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Abstract

The type specimens of fossil land and freshwater gastropods deposited in the Staatliches Museum für Naturkunde Stuttgart (SMNS), Germany, are listed and illustrated herein, comprising circa 180 nominal species-group taxa from Cenozoic fossil sites, mainly in the Baden-Württemberg and Bayern states in southern Germany. The list is arranged in alphabetical order of the specific epithets, with information on the original description, taxonomical status, type locality, record number in the collection and comments. A systematically arranged list of the taxa is also given, as well as a list arranged by authorship of the species-group names. At least one type specimen (holotype, lectotype, syntype or neotype) of each nominal species/subspecies is figured here, and further specimens were figured when they added information. In some cases lectotypes are designated herein.

Keywords: Cenozoic, Gastropoda, lectotype designation, non-marine snails, type specimens.

1. Introduction

The collection of fossil invertebrates in the Staatliches Museum für Naturkunde Stuttgart (SMNS; Stuttgart, Germany) comprises more than 200,000 fossil invertebrate lots, mostly of gastropods. Despite having specimens from diverse localities worldwide, the vast majority of the collection stems from Cenozoic fossil sites in the Baden-Württemberg and Bayern states in southern Germany. The collection includes the original material, particularly the name-bearing types, of 19th century and early 20th century paleontologists.

There is a current international consensus that all museums should publish inventories of their type specimens to make them more readily available for the scientific community at large. This is especially true for European fossil gastropods. Many species have a convoluted taxonomic history, often inadequate descriptions and illustrations (or no illustration at all), and little modern taxonomic analysis. Thus, future work would benefit greatly from examination of actual type specimens.

Therefore, we present here an annotated catalogue of the fossil non-marine gastropod types housed in the SMNS collection, arranged alphabetically according to the specific epithets. Furthermore, in order to facilitate locating information, the list of types is presented in two additional ways (Appendixes 1 and 2): a systematically arranged list of the taxa and a list arranged by authorship of the nominal species.

Abbreviations

Biozones: MN = European mammal Neogene zone; MP = European mammal Paleogene zone.

Institutions: GSL = Geological Society of London; MUWI = Naturwissenschaftliche Sammlung des Museums Wiesbaden (Wiesbaden, Germany); NHMUK = Natural History Museum, London; SMF = Senckenberg Forschungsinstitut und Naturmuseum (Frankfurt am Main, Germany); SMNS = Staatliches Museum für Naturkunde Stuttgart (Stuttgart, Germany).

Shell measurements: H = shell height; D = shell, maximum width (diameter); h = height of operculum. The specimens were measured either with a digital caliper or with the aid of computer software.

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2. Material and methods

2.1. Collections

The SMNS has acquired collections of mollusks from many 19th and early 20th century authors. The fossil continental gastropods are stored in the collection of Cenozoic Invertebrates in the SMNS. This collection is separated in two parts: one sorted geographically, the other systematically. The former focuses on the fossil Lagerstätten of Württemberg (part of Baden-Württemberg), such as Steinheim am Albuch and Randeck Maar. The latter comprises several historic collections, of which the Jooss and Geyer collections are the largest.

The Jooss collection is the most important collection of gastropods in the SMNS, containing ca. 1,400 species and subspecies and totaling ca. 17,000 specimens. The gastropods are mainly from Germany and neighboring countries, from Oligocene to Pliocene (but focusing on the Miocene). Jooss has intensively exchanged material with colleagues and specimens from his their publications are present as well. A good portion of Clessin's original material was incorporated into the Jooss collection in 1913, whereby Jooss unfortunately replaced Clessin's labels by his own. The Geyer collection contains Geyer's fossil specimens (his Recent mollusks are housed in the Malacozoological collection of the SMNS). This part of the collection contains ca. 250 species and subspecies (ca. 70,000 specimens), mainly of Plio-Pleistocene age.

In addition to Jooss' and Geyer's, collections (or part of them) of other authors were acquired by the SMNS, such as Klein, Gottschick, Miller, Clessin, Kranz and Schütze. Moreover, several other authors contributed types to the SMNS collection, such as Sandberger, O. Boettger and Wenz. The original handwritten labels of most of these authors could be found (Fig. 1), even those of Wenz, whose collection in Frankfurt am Main was destroyed during World War II. Below we give brief information about those malacologists whose material in the SMNS collection are important for historical and/or scientific reasons (biographic notes can be found in Lambrecht et al. 1938 and Mayer 1976).

Stefan Clessin (*1833 in Würzburg, †24.12.1911) was a full-time military officer who later worked for the Bavarian state railway (Quenstedt 1957). He was especially interested in malacology (both Recent and fossil) and described many new nominal species.

David Geyer (*06.11.1855 in Köngen, †06.11.1932 in Stuttgart) was a schoolteacher in Stuttgart and a malacologist (Wenz 1933), famous for his book on Germany's molluscan fauna (Geyer 1927) and his remarkable collection of extant and Quaternary gastropods.

Franz Gottschick (*14.08.1865 in Zang, †18.09.1927 in Tübingen) was a forester in Steinheim am Albuch and Tübingen and was particularly known for his studies of the fossil snails from the Steinheim Basin (Heizmann & Reiff 2002).

Carlo G. H. Jooss (*27.10.1883 in Stuttgart, †unknown [after 1936]) was a private collector in Stuttgart. According to Staesche (1958), Jooss started his study at the University of Tübingen, but never graduated. He had extensive contacts with contemporary malacologists and paleontologists. According to the SMNS documentation, Jooss left Germany on July 1st 1929

Fig. 1. Examples of the original labels of each author. Note that on Sandberger's label, the locality and collection number were added later.

after selling his collection to the SMNS for 2,500 Reichsmark. Today's purchasing value of this price would be ca. € 10,000, which shows the importance of Jooss' collection at that time. It is not known where Jooss emigrated to, but there is a last trace of his whereabouts: a short note in the annual report of the American Museum of Natural History (New York) from 1936 states that the museum purchased 183 fossil invertebrates from Jamaica, Trinidad and British Guyana from "Dr. Carlo H. Jooss of Georgetown, British Guyana".

Adolf von Klein (*30.09.1805 in Stuttgart, †03.04.1892 in Stuttgart) was a military medic and zoologist. He authored three seminal papers about the Miocene and Pleistocene freshwater mollusks of Württemberg, in which he defined many new taxa.

Ferdinand Krauss (*09.07.1812 in Stuttgart, †14.09.1890 in Stuttgart) was the director of the "Naturalienkabinett", the predecessor of the SMNS. He was a zoologist, but also worked with fossils, publishing the first account of the brackish mollusk fauna of the Kirchberg Formation.

Konrad Miller (*21.11.1844 in Oppeltshofen, †25.07.1933) was a theologian and teacher who carried out archaeological and geological research; the latter especially about the Upper Marine and Upper Freshwater Molasses in Württemberg (Hablitzel 1994).

Fridolin C. W. Sandberger (*22.11.1826 in Dillenburg, †11.06.1898 in Würzburg) was head of the "Naturhistorischen Museum" in Wiesbaden (1849–1855), professor of Geology and Mineralogy at the "Polytechnikum" in Karlsruhe (1855–1863), and finally professor of Mineralogy and Geology in Würzburg (Beckenkamp 1899). Besides his geological studies, he also carried out research on fossil continental mollusks. While the largest part of his material is in the Wiesbaden Museum, some originals can be found in Stuttgart.

2.2. Missing material

As the fossil collections of Klein, Jooss, Gottschick, Miller, Clessin, Kranz, Schütze and Geyer had been acquired by the SMNS, it had been expected that the majority of their types of species-group taxa would be present here, but this does not seem to be the case. Some specimens were lost during World War II (Tomlin 1947; Lueger 1981), but others might have been lost during loans or due to neglect. Appendix 3 lists all nominal species-group taxa of these authors of which no type material could be identified in the SMNS collection.

2.3. Type Catalogue

We present this catalogue in the following manner. The species epithets are arranged in alphabetical order. In each entry, the first line gives the species epithet, followed by the author and year, and the original genus-group name. The spelling of the specific epithets is corrected according to the ICZN (1999), article 32.5 (i.e., capitalization, correct gender ending, removal of diacritical marks and conversion of umlauts). The spelling of the genus name is changed to the correct original spelling, as a species-group name published in combination with an emendation or incorrect spelling is deemed to have been published in combination with the correct original spelling (article 11.9.3.2 ICZN). For example, the name originally published as *Limnaeus conicus* Miller, 1907 is deemed to have been published as *Lymnaea conica* Miller, 1907 and, thus, it is cited here in the first line in this form. If a name is nomenclaturally invalid because it is a junior homonym, and if a replacement name exists, the invalid name is listed in its proper alphabetical place with a reference to its replacement name, where all relevant information is given for both names.

The second line gives the species-group name in its original (i.e., uncorrected) form, with bibliographic reference, and in some cases additional bibliographic references to the type material. The following lines give the type status, inventory number(s), type locality, type stratum and age. In order to facilitate the use of the relevant literature, and to emphasize the status of locality and lithostratigraphic terms as proper names (although the latter are usually historical and informal), these have not been translated into English, but translations are given for the information of the reader unfamiliar with the German language. The entry "Taxonomic status" provides a reference or references to the most up-to-date taxonomic treatment of the name in question. It is not intended to present in this paper a taxonomic revision of the taxa involved. In a few cases, hitherto unpublished views of the authors are cited as such, as well as divergent opinions.

At least one type specimen (holotype, lectotype, syntype or neotype) of each nominal species/subspecies is figured here, and further original specimens were figured when they added information. Many nominal species/subspecies are figured here for the first time. Moreover, as authors often did not designate holotypes from their material, some lectotypes are designated herein.

The identification of the type series of nominal species proposed by Sandberger (1870–1875) requires a brief discussion here. Sandberger made many names available by publishing illustrations on plates with captions, thereby publishing new species names up to three years earlier than the pertinent text. It could therefore be argued that only the figured specimen(s) constitute the type series, but we argue that the entire material included in the published text should be regarded as the type series because it is inconceivable that Sandberger would not have this material at his disposal when he decided that a particular form is a new species. This assumption is in accordance with Article 72.4.1.1 ICZN: "For a nominal species or subspecies established before 2000, any evidence, published or unpublished, may be taken into account to determine what specimens constitute the type series." Sandberger's later text is deemed to be such evidence. Obviously the

possibility exists that he may have acquired some material after the publication of the figures, but this can neither be proven nor disproven. To exclude the possibility that such (hypothetical) material be included in the type series, a lectotype from the proven original material would need to be selected. Such proof will in most cases only be the identification of the figured specimen(s). In this paper we refrain from such lectotype fixations, because they should be done only when the SANDBERGER collection in the MUWI (and possible other institutions) have been checked.

We accepted all infraspecific names as of subspecies rank and therefore as available (article 45.6 ICZN), even where authors, notably JOOSS (1912) and GOTTSCHICK (1911–1922), differentiated two or even three categories of infraspecific taxa. It proved impossible to determine consistently whether those names were intended as of subspecific or infrasubspecific rank. None of the authors gave an explanation for the meaning of the terms "var." [varieties] and "f." [forma]; the way these terms were applied, it seemed in some cases that "forma" denoted variants of lower rank than "varieta"', but in others no consistent or convincing difference of taxonomic status could be inferred. Moreover, the ICZN (articles 10.2 and 45.6.4.1) accepts even infrasubspecific names published before 1961 as available if they had been so accepted by subsequent authors, which may have happened in some cases.

The authorship of names had to be reviewed in accordance with article 50.1 ICZN. It had been general practice in the 19th century and even later to accord authorship to the person who coined a name, regardless whether he published it in a way that satisfied the criteria of availability or not, or if he even did not publish it at all, as in the case of names in manuscripts, written communications or collection labels. Finally, the evidence for the actual dates of many publications were checked. Details are given in the reference list.

Several of the nominal species-group taxa were in this paper identified as junior primary or secondary homonyms. Although articles 57.2 and 60.1 ICZN require the junior homonyms to be replaced, we have refrained from so doing except in one case, because (1) of a high probability that article 23.9.5 may be applicable in many cases, i.e., if the primary homonyms were no longer treated as congeneric after 1899, and/or (2) the possibility of a subjective synonym being available as a replacement name could not be categorically ruled out without a taxonomic revision of nominal species similar to the junior homonym (such revision, however, is beyond the scope of this paper). According to article 23.9.5, these cases need to be referred to the ICZN for a ruling.

The classification used here follows BOUCHET et al. (2005), complemented by NORDSIECK's review (2014); taxa not covered by these works follow ZILCH (1959–1960). Where available, other taxonomic revisions were taken into consideration, but all too often the fallback option was to quote WENZ's (1923–1930) synonymies and genus allocations. In many cases the taxonomic status of the nominal species-group taxa is uncertain and in need of revision. Likewise, the stratigraphical and age data presented here are the currently accepted ones whenever possible. However, several of the fossil outcrops remained unstudied after the late 19th and early 20th centuries' works and thus the age given (found on these papers) might be misleading.

3. List of types

acuminata* (KLEIN, 1846), *Pupa (Plate 1, Figs. 1–2)
Pupa acuminata KLEIN, 1846: 75, pl. 1, fig. 19a, b.

Syntypes: SMNS 106361 (2 specimens, from Hohenmemmingen).

Type localities: Germany: Baden-Württemberg: Dächingen, Öpfingen and Hohenmemmingen, Silvanaschichten [Silvana-beds].

Age: Late Early/early Middle Miocene (Burdigalian/Langhian; MN 5).

Taxonomic status: Valid, as *Gastrocopta (Albinula) acuminata* (KLEIN, 1846) (revised by MANGANELLI & GIUSTI 2000). Family Gastrocoptidae.

Remarks: KLEIN based the species on incompletely preserved specimens, and figured one with a visible columellar lamella; nevertheless, this feature cannot be seen in the two present specimens.

alsaticus* JOOSS, 1918a**, ***Zonites (Grandipatula) (Plate 1, Fig. 3a, b)
Zonites (Grandipatula) alsaticus JOOSS, 1918a: 166, figs. 1–3.

Holotype: SMNS 65581.

Type locality: France: Alsace: Bouxwiller ("Buchsweiler"), Bastberg, Süßwasserkalk [freshwater limestone] of the Bouxwiller Formation.

Age: Middle Eocene (Lutetian; MP 13).

Taxonomic status: Valid, as *Grandipatula alsatica* (JOOSS, 1918a). Family Grandipatulidae.

alveum* JOOSS, 1918b, *Galactochilus (Plate 1, Fig. 4a–c)
See *alveus* SANDBERGER, 1875, *Helix*.

alveus* Sandberger, 1875, *Helix (Plate 1, Fig. 4a–c)
Helix alveus SANDBERGER, 1875: 459 (Markbronn, "Nur ein fast vollständiges Stück in der Sammlung des Herrn CAPLAN Dr. MILLER (…)") [non *Helix alveus* C.B. ADAMS, 1850 (5): 80].
Galactochilus alveum JOOSS, 1918b: 293.

Syntype?: SMNS 106362.

Type locality: Germany: Baden-Württemberg: Blaustein (Markbronn), upper "Rugulosa-Thalfinger-Schichten".

Age: Early Miocene (Aquitanian; MN 2).

Taxonomic status: Potentially valid, as *Pseudochloritis*? *alveus* (SANDBERGER, 1875). Family Elonidae (Eloninae) or Helicidae (Ariantinae).

Remarks: (1) The species epithet is a noun in apposition (alveus, Lat.: a beehive) and therefore immutable. The name

alveum Jooss is the same word with a variant gender ending, and hence an unjustified emendation. The intentional spelling change is evident by Jooss citing *Helix alveus* Sandberger correctly. Names published as unjustified emendations are available and can be utilized to substitute junior primary homonyms (Art. 33.2.3 ICZN). For the reasons given in the preceding chapter, we refrain from substituting the name *alveus* Sandberger for the time being. (2) Sandberger (1875) mentioned one nearly complete specimen in the collection of Miller, and damaged specimens from Gamerschwang and Öpfingen. The present specimen is the former, as it bears original labels from Sandberger and Miller. Jooss' label also indicates it as Sandberger's original material. (3) Jooss (1918b), believing erroneously that Sandberger had published a nomen nudum, treated "*alveum*" as a new species and provided a redescription (using the same type as Sandberger). As Jooss' intention was to redescribe *Helix alveus* Sandberger, which is cited as a synonym, *Galactochilus alveum* "Jooss" is not a new nominal species. (4) Sandberger compared this species with *Cyrtochilus expansilabris* (Sandberger), which is a significantly smaller species. *Galactochilus* species are larger than *alveus*, but similar in habitus: e.g., *Galactochilus ehingensis* as illustrated by Sandberger (1875: 457, pl. 29, fig. 10, from Eggingen near Ulm) measures 26–36 mm, while *alveus* measures 20–24 mm. *Pseudochloritis* species are of similar size, but usually with a more depressed spire and at least partially open umbilicus (Binder 2008).

amerbachensis* Jooss, 1912a, *Limnophysa (Plate 1, Fig. 5)
Limnophysa amerbachensis Jooss, 1912a: 90; Jooss, 1912b: 168, pl. 4, fig. 8, 8a.

Syntypes: SMNS 23918 (2 specimens).

Type locality: Germany: Bavaria: Dobelbuck ("Hobelsbuck") near Amerbach (Wemding), *Pomatias*-Süßwasserkalk des Rieses [*Pomatias* freshwater limestone of the Ries area].

Age: Early Oligocene (Rupelian).

Taxonomic status: Junior synonym of *Stagnicola fabulum* (Brongniart, 1810) (fide Kadolsky 2014). Family Lymnaeidae (Lymnaeinae).

ammoni* Clessin, 1894, *Hyalinia (Vitrea) (Plate 1, Fig. 6a, b)
Hyalina (Vitrea) Ammoni Clessin, 1894: 29.

Syntypes: SMNS 106363 (3 specimens) and 106364 (1 specimen).

Type locality: Germany: Bavaria: Nittendorf (Undorf), mittlere Silvanaschichten [middle Silvana-beds].

Age: Late Early/early Middle Miocene (Karpatian–Badenian; MN 5).

Taxonomic status: Valid as *Vitrea ammoni* (Clessin, 1894) (fide Wenz 1923). Family Pristilomatidae.

Remarks: The syntypes seem to belong to several species (and genera?), as remarked by Clessin (1894) himself. We figure here the specimen which was alone in the lot (SMNS 106364), which possibly is the one to which the description refers to. In the original description, Clessin lists seven specimens; the extra three specimens may be lost, as one lot of this material (SMNS 45257/2005) was not found in the collection.

angitorta* Jooss, 1912c, *Helicodonta (Helicodonta* s. str.*) involuta (Plate 1, Fig. 7a–c)
Helicodonta (Helicodonta s. str.*) involuta* var. *angitorta* Jooss, 1912c: 34, pl. 2, fig. 3, 3a.

Holotype: SMNS 106365.

Type locality: Germany: Baden-Württemberg: Steinheim am Albuch, sand pit Pharion, *Pupa* (i.e., *Granaria*) layer (upper *Gyraulus discoideus* zone to *G. trochiformis* zone), Steinheimer Seeschichten.

Age: Middle Miocene (MN 7).

Taxonomic status: Valid, as *Protodrepanostoma involutum angitortum* (Jooss, 1912) (fide Kadolsky herein). Family Helicodontidae.

angulosus* Miller, 1907, *Archaeozonites (Plate 1, Fig. 8a, b)
Archaeozonites angulosus Miller, 1907: 443, pl. 8, fig. 13a–c.

Syntype: SMNS 27620.

Type locality: Germany: Baden-Württemberg: Blaustein (Arnegg), karst fissure limestone.

Age: Early Oligocene (Rupelian).

Taxonomic status: Valid. Family Archaeozonitidae.

Remarks: Miller (1907) mentioned several specimens.

antiqua* Zieten, 1832, *Pupa
See *schuebleri* Klein, 1846, *Pupa*.

antiqua* Klein, 1852, *Glandina (Achatina) (Plate 1, Fig. 9)
Glandina (Achatina) antiqua Klein, 1852: 162, pl. 3, fig. 9.

Syntypes: SMNS 23908 (3 specimens, from Ulm).

Type localities: Germany: Baden-Württemberg: near Ehingen, Michaelsberg near Ulm, near Hohenmemmingen.

Age: Early Miocene (Aquitanian; MN 2).

Taxonomic status: Junior synonym of *Palaeoglandina gracilis* (Zieten, 1832). Family Oleacinidae.

Remarks: The specimens' label indicates only Ulm. The specimen figured by Klein (1852) is the one indicated as SMNS 23908a in the collection.

antiqua* Miller, 1907, *Patula (Plate 1, Fig. 10a–c)
Patula antiqua Miller, 1907: 454, pl. 9, fig. 13a–c.

Syntype: SMNS 27641.

