and Reeve's photograph of a dark shell with a white lip, dark aperture and a paler base. Furthermore, a close inspection shows evidence of the apical banding mentioned by Cox (1868) and Pilsbry (1890). As these ZMB specimens are considered part of the type series, we consider these specimens to be part of the original type series Pfeiffer studied, and in the absence of any other type material, these specimens should be designated as the lectotype and paralectotype of *H. lessoni* as per the ICZN (2012).

QM and AM collections do not contain any shells from the Percy Islands resembling *H. lessoni*. These islands are the type locality of *Helix incei* which is known to have dark colour morphs. However, these dark morphs differ from *H. lessoni* in having bands, including a broad subsutural band, visible below a darker

suffusion. We consider that Iredale's (1933) insinuation of Port Curtis as a possible type locality of *H. lessoni* (also cited by Cox and Pilsbry) is correct and that this name should be applied to extant populations in the Port Curtis area.

***Helix curtisiana* Pfeiffer, 1864**

(Figs 10–12)

Pfeiffer (1864: 528) described *H. curtisiana* from the George French Angas collection without illustration. He described (translated from the original Latin):

'a conoidly-semi-globose shell with a narrow umbilicus, striated, and a solid chestnut colour; the spire with a conoidly-convex lighter apex and a suture with a white thread; 6 whorls, slowly increasing with the last large, convex, somewhat angular above the middle. The shell is flattish at the base, descending in front with an aperture nearly diagonal and roundly-lunate with the peristome scarcely thickened. The narrowly expanded columellar margin is triangularly dilated above. Narrow umbilicus. Diameter = 29 mm, Height = 17 mm. The type locality was cited as Port Curtis.'

In his monograph on Australian land snails, Cox (1868: pl. 20, figs. 9 and 9a) illustrated *H. curtisiana* from a painting of the type by George French Angas (Iredale 1937:32) (see Fig. 10A). When Cox was preparing this monograph, he asked Angas to examine some species in the British Museum. There are no corresponding *H. curtisiana* specimens from the Angas collection in the collections of the British Museum. NHMUK's camaenid collection contains only eight lots of *Helix curtisiana* specimens and none from Angas's collection. The only Angas specimen of this species resides in the HMNT where Angas's collection of Australian land snails, including many types, was donated after his death.

Angas prepared coloured paintings which Cox included in two additional plates. This explains an anomaly, as Cox stated on the title page 'eighteen plates', whereas there are



FIG. 9. *Helix lessoni* from Pfeiffer's collection (ZMB Moll. 65914). Note the striated, chestnut shell with dark umbilical patch and dark aperture. Scale bars: 10 mm. Images: ZMB.

twenty in the monograph (Iredale 1959). It can be surmised that Angas painted the shell depicted on plate 20 from one in his personal collection as indicated by Pfeiffer (1864).

Pilsbry (1890) synonymised *Helix bala* Brazier, 1878 (a similar looking shell from Magnetic Island, north Queensland) with *Helix curtisiana*, though we consider this to be an error. Pilsbry's illustrations of the latter (pl. 47, figs 90-91) resembled the species as it was shown by Cox (1868).

Iredale (1933: 45) deemed it likely that *Helix curtisiana* and *H. lessoni* were identical, with *H. curtisiana* being the junior synonym. However, he did not formally synonymise the two species



FIG. 10. *Helix curtisiana* Pfeiffer, 1864. **A**, as illustrated by Cox (1868) from a drawing by Angas. **B**, as illustrated by Stanisic *et al.* (2010), QMMO72398, Tannum Sands, SEQ.



FIG. 11. *Varohadra curtisiana exedra* Iredale, 1937. AMSC100672, holotype, Boyne I., SEQ. Scale bars: 10 mm. Image: AM.

at that time, nor did he in his faunal checklist (Iredale 1937).

