Malacologica Bohemoslovaca (2020), 19: 1–8
ISSN 1336-6939

On *Helix grisea* Linnaeus, 1758 and the *Helix* species described by Carl Linnaeus and Otto Friedrich Müller

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Korábek O., 2020: On *Helix grisea* Linnaeus, 1758 and the *Helix* species described by Carl Linnaeus and Otto Friedrich Müller. – Malacologica Bohemoslovaca, 19: 1–8. Online serial at <http://mollusca.sav.sk> 12-Jan-2020.

http://zoobank.org/EA77631B-02ED-44F0-BC05-4A63366DBAF2

Helix grisea was described by Linnaeus in 1758, and its identity has been doubtful ever since. The name features in the early taxonomic history of some other species of *Helix sensu lato*. Here I provide a summary of the history of its use. Mostly, the name was applied for the widespread species now accepted as *Cornu aspersum* (O. F. Müller, 1774), while a few authors used it for *Helix cincta* O. F. Müller, 1774. Neither usage is in line with the Linnaeus' account. Based on a figure to which Linnaeus referred, I propose that the name originally applied to a species now known as *Helix lucorum* Linnaeus, 1758 and as the first reviser, I give precedence to *H. lucorum* over *H. grisea*. In respect to *C. aspersum*, *H. grisea* cannot take precedence because of reversal of precedence according to Art. 23.9, and is pronounced a *nomen oblitum*. The case of *H. grisea* illustrates the importance of Müller's work for the taxonomy of the genus. In this respect it is regrettable that some of his species, including *C. aspersum*, lack a known and well documented type specimens.

Key words: Helicidae, nomenclature, Niccolò Gualtieri, *Helix lucorum*, *Helix cincta*, *Cornu aspersum*

Introduction

In my recent work, I stumbled repeatedly upon the name *Helix grisea* Linnaeus, 1758, either in old literature or on museum labels. This name features in the early taxonomic history of three broadly distributed species (Fig. 1) of *Helix* Linnaeus, 1758 sensu lato (as in Welter-Schultes 2012, i.e. including the genera *Cornu* Born, 1778, *Cantareus* Risso, 1826 and *Erctella* Monterosato, 1894; not in the broad sense of the 18th and early 19th century), but the identification of *H. grisea* with currently accepted species remains unclear. As a *nomen dubium* it cannot be found in synonymies of the latest revision of the genus (Neubert 2014). Although not in use any more, the name is one of the three oldest in the genus. Therefore, I provide here a brief summary of the history of the name and its application.

Note: some of the cited works have been published in parts over several years. Where possible, year of publication of the relevant pages is indicated in square brackets following the bibliographic information at http://www.molluscabase.org (accessed July 2019).

The description of *Helix grisea*

Linnaeus (1758: 771, 773) described under numbers 593, 605 and 606 three species of the genus *Helix* in its currently accepted meaning (Korábek et al. 2015):

Helix pomatia
"testa umbilicata subovata obtusa decolori, apertura subrotundo-lunata. … *Gualt. test. t. 1 f. A.* ... Habitat in Angliae, Galiae nemoribus"
[Shell almost ovate, umbilicate, obtuse, and decolourized; aperture somewhat round and crescent-shaped. … Habitat in England and groves of France. "Gualt. test." refers to Gualtieri 1742.]
Helix lucorum
"testa imperforata subrotundata laevi fasciata, apertura oblonga fusca. *Gualt. test. t. 1 f. C.* Habitat in Europa arboribus"
[Shell imperforate and almost rounded shape, smoothly banded. Aperture oblong and brown. Habitat in woodlands of Europe.]
Helix grisea
"testa imperforata subovata obtusa grisea; fasciis duabus pallidis, apertura oblongiuscula. *Gualt. test. t. 1 f. B.* Habitat in Europa australi"
[Shell imperforate, almost ovate, obtuse, and grey; with two pallid bands. Aperture slightly oblong. Habitat in southern Europe.]