Type locality: Germany: Bavaria: Bachhagel, karst fissure limestone.

Age: Eocene.

Taxonomic status: Valid, as *Discus antiquus* (Miller, 1907) comb. nov. Family Discidae.

Remarks: Miller (1907) reported this species as frequent.

antiquior* Miller, 1907, *Clausilia (Plate 1, Fig. 11)
Clausilia antiquior Miller, 1907: 455, pl. 9, fig. 16.

Syntype: SMNS 27644.

Type locality: Germany: Bavaria: Bachhagel, karst fissure limestone.

Age: Eocene.

Taxonomic status: Valid, as *Triptychia antiquior* (Miller, 1907) (fide Schnabel 2007: 27, pl. 1, fig.1). Family Filholiidae.

Remarks: Miller (1907) reported two fragmentary specimens, of which Schnabel (2007) designated one invalidly as holotype.

arneggensis* Wenz, 1923, ?*Pomatias (Plate 1, Fig. 12)
Cyclotus scalaris Miller, 1907: 439, pl. 7, fig. 2 a–e [non *Cyclostoma scalare* Pfeiffer, 1851a (: 250), placed in genus *Cyclotus* by Pfeiffer 1851b (: 135, no. 34) and Reeve 1863 (: pl. 9, fig. 51)].
?*Pomatias arneggense* [sic] Wenz, 1923: 1802.

Lectotype (herein): SMNS 27614-a.

Paralectotype: SMNS 27614-b (1 operculum).

Type locality: Germany: Baden-Württemberg: Blaustein (Arnegg), karst fissure limestone.

Age: Early Oligocene (Rupelian).

Taxonomic status: Valid, as *Pomatias (Neobembridgia) arneggensis* Wenz, 1923 (fide Kadolsky 1989). Family Pomatiidae (Pomatiinae).

Remarks: The operculum is too small to belong to the shell and thus must come from a different individual. We select here the shell as the lectotype.

arneggensis* Miller, 1907, *Trochomorpha (Plate 1, Fig. 13a, b)
Trochomorpha arneggensis Miller, 1907: 443, pl. 8, fig. 14a–c.

Syntypes: SMNS 27621 (3 specimens).

Type locality: Germany: Baden-Württemberg: Blaustein (Arnegg), karst fissure limestone.

Age: Early Oligocene (Rupelian).

Taxonomic status: Valid, as *Archaeozonites*? *arneggensis* (Miller 1907). Family Archaeozonitidae.

Remarks: Wenz (1923: 251) lists this taxon as a possible synonym of *Archaeozonites angulosus* Miller, 1907. This is incorrect, as *arneggensis* is almost half the size at a similar number of whorls. It is therefore rather small for the genus *Archaeozonites* and may in fact not belong to it, but a more definite genus attribution requires further study.

arneggensis* Miller, 1907, *Laminifera (Plate 1, Fig. 14a–c)
Clausilia (Laminifera) n. sp. O. Boettger, 1877: 106.
Laminifera arneggensis Miller, 1907: 446, textfig. 23, pl. 8, fig. 23a.

Syntypes: SMNS 27629 (3 specimens).

Type locality: Germany: Baden-Württemberg: Blaustein (Arnegg), karst fissure limestone.

Age: Early Oligocene (Rupelian).

Taxonomic status: Valid (fide Nordsieck 2000, 2007). Family Clausiliidae (Laminiferinae).

Remarks: The only specimen with part of the body whorl preserved does not agree well with the figures provided by Miller (1907), because it does not show the detachment of the body whorl, which is a typical character of *Laminifera* and is strongly developed in *L. arneggensis*, according to Miller's figures and text. Probably the detached part of the last whorl shown by Miller (1907) has broken off and would thus be lost.

arneggensis* Miller, 1907, *Bulimus (Petraeus) (Plate 1, Fig. 15)
Bulimus (Petraeus) arneggensis Miller, 1907: 446, pl. 8, fig. 21a–c.

Syntypes: SMNS 36777 (4 specimens).

Type locality: Germany: Baden-Württemberg: Blaustein (Arnegg), karst fissure limestone.

Age: Early Oligocene (Rupelian).

Taxonomic status: Valid, as *Palaeomastus arneggensis* (Miller, 1907) comb. nov. Family Enidae. The shell shows the conical spire considered as diagnostic for the genus *Palaeomastus* H. Nordsieck, 2014.

badensis* Jooss, 1924, *Zonites (Aegopis) algiroides (Plate 1, Fig. 16a, b)
Zonites (Aegopis) algiroides badensis Jooss, 1924: 193, pl. 11, figs. 5–7.

Holotype: SMNS 65634.

Type locality: Germany: Baden-Württemberg: Blumberg (Zollhaus), Helicidenmergel [helicid marls].

Age: Early Miocene (Ottnangian; MN 3–4).

Taxonomic status: Unknown, possibly a synonym of *Miozonites algiroides* (Reuss, 1849). Family Archaeozonitidae.

baumbergeri* Jooss, 1924, *Cepaea eversa (Plate 1, Fig. 17a, b)
Cepaea eversa baumbergeri Jooss, 1924: 200, pl. 11, figs. 24–27.

Syntypes: SMNS 106366 (Germany: Baden-Württemberg: Stubersheim–Geislingen), 106367 and 106368 (Switzerland: Kt. Aargau: Wölflinswil).

Type locality: Numerous unspecified localities, Helicidenmergel [helicid marls]. Jooss (1924) figured specimens from more than one locality.

Age: Miocene ("Mittelvindobon").

Taxonomic status: Unknown, probably a synonym of *Megalotachea eversa* (Deshayes, 1851). Family Helicidae (Helicinae).

bilamellatus* Clessin, 1885, *Strobilus (Plate 2, Fig. 1)
Strobilus bilamellatus Clessin, 1885: 79.

Holotype: SMNS 106369.

Type locality: Germany: Bavaria: Nittendorf (Undorf), mittlere Silvanaschichten [middle Silvana-beds].

Age: Late Early/early Middle Miocene (Karpatian–Badenian; MN 5).

Taxonomic status: Synonym of *Strobilops costata* (Clessin, 1877). Family Strobilopsidae.

blaviana* Miller, 1907, *Helix (Gonostoma) (Plate 2, Fig. 2a, b)
Helix (Gonostoma) blaviana Miller, 1907: 445, pl. 8, fig. 19a, b.

Syntypes: SMNS 27626 (3 specimens).

Type locality: Germany: Baden-Württemberg: Blaustein (Arnegg), karst fissure limestone.

Age: Early Oligocene (Rupelian).

Taxonomic status: Subjective synonym of *Klikia? praeosculina* (Miller, 1907) (fide Wenz 1923). Family Elonidae (Klikiinae) or Helicidae (Ariantinae).

boettgeriana* Clessin, 1877, *Hyalinia (Plate 2, Fig. 3a, b)
Hyalina Böttgeriana Clessin, 1877: 35.
Hyalina Boettgeri Clessin, 1885: 75 [unjustified emendation or spelling error].

Holotype: SMNS 106370.

Type locality: Germany: Bavaria: Nittendorf (Undorf), mittlere Silvanaschichten [middle Silvana-beds].

Age: Late Early/early Middle Miocene (Karpatian–Badenian; MN 5).

Taxonomic status: Valid, as *Perpolita boettgeriana* (Clessin, 1877) (fide Kadolsky herein). Family Oxychili-

dae (Godwiniinae). WENZ (1923), however, placed the species in *Zonitoides* (family Gastrodontidae).

brancai* SCHÜTZE *in* BRANCA & FRAAS, 1908, *Lymnaea (Plate 2, Fig. 4)
Limnaeus Brancaï SCHÜTZE *in* BRANCA & FRAAS, 1908: 19, figs. 9–10.

Lectotype (herein): SMNS 11897-a.

Paralectotype: SMNS 11897-b (1 specimen).

Type locality: Germany: Bavaria: Monheim (Weilheim im Ries), grey freshwater limestone block in Bunter Breccie [varicoloured breccia, Ries ejecta].

Age: Early Oligocene.

Taxonomic status: Potentially valid, as *Lymnaea* (s.l.) *brancai* SCHÜTZE *in* BRANCA & FRAAS, 1908. Family Lymnaeidae (Lymnaeinae).

Remarks: We designate here as lectotype the largest and best preserved specimen (SCHÜTZE in BRANCA & FRAAS 1908: fig. 9).

bulimoides* KLEIN, 1846, *Melania (Plate 2, Figs. 5–6)
Melania bulimoides KLEIN, 1846: 81, pl. 2, fig. 1a, b [non *Melania bulimoides* EUDES-DESLONGCHAMPS, 1842 (: 229, pl. 12, fig. 15)].

Syntypes: SMNS 106371 (2 specimens and the external mould of one of them).

Type locality: Germany: Baden-Württemberg: Grimmelfingen near Ulm, Grimmelfinger Schichten [Grimmelfingen Beds].

Age: Late Early Miocene (Burdigalian/Ottnangian, MN 4a).

Taxonomic status: Uncertain; WENZ (1923) lists this species as *Galba bulimoides*, but this allocation seems mistaken. Family uncertain.

Remarks: (1) KLEIN (1846) figures a complete specimen, which is either lost or a reconstruction attempt, possibly based on the two preserved syntypes and the external mould. (2) Substitution of the junior primary homonym is not mandatory if the conditions of Article 23.9.5 ICZN are met; a request for a ruling of the Commission under its plenary powers to validate the junior homonymous name is intended.

bythiniformis* MILLER, 1907, *Pupa (Plate 2, Fig. 7)
Pupa bythiniformis MILLER, 1907: 455, pl. 9, fig. 17.

Holotype: SMNS 27645.

Type locality: Germany: Bavaria: Bachhagel, karst fissure limestone.

Age: Eocene.

Taxonomic status: Uncertain, listed as *Abida*? *bythiniformis* (MILLER, 1907) by WENZ (1923). Family Chondrinidae.

capellinii* SANDBERGER, 1873, *Strophostoma anomphalus (Plate 2, Fig. 8a–c)
Strophostoma Capellini FRAAS, 1869: 11 [nomen nudum].
Strophostoma anomphalus var. SANDBERGER, 1871: pl. 21, fig. 19, 19b.
Strophostoma anomphalus var. *Capellinii* SANDBERGER, 1873: 328; SANDBERGER, 1875: 354.

Syntypes: SMNS 22180 (2 specimens).

Type locality: Germany: Baden-Württemberg: Blaustein (Arnegg), karst fissure limestone.

Age: Early Oligocene (Rupelian).

Taxonomic status: Possibly valid, as *Ferussina capellinii* (SANDBERGER, 1873) or *F. anomphalus capellinii*. Family Ferussinidae.

Remarks: SANDBERGER (1873) stated that his "*Strophostoma anomphalus*" came from the "Meeressand" (now Alzey Formation) of Waldböckelheim and Weinheim in the Mainz Basin (Rheinland-Pfalz), and that he figured the only intact specimen from the Paleontological Collection in Munich. According to SANDBERGER, the specimens from Arnegg differ morphologically from those of the Mainz Basin and were named var. *capellinii* by him.

carinatus* MILLER, 1907, *Archaeozonites (Plate 2, Fig. 9a, b)
Archaeozonites carinatus MILLER, 1907: 454, pl. 9, fig. 11.

Lectotype (herein): SMNS 27639-a.

Paralectotypes: SMNS 27639-b, c, d (3 specimens).

Type locality: Germany: Bavaria: Bachhagel, karst fissure limestone.

Age: Eocene.

Taxonomic status: Valid. Family Archaeozonitidae.

Remarks: The best preserved specimen is designated here as the lectotype. The illustration presented by MILLER (1907) in the original description is a reconstruction based on this specimen.

carinatus* JOOSS, 1912a, *Zonites (Archaeozonites) risgoviensis (Plate 2, Fig. 10a, b)
Zonites (Archaeozonites) risgoviensis var. *carinata* JOOSS, 1912a: 89; JOOSS 1912b: 162, pl. 4, fig. 3c [non *Archaeozonites carinatus* MILLER, 1907 (: 454, pl. 9, fig. 11)].

Holotype: SMNS 23921.

Type locality: Germany: Bavaria: Dobelbuck ("Hobelsbuck") near Amerbach (Wemding), *Pomatias*-Süßwasserkalk des Riesgebietes [*Pomatias* freshwater limestone of the Ries area].

Age: Early Oligocene (Rupelian).

Taxonomic status: Junior synonym of *Omphalosagda pyramidalis* (JOOSS, 1912) (fide KADOLSKY, unpublished). Family Archaeozonitidae.

carinulata* KLEIN, 1853, *Helix (Plate 2, Fig. 11a–c)
Helix carinulata KLEIN, 1853: 208, pl. 5, fig. 5.

Syntypes: SMNS 106372 (6 specimens).

Type locality: Germany: Baden-Württemberg: Zwiefalten (near Mörsingen), Silvanaschichten [Silvana-beds].

Age: Late Early/early Middle Miocene (Burdigalian/Langhian; MN 5).

Taxonomic status: Junior synonym of *Leucochroopsis kleinii* (KLEIN, 1846) (fide WENZ 1923). Family Hygromiidae (Hygromiinae).

***conica* MILLER, 1907, *Lymnaea*(?)** (Plate 2, Fig. 12)
Limnaeus(?) *conicus* MILLER, 1907: 452, pl. 9, fig. 6 [non *Lymnaea palustris conica* JEFFREYS, 1862 (: 114)].

Holotype: SMNS 27635.

Type locality: Germany: Bavaria: Bachhagel, karst fissure limestone.

Age: Eocene.

Taxonomic status: Potentially valid, but insufficiently known. Questionably placed by WENZ (1923) in *Galba*. Family Lymnaeidae (Lymnaeinae).

Remarks: Substitution of the junior primary homonym is not mandatory if the conditions of Article 23.9.5 ICZN are met; a request for a ruling of the Commission under its plenary powers to validate the junior homonymous name is intended.

coniuncta* Berz & Jooss, 1927, *Cepaea renevieri (Plate 2, Fig. 13a, b)
Cepaea renevieri var. *coniuncta* Berz & Jooss, 1927: 203, fig. 1.

Syntypes: SMNS 101369 (figured by Berz & Jooss 1927), 101370 (3 specimens), 101372 (2 specimens).

Type localities: Germany: Baden-Württemberg: Oggenhausen, several outcrops (Oggenhausen 1 sensu Böttcher et al. 2009), Silvanaschichten [Silvana-beds].

Age: Late Early/early Middle Miocene (MN 5).

Taxonomic status: Synonym of *Palaeotachea renevieri* (Maillard, 1892). Family Helicidae (Helicinae).

conoidea* Krauss, 1852, *Paludina (Plate 2, Fig. 14)
Paludina conoidea Krauss, 1852: 141, pl. 3, fig. 1 [non *Paludina conoidea* de Reynies, 1844 (: 4); Küster, 1852 (: 43, pl. 9, figs. 3–7)].

Syntypes: SMNS 106373 (5 specimens, from same locality and stratum) and 25500/2005 (lost material).

Type locality: Germany: Baden-Württemberg: Unterkirchberg (now Illerkirchberg), bläulichgrauer weicher Thon des Fischlagers [bluish-gray soft clay of the fish beds] of the Kirchberg Formation.

Age: Late Early Miocene (Burdigalian/ Ottnangian; MN 4b).

Taxonomic status: Valid, as *Ctyrokya conoidea* (Krauss, 1852) (fide Schlickum 1965). Family Hydrobiidae (Hydrobiinae).

Remarks: Substitution of the junior primary homonym is not mandatory if the conditions of Article 23.9.5 ICZN are met; a request for a ruling of the Commission under its plenary powers to validate the junior homonymous name is intended.

constrictelabiata* Miller, 1907, *Helix (Plate 2, Fig. 15a, b)
Helix constrictelabiata Miller, 1907: 455, pl. 9, fig. 15.

Holotype: SMNS 27643.

Type locality: Germany: Bavaria: Bachhagel, karst fissure limestone.

Age: Eocene.

Taxonomic status: Valid, as *Loganiopharynx constrictelabiatus* (Miller, 1907) (fide Nordsieck 2014). Family Hygromiidae.

convexitesta* Jooss, 1912b, *Cepaea (Palaeotachea) (Plate 2, Fig. 16a, b)
Cepaea (Palaeotachea) convexitesta Jooss, 1912b: 164, pl. 4, fig. 5a–c.

Syntypes: SMNS 23914 (2 specimens).

Type locality: Germany: Bavaria: Dobelbuck ("Hobelsbuck") near Amerbach (Wemding), *Pomatias*-Süßwasserkalk des Riesgebietes [*Pomatias* freshwater limestone of the Ries area].

Age: Early Oligocene (Rupelian).

Taxonomic status: Valid as *Palaeotachea convexitesta* (Jooss, 1912b) (fide Kadolsky herein). Family Helicidae (Helicinae).

costataeformis* Jooss, 1912c, *Vallonia (Plate 2, Fig. 17a, b)
Vallonia costataeformis Jooss, 1912c: 35, pl. 2, fig. 5, 5a.

Holotype: SMNS 106375.

Type locality: Germany: Baden-Württemberg: Steinheim am Albuch (according to Gerber [1996] a recent contamination of the Steinheimer Seeschichten [Steinheim Lake beds]).

Age: originally assumed to be Middle Miocene (MN 7), but now interpreted as recent.

Taxonomic status: Synonym of *Vallonia costata* (O. F. Müller, 1774) (fide Gerber 1996). Family Valloniidae.

costata* Gottschick, 1911, *Patula (Charopa) (Plate 3, Fig. 1a–c)
Patula (Charopa) costata Gottschick, 1911: 501, pl. 7, fig. 15.

Syntype: SMNS 106376.

Type locality: Germany: Baden-Württemberg: Steinheim am Albuch, *laevis*-zone of the Steinheimer Seeschichten [Steinheim Lake beds].

Age: Middle Miocene (MN 7).

Taxonomic status: Valid, as *Discus costatus* (Gottschick, 1911) comb. nov. Family Discidae.

Remarks: Gottschick (1911) mentioned two localities in the Steinheim Basin; thus he must have had more than one specimen at his disposal.

costatus* Klein, 1846, *Planorbis (Plate 3, Figs. 2a, b)
Planorbis costatus Klein, 1846: 78, pl. 1, fig. 24a–c.

Lectotype (herein): SMNS 23907-1.

Paralectotypes: SMNS 23907-2 (9 specimens, from same locality and stratum).

Type locality: Germany: Baden-Württemberg: Steinheim am Albuch, Steinheimer Seeschichten [Steinheim Lake beds].

Age: Middle Miocene (MN 7).

Taxonomic status: Valid, as *Gyraulus costatus* (Klein, 1846). Family Planorbidae (Planorbinae).

Remarks: The best preserved specimen in Klein's original material, which fits the original description (Klein 1846) and figure very well, is here designated as lectotype.

costatus* Clessin, 1877, *Strobilus (Plate 3, Fig. 3)
Strobilus costatus (Sandberger MS) Clessin, 1877: 37.

Syntype?: SMNS 106374.

Type locality: Germany: Bavaria: Nittendorf (Undorf), Silvanaschichten [middle Silvana-beds].

Age: Late Early/early Middle Miocene (Karpatian–Badenian; MN 5).

Taxonomic status: Valid, as *Strobilops costata* (Clessin, 1877). Family Strobilopsidae.

Remarks: The specimen's label states that it is the material used by Clessin (1885), not 1877. Clessin (1877) reported the species as very rare, without stating the number of specimens, but his measurements correspond very closely to the present specimen. A second lot is recorded as "on loan" in the collection (SMNS 45172/2005), but could not be traced.

crassa* Clessin, 1894, *Amalia (Plate 3, Fig. 4)
Amalia crassa Clessin, 1894: 27, pl. 1, fig. 10.

Syntype?: SMNS 106378.

Type locality: Germany: Bavaria: Nittendorf (Undorf), Silvanaschichten [middle Silvana-beds].

Age: Late Early/early Middle Miocene (Karpatian–Badenian; MN 5).

Taxonomic status: Valid, as *Milax crassus* (Clessin, 1894). Family Milacidae.

Remarks: In the original description, Clessin (1894) lists "numerous" specimens, housed in the private collection of Diez. The single specimen in his own collection is most likely one of these, which Clessin retained himself.

crassissimus* Jooss, 1902, *Limax (Plate 3, Fig. 5)
Limax crassissimus Jooss, 1902: 303, fig. 1.

Holotype: SMNS 106377.

Type locality: Germany: Baden-Württemberg: Steinheim am Albuch, the Steinheimer Seeschichten [Steinheim Lake beds].

Age: Middle Miocene (MN 7).

Taxonomic status: Potentially valid. Family Limacidae.