Iredale (1933) reclassified *Helix curtisiana* as *Varohadra curtisiana* and at the same time, described a subspecies *Varohadra curtisiana exedra* with type locality of Boyne Island, Port Curtis (Fig. 11). The holotype of *V. curtisiana exedra* in the AM (AMSC100672) does have an indistinct supra-peripheral band and paler base similar to that of *H. curtisiana* figured by

Cox (1868) and Pilsbry (1890). This subspecies was considered to be a synonym of *H. curtisiana* by Smith (1992).

Smith (1992) reclassified *Varohadra curtisiana* as *Sphaerospira incei curtisiana* (Pfeiffer, 1864). Smith's decision as stated in the catalogue was based on 'original descriptions and the examination of types'. No other details were given. He gave the distribution of *S. incei curtisiana*

as Queensland and listed three synonyms, including Iredale's (1933) *V. curtisiana exedra*.

Stanisic *et al.* (2010) followed the subspecific classification of Smith (1992) but reassigned the subspecies to *Figuladra*. The accompanying illustration of *Figuladra incei curtisiana* featured a shell from the type locality area of Port Curtis (Fig. 10B).

Smith (1992) cited a 'probable holotype' of *H. curtisiana* from the HMNT but with no registration number. This specimen, now labelled by this museum as 'NEWHM:HANM.1.3531', is a worn specimen with a brown to light brown shell and vague brown spiral bands and is purportedly from Port Curtis, coming from the Angas collection (Fig. 12A). More than 100 years ago, Hedley (1913) reported that he had visited the HMNT and examined the types of Australian land snails from Angas' collection residing there and itemised the 40 specimens in a list, all of which were marked 'type'. *Helix curtisiana* was one such type listed (Hedley 1913: 260).

The HMNT specimen matches images in Cox (1868) and Pilsbry (1890), though has a lighter umbilicus that Pfeiffer did not mention in his description, referring instead to a solid chestnut shell. This specimen also agrees with specimens of *H. curtisiana* from Boyne Island in the QM collections (Fig. 12 B).

While the type locality of *H. curtisiana* was cited as Port Curtis, additional details on a more specific collection site are not available. Macgillivray (1851), during the voyage of the H.M.S. *Rattlesnake*, described Port Curtis as a 10-mile strip of land between Facing Island and Curtis Island to the north. Despite a three-week survey during this section of the voyage in 1847, this land snail was not found by Macgillivray. This area is now the site of Gladstone and much of the original habitat has been destroyed. Round Hill is also a site mentioned in early collections, but Gladstone city now subsumes this hill. Remnant vine thickets on Boyne Island and nearby Tannum Sands are one of the few areas remaining where this species is still present. There are specimens in the QM and AM that we consider to be



FIG. 12. **A**, Confirmed holotype of *Helix curtisiana* Pfeiffer, 1864, Hancock Museum, NEWHM:HANM.1.3531. **B**, *Figuladra curtisiana* (Pfeiffer, 1864), QMMO78028, Boyne I, SEQ. Scale bars: 10 mm. Image A: <https://gbmolluscatypes.ac.uk/specimens/534>, Creative Commons Attribution-Non Commercial-Share Alike 4.0 International License; Image B: JS courtesy of QM.

H. curtisiana, recorded from both Facing and Curtis Islands and on Rodd's Peninsula where the species is found with and without banding on the early whorls. Iredale (1937) nominated Mt Larcom as the type locality of *H. curtisiana*. This designation is considered an error as this location is home to Camaenid SQ19, a putative sister species which has a dark morph resembling *H. curtisiana*. In order to avoid further confusion, a restricted type locality of Boyne Island, SEQ, where shells closely matching the one in Angas' collection can be found, is herein proposed.

The single HMNT specimen is herein confirmed as the holotype of *Helix curtisiana* as evidence exists that this shell is from the Angas collection and is the one that was described by Pfeiffer (1864).