Linnaeus made in all three species a reference to an illustration by Gualtieri (1742), who depicted several species of *Helix sensu lato*, probably from Italy (Fig. 2, 3). In the case of *H. lucorum* and *H. grisea* this work was the

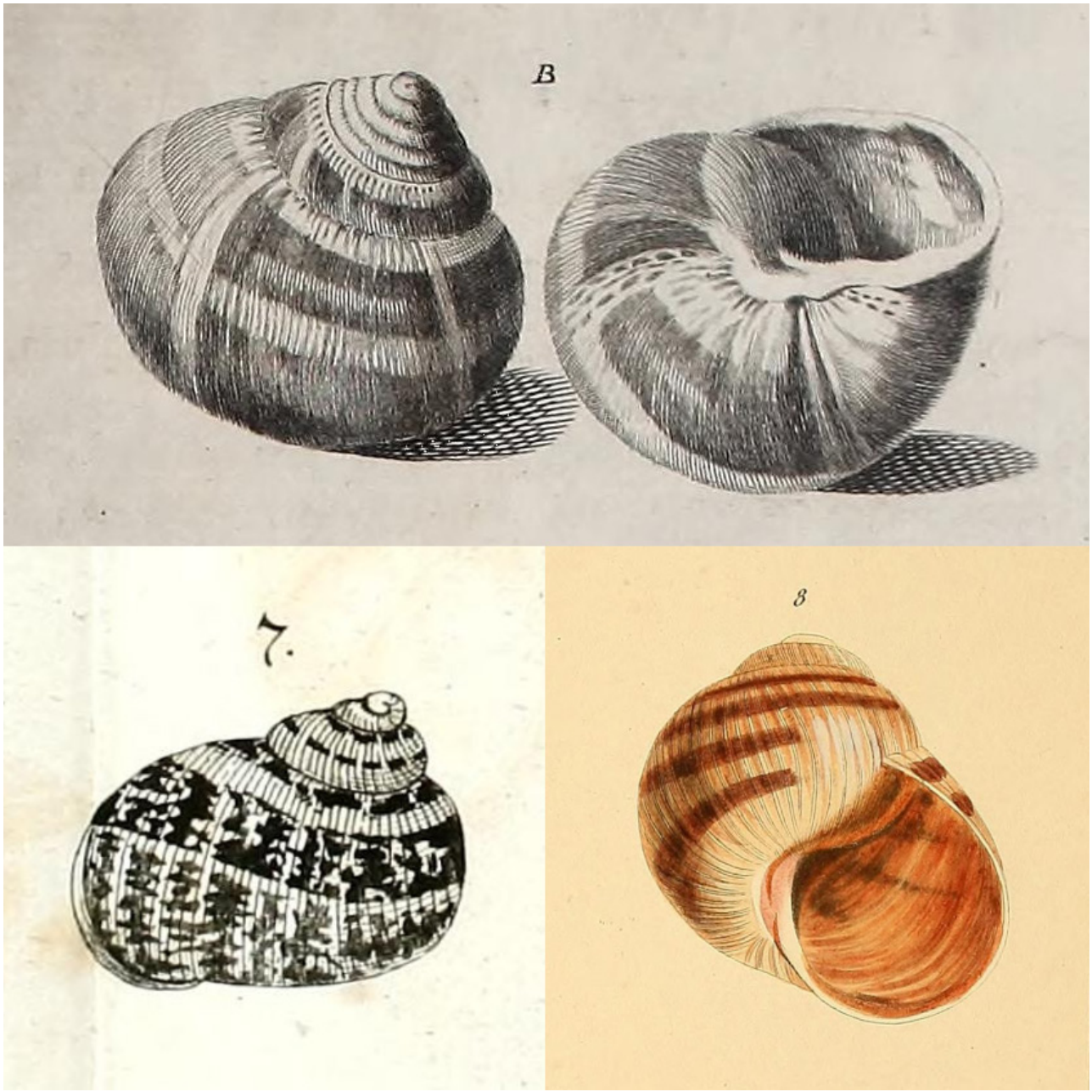

Fig. 1. The three incarnations of *Helix grisea*: top – sensu Linnaeus, 1758 (from Gualtieri 1742, pl. 1 fig. B); bottom left – Gmelin, 1791 (from Schröter 1784, pl. IV fig. 7); bottom right – sensu Pfeiffer 1847–1848 (from Pfeiffer 1840–1850, pl. 4 fig. 8).