Remarks: Falkner (in litt., 15.8.2015) suggested that the specimen could be the shell of a Recent *Limax* species.

crassiventer* nom. nov., *Granaria (Plate 7, Fig. 1)
See *pachygastra* Miller, 1900, *Pupa (Torquilla) schuebleri*.

crenulata* Klein, 1853, *Neritina (Plate 3, Figs. 6–7)
Neritina crenulata Klein, 1853: 221, pl. 5, fig. 18.

Syntypes: SMNS 106379 (7 specimens).

Type locality: Germany: Baden-Württemberg: Deutscher Hof near Zwiefalten, Silvanaschichten [Silvana-beds].

Age: Late Early/early Middle Miocene (Burdigalian/Langhian; MN 5).

Taxonomic status: Valid, as *Theodoxus crenulatus* (Klein, 1853). Family Neritidae (Neritininae).

Remarks: Klein's original specimens are poorly preserved; all fit the original description well, but it is impossible to identify the figured specimen.

crepidostoma* Sandberger, 1872, *Helix (Plate 3, Fig. 8a–c)
Helix crepidostoma Sandberger, 1872: pl. 21, fig. 10, 10a.
Helix (Coryda) crepidostoma: Sandberger, 1875: 456 (ref. pl. 21, fig. 10, 10a).

Syntypes?: SMNS 23209 (2 specimens, from Thalfingen).

Type localities: Germany: Bayern: Thalfingen, Thalfinger Schichten [Thalfingen beds]; Eckingen, Unterelchingen, Buckenrain, Kuhberg, Allewind, Göttingen near Ulm, Pappelau, Arnegg (road to Ermingen): oberste kreideartige Kalke, Rugulosa-Schichten [uppermost chalky limestones, Rugulosa Beds].

Age: Early Miocene (Aquitanian; MN 1–2).

Taxonomic status: Junior synonym of *Palaeotachea subsulcosa* (Thomä, 1845). Family Helicidae (Helicinae).

Remarks: One of the present specimens (SMNS 23209-b) compares reasonably well with the one figured by Sandberger (1874), but it is not a perfect match, as its apex is broken and slightly bent to the side. Sandberger's illustration could, of course, be a reconstruction of this fossil (with the axial sculpture being more marked to emphasize its presence), but it is more prudent to leave the status of these specimens as types tentative. A large lot of syntypes (from Eckingen) is present in the MUWI.

cyrtocelis* Krauss, 1852, *Neritina (Plate 3, Fig. 9a, b)
Neritina cyrtocelis Krauss, 1852: 145.

Syntypes: SMNS 106380 (17 specimens).

Type locality: Germany: Baden-Württemberg: Kirchberg an der Iller, Kirchberg Formation.

Age: Late Early Miocene (Burdigalian/Ottnangian, MN4b).

Taxonomic status: Valid, as *Theodoxus cyrtocelis* (Krauss, 1852) (fide Wenz 1929; Salvador et al. submitted). Family Neritidae (Neritininae).

deplanatus* Miller, 1907, *Archaeozonites (Plate 3, Fig. 10a, b)
Archaeozonites deplanatus Miller, 1907: 442, pl. 8, fig. 12.

Lectotype (herein): SMNS 27619.

Paralectotype: SMNS 106381 (1 specimen).

Type locality: Germany: Baden-Württemberg: Blaustein (Arnegg), karst fissure limestone.

Age: Early Oligocene.

Taxonomic status: Valid, as *Archaeozonites deplanatus* Miller, 1907. Family Archaeozonitidae.

Remarks: We select as lectotype the best preserved specimen; the illustration in the original description (Miller 1907) is a reconstruction of it.

deplanata* Jooss, 1911b, *Helicodonta (Helicodonta) involuta (Plate 3, Fig. 11a–c)
Helicodonta (Helicodonta s. str.*) involuta* var. *deplanata* Jooss, 1911b: 57.

Syntypes: SMNS 106382 (8 specimens).

Type locality: Germany: Hesse: Mosbach-Biebrich, "obere Hydrobienschichten" [upper Hydrobia Beds, now Wiesbaden Formation].

Age: Early Miocene (MN 2a/b).

Taxonomic status: Valid, as *Protodrepanostoma involutum deplanatum* (Jooss, 1911b) (fide Kadolsky herein). Family Helicodontidae.

depressa* Jooss, 1912b, *Cepaea (Palaeotachea) convexitesta (Plate 3, Fig. 12a, b)
Cepaea (Palaeotachea) convexitesta forma *depressa* Jooss, 1912b: 164, fig. 5d–e.

Holotype: SMNS 23914-c.

Type locality: Germany: Bavaria: Dobelbuck ("Hobelsbuck") near Amerbach (Wemding), *Pomatias*-Süßwasserkalk des Riesgebietes [*Pomatias* freshwater limestone of the Ries area].

Age: Early Oligocene.

Taxonomic status: Junior synonym of *Palaeotachea convexitesta* (Jooss, 1912b). Family Helicidae (Helicinae).

dietleni* Miller, 1907, *Megalomastoma (Plate 3, Fig. 13)
Megalomastoma Dietleni Miller, 1907: 440, pl. 7, fig. 5a, b.

Syntypes: SMNS 11886 (2 specimens).

Type locality: Germany: Baden-Württemberg: Ulm (Eselsberg), karst fissure limestone.

Age: Early Oligocene.

Taxonomic status: Unknown. Family Megalomastomatidae(?).

diezi* Clessin, 1894, *Amalia (Plate 3, Fig. 14)
Amalia diezi Clessin, 1894: 27, pl. 1, fig. 9.

Syntype: SMNS 106383.

Type locality: Germany: Bavaria: Nittendorf (Undorf), mittlere Silvanaschichten [middle Silvana-beds].

Age: Late Early/early Middle Miocene (MN 5).

Taxonomic status: Valid, as *Milax diezi* (Clessin, 1894). Family Milacidae.

Remarks: In the original description, Clessin (1894) lists "numerous" specimens in Diez's collection; see remarks under *crass*a Clessin, 1894.

dilatatus* Jooss, 1918b, *Tropidomphalus (Plate 3, Fig. 15a–c)
Tropidomphalus dilatatum Jooss, 1918b: 293; Jooss 1924: 195, pl. 11, fig.11.

Syntype: SMNS 106384.

Type locality: Germany: Baden-Württemberg: Stubersheim–Geislingen, rote Helicidenmergeln [red helicid marls].

Age: Late Middle Miocene ("Vindobonian" = Langhian?).

Taxonomic status: Junior subjective synonym of *Pseudochloritis incrassata* (Klein, 1853), fide Binder (2008). Family Elonidae (Eloninae) or Helicidae (Ariantinae).

Remarks: Jooss (1918b) implied multiple localities, which he listed subsequently (1924).

dubius* Miller, 1907, *Pomatias (Plate 3, Fig. 16)
Pomatias dubius Miller, 1907: 451, pl. 9, fig. 3.

Holotype: SMNS 27632.

Type locality: Germany: Bavaria: Bachhagel, karst fissure limestone.

Age: Eocene.

Taxonomic status: Potentially valid, as *Cochlostoma dubium* (Miller, 1907) (fide Wenz 1923). Family Diplommatinidae (Cochlostomatinae).

ebfraasii* Jooss 1902, *Pomatias (Plate 3, Fig. 17)
Pomatias Eb. Fraasii Jooss, 1902: 306, fig. 2.
Pomatias Fraasii Gottschick, 1911: 533 [unjustified emendation].

Syntypes: SMNS 106385 (1 specimen) and 45192/2005 (1 specimen).

Type locality: Germany: Baden-Württemberg: Steinheim am Albuch, Steinheimer Seeschichten [Steinheim Lake beds].

Age: Middle Miocene (MN 7).

Taxonomic status: Valid, as *Cochlostoma ebfraasii* (Jooss, 1902). Family Diplommatinidae (Cochlostomatinae).

Remarks: The species epithet has usually been changed to "*fraasi*" or "*fraasii*", but according to article 32.5.2.4.4 ICZN the original spelling has to be maintained in an amended form.

eburnea* Klein, 1853, *Glandina (Achatina) (Plate 3, Fig. 18)
Glandina (Achatina) eburnea Klein, 1853: 213, pl. 5, fig. 10.

Lectotype (herein): SMNS 106386-a.

Paralectotypes: SMNS 106386-b (3 specimens).

Type locality: Germany: Baden-Württemberg: near Mörsingen), Silvanaschichten [Silvana-beds].

Age: Late Early/early Middle Miocene (Burdigalian/Langhian; MN 5).

Taxonomic status: Valid, as *Pseudoleacina eburnea* (Klein, 1853). Family Oleacinidae.

Remarks: Amongst Klein's original specimens, there is one that clearly is the figured specimen in the species' original description; this specimen is designated here as lectotype.

elegans* Miller, 1907, *Craspedopoma (Plate 3, Fig. 19)
Craspedopoma elegans Miller, 1907: 451, pl. 9, fig. 1.

Syntype: SMNS 27631.

Type locality: Germany: Bavaria: Bachhagel, karst fissure limestone.

Age: Eocene.

Taxonomic status: Valid. Family Craspedopomatidae.

Remarks: Miller (1907) mentioned two specimens.

elevata* Berz & Jooss, 1927, *Cepaea renevieri (Plate 3, Fig. 20a, b)
Cepaea renevieri var. *elevata* Berz & Jooss, 1927: 204.

Syntypes: SMNS 105002 (3 specimens, from Combe Girard), 106387 (1 specimen, from the road to La Sagne), 106388 (1 specimen, from Frankfurt am Main).

Type localities: Germany: Hesse: Frankfurt am Main [Eschenbacher Landstr.-Knoblauchfeld], Landschneckenmergel [land snail marl]. Switzerland: Canton Bern: Le Locle [Combe Girard and road to La Sagne], Sylvestrina-Schichten [Sylvestrina beds].

Age: Late Early/early Middle Miocene (MN 5).

Taxonomic status: Valid, as *Megalotachea elevata* (Berz & Jooss, 1927) (fide Höltke & Rasser submitted). Family Helicidae (Helicinae).

elongata* Klein, 1846, *Lymnaea socialis (Plate 3, Fig. 21)
Limnaeus socialis var. *elongata* Klein, 1846: 85, pl. 2, fig. 8a, b [non *Limneus elongatus* Draparnaud 1805 (: 53, pl. 3 figs. 3–4); nec de Serres 1844 (: 179, pl. 12, fig. 7)].

Syntypes: SMNS 23911 (5 specimens).

Type locality: Germany: Baden-Württemberg: Steinheim am Albuch, Steinheimer Seeschichten [Steinheim Lake beds].

Age: Middle Miocene (MN 7).

Taxonomic status: Synonym of *Radix socialis* (Zieten, 1832). Family Lymnaeidae (Lymnaeinae).

elongata* Miller, 1907, *Glandina (Plate 4, Fig. 1)
Glandina elongata Miller, 1907: 453, pl. 9, fig. 7.

Lectotype (herein): SMNS 27636-a.

Paralectotype: SMNS 27636-b.

Type locality: Germany: Bavaria: Bachhagel, karst fissure limestone.

Age: Eocene.

Taxonomic status: Valid, as *Pseudolecina elongata* (Miller, 1907). Family Oleacinidae.

Remarks: Miller (1907) figured both specimens. Here we define as lectotype the best preserved one.

eocaenica* Miller, 1907, *Bithynia (Plate 4, Fig. 2)
Bythinia [sic] *eocaenica* Miller, 1907: 456, pl. 9, fig. 18.

Holotype: SMNS 8328.

Type locality: Germany: Bavaria: Bachhagel, karst fissure limestone.

Age: Eocene.

Taxonomic status: Unknown. Family Bithyniidae or Hydrobiidae.

eocaenica* Miller, 1907, *Lymnaea (Plate 4, Fig. 3)
Limnaeus eocaenicus Miller, 1907: 452, pl. 9, fig. 5.

Syntypes: SMNS 27634 (2 specimens).

Type locality: Germany: Bavaria: Bachhagel, karst fissure limestone.

Age: Eocene.

Taxonomic status: Potentially valid, but insufficiently known; questionably placed in *Galba* by Wenz (1923: 1366). Family Lymnaeidae (Lymnaeinae).

eocaenicus* Miller, 1907, *Archaeozonites (Plate 4, Fig. 4a, b)
Archaeozonites eocaenicus Miller, 1907: 453, pl. 9, fig. 10.

Lectotype (herein): SMNS 27673-b.

Paralectotypes: SMNS 27673-a and 27673-c (2 specimens).

Type locality: Germany: Bavaria: Bachhagel, karst fissure limestone.

Age: Eocene.

Taxonomic status: Valid. Family Archaeozonitidae.

Remarks: The most complete and best preserved specimen is here designated as the lectotype; the figure provided by Miller (1907) is a reconstruction based on this specimen.

escheri* Sandberger, 1875, *Clausilia (Plate 4, Fig. 5)
Clausilia Escheri (Mayer MS.) Sandberger, 1875: 461.

Lectotype: SMNS 106389-a (designated by Schnabel 2007).

Paralectotype: SMNS 106389-b.

Type locality: Germany: Baden-Württemberg: Berg near Ehingen (Donau), Ehinger Ramondi-Schichten [Ramondi beds of Ehingen].

Age: Late Oligocene (Chattian).

Taxonomic status: Valid, as *Triptychia escheri* (Sandberger, 1875) (revised by Schnabel 2007). Family Filholiidae.

excellens* Jooss, 1912c, *Pomatias (Rhabdotakra) (Plate 4, Fig. 6)
Pomatias (Rhabdotakra) excellens Jooss, 1912c: 43, pl. 2, fig. 9.

Holotype: SMNS 106390.

Type locality: Germany: Baden-Württemberg: Steinheim am Albuch, Steinheimer Seeschichten [Steinheim Lake beds].

Age: Middle Miocene (MN 7).

Taxonomic status: Valid, as *Cochlostoma excellens* (Jooss, 1912c). Family Diplommatinidae (Cochlostomatinae).

Remarks: Jooss (1912c) based the species on one incomplete shell.

excellens* Jooss, 1927, *Laminifera (Laminifera) (Plate 4, Fig. 7)
Laminifera (Laminifera) excellens Jooss, 1927: 146, fig. 1a, b.

Holotype: SMNS 27650.

Type locality: Germany: Hesse: Falkenberg, between the cities of Flörsheim and Hochheim am Main, Landschneckenkalk [land snail limestone, now Hochheim Formation or lower Oppenheim Formation].

Age: Late Oligocene (Chattian).

Taxonomic status: Valid (fide Nordsieck 1981, 2000). Family Clausiliidae (Laminiferinae).

exigua* Miller, 1907, *Cionella
See *milleri* Wenz, 1919, *Cochlicopa*.

flachi* Clessin, 1911, *Acme (Plate 4, Fig. 8)
Acme Flachi Clessin, 1911: 9.
Acme Flachi Clessin, 1913: 110 [described again as new species].

Lectotype (herein): SMNS 106391-a.

Paralectotype: SMNS 106391-b. The paralectotype actually belongs to *Acicula diezi* (Flach 1889); it is a relatively broader specimen, which fits well with this species, likewise described from Undorf.

Type locality: Germany: Bavaria: Nittendorf (Undorf), mittlere Silvanaschichten [middle Silvana-beds].

Age: Late Early/early Middle Miocene (Karpatian–Badenian; MN 5).

Taxonomic status: Valid, as *Acicula flachi* (Clessin, 1911). Family Aciculidae.

Remarks: Kadolsky (2008a) doubted that these specimens were syntypes of *Acme flachi* Clessin, 1911, because the measurements given by Clessin do not agree with these specimens. It is now assumed that these measurements were incorrect, and that the two preserved specimens represent two of the three syntypes mentioned by Clessin (1911), for the following reasons: (1) Many of Clessin's measurements of small specimens were incorrect. (2) The specimens are dark grey, which is close to Clessin's statement that they were black; this coloration is less common for mollusks from Undorf, which are mostly white. (3) The incised collabral lines mentioned by Clessin are well developed. (4) It is implausible that Clessin or Jooss (who incorporated Clessin's collection in his own and who replaced any earlier label with his own) should have labelled the wrong specimens as Clessin's syntypes, and that the supposed real syntypes (which would agree with Clessin's dimensions) were absent.

fraasi* Jooss, 1912a, *Plebecula (Plate 4, Fig. 9a–c)
Plebecula fraasi Jooss, 1912a: 90; Jooss, 1912b: 166, pl. 4, fig. 6–c.

Syntypes: SMNS 23922 (2 specimens) and 106392 (1 specimen).

Type locality: Germany: Bavaria: Dobelbuck ("Hobelsbuck") near Amerbach (Wemding), *Pomatias*-Süßwasserkalk des Riesgebietes [*Pomatias* freshwater limestone of the Ries area].

Age: Early Oligocene (Rupelian).

Taxonomic status: Valid, as *Wenzia fraasi* (Jooss, 1912a) (fide Kadolsky herein). Family Sphincterochilidae.

fraasii* "Jooss, 1902", *Pomatias
See *ebfraasii* Jooss, 1902, *Pomatias*.

geniculata* Sandberger, 1872, *Helix (Plate 4, Fig. 10a–c)
Helix geniculata Sandberger, 1872: pl. 26, fig. 23, 23b; Sandberger, 1875: 629.

Syntypes: SMNS 22179 (3 specimens).

Type locality: Germany: Baden-Württemberg: Engen im Hegau (Hohenhöwen), "gypsum and limestone".

Age: Miocene.

Taxonomic status: Synonym of *Megalotachea sylvestrina* (Schlotheim, 1820). Family Helicidae (Helicinae).

giraudi* Dollfus, 1908, *Valvata (Cincinna) (Plate 4, Fig. 11)
Valvata (Cincinna) Giraudi Dollfus, 1908: 20, text-fig. 2.

Syntypes?: SMNS 106393 (18 specimens, from type locality and stratum; leg. Dollfus, Jooss collection).

Type locality: France: Dép. Allier: Montaigut-le-Blin.

Age: Lower Miocene (Aquitanian).

Taxonomic status: Valid as *Pseudamnicola? giraudi* (Dollfus, 1908) (fide Kadolsky herein), Family Hydrobiidae (Pseudamnicolinae?).

Remarks: It is unclear whether the date "April 1911" on Jooss' label is the date of collection or the date of his acquisition of the material. Only in the latter case the specimens could possibly be syntypes of Dollfus' species.

globosa* Miller, 1907, *Hyalinia (Plate 4, Fig. 12a, b)
Hyalinia globosa Miller, 1907: 454, pl. 9, fig. 12.

Syntypes: SMNS 27640 (3 specimens).

Type locality: Germany: Bavaria: Bachhagel, karst fissure limestone.

Age: Eocene.

Taxonomic status: Potentially valid; questionably placed in *Oxychilus* by Wenz (1923). Family Oxychilidae.

globosa* Miller, 1907, *Patula (Plate 4, Fig. 13a, b)
Patula globosa Miller, 1907: 444, pl. 8, fig. 15.

Syntypes: SMNS 17088 (1 specimen, from Eselsberg) and 27622 (4 specimens, from Örlinger Tal).

Type localities: Germany: Baden-Württemberg: Ulm [Eselsberg and Örlinger Tal], karst fissure limestones.

Age: Early Oligocene (Rupelian).

Taxonomic status: Valid, as *Discus globosus* (Miller, 1907) comb. nov. Family Discidae.

Remarks: A further original lot from Miller (1907) is recorded as SMNS 11904, but is likely lost.

gottschicki* Jooss, 1912c, *Patula (Plate 4, Fig. 14a, b)
Patula gottschicki Jooss, 1912c: 32, pl. 2, fig. 2.

Holotype: SMNS 106394.

Type locality: Germany: Baden-Württemberg: Steinheim am Albuch, *Pupa* (*Granaria*) layer of sand pit Pharion, upper *Gyraulus discoideus* zone to *G. trochiformis* zone).

Age: Middle Miocene (MN 7).

Taxonomic status: Valid, as *Janulus gottschicki* (Jooss, 1912c). Family Gastrodontidae.

gracilior* Sandberger, 1875, *Amalia (Plate 4, Fig. 15)
Amalia gracilior Sandberger, 1875: 603.

Syntype: SMNS 22757 (Probst coll.).

Type locality: Germany: Baden-Württemberg: Maselheim (Heggbach), middle Silvana-beds ("Silvanaschichten").

Age: Late Early/early Middle Miocene (Burdigalian/Langhian; MN 5).

Taxonomic status: Valid, as *Milax gracilior* (Sandberger, 1875). Family Milacidae.

Remarks: Sandberger (1875) gives the type locality as Biberach (from Probst coll.), but the label gives the more precise locality of Heggbach, which is part of the Biberach district.

gracilis* Sandberger, 1872, *Bithynia (Plate 4, Fig. 16)
Paludina tentaculata: Krauss, 1852: 140-141 (Thon der untersten Fischschicht von Unterkirchberg) [non *Helix tentaculata* Linnaeus, 1758 (: 774, no. 616)].
Bythinia gracilis Sandberger, 1872: pl. 28, fig. 16, 16a; Sandberger, 1875: 561, 575.