The shells of *H. curtisiana* and *H. lessoni* share similar descriptions and historically, both have been associated with the Port Curtis locality by early conchologists. Collections of shells at both the QM and AM illustrate that it is highly unlikely that there are two species in the Port Curtis area. This raises the possibility that *Helix lessoni* and *Helix curtisiana* are synonymous. This issue will be resolved in a forthcoming revision of the *Figuladra* clade.



FIG. 13. Cox's (1868: pl. 20, Figure 13) illustration of *Helix (Camaena) praetermissi*.

***Helix (Camaena) praetermissi* Cox, 1868**
(Figs 13, 14)

Cox (1868) introduced *Helix (Camaena) praetermissi* in the additional appendices to his monograph (Cox 1868:111). He described the shell as:

'deeply, openly and rather narrowly umbilicated, globose, solid, closely and finely striated, glossy, uniformly of a pale brownish-yellowish colour, obscurely banded with fine pale chestnut lines; spire obtusely conical; convex, 7 whorls, the last inflated and deflected in front; base rounded; aperture roundly-lunate, pure white within; peristome white, thickened and slightly reflected, margins approximating, joined by a thin callus, columellar margin shortly dilated at the base $\frac{1}{2}$ covering the umbilicus. Diameter 1.13- 1.2 inches; height 1.08 inch' (Fig. 13).

Cox noted that this specimen was collected during the voyage of the H.M.S *Rattlesnake* by Macgillivray who was engaged to help prepare his monograph (Calaby 1967). The type locality of this species was given as Cape Direction in northern Queensland which was considered an error by Hedley (1888). The H.M.S. *Rattlesnake* did anchor at Cape Direction in August 1847, but also anchored at Great Keppel I in December of the same year. Macgillivray, who is recorded as being the first European to set foot on the Keppel islands, landing near Leeke's Creek, Great Keppel I., detailed the visit in his log (Macgillivray 1851: 64). Cox's description (1868: 111) referred to the 'late Mr Macgillivray' who had died of a heart attack during his employment with Cox. At the time, Cox considered the species closely allied to *H. incei* and *H. curtisiana*, though unique.

Iredale (1937) reassigned *H. praetermissi* to *Varohadra* but he also questioned the type locality as doubtful. Given MacGillivray's death during his work with Cox, it is possible that a locality error could have been made by Cox during this period.

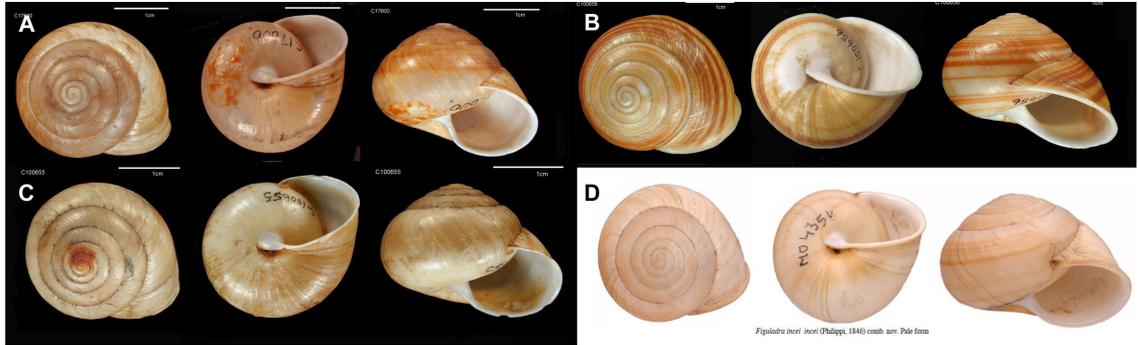


FIG. 14. **A**, *Helix (Camaena) praetermissi* Cox, 1868, AMSC17600, holotype. **B**, *Varohadra keppelensis* Iredale, 1937, AMSC100656, holotype. **C**, *Varohadra keppelensis degener* Iredale, 1937, AMSC100672, holotype. **D**, *Varohadra keppelensis* as erroneously illustrated as *Figuladra incei incei* in Stanistic *et al.* (2010: Species 753, QMMO4358, Keppel Islands, MEQ). Scale bars: 10 mm. Images: A-C, AM; D from Stanistic *et al.* (2010).