only reference ever made. The individuals upon which the illustrations were based are syntypes of the Linnaean taxa under Art. 72.4.1 of the Code of Zoological Nomenclature (International Commission on Zoological Nomenclature 1999): "the type series of a nominal species-group taxon consists of all the specimens included by the author in the new nominal taxon (whether directly or by bibliographic reference), except any that the author expressly excludes from the type series [Art. 72.4.6], or refers to as distinct variants (e.g. by name, letter or number), or doubtfully attributes to the taxon".

The illustrations of Gualtieri, who worked in Pisa, are relatively realistic and may be tentatively identified with currently accepted Italian species as follows:

plate I (Fig. 2):

fig. A: *Helix pomatia* Linnaeus, 1758 (the shell is extant in Museo di storia naturale dell'Università di Pisa, No. G2374)

fig. B: *Helix lucorum* Linnaeus, 1758 (sic!, shell lost)

fig. C: *Helix straminea* Briganti, 1825 (sic!, shell lost)

fig. D: juvenile *Helix aspersa* Müller, 1774 = *Cornu aspersum* (No. G2149)

fig. E: *Helix aspersa* Müller, 1774 = *Cornu aspersum* (No. G2375)

fig. F: *Helix aperta* Born, 1778 = *Cantareus apertus* (shell lost)

plate II (Fig 3):

fig. B: *Helix cincta* Müller, 1774 (No. G2137)

fig. C: unidentifiable, perhaps not Italian (shell lost)

The pl. I fig. B of Gualtieri is well identifiable with typical *H. lucorum* in its current sense (Korábek et al. 2014, 2018), which is broadly distributed between Genova and Firenze (own data, Cianfanelli 2009). The shell is broadly conical, with narrow apical whorls and spiral bands

fused on the last whorl. The bands are conspicuously interrupted at several places. The shell lacks an umbilicus and has thickened aperture margins. All these are characters typical for *H. lucorum*. The pl. I fig. C may represent *H. straminea*, whose records closest to Pisa originate from near Siena (Korábek et al. 2014; Fiorentino et al. 2016). I base this supposition on the shell shape and colouration, wide apex, and the shape of the aperture. If the proposed identification of the Gualtieri's specimens is correct, we may assume that *H. lucorum* and *H. grisea* in the original Linnaeus' sense established by the reference to Gualtieri are two species of *Helix sensu stricto* from Italy, in the current system named as follows:
Helix lucorum Linnaeus, 1758 = current *H. straminea*
Helix grisea Linnaeus, 1758 = current *H. lucorum*

Ironically, Briganti (1825) referred in his description of *H. straminea* to pl. I fig. B, although pl. I fig. C fits better his own illustrations as well as the probable syntypes of the species (Korábek et al. 2014).
While the syntypes of *H. lucorum* and *H. grisea* depicted by Gualtieri are not extant in his collections in Pisa, there are preserved shells under these names in the Linnaean collections (Linnaean Society of London; Uppsala University, Museum of Evolution, Zoology Section). In case of *H. lucorum*, specimens held in both institutions belong to *Otala punctata* (O. F. Müller, 1774) (Van Osselaer et al. 2001), so they were set aside and a neotype has been designated (Case 3158). For *H. grisea*, there is a specimen in Uppsala (No. 968b), which is a shell of *C. aspersum*, and Hanley (1855) reported a box of *C. aspersum* shells labelled as *H. grisea* from the Linnaean collection held by the Linnean Society in London. Given the extent to which the Linnaean collections have been mishandled following his death (Hanley 1855; Dance 1967), it is doubtful whether these shells truly belong to the original collections of Linnaeus. Kennard & Woodward (1920) even suggested that specimens labelled as *H. grisea* in the London collection in fact originated from O. F. Müller, who corresponded with Linnaeus, but it is not clear why either of them would use the name *H. grisea* for these shells.
The potential syntypes in Linnaean collections do not fit well the Linnaeus's descriptions and the figures he referred to, and with all likelihood are not those, upon which Linnaeus based his descriptions. In any case, the meaning of *H. lucorum* is now fixed by a neotype selected from the collection of O. F. Müller, while the identity of *H. grisea* remains dubious.