Paratypes?: SMNS 106395 (numerous opercula), SMNS 106396 (rock fragment with numerous shells and moulds) and 106750 (3 specimens), all Krauss coll., from: Germany: Baden-Württemberg: Kirchberg an der Iller, Kirchberg Formation.

Type localities: Germany: Bavaria: Leipheim near Günzburg, and Kirchberg an der Iller; both Kirchberg Formation.

Age: Late Early Miocene (Burdigalian/Ottnangian, MN4b).

Taxonomic status: Junior synonym of *Bithynia glabra* (Zieten, 1832). Family Bithyniidae.

Remarks: Sandberger (1872) introduced this nominal species with the illustration of a named specimen (1872: pl. 28, fig. 16–16a), which was later said to be from Leipheim (1875: 561). In the later published text (1875: 561, 575) he cites material from numerous additional localities, including that reported by Krauss (1852), which are preserved in SMNS. Since it is most likely that Sandberger had all this material at his disposal when he had the illustration of his *Bythinia gracilis* prepared, Krauss's material has thus the status of syntypes (see articles 72.4.1 and 72.4.1.1 ICZN).

gracilis* Jooss, 1912a, *Limnophysa amerbachensis (Plate 4, Figs. 17–18)
Limnophysa amerbachensis var. *gracilis* Jooss, 1912a: 90; Jooss, 1912b: 168, pl. 4, fig. 8b, c.

Syntypes: SMNS 23924 (2 specimens, from same locality and stratum).

Type locality: Germany: Bavaria: Dobelbuck ("Hobelsbuck") near Amerbach (Wemding), *Pomatias*-Süßwasserkalk des Riesgebietes [*Pomatias* freshwater limestone of the Ries area].

Age: Early Oligocene.

Taxonomic status: Valid as *Lymnaea gracilis* (Jooss, 1912) (fide Kadolsky 2014). Family Lymnaeidae (Lymnaeinae).

grandis* Klein, 1846, *Clausilia
See *kleini* Schnabel, 2006, *Triptychia (Triptychia).*

grossecostata* Klein, 1852, *Melania (Plate 4, Fig. 19)
Melania grossecostata Klein, 1852: 158, pl. 3, fig. 11.

Syntype: SMNS 23909 (1 specimen).

Type locality: Michelsberg near Ulm.

Age: Early Miocene.

Taxonomic status: Junior subjective synonym of *Tinnyea lauraea* (Mathéron, 1843) (syn. *Melania escheri* Merian, 1849; fide Kadolsky 1995). Family Pachychilidae.

Remark: The only available specimen is the original of KLEIN's fig. 11. It appears to be lost, but a photograph taken in ca. 1980 still exists (Plate 4, Fig. 19).

helicidarum* JOOSS, 1924, *Abida (Plate 4, Fig. 20)
Abida helicidarum JOOSS, 1924: 205.

Syntypes: SMNS 100113 (4 specimens).

Type locality: Germany: Baden-Württemberg: Blumberg (Zollhaus), Helicidenmergel [helicid marls].

Age: Early Miocene (Ottnangian; MN 3–4).

Taxonomic status: *Granaria helicidarum* (JOOSS, 1924), but species validity questioned due to incomplete preservation (HÖLTKE & RASSER 2013). Family Chondrinidae.

Remarks: According to HÖLTKE & RASSER (2013), the specimen among the original ones used by JOOSS (1924) that best fits the original description is the largest spire apex.

helicidarum* JOOSS, 1918b, *Hygromia (Trichiopsis) (Plate 4, Fig. 21a, b)
Hygromia (Trichiopsis) helicidarum JOOSS, 1918b: 292.
Fruticicola (Leucochroopsis) helicidarum: JOOSS, 1924: 194, pl. 11, figs. 8–10.

Syntypes: SMNS 106397 (3 specimens).

Type locality: Germany: Baden-Württemberg: Winterlingen (Harthausen auf der Scher), rote Helicidenmergel [red helicid marls].

Age: Middle Miocene (MN 4–5).

Taxonomic status: Possibly valid, as *Leucochroopsis helicidarum* (JOOSS, 1918b). Family Hygromiidae (Hygromiinae).

Remarks: Type material is very poorly preserved and *L. helicidarum* could be a synonym of an earlier named *Leucochroopsis* species.

hesslerana* JOOSS, 1911a, *Acanthinula (Plate 4, Fig. 22)
Acanthinula hesslerana JOOSS, 1911a: 705; JOOSS 1911b: 66, fig. 3.

Syntype: SMNS 67545.

Type locality: Germany: Hesse: Mosbach-Biebrich, obere Hydrobienschichten [upper Hydrobia beds, now Wiesbaden Formation].

Age: Early Miocene (Aquitanian).

Taxonomic status: Valid. Family Valloniidae.

Remarks: JOOSS (1911b: 67) mentioned three specimens. A lot in SMF (no. 151291) is labelled as syntypes from JOOSS' collection, but contains 6 specimens.

hoppla* GERBER, 1996, *Vallonia (Plate 5, Figs. 1–3)
Vallonia hoppla hoppla GERBER, 1996: 201, figs. 2q, 3ai, 81a–c, 82a.

Paratypes: SMNS 106398 (23 specimens).

Type locality: Germany: Hesse: Flörsheim-Hochheim am Main, Landschneckenkalk [land snail imestone, now Hochheim Formation].

Age: Late Oligocene (Chattian).

Taxonomic status: Valid. Family Valloniidae.

hydrobiarum* JOOSS, 1911a, *Omphalosagda (Plate 5, Fig. 4a–c)
Omphalosagda hydrobiarum JOOSS, 1911a: 705; JOOSS 1911b: 54, figs. 1–2.

Lectotype (herein): SMNS 106399.

Type locality: Germany: Hesse: Mosbach-Biebrich, Obere Hydrobienschichten [upper *Hydrobia* beds, now Wiesbaden Formation].

Age: Early Miocene (Aquitanian).

Taxonomic status: Valid. Family Archaeozonitidae.

Remarks: JOOSS (1911b: 55) mentioned "several" specimens in the SMF and the "original" in his collection. The latter is here designated as lectotype.

imperforata* MILLER, 1907, *Hyalinia (Conulus) (Plate 5, Figs. 5a, b)
Hyalinia (Conulus) imperforata MILLER, 1907: 442, pl. 7, fig. 11, 11b.

Holotype: SMNS 27618.

Type locality: Germany: Baden-Württemberg: Ulm (Eselsberg), karst fissure limestone.

Age: Early Oligocene (Rupelian).

Taxonomic status: Uncertain, possibly *Acanthinula* (s. lat.) *imperforata* (MILLER, 1907) (fide WENZ 1923). Family Valloniidae(?).

impressa* KRAUSS, 1852, *Melanopsis (Plate 5, Fig. 6)
Melanopsis impressa KRAUSS, 1852: 143, pl. 3, fig. 3.

Syntypes: SMNS 106400 (11 specimens).

Type locality: Germany: Baden-Württemberg: Kirchberg an der Iller, gelblicher Sand [yellowish sand layer].

Age: Late Early Miocene (Burdigalian/Ottnangian, MN4b).

Taxonomic status: Valid. Family Melanopsidae.

incrassata* KLEIN, 1853, *Helix (Plate 5, Fig. 7a–c)
Helix incrassata KLEIN, 1853: 208, pl. 5, fig. 6 [non *Helix incrassata* REEVE, 1853 (: pl. 150, species 972)].

Syntypes?: SMNS 22737 (2 specimens).

Type locality: Germany: Baden-Württemberg: Zwiefaltendorf "bei der Birk" (KLEIN 1853: 203), Silvanaschichten [Silvana-beds].

Age: Late Early/early Middle Miocene (Burdigalian/Langhian; MN 5).

Taxonomic status: Valid, as *Pseudochloritis incrassata* (KLEIN, 1853) (fide BINDER 2008). Family Elonidae (Eloninae) or Helicidae (Ariantinae).

Remarks: (1) Two specimens in the SMNS collection (no. 22737) were hitherto believed to be KLEIN's originals of his *Helix incrassata*, but the earliest available label gives the date as the year 1854, with the forester VON ZELL as the collector or donor, and the locality as Zwiefalten. There is no label from KLEIN's hand, unlike the case of *Helix inflexa* (q.v.). As KLEIN received the material for his 1853 paper from ZELL, the year 1854 can only mean that ZELL collected or passed the specimens on in 1854, be it to KLEIN or to the SMNS. The later display labels state that the material is KLEIN's originals of *Helix incrassata*, and give the locality as Zwiefalten. The discrepancies between the original and the subsequent labels could possibly be explained by a more or less arbitrary reinterpretation of the specimens' status and locality, or by a mix-up of different labels. In the latter case the "1854" label may not belong to the two specimens, which could then indeed be syntypes of *Helix incrassata* KLEIN. Neither possibility can be proved or disproved, but it should be noted that the specimens are in shape and size close to KLEIN's figures, although these show an

intact specimen unlike the actual ones; it was, however, common practice to idealize and reconstruct figures. The best preserved of the two specimens is here figured as a questionable syntype (Plate 5, Fig. 7a–c). (2) Reeve's description of *Helix incrassata* is dated February 1853; Klein's paper is listed in "*Neues Jahrbuch für Mineralogie* etc." 1853(6): 689, which printed letters to the editors dated up to 15.9.1853, i.e., it was received by the editors within a similar time. Thus, Klein's paper was published clearly later than February 1853 and consequently *Helix incrassata* Klein is a junior primary homonym. Its substitution is not mandatory if the conditions of Article 23.9.5 ICZN are met; a request for a ruling of the Commission under its plenary powers to validate the junior homonymous name is intended.

inflexa* C. Boettger, 1909, *Pseudochloritis (Plate 5, Fig. 8a–c)
Helix inflexa "Zieten" Klein, 1846: 71, pl. 1, fig. 12a, b [non Zieten, 1832].
Helix inflexa "von Martens": Sandberger, 1872: pl. 29, fig. 8, 8b.
Helix (Campylaea) inflexa "Klein": Sandberger, 1875: 589 (ref. pl. 29, fig. 8, 8b) (author: "Klein non v. Martens sp. Zieten").
Pseudochloritis inflexa "Klein": C. Boettger, 1909: 15.

Syntypes: SMNS 22736 (3 specimens).

Type localities: Zwiefaltendorf (Klein 1846), but Mörsingen on original label, Silvanaschichten; 5 other localities mentioned by Klein (1846).

Age: Late Early/early Middle Miocene (Burdigalian/Langhian; MN 5).

Taxonomic status: A junior subjective synonym of *Pseudochloritis incrassata* (Klein, 1853) (fide Binder 2008; Nordsieck 2014). Family Elonidae (Eloninae) or Helicidae (Ariantinae).

Remarks: (1) In the introduction of the genus-group name *Pseudochloritis*, C. Boettger cited the type species merely as "*inflexa* Klein", meaning *Helix inflexa* sensu Klein 1846, which is a misidentification of *Helix inflexa* Zieten, 1832 (Die Versteinerungen Württembergs: 41, pl. 31, figs. 1a–c). This is a deliberate application of a misidentification, whereby C. Boettger created a new species-group name (article 11.10 ICZN). This name is unnecessary, as the subjective synonym *Helix incrassata* Klein, 1853 (q.v.) and others exist for the species in question. (2) While Klein (1846) believed to be describing Zieten's "*Helix*" *inflexa*, Sandberger (1875) suggested that Zieten's name actually referred to a large specimen of *Megalotachea silvana* (Klein); but as Zieten's originals were lost, his species could no longer be identified with any certainty and hence the name *inflexa* Zieten could not be used. Sandberger argued that it was therefore acceptable to use the name *inflexa* in the sense of Klein, and with Klein as its author. His action could be construed as the introduction of a new nominal species available from Sandberger (1875), albeit knowingly introduced as a junior primary homonym. In this interpretation Klein's material would also be part of the type series. We suggest, however, that Sandberger's action is simply the continuation of a misidentification initiated by Klein (1846).

insignis* Jooss, 1918b, *Poiretia (Palaeoglandina) gracilis (Plate 5, Fig. 9)
Poiretia (Palaeoglandina) gracilis var. *insignis* Jooss, 1918b: 288; Jooss 1924: 189, pl. 11, figs. 1–2.

Syntype: SMNS 106401.

Type localities: Germany: Baden-Württemberg: Stubersheim–Geislingen area, rote Helicidenmergel [red helicid marls] (figured specimen), and others.

Age: Late Middle Miocene ("Vindobonian" = Langhian?).

Taxonomic status: Possibly a junior synonym of *Palaeoglandina gracilis* (Zieten, 1832). Family Oleacinidae.

Remarks: (1) The type material is very poorly preserved. (2) Jooss (1918b) implied that his material came from numerous localities, which he listed subsequently (1924).

insignis* Zieten, 1832, *Helix (Plate 5, Fig. 10a–c)
Helix insignis (Schübler MS) Zieten, 1832: 38, pl. 29, fig. 1.

Neotype: SMNS 23910-a (designated by Höltke & Rasser 2015).

Neotype locality: Germany: Baden-Württemberg: Steinheim am Albuch, Steinheimer Seeschichten [Steinheim Lake beds].

Age: Middle Miocene (MN 7).

Taxonomic status: Valid, either as *Joossia insignis* (fide Binder 2008; Nordsieck 2014) or as *Tropidomphalus insignis* (fide Höltke & Rasser 2015). Family Elonidae (Eloninae) or Helicidae (Ariantinae).

intermedia* Klein, 1846, *Lymnaea socialis (Plate 5, Fig. 11)
Limnaeus socialis var. *intermedia* Klein, 1846: 85, pl. 2, fig. 9a, b [non *Lymnaea intermedia* (Férussac) Lamarck 1822 (: 162)].

Syntypes: SMNS 23905 (3 specimens).

Type locality: Germany: Baden-Württemberg: Steinheim am Albuch, Steinheimer Seeschichten [Steinheim Lake beds].

Age: Middle Miocene (MN 7).

Taxonomic status: Synonym of *Radix socialis* (Zieten, 1832). Family Lymnaeidae (Lymnaeinae).

involutus* Jooss, 1912a, *Planorbis crassus (Plate 5, Fig. 12a–c)
Planorbis crassus var. *involuta* Jooss, 1912a: 90; Jooss 1912b: 169, pl. 4 fig. 9, 9a [non *Planorbis multiformis steinheimensis* β *involutus* Hilgendorf, 1866 (: 485) (made available according to article 45.6.4.1 ICZN by Hyatt 1880 (: 78, pl. 1, figs. d18, e17–e19; as *Planorbis discoideus* var. *involutus*)].

Syntypes: SMNS 23926 (6 specimens, from same locality and stratum).

Type locality: Germany: Bavaria: Dobelbuck ("Hobelsbuck") near Amerbach (Wemding), *Pomatias*-Süßwasserkalk des Riesgebietes [*Pomatias* freshwater limestone of the Ries area].

Age: Early Oligocene (Rupelian).

Taxonomic status: Probably a junior synonym of *Planorbarius cornu* (Brongniart, 1810). Family Planorbidae (Coretinae).

joossi* Pfeffer, 1930, *Trachytachea (Plate 5, Fig. 13a–c)
Trachytachea joossi Pfeffer, 1930: 334, pl. 16, fig. 28, pl. 17, fig. 20 [= p. 184, pl. 2, fig. 29, pl. 3 fig. 20].

Holotype: SMNS 106402.

Type locality: Austria: Grund near Vienna, "Vindobon" Helvetien-Meeressand [Vindobonian Austrian marine sand].

Age: Miocene ("Vindobonian" = Langhian?).

Taxonomic status: Potentially valid in the genus *Megalotachea* (fide Nordsieck 1986: 114). Family Helicidae (Helicinae).

joossii* Miller, 1907, *Helix (Plate 5, Fig. 14a, b)
Helix joossii Miller, 1907: 455, pl. 9, fig. 14.

Syntype: SMNS 27642.

Type locality: Germany: Bavaria: Bachhagel, karst fissure limestone.

Age: Eocene.

Taxonomic status: Possibly valid, but genus attribution uncertain; Wenz (1923) placed the species questionably in *Klikia*, but commented that it might be conspecific with *Loganiopharynx constrictelabiatus* (Miller, 1907). Family Elonidae(?) or Hygromiidae (Hygromiinae)(?).

joossii* Gottschick, 1911, *Strobilus (Plate 5, Fig. 15)
Strobilus Joossii Gottschick, 1911: 502, pl. 7, fig. 16, 16c.

Syntype: SMNS 106403.

Type locality: Germany: Baden-Württemberg: Steinheim am Albuch, *laevis*-zone of Steinheimer Seeschichten [Steinheim Lake beds].

Age: Middle Miocene (MN 7).

Taxonomic status: Valid, as *Strobilops joossii* (Gottschick, 1911). Family Strobilopsidae.

Remarks: Gottschick (1911) mentioned two localities in the Steinheim Basin; thus he must have had more than one specimen at his disposal.

kleini* Gottschick & Wenz, 1916, *Gyraulus multiformis (Plate 5, Fig. 16a–c)
Planorbis laevis Klein, 1846: 79, pl. 1, fig. 26a–c [non Alder, 1838 (: 137)].
Gyraulus multiformis kleini Gottschick & Wenz, 1916: 101, fig. 3.

Syntypes: SMNS 25263/2005 (2 specimens).

Type locality: Germany: Baden-Württemberg: Dächingen and Hohenmemmingen (Klein 1846); the original label gives Hohenmemmingen, but the subsequent one "Däschingen"; Silvanaschichten [Silvana-beds].

Age: Late Early/early Middle Miocene (Burdigalian/Langhian; MN 5).

Taxonomic status: Valid, as *Gyraulus kleini* Gottschick & Wenz, 1916. Family Planorbidae (Planorbinae).

kleini* Schnabel, 2006, *Triptychia (Triptychia) (Plate 5, Figs. 17–18)
Clausilia grandis Klein, 1846: 73, pl. 1, figs. 16a, b [non *Clausilia similis* var. *grandis* Rossmässler, 1838 (: 17, pl. 34, fig. 469)].
Triptychia (Triptychia) kleini kleini Schnabel, 2006: 147, pl. 3, figs. 32–34.

Lectotype (herein): SMNS 106404-a.

Paralectotypes: SMNS 106404-b (5 specimens).

Type locality: Germany: Baden-Württemberg: Zwiefalten, Silvanaschichten [Silvana-beds].

Age: Late Early/early Middle Miocene (Burdigalian/Langhian; MN 5).

Taxonomic status: Valid, as *Triptychia kleini* Schnabel, 2006. Family Filholiidae.

Remarks: The species was revised by Schnabel (2006), who also coined a new name, since the epithet "*grandis*" was preoccupied. Schnabel (2006), believing the types were lost, designated a neotype from the SMF collection. However, the type series is actually present in Klein's original material in the SMNS collection. Article 75.8 of the ICZN (1999) states: "If, after the designation of a neotype, the name-bearing type (holotype, syntypes, lectotype or previous neotype) of the nominal species-group taxon that was (were) presumed lost is (are) found still to exist, on publication of that discovery the rediscovered material again becomes the name-bearing type and the neotype is set aside (…)". The material in the SMNS collection thus constitutes syntypes. In the species' original description (Klein 1846), the figured specimen is clearly a composite drawn from all the available specimens. Therefore, here we designate as lectotype the aperture fragment, which bears the most important characters for clausilioid taxonomy.

kraussii* Klein, 1846, *Planorbis (Plate 5, Fig. 19a, b)
Planorbis Kraussii Klein, 1846: 80, pl. 1, fig. 28a–c.

Syntypes: SMNS 106405 (5 specimens).

Type locality: Germany: Baden-Württemberg: Steinheim am Albuch, Steinheimer Seeschichten [Steinheim Lake beds].

Age: Middle Miocene (MN 7).

Taxonomic status: Valid, as *Gyraulus kraussii* (Klein, 1846). Family Planorbidae (Planorbinae).

laevis* Klein, 1846, *Planorbis
See *kleini* Gottschick & Wenz, 1916, *Gyraulus multiformis*.

laxa* Gerber, 1996, *Vallonia (Plate 6, Figs. 1–3)
Vallonia laxa Gerber, 1996: 206, figs. 2s, 3a–l, 81f, 82c.

Paratypes: SMNS 106406 (4 specimens) and 106407 (5 specimens), all from type locality and stratum.

Type locality: Germany: Hesse: Frankfurt am Main (Palmengarten); Landschneckenmergel [land snail marl, now Niederrad Formation].

Age: Early Miocene (Burdigalian; MN 3).