Iredale (1937) described *Varohadra keppelensis* Iredale, 1937 from the Keppel Islands, with a brief description separating it from *H. incei* and *H. challisi*. Iredale noted that shells of *V. keppelensis* were large and solid on North Keppel I, and smaller, thinner and less elevated on South Keppel I (Great Keppel I) and some had more 'lines' (bands) than others. He described the snail from South Keppel I as a subspecies, *V. keppelensis degener* Iredale, 1937.

Smith (1992) synonymised *H. praetermissi*, *V. keppelensis* and *V. keppelensis degener* under *Sphaerospira incei incei* (Pfeiffer, 1846) with the comment that this was done after examination of the types but with the status of the morphs remaining unresolved. Our examination of these types and comparison with Cox's (1868) description and illustration of *H. praetermissi* indicates that it is a senior synonym of *V. keppelensis* and *V. keppelensis degener* (Figs 14 A-C) but is not conspecific with *H. incei* which is found in the Percy Island group. Stanistic *et al.* (2010) followed Smith's classification.

The holotype of *Helix (Camaena) praetermissi* (AMSC17600) is in the collections of the AM. Based on comparative material in the AM and QM, we consider that *Helix (Camaena) praetermissi* should only apply to populations on the Keppel Islands pending the outcome of future studies. In light of the fact that Macgillivray only recorded a shell of this description from Great Keppel

Island, we consider that these islands represent a more suitable type locality.

***Helix (Camaena) aureedensis* Brazier, 1872**
(Figs 15, 16)

Brazier (1872) described *Helix (Camaena) aureedensis* from the Hargraves collection as coming from Aureed Island in the Torres Strait. The shell was depicted as:

'umbilicated, depressedly globose, rather solid, very finely obliquely striated, and, under the lens finely granulated, dark chestnut; suture ornamented with a fine white thread, and also a broad dirty white undefined zone round the umbilicus; spire broadly conoid, obtuse; whorls 6 to 6 1/2, convex, the five upper whorls of a reddish chestnut, the last increasing in size, rounded and deflected in front; base convex; aperture diagonally ovately lunate, brownish white within; peristome straight, ivory-white, slightly thickened and reflected; margins approximating, right margin expanded, columellar margin arcuate and reflexed, concealing nearly half of the umbilicus, which is deep' (p. 640).

Personal inspection confirms the holotype shell (AMSC17604) fits with Brazier's description (Fig. 15).