The development of the concept of *Helix grisea*

Schröter (1784: 160, pl. 4 fig. 7) depicted under the name *H. grisea* Linnaeus a shell of *C. aspersum*. Gmelin [1791: 3649] used the name in the same sense, referring to illustrations of *C. aspersum* by Schröter (1784), Knorr (1769: pl. 27 fig. 3) and Chemnitz (1786: pl. 130, fig. 1156–1158). With *H. lucorum*, Gmelin referred to mutually incompatible illustrations of Gualtieri (1742: pl. I fig. C) and Lister (1770: pl. 1058 fig. 1–2; = *Otala* Schumacher, 1817, most probably *Otala lactea* (Müller, 1774)). Dillwyn (1817: 943) followed the same concept of *H. grisea* as Gmelin, considering *H. aspersa* Müller a junior synonym of *H. grisea*. Draparnaud (1801: 76) and Férussac (1821: 30) listed *H. grisea* in synonymy of *H. aspersa*. Bosc (1801: 46) repeated the account of Linnaeus including the reference to the Gualtieri's illustration, but added a reference to the illustration of *C. aspersum* by Chemnitz, incompatible with the former.
Deshayes & Milne Edwards (1838: 33) noted that the synonymy of *H. grisea* with *H. aspersa* has no basis. Hanley (1855) reported that *H. aspersa* shells are present in the Linnaean collections under the name *H. grisea*, but pointed out that the description does not fit well to these, nor to the Gualtieri's figure. He suggested the name be abandoned altogether. A similar suggestion was made already by Jeffreys (1830: 328), who argued that the description by Linnaeus is insufficient and the already well accepted name *H. aspersa* should be used.
Due to the poor description of the taxon, the name *H. grisea* never achieved popularity and the name *H. aspersa* was eventually accepted for the species currently known as *C. aspersum*. *Helix grisea* was thus mostly considered synonymous with *H. aspersa* Müller, 1774. However, L. Pfeiffer (1840–1850 [1846]: XII, pl. 4. fig. 7–8) rejected the synonymy with *H. aspersa* and interpreted the name as a senior synonym of another Müller's name, namely *Helix cincta* O. F. Müller, 1774 (cf. Pfeiffer 1840–1850 [1841]: 38; note that the explanation of the plates erroneously refers to figs. 1–2). This might have been based on Pfeiffer's identification of the Gualtieri's figure, as Kennard & Woodward (1920) speculated.
Müller (1774: 46, 58–59) (re-)described five currently accepted species of *Helix* s. l.: *H. pomatia*, *H. lucorum*, *H. aspersa*, *H. cincta*, and *H. ligata*. His work thus became the second keystone of the taxonomy of European *Helix* after Linnaeus' Systema Naturae. His concept of *H. lucorum* has been widely accepted and is now fixed by selection of a neotype from his collection (Van Osselaer et al. 2001). Also, the concept of *H. aspersa* (= *C. aspersum*) is well established, although there is probably no type specimen. The interpretation of *H. cincta* was initially problematic, also in relation to *H. ligata* (Deshayes 1839–1851: 261–266). The current concept has its roots in Férussac (1821–1822 [1921, quatro edition]: 29), C. Pfeiffer (1828: 32, pl. 5. fig. 2–3) and Rossmässler (1837: 2, pl. 21 fig. 287). Recently, it has been fixed by a neotype designation (Giusti et al. 2015). *Helix ligata* is also an accepted taxon, its current concept being based on Rossmässler (1837, 1847).
When L. Pfeiffer stated that *H. cincta* is a junior synonym of *H. grisea*, he presented a very broad concept of *H. grisea* including also some other currently accepted species (*Helix philibinensis* Rossmässler, 1839, *Helix albescens* Rossmässler, 1839; L. Pfeiffer 1847–1848 [1847]: 236). Deshayes (1839–1851: 264) and Bourguignat (1853: 13) followed this broad definition. Nevertheless, the former authors expressed doubts about the synonymy of *H. cincta* and *H. grisea*. Bourguignat (1860: 160) adopted later a narrower delimitation, including only *H. cincta*, although in 1883 he also assigned a high-spired form of *H. straminea* to *H. grisea* (Bourguignat 1882–1883: 262).