Taxonomic status: Valid. Family Valloniidae.

lepida* Wenz, 1919a, *Cepaea (Plate 6, Fig. 4a–c)
Helix pachystoma Klein, 1853: 207, pl. 5, fig. 4 [non Hombron & Jacquinot, 1841 (: 62; as *Helyx Pachystoma* [sic])].
Cepaea lepida Wenz, 1919a: 70.

Syntypes: SMNS 105004 (4 specimens).

Type locality: Germany: Baden-Württemberg: Emerberg near Zwiefalten, in a gully running towards Ober-Wilzingen; Silvanaschichten [Silvana-beds].

Age: Late Early/early Middle Miocene (Karpatian/Badenian; MN 5).

Taxonomic status: Subjective synonym of *Palaeotachea dentula* (Quenstedt, 1867). Family Helicidae (Helicinae).

Remarks: (1) Wenz (1919a) substituted the preoccupied name *Helix pachystoma* Klein, but withdrew this name later (1919b: 64), when he recognized that the earlier name *Helix dentula* Quenstedt referred to the same species. (2) Wenz (1919a: 70) designated as "Typus" of *Cepaea dentula* a specimen from Emerberg near Oberwilzingen in his collection. This is incorrect, because as a substitution name, *Cepaea lepida* has the same name-bearing type as the replaced name, *Helix pachystoma* Klein.

leubii* Miller, 1907, *Helix (Gonostoma) (Plate 6, Fig. 5a–c)
Helix (Gonostoma) Leubii Miller, 1907: 445, pl. 8, fig. 18a–d.

Syntypes: SMNS 36777 (4 specimens).

Type locality: Germany: Baden-Württemberg: Blaustein (Arnegg), karst fissure limestone.

Age: Early Oligocene (Rupelian).

Taxonomic status: Subjective synonym of *Klikia*? *praeosculina* (Miller, 1907) (fide Wenz 1923). Family Elonidae (Klikiinae) or Helicidae (Ariantinae).

lincki* Schütze in Branca & Fraas, 1908, *Planorbis (Coretus) (Plate 6, Fig. 6a–c)
Planorbis (Coretus) Lincki Schütze in Branca & Fraas, 1908: 22, figs. 17–18.

Lectotype (herein): SMNS 11902-a.

Paralectotypes: SMNS 11897-b (2 specimens).

Type locality: Germany: Bavaria: Monheim (Weilheim im Ries), grey freshwater limestone block in Bunter Breccie [varicoloured breccia, Ries ejecta].

Age: Early Oligocene.

Taxonomic status: Potentially valid, as *Planorbarius lincki* (Schütze in Branca & Fraas, 1908). Family Planorbidae (Coretinae).

Remarks: We designate here as lectotype the largest and best preserved specimen (Schütze in Branca & Fraas 1908: fig. 18).

lingulatus* Sandberger, 1875, *Limax (Plate 6, Fig. 7)
Limax lingulatus Sandberger, 1875: 603.

Syntype: SMNS 22756.

Type locality: Germany: Baden-Württemberg: Biberach a. d. Riss, mittlere Silvanaschichten [middle Silvana-beds].

Age: Late Early/early Middle Miocene (Burdigalian/Langhian; zones MN 5/6).

Taxonomic status: Potentially valid. Family Limacidae.

maior* Miller, 1900, *Helix (Campylaea) insignis (Plate 6, Fig. 8a–c)
Helix (Campylaea) insignis var. *maior* Miller, 1900: 394, pl. 7, fig. 1 [non *Helix major* Binney 1837 (: 473, pl. 12), and others before 1900].

Holotype: SMNS 4779-a.

Type locality: Germany: Baden-Württemberg: Steinheim am Albuch, Steinheimer Seeschichten [Steinheim Lake beds].

Age: Middle Miocene (MN 7).

Taxonomic status: Synonym of *Joossia insignis* (Zieten, 1832) (fide Binder 2008; Nordsieck 2014) or *Tropidomphalus insignis* (fide Höltke & Rasser 2015). Family Elonidae (Eloninae) or Helicidae (Ariantinae).

milleri* Fulton, 1915, *Helicina (Plate 6, Fig. 9a, b)
Helicina(?) *trochiformis* Miller, 1907: 452, pl. 9, fig. 4 [non G.B. Sowerby II, 1842 (: 7)].
Helicina milleri Fulton, 1915: 241.

Syntypes: SMNS 27633 (4 specimens).

Type locality: Germany: Bayern: Bachhagel, karst fissure limestone.

Age: Eocene.

Taxonomic status: Valid, as *Proserpina*? *milleri* (Fulton, 1915); tentative generic allocation by Kadolsky (2008a). Family Proserpinidae.

milleri* Jooss, 1913, *Lymnaea turrita (Plate 6, Fig. 10)
Limnaea turrita var. *milleri* Jooss, 1913: 61, figs. 5–6.

Syntypes: SMNS 106408 (1 specimen) and 106409 (1 specimen).

Type locality: Germany: Baden-Württemberg: Zwiefalten (Mörsingen), Silvanaschichten [Silvana-beds].

Age: Late Early/early Middle Miocene (Burdigalian/Langhian; MN 5).

Taxonomic status: Subjective synonym of *Radix socialis* (Zieten, 1832). Family Lymnaeidae (Lymnaeinae).

milleri* Wenz, 1919, *Cochlicopa (Plate 6, Fig. 11)
Cionella exigua Miller, 1907: 446, pl. 8, fig. 22a, b [non *Bulimus (Cochlicopa) subcylindricus* var. *exigua* Moquin-Tandon, 1856 (: 304)]
Cochlicopa milleri Wenz, 1919: 71.

Syntype: SMNS 27628.

Type locality: Germany: Baden-Württemberg: Blaustein (Arnegg), karst fissure limestone.

Age: Early Oligocene (Rupelian).

Taxonomic status: Valid, as *Cochlicopa milleri* Wenz, 1919. Family Cochlicopidae.

Remarks: (1) Wenz (1919) substituted the name *Cionella exigua* Miller as a putative junior homonym of *Achatina exigua* Menke, 1830 (: 29), which is, however, a nomen nudum. Moquin-Tandon (1856) eventually provided a diagnosis for the name *exigua* "Menke" and made it thus an available name for a modern form of *Cochlicopa*. (2) Miller mentioned several specimens from Arnegg and one from Eselsberg, which were kept in the Munich museum.

milleri* Pilsbry, 1909, *Poiretia (Plate 6, Fig. 12)
Glandina ovata (Sandberger MS.) Miller, 1907: 441, pl. 7, fig. 9a, b [non *Glandina truncata* var. *ovata* Dall, 1890 (: 19)].
Poiretia milleri Pilsbry, 1909: 113.

Lectotype (herein): SMNS 27617-b.

Paralectotype: SMNS 27617-a (1 specimen).

Type locality: Germany: Baden-Württemberg: Blaustein (Arnegg), karst fissure limestone.

Age: Early Oligocene (Rupelian).

Taxonomic status: Valid, as *Palaeoglandina milleri* (Pilsbry, 1909). Family Oleacinidae.

Remarks: Here we designate the best preserved specimen (and likely the base for the original illustration) as lectotype.

minima* Klein, 1853, *Succinea (Plate 6, Fig. 13)
Succinea minima Klein, 1853: 205.

Syntypes: SMNS 106410 (2 specimens).

Type locality: Germany: Baden-Württemberg: near Mörsingen, Silvanaschichten [Silvana-Beds].

Age: Late Early/early Middle Miocene (Burdigalian/Langhian; MN 5).

Taxonomic status: Valid, as *Oxyloma minima* (Klein, 1853) (fide Harzhauser et al. 2014). Family Succineidae (Succineinae).

Remarks: Both specimens of Klein's original material fit the original description well and none was figured.

miocaenica* Gottschick & Wenz, 1927, *Trochoidea (Plate 6, Fig. 14a, b)
Trochoidea miocaenica Gottschick & Wenz, 1927: 149, pl. 8, fig. 3a–c.

Syntype: SMNS 15817-131.

Type locality: Germany: Baden-Württemberg: Mörsingen near Riedlingen, Silvanaschichten [Silvana-beds].

Age: Late Early/early Middle Miocene (Burdigalian/Langhian; MN 5).

Taxonomic status: Valid, as *Miodiscula miocaenica* (Gottschick & Wenz, 1927) (fide Nordsieck 2014). Family Helicodontidae?.

Remarks: Gottschick & Wenz (1927) mention four specimens.

moersingensis* Jooss, 1918b, *Janulus (Plate 6, Fig. 15a–c)
Janulus mörsingensis Jooss, 1918b: 289.

Holotype: SMNS 106411.

Type locality: Germany: Baden-Württemberg: Zwiefalten (Mörsingen), Silvanaschichten [Silvana-beds].

Age: Late Early/early Middle Miocene (Burdigalian/Langhian; MN 5).

Taxonomic status: Valid. Family Gastrodontidae.

moguntiaca* Wenz, 1915, *Vallonia (Plate 6, Fig. 16a, b)
Vallonia moguntiaca Wenz, 1915: 41.

Neotype: SMNS 106412 (designated by Gerber 1996).

Type locality: Germany: Rheinland-Pfalz: Budenheim, Hydrobienschichten [*Hydrobia* Beds, now Wiesbaden Formation].

Age: Early Miocene (Aquitanian; MN 2a/b).

Taxonomic status: Synonym of *Vallonia lepida* (Reuss, 1849) (fide Gerber 1996). Family Valloniidae.

mucronata* Klein, 1846, *Helix (Plate 6, Fig. 17)
Helix mucronata Klein, 1846: 72, pl. 1, fig. 15).

Holotype: SMNS 106413.

Type locality: Germany: Baden-Württemberg: Ehingen (Staffelsberg), Silvanaschichten [Silvana-beds].

Age: Late Early/early Middle Miocene (Burdigalian/Langhian, MN 5).

Taxonomic status: Synonym of *Leucochroopsis kleinii* (Klein, 1846) (fide Wenz 1923). Family Hygromiidae (Hygromiinae).

obtusangula* Krauss, 1852, *Neritina (Plate 6, Fig. 18a, b)
Neritina obtusangula Krauss, 1852: 145.

Holotype: SMNS 106414.

Type locality: Germany: Baden-Württemberg: Kirchberg an der Iller, Kirchberg Formation.

Age: Late Early Miocene (Burdigalian/Ottnangian, MN 4b).

Taxonomic status: Valid, as *Theodoxus obtusangula* (Krauss, 1852) (fide Salvador et al. submitted). Family Neritidae (Neritininae).

Remarks: The species epithet is derived from Lat. *angulus* (an angle); as such, "angula" is still a substantive with a variant gender ending and therefore not declensable.

oligocaenica* Miller, 1907, *Clausilia (Plate 6, Fig. 19)
Clausilia oligocaenica Miller, 1907: 449, fig. 29.

Holotype: SMNS 27647.

Type locality: Germany: Baden-Württemberg: Blaustein (Arnegg), karst fissure limestone.

Age: Early Oligocene (Rupelian).

Taxonomic status: Valid, as *Triptychia oligocaenica* (Miller, 1907) (fide Schnabel 2007). Family Filholiidae.

orbicularis* Klein, 1846, *Helix (Plate 6, Fig. 20a, b)
Helix orbicularis Klein, 1846: 71, pl. 1, fig. 13a, b.

Syntype: SMNS 106415.

Type locality: Germany: Baden-Württemberg: Ulm (Michelsberg), Silvanaschichten [Silvana-beds].

Age: Late Early/early Middle Miocene (Burdigalian/Langhian; MN 5).

Taxonomic status: Valid, as *Pleurodiscoides* (*Pleurodiscoides*) *orbicularis* (Klein, 1846) (fide Nordsieck 2014). Family Pleurodiscidae.

Remarks: Klein (1846) reported the species as rare, which does not exclude that he had more than one specimen at his disposal.

ovata* Miller ,1907, *Glandina
See *milleri* Pilsbry, 1909, *Poiretia*.

ovulina* Miller, 1907, *Oleacina (Plate 6, Fig. 21)
Oleacina ovulina Miller, 1907: 453, pl. 9, fig. 9.

Syntype: SMNS 27637.

Type locality: Germany: Bavaria: Bachhagel, karst fissure limestone.

Age: Eocene.

Taxonomic status: Synonym of *Pseudoleacina elongata* (Miller, 1907). Family Oleacinidae.

Remarks: Miller (1907) mentioned 3 specimens.

pachygastra* Miller, 1900, *Pupa (Torquilla) schuebleri (Plate 7, Fig. 1)
Pupa pachygastra Fraas, 1882: 174 [nomen nudum].
Pupa (Torquilla) Schübleri var. *pachygastra* (Fraas MS.) Miller, 1900: 397, pl. 7, fig. 12 [non *Pupa pachygastra* Rossmässler, 1837 (: 11, pl. 23, fig. 314, *P. oblongata* on plate)].

Syntype: SMNS 106416.

Type locality: Germany: Baden-Württemberg: Steinheim am Albuch, Steinheimer Seeschichten [Steinheim Lake beds].

Age: Middle Miocene (MN 7).

Taxonomic status: Valid, as *Granaria crassiventrosa* nom. nov. (revised by Höltke & Rasser 2013, as *Granaria pachygastra*). Family Chondrinidae.

Remarks: (1) The single specimen in the SMNS collection is the original of Fraas (1882). Höltke & Rasser (2013)

argued that its type status is uncertain because it cannot be established that Miller (1900) based his diagnosis of the "variety" *pachygastra* on this specimen. But Miller gave a bibliographic reference to Fraas' publication, whereby it is included in the type series. It is unknown whether Miller had additional specimens at his disposal. (2) As the name *pachygastra* is preoccupied, herein we substitute it by *Granaria crassiventer* nom. nov. The epithet, *crassiventer*, is the Latin translation of the Greek *pachygastra*, meaning "fat belly". It is a noun in apposition, i.e., it is unchangeable. Article 23.9.5 ICZN is not applicable in this case, because both homonyms are still placed in the genus *Granaria*; *pachygastra* Rossmässler, 1837 was used as a valid name by Pilsbry (1918: 302, pl. 42 fig. 7, 10, 11; as *Abida frumentum pachygastra*) and is listed as a subjective synonym of *Granaria frumentum illyrica* (Rossmässler, 1835) by Féher et al. (2010: 203, figs. 3K–L).

pachystoma* Klein, 1853, *Helix
See *lepida* Wenz, 1919, *Cepaea*.

palustris* Clessin, 1877, *Ancylus (Plate 7, Fig. 2)
Ancylus palustris Clessin, 1877: 41.

Holotype: SMNS 106417.

Type locality: Germany: Bavaria: Nittendorf (Undorf), mittlere Silvanaschichten [middle Silvana-beds].

Age: Late Early/early Middle Miocene (Karpatian–Badenian; MN 5).

Taxonomic status: Synonym of *Ferrissia deperdita* (Desmarest, 1814). Family Planorbidae (Ancylinae).

physoides* Miller, 1907, *Clausilia (Plate 7, Fig. 3)
Clausilia physoides (Balea?) Miller, 1907: 449, fig. 30.

Holotype: SMNS 27648.

Type locality: Germany: Baden-Württemberg: Blaustein (Arnegg), karst fissure limestone.

Age: Early Oligocene (Rupelian).

Taxonomic status: Valid, as *Neniopsis physoides* (Miller, 1907) (fide Nordsieck 2000, 2007). Family Clausiliidae (Eualopiinae).

planus* Clessin, 1885, *Strobilus (Plate 7, Fig. 4a, b)
Strobilus planus Clessin, 1885: 80, pl. 7, fig. 8.

Holotype: SMNS 106418.

Type locality: Germany: Bavaria: Nittendorf (Undorf), Silvanaschichten [middle Silvana-beds].

Age: Late Early/early Middle Miocene (Karpatian/Badenian; MN 5).

Taxonomic status: Subspecies of *Strobilops uniplicata* (Braun in Walchner, 1851). Family Strobilopsidae.

platystoma* Klein, 1853, *Planorbis (Plate 7, Fig. 5a–c)
Planorbis platystoma Klein, 1853: 219, pl. 5, fig. 16 [non Edwards, 1852 (: 103, pl. 15, fig. 2a–d)].

Syntypes: SMNS 25211/2005 (3 specimens).

Type locality: Germany: Baden-Württemberg: Zwiefalten (Mörsingen), Silvanaschichten [Silvana-beds].

Age: Late Early/early Middle Miocene (Burdigalian/Langhian; MN 5).

Taxonomic status: Junior synonym of *Planorbarius cornu* (Brongniart, 1810). Family Planorbidae (Coretinae).

praecostatus* Jooss, 1918b, *Zonites (Aegopis) (Plate 7, Fig. 6a, b)
Zonites (Aegopis) praecostatus Jooss, 1918b: 288; Jooss 1924: 191, pl. 11, figs. 3–4.

Syntype: SMNS 65614.

Type localities: Germany: Baden-Württemberg: Stubersheim–Geislingen, rote Helicidenmergel [red helicid marls] (figured specimen) and other localities.

Age: Late Middle Miocene ("Vindobonian" = Langhian?).

Taxonomic status: Possibly valid, but see below. Family Archaeozonitidae.

Remarks: (1) Type material is very poorly preserved and *A. praecostatus* could be a synonym of a previously described *Archaeozonites* species. (2) Jooss (1918b) implied that he included material from several localities in his species; these are listed subsequently (Jooss 1924).

praeosculina* Miller, 1907, *Helix (Gonostoma) (Plate 7, Fig. 7a, b)
Helix (Gonostoma) praeosculina Miller, 1907: 445, pl. 8, fig. 17a–c.

Syntypes: SMNS 27624 (3 specimens).

Type locality: Germany: Baden-Württemberg: Blaustein (Arnegg), karst fissure limestone.

Age: Early Oligocene (Rupelian).

Taxonomic status: Valid, as *Klikia*? *praeosculina* (Miller, 1907). Family Elonidae (Klikiinae) or Helicidae (Ariantinae).

procellaria* Jooss, 1918b, *Hyalinia (Hyalinia) (Plate 7, Figs 8a–c)
Hyalinia (Hyalinia) procellaria Jooss, 1918b: 289.

Syntypes: SMNS 106419 (2 specimens).

Type locality: Germany: Baden-Württemberg: Zwiefalten (Mörsingen), Silvanaschichten [Silvana-beds].

Age: Late Early/early Middle Miocene (Burdigalian/Langhian; MN 5).

Taxonomic status: Valid, as *Aegopinella*? *procellaria* (Jooss, 1918b) (fide Nordsieck 2014). Family Oxychilidae (Godwiniinae).

protocrescens* Nützel & Bandel, 1993, *Gyraulus (Plate 7, Figs. 9–11)
Gyraulus protocrescens Nützel & Bandel, 1993: 332, pl. 1, figs. 3–4, pl. 3, figs. 2–3.

Holotype: SMNS 25669.

Paratypes: SMNS 25668 (1 specimen) and 25711 (1 specimen).

Type locality: Germany: Baden-Württemberg: Steinheim am Albuch, Steinheimer Seeschichten [Steinheim Lake beds], transition of *Gyraulus steinheimensis* zone to *G. tenuis* zone.

Age: Middle Miocene (MN 7).

Taxonomic status: Valid. Family Planorbidae (Planorbinae).

pumilio* Jooss, 1918b, *Punctum (Plate 7, Figs. 12–13b)
Punctum pumilio Jooss, 1918b: 292.

Syntypes: SMNS 106420 (2 specimens, from same locality and stratum).

Type locality: Germany: Baden-Württemberg: Dischingen, mittlere Silvanaschichten [middle Silvana-beds].

Age: Early Late Miocene (Tortonian).

Taxonomic status: Valid. Family Punctidae.

pyramidalis* Jooss, 1912a, *Zonites (Archaeozonites?) (Plate 7, Fig. 14a–c)
Zonites (Archaeozonites?) pyramidalis Jooss, 1912a: 89; Jooss 1912b: 163, pl. 4, fig. 4, 4a.

Holotype: SMNS 23917.

Type locality: Germany: Bavaria: Dobelbuck ("Hobelsbuck") near Amerbach (Wemding), *Pomatias*-Süßwasserkalk des Riesgebietes [*Pomatias* freshwater limestone of the Ries area].

Age: Early Oligocene (Rupelian.)

Taxonomic status: Valid, as *Omphalosagda pyramidalis* (Jooss, 1912a) (fide Kadolsky herein). Family Archaeozonitidae.

quadridentata* Klein, 1853, *Pupa (Plate 7, Fig. 15)
Pupa quadridentata Klein, 1853: 216, pl. 5, fig. 13.

Syntypes: SMNS 106421 (12 specimens, from Zwiefalten).

Type localities: Germany: Baden-Württemberg: Zwiefalten (Mörsingen), Silvanaschichten [Silvana-beds].

Age: Late Early/early Middle Miocene (Burdigalian/Langhian; MN 5).