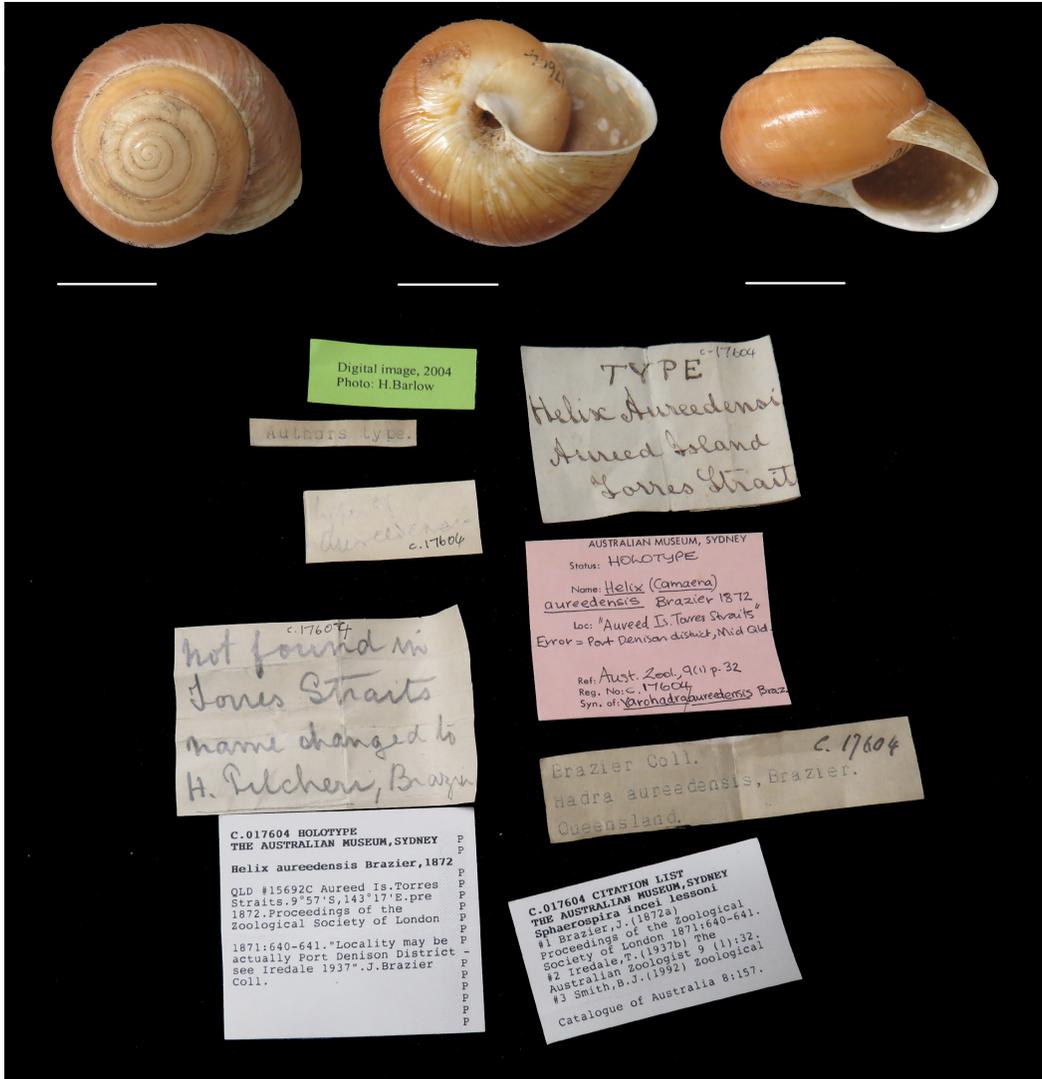


FIG. 15. *Helix (Camaena) aureedensis* Brazier, 1872, AMSC017604, holotype. Scale bars: 10 mm. Image: JS courtesy of AM.

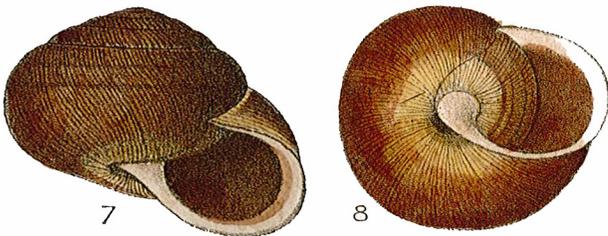


FIG. 16. *Helix (Camaena) aureedensis* Brazier, 1872 as illustrated in Pilsbry (1893, pl. 54, figs 7, 8).

Brazier commented that he had seen similar shells in some of the Australian collections labelled as a variety of *H. incei*, but with no white thread-like line at the suture as in the present species. The fine white sutural thread and yellow circum-umbilical patch are important features of the shell morphology of this species.

Hedley (1888: 102) first questioned the type locality of Aureed Island, saying that Brazier himself had admitted that this could have been the localities around Port Denison. As stated in the 'Background' section, land snails from the Hargraves collection are notorious for inaccuracies in their locality data.