Fig. 2. Reproduction of plate I from GUALTIERI (1742).

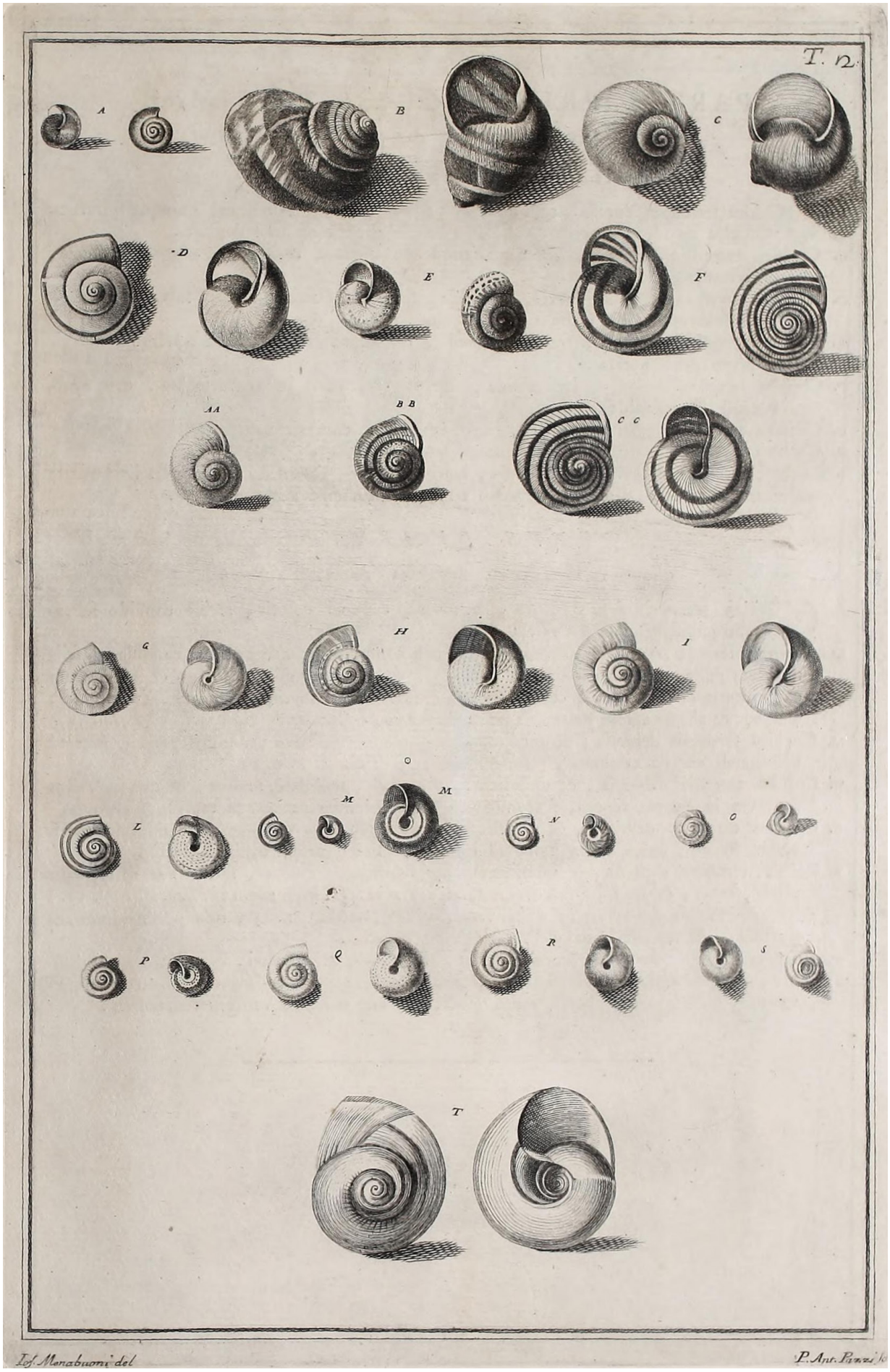

Fig. 3. Reproduction of plate II from GUALTIERI (1742).