Taxonomic status: Junior synonym of *Gastrocopta acuminata* (Klein, 1846) (fide Manganelli & Giusti 2000). Family Gastrocoptidae.

randeckiana* Kranz, 1908, *Clausilia (Plate 7, Figs. 16–17)
Clausilia randeckiana Kranz, 1908: 590, fig. 2.

Lectotype: SMNS 101212 (designated by Salvador et al. 2015).

Paralectotypes: SMNS 101213 (2 specimens).

Type locality: Germany: Baden-Württemberg: Randeck Maar, gelber Tuff [light/yellow tuffite].

Age: Late Early/early Middle Miocene (Karpatian–Badenian; MN 5).

Taxonomic status: Valid, as *Triptychia randeckiana* (Kranz, 1908) (fide Schnabel 2006). Family Filholiidae.

risgoviensis* Jooss, 1912a, *Zonites (Archaeozonites) (Plate 7, Figs. 18a, b)
Zonites (Archaeozonites) risgoviensis Jooss, 1912a: 89; Jooss, 1912b: 162, pl. 4, fig. 3, 3b.

Syntypes: SMNS 23915 (1 specimen) and 23916 (2 specimens).

Type locality: Germany: Bavaria: Dobelbuck ("Hobelsbuck") near Amerbach (Wemding), *Pomatias*-Süßwasserkalk des Riesgebietes [*Pomatias* freshwater limestone of the Ries area].

Age: Early Oligocene (Rupelian).

Taxonomic status: Subjective synonym of *Omphalosagda pyramidalis* (Jooss, 1912) (fide Kadolsky herein). Family Archaeozonitidae.

rotundostomus* Nützel & Bandel, 1993, *Gyraulus (Plate 7, Figs. 19–21)
Gyraulus rotundostomus Nützel & Bandel, 1993: 348, pl. 8, figs. 5–7.

Holotype: SMNS 25705.

Paratypes: SMNS 25703 (1 specimen) and 25710 (5 specimens).

Type locality: Germany: Baden-Württemberg: Steinheim am Albuch, Steinheimer Seeschichten [Steinheim Lake beds], *Gyraulus oxystoma* zone.

Age: Middle Miocene (MN 7).

Taxonomic status: Valid. Family Planorbidae (Planorbinae).

salomoni* Geyer, 1914, *Pomatias (Plate 7, Fig. 22)
Pomatias salomoni Geyer, 1914: 136, pl. 2, figs. 5, 6, 8, 13.

Lectotype (herein): SMNS 13519-a.

Paralectotype: SMNS 13519-b (1 specimen and numerous fragments)

Type locality: Germany: Bayern: Buch bei Illertissen, diluviale Nagelfluh [diluvial (i.e., Pleistocene) gravel].

Age: Pleistocene.

Taxonomic status: Possibly valid, as *Cochlostoma salomoni* (Geyer, 1914). Family Diplommatinidae (Cochlostomatinae).

Remarks: We designate here as lectotype the only completely preserved specimen (Geyer 1914: fig. 13).

sandbergeri* Clessin, 1885, *Amalia (Plate 7, Fig. 23)
Amalia sandbergeri Clessin, 1885: 72.

Syntypes: SMNS 22754 (2 specimens).

Type locality: Germany: Bavaria: Nittendorf (Undorf), mittlere Silvanaschichten [middle Silvana-beds].

Age: Late Early/early Middle Miocene (Karpatian/Badenian; MN 5).

Taxonomic status: Valid, as *Milax sandbergeri* (Clessin, 1885). Family Milacidae.

saueri* Geyer, 1914, *Pomatias scalarinus (Plate 7, Fig. 24)
Pomatias scalarinus saueri Geyer, 1914: 129, pl. 2, figs. 1–2.

Lectotype (herein): SMNS 106422-a.

Paralectotype: SMNS 106422-b (1 specimen) and 106423 (6 specimens).

Type locality: Germany: Baden-Württemberg: Bietigheim-Bissingen, Enzschotter [River Enz gravel].

Age: Pleistocene.

Taxonomic status: Possibly valid, as *Cochlostoma scalarinum saueri* (Geyer, 1914). Family Diplommatinidae (Cochlostomatinae).

Remarks: We designate here as lectotype the only completely preserved specimen (Geyer 1914: fig. 1).

scalaris* Miller, 1907, *Cyclotus
See *arneggensis* Wenz, 1923, ?*Pomatias.*

scalaris* Miller, 1900, *Planorbis (Dilatata) kraussii (Plate 7, Fig. 25)
Planorbis (Dilatata) Kraussii var. *scalaris* Miller, 1900: 405.

Holotype: SMNS 106424.

Type locality: Germany: Baden-Württemberg: Steinheim am Albuch, Steinheimer Seeschichten [Steinheim Lake beds].

A g e : Middle Miocene (MN 7).

T a x o n o m i c s t a t u s : Unidentifiable teratological specimen of *Gyraulus* sp.; attribution to *Gyraulus kraussii* (Klein, 1846), fide Miller (1900). Family Planorbidae (Planorbinae).

schaefferiana* O. Boettger, 1877, *Clausilia (Emarginaria) (Plate 7, Fig. 26)
Clausilia (Emarginaria) Schaefferiana O. Boettger, 1877: 79, pl. 3, figs. 28a–f, 29.

L e c t o t y p e (h e r e i n) : SMNS 106425-a.

P a r a l e c t o t y p e s : SMNS 106425-b (1 specimen) and 106426 (1 specimen).

T y p e l o c a l i t y : Germany: Bavaria: Nittendorf (Undorf), Braunkohlenthon [lignitic clay], mittlere Silvanaschichten [middle Silvana-beds].

A g e : Late Early/early Middle Miocene (Karpatian/Badenian; MN 5).

T a x o n o m i c s t a t u s : Valid, as *Emarginaria schaefferiana* (O. Boettger, 1877) (fide Nordsieck 1981, 2000). Family Clausiliidae (Clausiliinae).

R e m a r k s : O. Boettger (1877) figured all three specimens. Here we designate as lectotype the aperture fragment, which bears the most important characters for clausilioid taxonomy.

schneideri* Jooss, 1924, *Cepaea (Plate 8, Fig. 1a, b)
Cepaea schneideri Jooss, 1924: 204, pl. 11, figs. 28–31.

S y n t y p e s : SMNS 106427 (2 specimens).

T y p e l o c a l i t y : Germany: Baden-Württemberg: Winterlingen (Harthausen auf der Scher), rote Helicidenmergel [red helicid marls].

A g e : Late Early Miocene (Late Burdigalian; MN 4).

T a x o n o m i c s t a t u s : Unknown. Family Helicidae (Helicinae).

schneidi* Jooss, 1912b, *Ericia (Plate 8, Fig. 2)
Cyclostoma (Ericia) schneidti Jooss, 1912a: 90 [nomen nudum].
Ericia schneidi Jooss, 1912b: 172, 174, pl.4 fig. 13, 13b.

S y n t y p e s : SMNS 23925 (25 specimens).

T y p e l o c a l i t y : Germany: Bavaria: Dobelbuck ("Hobelsbuck") near Amerbach (Wemding), *Pomatias*-Süßwasserkalk des Riesgebietes [*Pomatias* freshwater limestone of the Ries area].

A g e : Early Oligocene (Rupelian).

T a x o n o m i c s t a t u s : Valid, as *Pomatias (Neobembridgia) antiquus schneidi* (Jooss, 1912b) (fide Kadolsky 2014). Family Pomatiidae (Pomatiinae).

R e m a r k s : Jooss (1912a) introdued the taxon with the words "*Ericia schneidti* is a smaller *Cyclostoma* from the group of *C. (Ericia) bisulcatum* Zieten" [translated from German], which is deemed insufficient as a diagnosis. Jooss dedicated the taxon to Theodor Schneid, whose name he consistently misspelt. Only in the follow-up publication (1912b) did Jooss provide a diagnosis, figure and the correct spelling of the name of the person to be honoured. Even if the original words (1912a) would satisfy the requirement of a diagnosis or definition (article 12.1 ICZN), *schneidti* is to be treated as an incorrect original spelling and to be corrected to *schneidi* (see article 32.5.1 ICZN, in particular the example).

schuebleri* Klein, 1846, *Pupa (Plate 8, Fig. 3)
Pupa antiqua (Schübler MS) Zieten, 1832: 39, pl. 29, fig. 7 [non Mathéron, 1832 (: 56, pl. 1, figs. 4–5)]
Pupa Schübleri Klein, 1846: 74, pl. 1, fig. 18.

N e o t y p e : SMNS 100110-1.

T y p e l o c a l i t y : Germany: Baden-Württemberg: Steinheim am Albuch, Steinheimer Seeschichten [Steinheim Lake beds].

A g e : Middle Miocene (MN 7).

T a x o n o m i c s t a t u s : Valid, as *Granaria schuebleri* (Klein, 1846) (fide Höltke & Rasser 2013). Family Chondrinidae.

R e m a r k s : (1) The neotype defined by Höltke & Rasser (2013) is also the neotype for *Pupa antiqua* Zieten, as Klein proposed the name *schuebleri* as a substitute name for *Pupa antiqua* (article 72.7 ICZN). (2) The name *Pupa antiqua* has been published nearly simultaneously by Mathéron and Zieten late in 1832. Höltke & Rasser (2013) discussed the question of precedence, which is here briefly restated, updated and formally resolved in accordance with the IZCN. Mathéron's work appeared in the September/October issue of volume 3 of the Annales des Sciences et de l'Industrie du Midi de la France, i.e., most likely in or after October 1832. Heft 5–6 of Zieten's work is reported in Neues Jahrbuch für Mineralogie, Geognosie, Geologie und Petrefaktenkunde 1833, issue 1. This issue contains letters to the editors dated till 22.11.1832; for Heft 5-6 of Zieten's work to be reported in that issue, it must have been received by the editors at a similar time. The previous issue of this journal (1832[4]) contains letters dated till 10.8.1832, i.e., Zieten's Heft 5-6 had not been received by that date by the editors. The SMNS copy of Zieten's work states only "second half of 1832". The date can now be narrowed down to "after 10.8.1832" and "before 22.11.1832". (3) As the precedence between Mathéron's and Zieten's works cannot be established with any certainty, we determine hereby as First Revisers (article 24.2.1 ICZN) that Mathéron's work shall be accorded precedence over Zieten's Heft 5-6. This is in accordance with the actions of Klein (1846) and Höltke & Rasser (2013). Thus, *Pupa antiqua* Mathéron, 1832 will have precedence over *Pupa antiqua* Zieten, 1832, for which the substitute *Pupa schuebleri* Klein, 1846 becomes the valid name. *Pupa subantiqua* A. d'Orbigny, 1850 (: 208) thus becomes an unnecessary replacement name for *Pupa antiqua* Mathéron, 1832.

semiconvexa* Sandberger, 1875, *Hydrobia (Plate 8, Figs. 4–5)
Litorinella acuta: Krauss, 1852: 142 [non *Cyclostoma acutum* Draparnaud, 1805].
Hydrobia semiconvexa Sandberger, 1875: 561.

P a r a l e c t o t y p e s : SMNS 2864 (6 specimens), 106428 (9 specimens; Figs. 4–5) and 106429 (7 specimens); leg. Gatekunst 1851.

T y p e l o c a l i t y : Germany: Baden-Württemberg: Leipheim, Kirchberg Formation. The paralectotypes in SMNS are from Kirchberg an der Iller (now Illerkirchberg), "bläulichgrauen weichen Thon" [bluish-gray soft clay layer] of the Kirchberg Formation.

A g e : Late Early Miocene (Burdigalian/ Ottnangian, MN 4b).

T a x o n o m i c s t a t u s : The type series is a mixture of four different species. The lectotype, designated by Kadolsky (this volume), and the remaining 8 specimens from the lot in Sandberger's collection in the MUWI are for the time being

classified as *"Hydrobia" semiconvexa* SANDBERGER, 1875 (family Hydrobiidae), but may belong to *Heleobia* (family Cochliopidae). Lot SMNS 106428 consists of 9 specimens of *Nematurella zilchi* SCHLICKUM, 1960; lot SMNS 2864 consists of 2 *Nematurella* sp. (white fosssils) and 7 *Ctyrokya conoidea* (KRAUSS, 1852) (blackish fossils); lot SMNS 106429 consists of two rock fragments with many shells of *Nematurella* sp., *Ctyrokya conoidea* and *Bithynia glabra* (ZIETEN, 1832).

Remarks: (1) SANDBERGER's own type material is preserved in MUWI and is the species so identified by SCHLICKUM (1960) and subsequent authors in the genus *Hydrobia*. Because SANDBERGER also included "*Litorinella acuta* BRAUN" sensu KRAUSS (1852) in his *Hydrobia semiconvexa*, KRAUSS' material is part of the type series. KRAUSS received his material from Fr. GATEKUNST of Ulm, whom he mentions [1852: 136] as a punctual collector providing fossils to the Königliche Naturaliencabinet. This material, however, is a mixture of several species (see above). Although *Ctyrokya conoidea*, *Bithynia glabra* and all shells which are not white do not agree with the data published by KRAUSS for his "*Litorinella acuta*", lots SMNS 2864 and SMNS 106429 were labelled *Hydrobia semiconvexa* by SANDBERGER. (2) KRAUSS, as well as other contemporaneous authors, cite A. BRAUN 1851 as the author of "*Litorinella acuta*". But this species is based on *Cyclostoma acutum* DRAPARNAUD 1805, as BRAUN's reference to modern occurrences in the Mediterranean lagoons of France make obvious. *Cyclostoma acutum* DRAPARNAUD 1805 is the type species of *Hydrobia* HARTMANN 1821 and of *Litorinella* A. BRAUN 1843.

serratiliniformis* GEYER, 1914, *Neritina (Plate 8, Figs. 6a, b)
Neritina serratiliniformis GEYER, 1914: 131, pl. 2, figs. 7, 9–12.

Lectotype (herein): SMNS 13514-a.

Paralectotype: SMNS 13514-b (39 specimens).

Type locality: Germany: Baden-Württemberg: Bietigheim-Bissingen, Enzschotter [gravels of the river Enz].

Age: Pleistocene.

Taxonomic status: Valid, as *Theodoxus serratiliniformis* (GEYER, 1914) (fide GLÖER 2002). Family Neritidae (Neritininae).

Remarks: We designate here as lectotype the best preserved specimen, also figured in the original description (GEYER 1914: fig. 12).

silvana* KLEIN, 1853, *Helix (Plate 8, Fig. 7a–c)
Helix silvana KLEIN, 1853: 205, pl. 5, fig. 2.

Syntype: SMNS 22738.

Type locality: Germany: Baden-Württemberg: Zwiefalten (near Mörsingen), Silvanaschichten [Silvana-beds].

Age: Late Early/early Middle Miocene (Burdigalian/Langhian; MN 5).

Taxonomic status: Valid, as *Megalotachea silvana* (KLEIN, 1853) (revised by HÖLTKE in preparation). Family Helicidae (Helicinae).

Remarks: KLEIN (1853) reported the species as fairly rare ("seltener"), which does not exclude that he had more than one specimen at his disposal.

sparsa* KRAUSS, 1852, *Neritina (Plate 8, Fig. 8)
Neritina sparsa KRAUSS, 1852: 145.

Syntypes: SMNS 106430 (7 specimens).

Type locality: Germany: Baden-Württemberg: Kirchberg an der Iller, Kirchberg Formation.

Age: Late Early Miocene (Burdigalian/Ottnangian, MN 4b).

Taxonomic status: Synonym of *Theodoxus cyrtocelis* (KRAUSS, 1852) (SALVADOR et al. submitted). Family Neritidae (Neritininae).

steinheimensis* KLEIN, 1846, *Helix (Plate 8, Fig. 9a–c)
Helix Steinheimensis KLEIN, 1846: 70, pl. 1, fig. 10a, b.

Holotype: SMNS 106431.

Type locality: Germany: Baden-Württemberg: Steinheim am Albuch, Steinheimer Seeschichten [Steinheim Lake Formation].

Age: Middle Miocene (MN 7).

Taxonomic status: Synonym of *Joossia insignis* (ZIETEN, 1832) (BINDER 2008; NORDSIECK 2014) or *Pseudochloritis insignis* (fide HÖLTKE & RASSER 2015). Family Elonidae (Eloninae) or Helicidae (Ariantinae).

steinheimensis* JOOSS, 1918b, *Klikia (Klikia) coarctata (Plate 8, Fig. 10a–c)
Klikia (Klikia) coarctata var. *steinheimensis* JOOSS, 1918b: 294.

Syntype?: SMNS 106432.

Type locality: Germany: Baden-Württemberg: Steinheim am Albuch, Steinheimer Seeschichten [Steinheim Lake beds].

Age: Middle Miocene (MN 7).

Taxonomic status: Synonym of *Apula coarctata* (KLEIN, 1853). Family Elonidae (Klikiinae) or Helicidae (Ariantinae).

Remarks: There is no indication in the specimen's original label that it is a type (all the other material from JOOSS' collection have such indication). Nevertheless, there is a second label signed by W. R. SCHLICKUM stating that it is a lectotype. The original description is not accompanied by a figure to verify this claim and a lectotype designation has, to our knowledge, never been published. Therefore, the status of the present specimen remains unknown.

striata* KLEIN, 1846, *Lymnaea socialis (Plate 8, Fig. 11)
Limnaeus socialis var. *striata* KLEIN, 1846: 85, pl. 2, fig. 10a, b [?non *Limnaeus striatus* ZIETEN, 1832 (: pl. 30, fig. 5)].

Syntypes: SMNS 23904 (2 specimens).

Type locality: Germany: Baden-Württemberg: Steinheim am Albuch, Steinheimer Seeschichten [Steinheim Lake beds].

Age: Middle Miocene (MN 7).

Taxonomic status: Synonym of *Radix socialis* (ZIETEN, 1832). Family Lymnaeidae (Lymnaeinae).

Remarks: KLEIN stated that this variety was "probably" *Limnaeus striatus* ZIETEN, 1832, i.e., he introduced knowingly a nominal taxon which under the current Code is a junior primary homonym, but in KLEIN's time "varieties" were not considered to compete for homonymy with species names.

subapicalis* SANDBERGER, 1872, *Helix (Plate 8, Fig. 12a–c)
Helix subapicalis SANDBERGER, 1872: pl. 21, fig. 8, 8b.
Helix (Fruticicola) leptoloma var. *subapicalis* SANDBERGER 1875: 380 (ref. pl. 21, figs. 8, 8b).

Syntypes: SMNS 14917 (2 specimens, from Donaurieden).

Type localities: Germany: Baden-Württemberg: Thalfingen, Eckingen, Göttingen (near Ulm), Erbach (Donaurieden), obere Rugulosa-Schichten [upper Rugulosa-beds].

Age: Early Miocene (Aquitanian; MN 2).

Taxonomic status: Synonym of *Leucochroopsis apicalis* (Reuss, 1860). Family Hygromiidae (Hygromiinae).

subcostata* Clessin, 1913, *Helix (Vallonia) (Plate 8, Figs. 13–15)
Helix (Vallonia) subcostata Clessin, 1913: 109 [non *Vallonia lepida* var. *subcostata* O. Boettger, 1903a (: 74); nec *Helix reboudiana subcostata* Bourguignat, 1863 (: 213, pl. 21, fig. 23)].

Lectotype: SMNS 106433 (designated by Gerber 1996).

Paralectotypes: SMNS 45162/2005 (9 specimens).

Type locality: Germany: Bavaria: Nittendorf (Undorf), mittlere Silvanaschichten [middle Silvana-beds].

Age: Late Early/early Middle Miocene (Karpatian–Badenian; MN 5).

Taxonomic status: Synonym of *Vallonia subcyclophorella* (Gottschick, 1911) (fide Gerber 1996). Family Valloniidae.

Remarks: (1) The lectotype and paralectotypes were designated by Gerber (1996). This material, as well as all or most of Clessin's other fossils, were on 2.5.1913 acquired by Jooss, who replaced all original labels with his own and discarded the originals. Jooss' label indicates that Clessin collected the specimens in 1910, but does not provide the name which Clessin gave them. Jooss determined them as *Vallonia subcyclophorella undorfensis* Jooss, which remains an unpublished und unavailable name. Conceivably Clessin 's publication of the name *subcostata* escaped Jooss and was, moreover, not noted down by Clessin, who died 1911 and therefore might not have been able to update his label. (2) O. Boettger (1903) introduced the name *subcostata* independently for a different *Vallonia* form, which is considered to be conspecific with *V. lepida* (Reuss, 1849) (fide Gerber 1996).

subcyclophorella* Gottschick, 1911, *Helix (Vallonia)
Helix (Vallonia) subcyclophorella Gottschick, 1911: 503, pl. 7, fig. 2.

Neotype: SMNS 15817 (designated by Gerber 1996).

Type locality: Germany: Baden-Württemberg: Steinheim am Albuch, Steinheimer Seeschichten [Steinheim lake beds], "*laevis*-Zone" [= *Gyraulus kleini* zone].