Pilsbry's (1893, pl. 54, figs 7-8) illustration of *Helix (Camaena) aureedensis* also highlighted the yellow circum-umbilical patch that is characteristic of this species (Fig. 16). This shell character is absent in *Helix lessoni*.

Iredale (1937) realised that no species resembling Brazier's description were to be found in the Torres Strait and termed the designation of the type locality as Aureed Island an error, nominating the type locality as the Port Denison district, consistent with Hedley's comment. Port Denison is currently recognised as a small area around Bowen, MEQ, but historically included areas further southward to north of Rockhampton, SEQ. QM and AM collections show that neither this species, nor any other species in the *Figuladra* clade, occurs north of the O'Connell River, south of Proserpine, MEQ.

Smith (1992) included *H. aureedensis* as a synonym of *Sphaerospira incei lessoni* (Pfeiffer, 1846) along with *Varohadra bernhardi* Iredale, 1933 which has been considered a junior synonym of the former. This erroneous classification was followed by Stanistic *et al.* (2010).

Shells aligning with Brazier's description of *H. aureedensis* (including those possessing a fine white sutural thread and yellow circum-umbilical patch) in the QM and AM collections occur in MEQ in the limestone outcrops of Mt Etna NP and along the coast from Emu Park to Yeppoon and north to Sandy Point. Lighter banded forms of the species (= *Helix (Hadra) yeppoonensis* Beddome, 1897) are

especially prevalent in the coastal vine thickets in this area. Consequently, these names should only be applied to populations in the greater Yeppoon area and a more suitable type locality nominated as Johannsen's Caves, Mt Etna NP, MEQ where both the dark morph with yellow circum-umbilical patch and the lighter banded morph occur in great abundance.

***Helix (Camaena) challisi* Cox, 1873**
(Figs 17–19)

Cox (1873: 565, pl. 48, Figure 3) described and illustrated *Helix (Camaena) challisi* using specimens from the Hargraves collection occurring on L Island (Fig. 17).

Establishing the probable type localities of species described over 100 years ago has proven difficult with name changes and recording of locations in Queensland as 'Northern Australia', often including the Great Barrier Reef environs as part of Torres Strait. When Cox described *Helix challisi* in 1873, he referred to the type locality as L Island, Torres Strait. Hedley (1888: 102) noted the location as incorrect and said that it should be 'in the neighbourhood of Broadsound, 20° 52' S, 149° 37' E'. However, these coordinates are not those of the Broadsound area in MEQ, but rather those of the Scawfell Islands in the South Cumberland island group, MEQ. Iredale (1937) noted that L Island, Torres Strait, did not exist and was an error and considered L Island to be Long Island, Broadsound, SEQ. Once again it would seem that the errant locality data often associated with the Hargraves collection of land snails has been the source of this unintended confusion.

Naming a principal island, or groups of islands, on a map using an alphabetic notation was a custom used by Royal Naval hydrographers of the nineteenth century. Further research revealed 'L Island' as being named by Matthew Flinders in 1802. In his diary of the journey Flinders (1802) wrote:

'Friday 15 October, 1802. At eleven we rounded their west end; and at noon were in latitude 20° 38' 58", and from the bearing of the Cumberland Isle *k*, in longitude 150° 01' east. We were now obliged to steer west-

ward again, having reefs at the distance of two miles, from N. E. by E., to N. W. by W.; and seeing that they extended onward, and the breeze was fresh, I hauled up for the Cumberland Island marked *l*, the largest yet seen, with the intention of anchoring there for the night. The tide carried us too far to leeward, but we fetched a lesser island, *l2*, seven miles to the north; and came to, in 17 fathoms grey sand, one mile from a beach on its north-west side, and half a mile from the reef which surrounds the island.'