The proposal that *H. grisea* is a senior synonym of *H. cincta* gained only limited following. Examples are Reeve (1854: pl. 93 fig. 509), who depicted under the name *H. grisea* a shell of *H. cincta*, and Pini (1876). Westerlund (1889: 450, 458) listed *H. grisea* sensu Gmelin in the synonymy of *H. aspersa* and *H. grisea* sensu L. Pfeiffer in the synonymy of *H. cincta*. Kobelt (1902–1906 [1903]: 96, 104) did the same. By the end of the 19th century, the usage of the name was already over.

Concluding remarks

As the origin of the shells preserved in Linnaean collections cannot be determined with definitive certainty, *Helix grisea* may be interpreted as a synonym of either *H. lucorum* or *H. aspersa* (= *C. aspersum*), although I deem the former more likely to be correct. In either case, the name poses no threat to the established nomenclature originating from Müller (1774).

Helix grisea was published simultaneously with *H. lucorum*. Following the designation of the neotype of the latter the two nominal taxa appear to be synonyms. In that case, priority is determined by the First Reviser (Art. 24.2.2.). As such, I give here precedence to *H. lucorum*. If considered a senior synonym of *H. aspersa*, the younger name *H. aspersa* is valid in accordance with Art. 23.9. of the Code. To my knowledge, the name *H. grisea* has not been used as valid after 1899. At the same time, provisions of Art. 23.9.1.2. are met for *H. aspersa*, as demonstrated by the following references from a wide array of research fields, picked from thousands of such publications: Brown et al. (1972); Eakin & Ferlatte (1973); Meech & Standen (1975); Potts (1975); Selander & Kaufman (1975); Dan & Bailey (1982); Payza (1987); Adamo & Chase (1988, 1990); Gomot et al. (1989); Madec & Guiller (1994); Linhart & Thompson (1995); Arnaud et al. (1999); Iglesias & Castillejo (1999); Bishop & Brand (2000); Guiller et al. (2001); Stott (2002); Arnaud (2003); Grande et al. (2004); Ros et al. (2004); Manganelli et al. (2005); Wade et al. (2007); Hutterer et al. (2011); Welter-Schultes (2012); Gaitán-Espitia et al. (2013); Neiber & Hausdorf (2015); Popova & Boyle (2015); Naranjo-García & Castillo-Rodríguez (2017); Parmakelis et al. (2017); Sherpa et al. (2018); Çelik et al. (2019); Cvetkovska-Gjorgievska et al. (2019); Krings et al. (2019).

The case of *H. grisea* points to the work of O. F. Müller instead of Linnaeus as the actual starting point of the *Helix* taxonomy. Unfortunately, of the accepted species he described, i.e. *H. aspersa*, *H. ligata* and *H. cincta*, only the last one is based on a known type (a neotype designated in 2015). The types of *H. aspersa* and *H. ligata* are not registered in the Natural History Museum of Denmark, Copenhagen, where the bulk of the extant Müller's collections is held. Absence of type material does not seem to be an issue in case of *H. aspersa*, but *H. ligata* needs to be based on a type. The type locality is "Italy", but Fiorentino et al. (2016) showed that the traditional concept of *H. ligata* likely encompasses several related species. Because of their morphological similarity, it cannot be said which of them should bear the name *H. ligata*. A neotype with exact locality data, preserved soft tissues and at least a barcode sequence is urgently needed.

Acknowledgements

I thank the curators and collection managers for information regarding their collections and photos of historical specimens, namely Tom Schiøtte (København), Marco Dellacasa (Pisa), and Erica Sjölin (Uppsala). I thank Georges Jansoone for Latin translation. I am indebted to The Biodiversity Heritage Library (www.biodiversitylibrary.org) for the multitude of rare literature made available.

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