Age: Middle-Late Miocene (MN 7).

Taxonomic status: Valid, as *Vallonia subcyclophorella* (Gottschick, 1911) (fide Gerber 1996). Family Valloniidae.

Remarks: Although having been rather recently designated, this type could not be presently found in the collection.

subdiaphana* Clessin, 1885, *Hyalinia (Plate 8, Fig. 16a–c)
Hyalina subdiaphana Clessin, 1885: 75.

Holotype: SMNS 22755.

Type locality: Germany: Baden-Württemberg: Berg near Ehingen (Donau), Ehinger Ramondi-Schichten [Ramondi beds of Ehingen].

Age: Late Oligocene (Chattian).

Taxonomic status: Valid, as *Vitrea subdiaphana* (Clessin, 1885). Family Pristilomatidae.

subfontanus* Clessin, 1877, *Planorbis (Hippeutis) (Plate 8, Fig. 17a–c)
Planorbis (*Hippeutis*) *subfontanus* Clessin, 1877: 39; Clessin 1885: 91, pl. 7, fig. 4a–c.

Syntypes: SMNS 106434 (2 juvenile specimens, from Undorf; actual syntypes are mixed with four other specimens).

Type localities: Undorf and Mörsingen-Birk.

Age: Middle Miocene.

Taxonomic status: Valid, as *Hippeutis subfontanus* (Clessin, 1877). Family Planorbidae (Segmentininae).

Remarks: (1) Clessin (1877) described the species from two "unfinished" (i.e., juvenile) specimens. In 1885, he provided an illustration of the only fully grown specimen which he had subsequently acquired. The present lot consists of 4 juvenile and 2 adult specimens. It is impossible to identify the two juvenile syntypes or the figured adult (1885) in this lot, although they are almost certainly amongst the specimens. Apparently, non-type specimens had been added to the type series after 1877. (2) The figure from 1885 shows the proportions of the shell very different from those of the actual specimens, which is tentatively interpreted as a draftman's error. **(3)** Clessin (1877) included in his species specimens from Mörsingen-Birk from O. Boettger's collection, which is in the Senckenberg Museum, Frankfurt a. Main. This material is thus part of the type series.

subfusiformis* Sandberger, 1875, *Pupa (Torquilla) (Plate 8, Fig. 18)
Pupa nov. spec.? Klein, 1853: 216.
Pupa (Torquilla) subfusiformis Sandberger, 1875: 598.
Granaria subfusiformis: Höltke & Rasser, 2013: 190, fig. 4.7–4.8.

Syntype: SMNS 100112 (from Zwiefalten).

Type localities: Zwiefalten, Mörsingen, Hausen near Ehingen, Georgsgemünd, Schönbrunn near Kipfenberg, Adelegg in Oberschwaben.

Age: M. Miocene, Silvanaschichten [Silvana-beds].

Taxonomic status: *Granaria* sp., indeterminable due to its incomplete preservation (fide Höltke & Rasser 2013). Family Chondrinidae.

Remarks: (1) As Sandberger (1875) included Klein's "*Pupa* n. sp." in *subfusiformis*; it is a syntype. (2) Any redescription of this nominal species should be based on specimens from Schönbrunn near Kipfenberg, because of Sandberger's statement that he based his description on the best preserved specimens, which were from this locality.

subhammonis* Gottschick, 1928, *Zonitoides (Plate 8, Fig. 19a–c)
Zonitoides subhammonis Gottschick, 1928: 146, pl. 2, fig. 6.

Holotype: SMNS 15817.

Type locality: Germany: Baden-Württemberg: Altheim, near Ehingen, Malleolatakalk [Malleolata limestone].

Age: Late Miocene.

Taxonomic status: Potentially valid, as *Perpolita subhammonis* (Gottschick, 1928). Family Oxychilidae (Godwiniinae).

subnitens* Klein, 1853, *Helix (Plate 8, Fig. 20a–c)
Helix subnitens Klein, 1853: 210, pl. 5, fig. 7.

Lectotype (herein): SMNS 106435-a.

Paralectotypes: SMNS 106435-b (2 specimens).

Type locality: Germany: Baden-Württemberg: Zwiefalten (near Mörsingen), Silvanaschichten [Silvana-beds].

Age: Late Early/early Middle Miocene (Karpatian–Badenian; MN 5).

Taxonomic status: Valid, as *Aegopinella subnitens* (Klein, 1853) (fide Schlickum 1976, Nordsieck 2014). Family Oxychilidae (Godwiniinae).

Remarks: Type series with three specimens, we designate here the lectotype as the most complete specimen, which is also the one that best fits the original description and figures.

subteres* Clessin, 1877, *Helix (Patula) (Plate 9, Fig. 1)
Helix (Patula) subteres (Sandberger MS.) Clessin, 1877: 35.

Syntype: SMNS 68501.

Type locality: Germany: Bavaria: Nittendorf (Undorf), mittlere Silvanaschichten [middle Silvana-beds].

Age: Late Early/early Middle Miocene (Karpatian–Badenian; MN 5).

Taxonomic status: Valid, as *Lucilla subteres* (Clessin, 1877) (fide Schlickum 1979a, as *Helicodiscus (Hebetodiscus)*; and Salvador & Rasser 2014). Family Helicodiscidae.

Remarks: A later-added note by G. Falkner on the specimen's label states that it is the material used by Clessin (1877) and, thus, the holotype. As the original number of specimens was not stated (Clessin 1877), it is more prudent to treat the specimen as a syntype.

subtilisticta* Sandberger, 1875, *Helix (Plate 9, Fig. 2a–c)
Helix subtilisticta Sandberger, 1875: 459.

Syntypes: SMNS 14913 (3 specimens).

Type locality: Germany: Baden-Württemberg: Ehingen (Donau), Ehinger Ramondi-Schichten or Rugulosa-Schichten [Ramondi/Rugulosa-beds of Ehingen].

Age: Late Oligocene (Chattian).

Taxonomic status: Valid, as *Pseudochloritis subtilisticta* (Sandberger, 1875) (fide Binder 2008). Family Elonidae (Eloninae) or Helicidae (Ariantinae).

subtruncatula* Clessin, 1885, *Lymnaea (Plate 9, Fig. 3)
Limnaea subtruncatula Clessin, 1885: 89.
Limnaea subtruncata Clessin, 1894: 35 [error or unjustified emendation].

Holotype: SMNS 106436.

Type locality: Germany: Bavaria: Nittendorf (Undorf), originally assumed to be from the mittlere Silvanaschichten [middle Silvana-beds].

Age: Late Early/early Middle Miocene (Karpatian–Badenian; MN 5) or recent contamination.

Taxonomic status: The specimen is certainly a *Galba* s. str.; judging from its shape and state of preservation, it appears to be a recent specimen of *Galba truncatula* (O.F. Müller, 1774). Family Lymnaeidae (Lymnaeinae).

subventrosa* Gottschick, 1921, *Hydrobia (Plate 9, Fig. 4)
Hydrobia subventrosa Gottschick, 1921: 172.

Syntypes: SMNS 15523 (4 specimens) and 15817 (7 specimens).

Type locality: Germany: Baden-Württemberg: Steinheim am Albuch, "Kaltwasserschichten" (=*Gyraulus kleini*-Zone, Steinheimer Seeschichten) ["cold water beds", *Gyraulus kleini* zone, Steinheim Lake Formation].

Age: Middle Miocene (MN 7).

Taxonomic status: Closely related to, or synonym of *Heleobia trochulus* (Sandberger, 1875) (cf. Kadolsky 2008b). Family Cochliopidae.

subvermiculata* Sandberger, 1875, *Helix (Macularia) (Plate 9, Fig. 5a–c)
Helix Leymeriana Sandberger, 1872: pl. 29, fig.11 [non Noulet, 1854 (: 73)].
Helix (Macularia) subvermiculata Sandberger, 1875: 591 (ref. pl. 29, fig. 11).

Syntype?: SMNS 10920, from Mörsingen.

Type locality: Germany: Baden-Württemberg: Mörsingen, Silvanaschichten [Silvana-beds] and seven other localities in Baden-Württemberg, Bavaria and Switzerland.

Age: Late Early/early Middle Miocene (Burdigalian/Langhian; MN 5).

Taxonomic status: Junior synonym of *Megalotachea silvana* (Klein, 1853). Family Helicidae (Helicinae).

Remarks: The present specimen compares well in shape with the one figured by Sandberger (1872), from Mörsingen. Nevertheless, it does not show the dark spiral bands depicted in the figure, even under UV light. As such, this specimen status as a type remain questionable. The labels state there was a second specimen in the lot, but it could not be located. There are presently three further syntypes in the MUWI collection.

suevica* Gottschick & Wenz, 1927, *Helicopsis (Plate 9, Fig. 6a–c)
Helicopsis suevica Gottschick & Wenz, 1927: 148, pl. 8, fig. 2a, b.

Syntype: SMNS 22828.

Type locality: Germany: Baden-Württemberg: Zwiefaltendorf, sand pit, reworked block from the Silvanaschichten [Silvana-beds] in Pleistocene sands.

Age: Late Early/early Middle Miocene (Burdigalian/Langhian; MN 5).

Taxonomic status: Unknown. Family Hygromiidae.

Remarks: Gottschick & Wenz (1927) mentioned two specimens.

suevica* Jooss, 1918b, *Hyalinia (Polita) (Plate 9, Fig. 7a–c)
Hyalinia (Polita) suevica Jooss, 1918b: 289.

Holotype: SMNS 106441.

Type locality: Germany: Baden-Württemberg: Dischingen, Silvana-beds ("Silvanaschichten").

Age: Late Miocene (Tortonian).

Taxonomic status: Valid, as *Zonitoides suevicus* (Jooss, 1918b) (fide Wenz 1923). Family Gastrodontidae.

suevica* Miller, 1907, *Melania (Plate 9, Fig. 8)
Melania suevica Miller, 1907: 456, pl. 9, fig. 20.

Syntypes: SMNS 27646 (5 specimens).

Type locality: Germany: Bavaria: Bachhagel, karst fissure limestone.

Age: Eocene.

Taxonomic status: Uncertain; Wenz (1923) lists this species as *Palaeostoa suevica*. Family Palaeostoidae.

suevica* Sandberger, 1875, *Clausilia (Plate 9, Fig. 9)
Clausilia grandis Sandberger, 1872: pl. 29, fig. 18a [non Klein, 1846, nec fig. 18]
Clausilia suevica Sandberger, 1875: 461 (ref. pl. 29, fig. 18a).

Syntypes: SMNS 106438 (2 specimens).

Type locality: Germany: Baden-Württemberg: Berg near Ehingen (Donau), Ehinger-Ramondi-Schichten [Ramondi-beds of Ehingen].

Age: Late Oligocene (Chattian).

Taxonomic status: Valid, as *Triptychia suevica* (Sandberger, 1875) (revised by Schnabel 2007). Family Filholiidae.

Remarks: Schnabel (2007) cites as "holotype" a specimen in Sandberger's collection in the MUWI, although Sandberger stated that he studied from Ehingen one specimen from each of the following: his personal collection, the Stuttgart collection and Probst's collection. Schnabel's "holotype" declaration is invalid (article 73.1 ICZN), and a name-bearing type specimen is to date not validly selected. Sandberger's specimen in the SMNS is a syntype and not just "further material" as mentioned by Schnabel. Moreover, the collection in Stuttgart counts with two specimens as Sandberger's original material, not just a single one.

suevica* Sandberger, 1875, *Helix (Plate 9, Fig. 10a–c)
Helix suevica Sandberger, 1875: 459 (Probst coll.).
Galactochilus brauni var. *suevica* Jooss, 1918b: 292.

Syntypes: SMNS 14914 (4 specimens), 106440 (3 specimens), ex Probst coll.

Type locality: Germany: Baden-Württemberg: Berg near Ehingen (Donau), Ehinger Ramondi-Schichten [Ramondi-beds of Ehingen].

Age: Late Oligocene (Chattian).

Taxonomic status: Uncertain, possibly a synonym of *Galactochilus braunii ehingensis* (Klein, 1846) (fide Wenz 1923). Family Elonidae (Eloninae) or Helicidae (Ariantinae).

Remarks: Jooss (1918b) stated that *Helix suevica* Sandberger, 1875 was a juvenile specimen of his *Galactochilus brauni* var. *suevica*. Although Jooss designated the name *suevica* as new ("n. var."), his citation of *Helix suevica* Sandberger indicates that he meant to redescribe the latter. Analogous to the case of *Helix alveus* Sandberger (q.v.), Jooss believed apparently that *Helix suevica* Sandberger was a nomen nudum. This is incorrect, as Sandberger provided a short diagnosis. Sandberger's original material thus constitutes the type series. Jooss' label indicates that it is Sandberger's original material.

suevica* Sandberger, 1872, *Vitrina (Plate 9, Fig. 11a, b)
Vitrina suevica Sandberger, 1872: pl. 29, figs. 27a–b; Sandberger, 1875: 602.

Holotype: SMNS 106439.

Type locality: Germany: Baden-Württemberg: Neuselhalder Hof near Steinheim am Albuch, marl layers with *Planorbarius cornu* (Brongniart, 1810).

Age: Middle Miocene (MN 7).

Taxonomic status: Valid. Family Vitrinidae.

suevicus* Gottschick, 1928, *Amnicola (Plate 9, Fig. 12)
Amnicola suevica Gottschick, 1928: 148, pl. 2, fig. 7a–c.

Syntypes: SMNS 15817 (11 specimens).

Type locality: Germany: Baden-Württemberg: Zwiefalten (Mörsingen), Silvanaschichten [Silvana-beds].

Age: Late Early/early Middle Miocene (Karpatian–Badenian; MN 5).

Taxonomic status: Uncertain, possibly a subspecies of *Pseudamnicola convexus* (Sandberger, 1875). Family Hydrobiidae (Pseudamnicolinae).

Remarks: The material is labelled "*Amnicola subpseudoglobulus* Gottschick & Wenz". This name was never published, and it is likely that it had been changed because of its clumsiness, but due to his death in 1928, Gottschick was unable to change the label. Gottschick (1928) lists 15 specimens, but the present material consists only of eleven; the remaining four are thus deemed lost. The two syntypes of the "subspecies" *Amnicola suevicus major* Gottschick, 1928 could not be found; this nominal taxon does not appear to be conspecific.

suevicus* Wenz, 1919, *Viviparus (Plate 9, Fig. 13)
Paludina varicosa Krauss, 1852: 139, pl. 3, fig. 2 [non C. d'Orbigny, 1837 (: 1, pl. 79, figs. 1–3)].
Viviparus suevicus Wenz, 1919a: 76.

Syntype: SMNS 106437.

Type locality: Germany: Baden-Württemberg: Kirchberg an der Iller, lower "greenish-yellow sand" layer ("grünlich gelber Sand") of the Kirchberg Formation.

Age: Late Early Miocene (Burdigalian/Ottnangian, MN 4b).

Taxonomic status: Valid as *Viviparus suevicus* Wenz, 1919. Family Viviparidae (Viviparinae).

Remarks: When Wenz (1919) defined the new name for the species, he also designated a "Typus" from his personal collection. This action is not valid as per ICZN Article 75.8; the replacement name has the same name-bearing type as Krauss' original name.

***trochiformis* Miller, 1907, *Helicina*(?)**
See *milleri* Fulton, 1915, *Helicina*.

trolli* Schlickum, 1979b, *Hydrocena (Hydrocena) (Plate 9, Fig. 14)
Pseudamnicola helicella Andreae, 1902: 24 [partim, non A. Braun, 1851 (: 1126, no. 169)].
Amnicola (*Amnicola*) cf. *helicella* Wenz 1926: 2064 [non A. Braun, 1851].
Amnicola (*Amnicola*) *gobanzi* Wenz, 1930: 3042 [non Frauenfeld, 1864 (: 604)].
Hydrocena (*Hydrocena*) *trolli* Schlickum, 1979b: 71, figs. 3–4.

Paratypes: SMNS 106442 (2 specimens, Andreae leg. III. 2003).

Type locality: Poland: Silesia: Opole (= Königlich Neudorf near Oppeln).

Age: Middle Miocene (MN 6–7).

Taxonomic status: Valid. Family Hydrocenidae.

Remarks: Schlickum (1979) included the material reported by Andreae (1902) and Wenz (1926, 1930) in his new species. This material is therefore part of the type series (article 72.4.2 ICZN).

truncatuliformis* Schütze in Branca & Fraas, 1908, *Lymnaea (Plate 9, Fig. 15)
Limnaeus truncatuliformis Schütze in Branca & Fraas, 1908: 20, fig. 11.

Lectotype (herein): SMNS 11898-a.

Paralectotype: SMNS 11898-b (1 specimen).

Type locality: Germany: Bavaria: Monheim (Weilheim im Ries), grey freshwater limestone block in Bunter Breccie [varicoloured breccia, Ries ejecta].

Age: Early Oligocene.

Taxonomic status: Potentially valid, as *Stagnicola*? *truncatuliformis* (Schütze *in* Branca & Fraas, 1908). Family Lymnaeidae (Lymnaeinae).

Remarks: We designate here as lectotype the specimen figured in the original description (Schütze *in* Branca & Fraas 1908: fig. 9).

turrita* Klein, 1853, *Lymnaea (Plate 9, Fig. 16)
Lymnaeus turritus Klein, 1853: 220, pl. 5, fig. 17.

Lectotype (herein): SMNS 106443-a.

Paralectotypes: SMNS 106443-b (2 specimens).

Type locality: Germany: Baden-Württemberg: Andelfinger Berg near the village of Andelfingen, Silvanaschichten [Silvana-beds].

Age: Late Early/early Middle Miocene (Burdigalian/Langhian; MN 5).

Taxonomic status: Valid, as *Lymnaea* (s. lat.) *turrita* Klein, 1853. Family Lymnaeidae (Lymnaeinae).

Remarks: We designate here the lectotype as the most complete specimen, which is also the one figured in the original description (Klein 1853).

turrita* Klein, 1846, *Melania (Plate 9, Fig. 17a, b)
Melania turrita Klein, 1846: 81, pl. 2, fig. 2.

Syntypes: SMNS 106444 (2 specimens).

Type locality: Germany: Baden-Württemberg: Ehingen, Silvanaschichten [Silvana-beds].

Age: Late Early/early Middle Miocene (Burdigalian/Langhian; MN 5).

Taxonomic status: Junior synonym of *Tinnyea lauraea* (Mathéron, 1843) (fide Kadolsky 1995). Family Pachychilidae.

ulmensis* Jooss, 1918b, *Discus diezi (Plate 9, Fig. 18a–c)
Pyramidula (Gonyodiscus) diezi var. *ulmensis* Jooss, 1918b: 291.

Syntype: SMNS 106445.

Type locality: Germany: Baden-Württemberg: Ulm (Thalfingen), Thalfinger Schichten [Thalfingen beds].

Age: Early Miocene (Aquitanian, MN2a).

Taxonomic status: Potentially valid in the genus *Discus*, but requiring further study. Family Discidae.

Remarks: Jooss (1918b) reports the species as "rather rare". As this does not exclude the possibility of the type series consisting of more than one specimen, it is prudent to treat the only preserved specimen in the Jooss collection as syntype.

ulmensis* Sandberger, 1875, *Clausilia (Plate 9, Fig. 19)
Clausilia grandis Sandberger, 1872: pl. 29, fig. 18 [non 18a] [non *Clausilia grandis* Klein, 1846].
Clausilia ulmensis Sandberger, 1875: 461, 598 (ref. pl. 29, fig. 18).

Lectotype: SMNS 22181-a (designated by Schnabel 2006).

Paralectotype: SMNS 22181-b.

Type locality: Germany: Baden-Württemberg: Ulm (Michelsberg), Ulmer Subrugulosa-Schichten [Subrugulosa-beds of Ulm].

Age: Early Miocene (Aquitanian; MN 2).