Flinders noted in the voyage log that *l* islands were the 'S.E. most of the Cumberland Isles as laid down by Captain Cook' (Flinders 1802-1803).

Given the latitudes and longitudes of the time and description of the islands, we submit that Keswick Island is L Island and Brampton Island (7 km north of Keswick Island), is L2 Island. L Island was visited by H.M.S. *Fly*, and altitude data collected by Mr. Evans, the Master of the *Fly* (Jukes, 1842-1846), indicate that he logged L Island in the southern Cumberland Islands.



FIG. 17. Cox's (1873: pl.48, Figure 3) illustration of *Helix (Camaena) challisi*.

Based on the evidence presented above, the type locality of *H. challisi* is herein restricted to Keswick I in the South Cumberland island group.

There has been significant, long-term confusion surrounding the identities of *Figuladra challisi* (Cox, 1873) and *Figuladra mattea* (Iredale, 1933) and mixed groupings exist in both the AM and QM collections. Smith (1992) considered these taxa to represent the same species in *Sphaerospira*. Stanisic *et al.* (2010) followed Iredale (1937) and treated them as separate

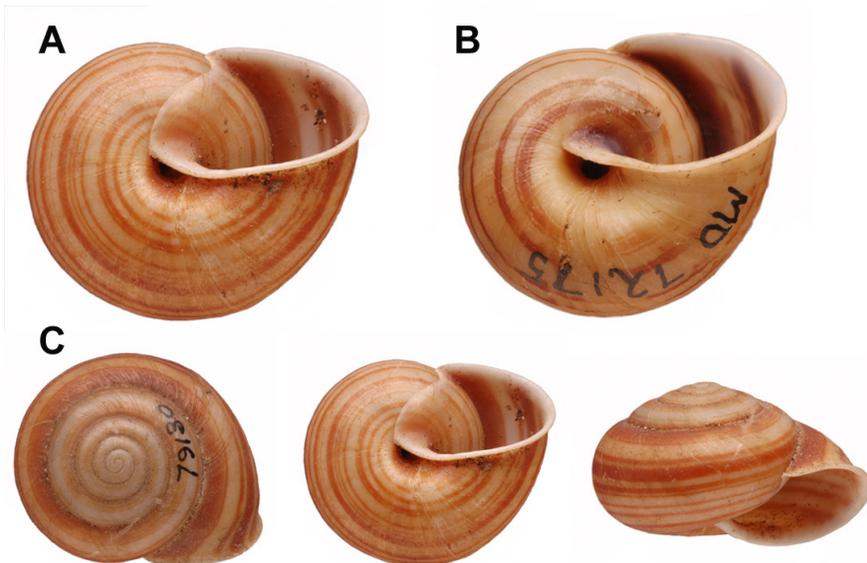


FIG. 18. A-B. Comparison of umbilical areas. **A**, *Figuladra challisi*, AMSC 79130, Keswick I, MEQ; **B**, *F. mattea*, QMMO72175, Bracewell, SEQ. **C**, *Figuladra challisi* illustrated in Stanisic *et al.* (2010: species 758, AMSC79130, Keswick I, MEQ. Images A, C: from Stanisic *et al.* (2010).



FIG. 19. *Helix (Camaena) challisi* (Cox, 1873). A, AMSC 17597, probable syntypes as cited by Smith (1992). B, lectotype, AMSC583621, Keswick I, MEQ. Scale bar: 20 mm. Images: A. AM; B JS courtesy of AM.

species but then re-assigned both to *Figuladra*. The two species have. They have very similar shell morphologies, though *F. mattea* differs from *F. challisi* chiefly by having a more solid shell and a more excavate umbilical region (Figs 18A, B). *Figuladra challisi* has a flatter, 'ceramic-like' shell as illustrated in Stanisic *et al.* (2010) from a specimen from Keswick Island, MEQ (Fig. 18C). *Figuladra mattea* is an open woodland snail found between Brisbane and Rockhampton, SEQ (type locality Rockhampton) whereas *H. challisi* is a vine thicket dweller. Confirmation of the type locality of *F. challisi* as Keswick Island in MEQ indicates that the two species are geographically separated.

Cox (1873) did not designate a holotype for *H. challis*. Smith (1992) recorded eight probable syntypes from L Island in the AM (AMSC17597) from the Hargraves collection (Fig. 19A). While the most recent labels with these specimens indicate that Long I, Broadsound is their collection locality, a handwritten label by Cox shows that these specimens are from L Island, Torres Strait, the original type locality associated with Cox's description. Accordingly, these shells are considered to be the original type series. As a result, a lectotype (AMSC583621) is designated from this series (Fig. 19B).

DISCUSSION

The historical taxonomic confusion surrounding *Figuladra* species described prior to 1900 encompasses a range of outstanding issues outlined in this study. These have been resolved through an examination of type and related specimens and their reconciliation with original descriptions and illustrations. In some cases, this meant scrutinising the logs of the early expeditions of exploration and those of individual collectors. In many instances, purported types were shown to be wrongly designated and the true type species or series are presumed lost.

The key decisions resulting from this study outlined below:

A single shell of *Helix incei* Pfeiffer (in Philippi), 1846 collected by Commander Ince RN and

considered part of the original type series was located in the NHMUK. This specimen (NHMUK20200001) is herein designated as lectotype and the type locality fixed as the Percy Islands, MEQ. *Helix incei* should only apply to Percy Island populations.

The subsequently designated type locality of the Percy Islands, MEQ for *Helix lessoni* Pfeiffer, 1846 by Iredale (1937) is considered an error and is herein amended to Port Curtis. No type material corresponding to Pfeiffer's original description of this species is considered to exist in the NHMUK. A lectotype (ZMB/Moll 260025a) and a paralectotype (ZMB/Moll 260025b) from Pfeiffer's personal collection in the ZMB are designated herein. *H. lessoni* should only apply to populations in the Port Curtis area.

A specimen from the personal collection of George French Angas in the Hancock Museum, Newcastle on Tyne (NEWHM:HANM.1.3531) is confirmed as the holotype of *Helix curtisiana* Pfeiffer, 1864 with the original broad type locality of Port Curtis. This type locality is further restricted herein to Boyne I, MEQ. *H. curtisiana* should only apply to populations in the immediate Port Curtis area.

The original type locality for *Helix (Camaena) praetermissi* Cox, 1868 (holotype AMSC17600) of Cape Direction, NEQ is considered an error and is amended to the Keppel Islands, MEQ. *H. praetermissi* should only apply to populations on the Keppel Islands pending the outcome of future studies.

The original type locality for *Helix (Camaena) aureedensis* Brazier, 1872 (holotype AMSC017604) of Aureed Island, Torres Strait, is considered an error and is amended to a locality in the Yeppoon area, MEQ. Johannsen's Caves, Mt Etna NP, MEQ is herein nominated. *Helix aureedensis* should only apply to populations in the greater Yeppoon area.

The original type locality of L Island, Torres Strait, and subsequent redesignated type locality of L Island, Broadsound, MEQ for *Helix (Camaena) challisi* Cox, 1873 are considered errors and the type locality is amended herein to Keswick Island, MEQ. A lectotype (AMSC583621) and

seven paralectotypes (AMSC17597) are herein designated from what is considered to be the original type series studied by Cox. *H. challisi* should only apply to Keswick Island populations pending the outcome of future studies.

The above decisions have been taken to stabilise the taxonomy of these species and allow for a comprehensive revision of *Figuladra* Kohler & Bouchet, 2020 to be undertaken unencumbered by nomenclatural uncertainty.

These findings are the outcome of detailed investigative work by the senior author and will be further amplified in a forthcoming revision of the *Figuladra* clade.

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