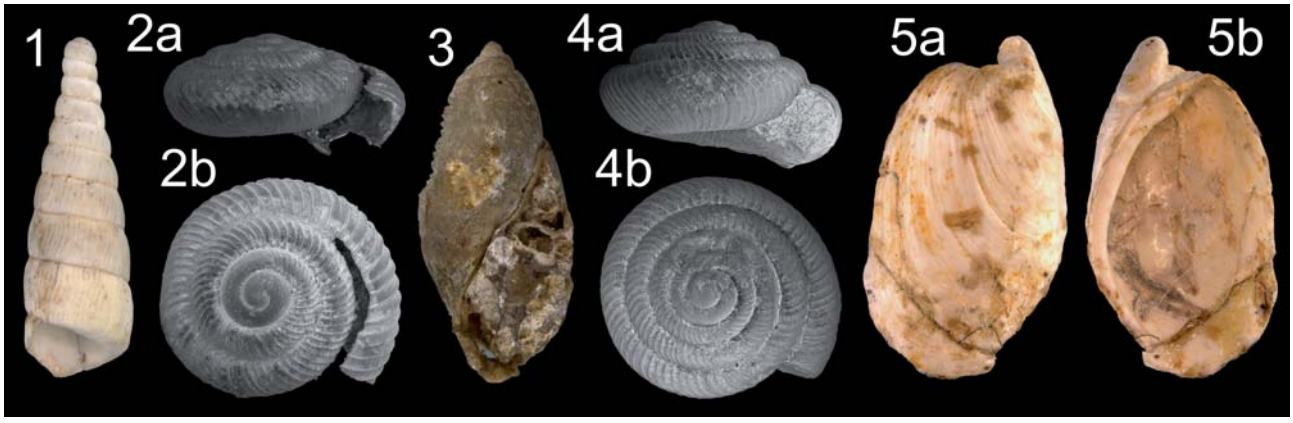

Fig. 2. 1. *Pseudidyla*? *undatistria* (O. Boettger, 1877), holotype (SMNS 22830; H = 8.7 mm). **2a, b.** *Discus euglyphoides undorfensis* (Clessin, 1894), syntype? (SMNS 106446; H = 2.5 mm, D = 2.6 mm). **3.** *Palaeoglandina wagneri* (Miller, 1907), holotype (SMNS 27638; H = 24.9 mm). **4a, b.** *Discus wenzi* (Jooss, 1918), syntype (SMNS 106447; H = 2.5 mm, D = 3.8 mm). **5a, b.** *Testacella zellii* Klein, 1853, holotype (SMNS 106448; H = 11.7 mm, D = 6.3 mm).

Taxonomic status: Valid, as *Triptychia ulmensis* (Sandberger, 1875) (fide Schnabel 2006). Family Filholiidae.

undatistria* O. Boettger, 1877, *Clausilia (Pseudidyla) moersingensis (Fig. 2.1)
Clausilia (Pseudidyla) mörsingensis var. undatistria O. Boettger, 1877: 92, pl. 4, fig. 40.

Holotype: SMNS 22830.

Type locality: Germany: Baden-Württemberg: Zwiefalten (Mörsingen), Silvanaschichten [Silvana-beds].

Age: Late Early/early Middle Miocene (Burdigalian/Langhian; MN 5).

Taxonomic status: Unidentified species (fide Nordsieck 1981, 2007). Family Clausiliidae (inc. sed.).

undorfensis* Clessin, 1894, *Patula (Fig. 2.2a, b)
Patula undorfensis Clessin, 1894: 5, pl. 1, fig. 11.

Syntype?: SMNS 106446.

Type locality: Germany: Bavaria: Nittendorf (Undorf), middle Silvanaschichten [Silvana-beds].

Age: Late Early/early Middle Miocene (Karpatian–Badenian; MN 5).

Taxonomic status: Synonym or subspecies of *Discus euglyphoides* (Sandberger, 1872) (fide Wenz 1923). Family Discidae.

Remarks: In the original description, Clessin (1894) lists four specimens, housed in the private collection of Diez. The single specimen in the Clessin collection of the SMNS is probably one of them, retained by Clessin.

varicosa* Krauss, 1852, *Paludina
See *suevicus* Wenz, 1919, *Viviparus*.

wagneri* Miller, 1907, *Glandina (Fig. 2.3)
Glandina Wagneri Miller, 1907: 453, pl. 9, fig. 8.

Holotype: SMNS 27638.

Type locality: Germany: Bavaria: Bachhagel, karst fissure limestone.

Age: Eocene.

Taxonomic status: Valid, as *Palaeoglandina wagneri* (Miller, 1907). Family Oleacinidae.

wenzi* Jooss, 1918b, *Pyramidula (Gonyodiscus) (Figs. 2.4a, b)
Pyramidula (Gonyodiscus) wenzi Jooss, 1918b: 291.

Syntype: SMNS 106447.

Type locality: Germany: Baden-Württemberg: Zwiefalten (Mörsingen), Silvanaschichten [Silvana-beds].

Age: Late Early/early Middle Miocene (Burdigalian/Langhian; MN 5).

Taxonomic status: Valid, as *Discus wenzi* (Jooss, 1918b). Family Discidae.

zellii* Klein, 1853, *Testacella (Fig. 2.5a, b)
Testacella Zellii Klein, 1853: 204, pl. 5, fig. 1.

Holotype: SMNS 106448.

Type locality: Germany: Baden-Württemberg: Andelfinger Berg, near the village of Andelfingen, Silvanaschichten [Silvana-beds].

Age: Late Early/early Middle Miocene (Burdigalian/Langhian; MN 5).

Taxonomic status: Valid. Family Testacellidae.

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Plate 1

Fig. 1. *Gastrocopta (Albinula) acuminata* (Klein, 1846), syntype #1 (SMNS 106361; H = 2.5 mm).
Fig. 2. *Gastrocopta (Albinula) acuminata* (Klein, 1846), syntype #2 (SMNS 106361; H = 2.4 mm).
Fig. 3a, b. *Grandipatula alsatica* (Jooss, 1918), holotype (SMNS 65581; H = 16.3 mm, D = 22.4 mm).
Fig. 4a–c. *Pseudochloritis*? *alveus* (Sandberger, 1875), syntype? (SMNS 106362; H = 20.0 mm, D = 24.0 mm).
Fig. 5. *Stagnicola fabulum* (Brongniart, 1810), syntype of *Limnophysa amerbachensis* Jooss, 1912 (SMNS 23918-a; H = 26.6 mm).
Fig. 6a, b. *Vitrea ammoni* (Clessin, 1894), syntype (SMNS 106364; H = 1.7 mm, D = 2.8 mm).
Fig. 7a–c. *Protodrepanostoma involutum angitortum* (Jooss, 1912), holotype (SMNS 106365; H = 2.6 mm, D = 5.0 mm).
Fig. 8a, b. *Archaeozonites angulosus* Miller, 1907, syntype (SMNS 27620; H = 10.1 mm, D = 16.5 mm).
Fig. 9. *Palaeoglandina gracilis* (Zieten, 1832), syntype of *Glandina (Achatina) antiqua* Klein, 1852 (SMNS 23908-a; H = 42.9 mm).
Fig. 10a–c. *Discus antiquus* (Miller, 1907), syntype (SMNS 27641; H = 2.9 mm, D = 5.6 mm).
Fig. 11. *Triptychia antiquior* (Miller, 1907), syntype (SMNS 27644; H = 8.8 mm).
Fig. 12. *Pomatias (Neobembridgia) arneggensis* Wenz, 1923, lectotype of *Cyclotus scalaris* Miller, 1907 and *Pomatias arneggensis* (SMNS 27614-a; H = 14.8 mm).
Fig. 13a, b. *Archaeozonites? arneggensis* (Miller, 1907), syntype (SMNS 27621; H = 5.3 mm, D = 9.4 mm).
Fig. 14a–c. *Laminifera arneggensis* (Miller, 1907), syntype (SMNS 27629; H = 6.1 mm).
Fig. 15. *Palaeomastus arneggensis* (Miller, 1907) comb. nov., syntype (SMNS 36777; H = 9.9 mm).
Fig. 16a, b. *Miozonites algiroides badensis* (Jooss, 1924), holotype (SMNS 65634; H = 16.1 mm, D = 26.9 mm).
Fig. 17a, b. *Megalotachea eversa baumbergeri* Jooss 1924, syntype (SMNS, 106366; H = 15.7 mm, D = 19.4 mm).

Plate 2

Fig. 1. *Strobilops costata* (Clessin, 1877), holotype of *Strobilus bilamellatus* Clessin, 1885 (SMNS 106369; H = 1.5 mm, D = 1.6 mm).
Fig. 2a, b. *Klikia praeosculina* (Miller, 1907), syntype of *Helix (Gonostoma) blaviana* Miller, 1907 (SMNS 27626; H = 8.5 mm, D = 13.0 mm).
Fig. 3a, b. *Perpolita boettgeriana* (Clessin, 1877), holotype (SMNS 106370; H = 1.4 mm, D = 3.1 mm).
Fig. 4. *Lymnaea* (s.l.) *brancai* Schütze *in* Branca & Fraas, 1908, lectotype (SMNS 11897-a; H = 15.4 mm)
Fig. 5. "*Melania" bulimoides* Klein, 1846, syntype #1 (SMNS 106371; H = 13.6 mm).
Fig. 6. "*Melania" bulimoides* Klein, 1846, syntype #2 (SMNS 106371; H = 12.1 mm).
Fig. 7. "*Abida" bythiniformis* (Miller, 1907), holotype (SMNS 27645; H = 3.6 mm).
Fig. 8a–c. *Ferussina anomphalus capellinii* (Sandberger, 1873), syntype (SMNS 22180; H = 14.7 mm, D = 26.8 mm).
Fig. 9a, b. *Archaeozonites carinatus* Miller, 1907, lectotype (SMNS 27639-a; H = 11.3 mm, D = 17.5 mm).
Fig. 10a, b. *Omphalosagda pyramidalis* (Jooss, 1912), holotype of *Zonites (Archaeozonites) risgoviensis carinatus* Jooss, 1912, (SMNS 23921; H = 11.1 mm, D = 16.4 mm).
Fig. 11a–c. *Leucochroopsis kleinii* (Klein, 1846), syntype of *Helix carinulata* Klein, 1853, (SMNS 106372; H = 4.7 mm, D = 7.2 mm).
Fig. 12. *"Lymnaea" conica* Miller, 1907, holotype (SMNS 27635; H = 8.2 mm).
Fig. 13a, b. *Palaeotachea renevieri* (Maillard, 1892), syntype of *Cepaea renevieri coniuncta* Berz & Jooss, 1927 (SMNS 101369; H = 10.8 mm, D = 16.1 mm).
Fig. 14. *Ctyrokya conoidea* (Krauss, 1852), syntype (SMNS 106373; H = 5.2 mm).
Fig. 15a, b. *Loganiopharynx constrictelabiatus* (Miller, 1907), holotype (SMNS 27643; H = 6.2 mm, D = 9.2 mm).
Fig. 16a, b. *Palaeotachea convexitesta* (Jooss, 1912), syntype (SMNS 23914-b; H = 8.2 mm, D = 13.0 mm).
Fig. 17a, b. *Vallonia costata* (O.F. Müller, 1774), holotype of *Vallonia costataeformis* Jooss, 1912 (SMNS 106375; H = 1.2 mm, D = 2.4 mm).

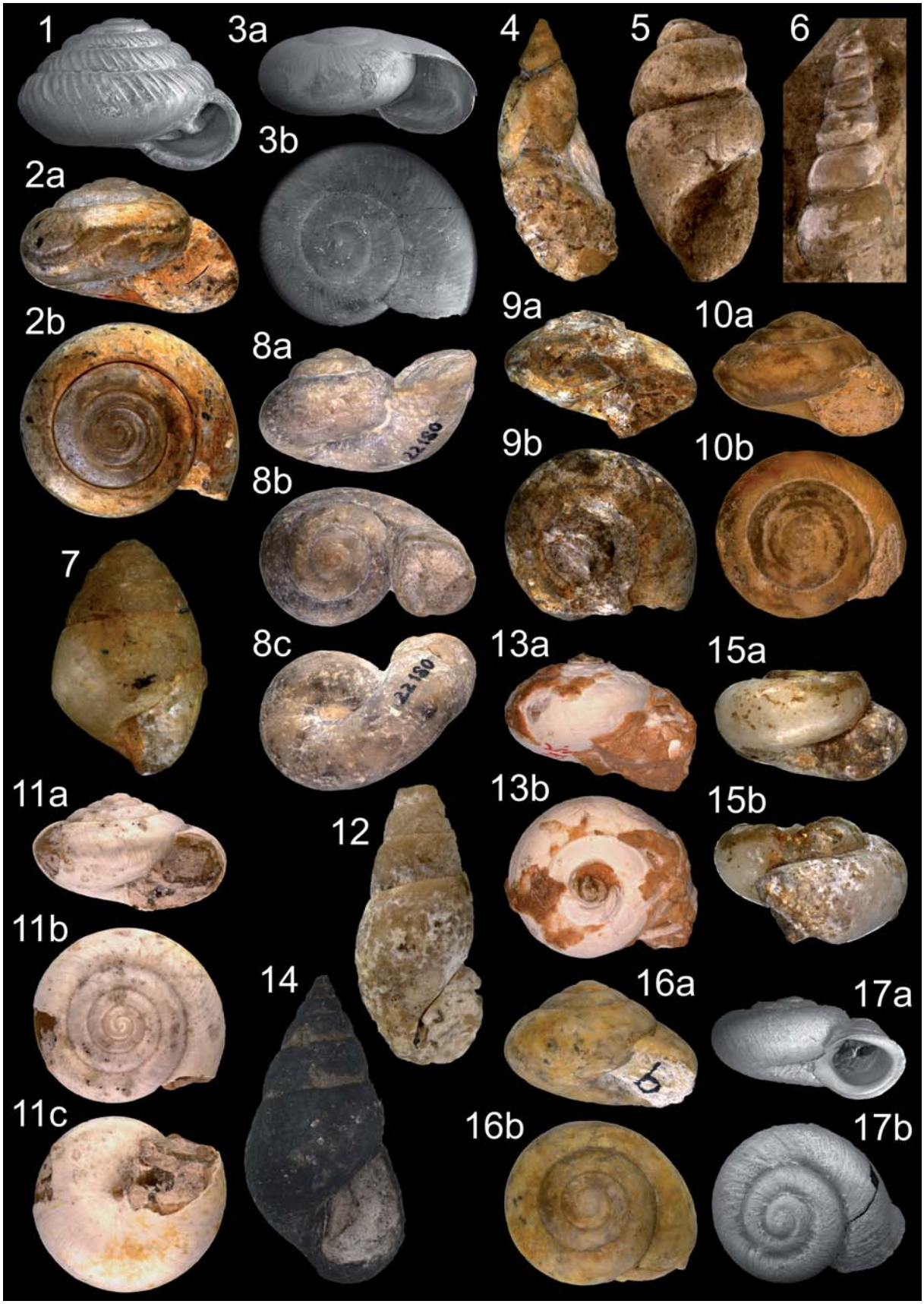


Plate 3

Fig. 1a–c. *Discus costatus* (Gottschick, 1911), syntype (SMNS 106376; H = 2.2 mm, D = 3.8 mm).
Fig. 2a, b. *Gyraulus costatus* (Klein, 1846), lectotype (SMSN 23907-1; H = 1.0 mm, D = 2.0 mm).
Fig. 3. *Strobilops costata* (Clessin, 1877), syntype? (SMNS 106374; H = 1.5 mm, D = 2.1 mm).
Fig. 4. *Milax crassus* (Clessin, 1894), syntype? (SMNS 106378; H = 4.1 mm, D = 2.8 mm).
Fig. 5. *Limax crassissimus* Jooss, 1902, holotype (SMNS 106377; H = 11.1 mm, D = 6.3 mm).
Fig. 6. *Theodoxus crenulatus* (Klein, 1853), syntype #1 (SMNS 106379; H = 8.1 mm, D = 9.1 mm).
Fig. 7. *Theodoxus crenulatus* (Klein, 1853), syntype #2 (SMNS 106379; H = 8.9 mm, D = 7.8 mm).
Fig. 8a–c. *Palaeotachea subsulcosa* (Thomä, 1845), syntype? of *Helix crepidostoma* Sandberger, 1872 (SMNS 23209-b; H = 14.5 mm, D = 19.7 mm).
Fig. 9a, b. *Theodoxus cyrtocelis* (Krauss, 1852), syntype (SMNS 106380; D = 7.5 mm).
Fig. 10a, b. *Archaeozonites deplanatus* Miller, 1907, lectotype (SMNS 27619; H = 17.1 mm, D = 32.7 mm).
Fig. 11a–c. *Protodrepanostoma involutum deplanatum* (Jooss, 1911), syntype (SMNS 106382; H = 3.2 mm, D = 6.3 mm).
Fig. 12a, b. *Palaeotachea convexitesta* (Jooss, 1912), holotype of *Cepaea convexitesta depressa* Jooss, 1912 (SMNS 23914-c; H = 8.1 mm, D = 12.5 mm).
Fig. 13. *"Megalomastoma" dietleni* Miller, 1907, syntype (SMNS 11886; H = 13.3 mm).
Fig. 14. *Milax diezi* (Clessin, 1894), syntype (SMNS 106383; H = 6.9 mm, D = 4.1 mm).
Fig. 15a, b. *Pseudochloritis incrassata* (Klein, 1853), syntype of *Tropidomphalus dilatatus* Jooss, 1918, (SMNS 106384; H = 19.4 mm, D = 27.4 mm).
Fig. 16. *Cochlostoma dubium* (Miller, 1907), holotype (SMNS 27632; H = 1.7 mm).
Fig. 17. *Cochlostoma ebfraasii* (Jooss, 1902), syntype (SMNS 106385; H = 8.5 mm).
Fig. 18. *Pseudoleacina eburnea* (Klein, 1853), lectotype (SMNS 106386-a; H = 11.3 mm).
Fig. 19. *Craspedopoma elegans* Miller ,1907, syntype (SMNS 27631; H = 6.2 mm).
Fig. 20a, b. *Megalotachea elevata* (Berz & Jooss, 1927), syntype (SMNS 105002; H = 10.9 mm, D = 16.0 mm).
Fig. 21. *Radix socialis* (Zieten, 1832), syntype of *Lymnaea socialis elongata* Klein, 1846 (SMNS 23911; H = 15.4 mm).

Plate 4

Fig. 1. *Pseudoleacina elongata* (Miller, 1907), lectotype (SMNS 27636-a; H = 17.8 mm).
Fig. 2. *"Bithynia" eocaenica* Miller, 1907, holotype (SMNS 8328; H = 5.5 mm).
Fig. 3. *"Lymnaea" eocaenica* Miller, 1907, syntype (SMNS 27634; H = 15.8 mm).
Fig. 4a, b. *Archaeozonites eocaenicus* Miller, 1907, lectotype (SMNS 27673; H = 13.8 mm, D = 21.7 mm).
Fig. 5. *Triptychia escheri* (Sandberger, 1875), lectotype (SMNS 106389-a; H = 27.4 mm).
Fig. 6. *Cochlostoma excellens* Jooss, 1912, holotype (SMNS 106390; H = 7.9 mm).
Fig. 7. *Laminifera excellens* Jooss, 1927, holotype (SMNS 27650; H = 19.6 mm).
Fig. 8. *Acicula flachi* (Clessin, 1911), lectotype (SMNS 106391-a; H = 1.9 mm).
Fig. 9a–c. *Wenzia fraasi* (Jooss, 1912), syntype (SMNS 106392; H = 13.4 mm, D = 16.4 mm).
Fig. 10a–c. *Megalotachea sylvestrina* (Schlotheim, 1820), syntype of *Helix geniculata* (Sandberger, 1872) (SMNS 22179; H = 14.6 mm, D = 21.6 mm).
Fig. 11. *Pseudamnicola? giraudi* Dollfus, 1908, syntype? (SMNS 106393; H = 2.8 mm).
Fig. 12a, b. *Oxychilus*? *globosus* (Miller, 1907), syntype (SMNS 27640; H = 5.0 mm, D = 7.2 mm).
Fig. 13a, b. *Discus globosus* (Miller, 1907), syntype (SMNS 27622; H = 2.3 mm, D = 4.6 mm).
Fig. 14a, b. *Janulus gottschicki* (Jooss, 1912), holotype (SMNS 106394; H = 1.4 mm, D = 2.9 mm).
Fig. 15. *Milax gracilior* (Sandberger, 1875), holotype (SMNS 22757; H = 10.5 mm, D = 3.3 mm).
Fig. 16. *Bithynia glabra* (Zieten, 1832), syntype of *Bithynia gracilis* Sandberger, 1872 (SMNS 106750; h = 7.8 mm).
Fig. 17. *Lymnaea gracilis* (Jooss, 1912), syntype #1 (SMNS 23924; H = 25.2 mm).
Fig. 18. *Lymnaea gracilis* (Jooss, 1912), syntype #2 (SMNS 23924; H = 16.4 mm).
Fig. 19. *Tinnyea lauraea* (Mathéron, 1843), syntype of *Melania grossecostata* Klein, 1852 (SMNS 23909; photograph from ca. 1980, material is missing).
Fig. 20. *Granaria helicidarum* (Jooss, 1924), syntype (SMNS 100113; H = 8.1 mm).
Fig. 21a, b. *Leucochroopsis helicidarum* Jooss, 1918, syntype (SMNS 106397; H = 3.4 mm; D = 5.5 mm).
Fig. 22. *Acanthinula hesslerana* Jooss, 1911, syntype (SMNS 67545; H = 2.6 mm, D = 2.0 mm).

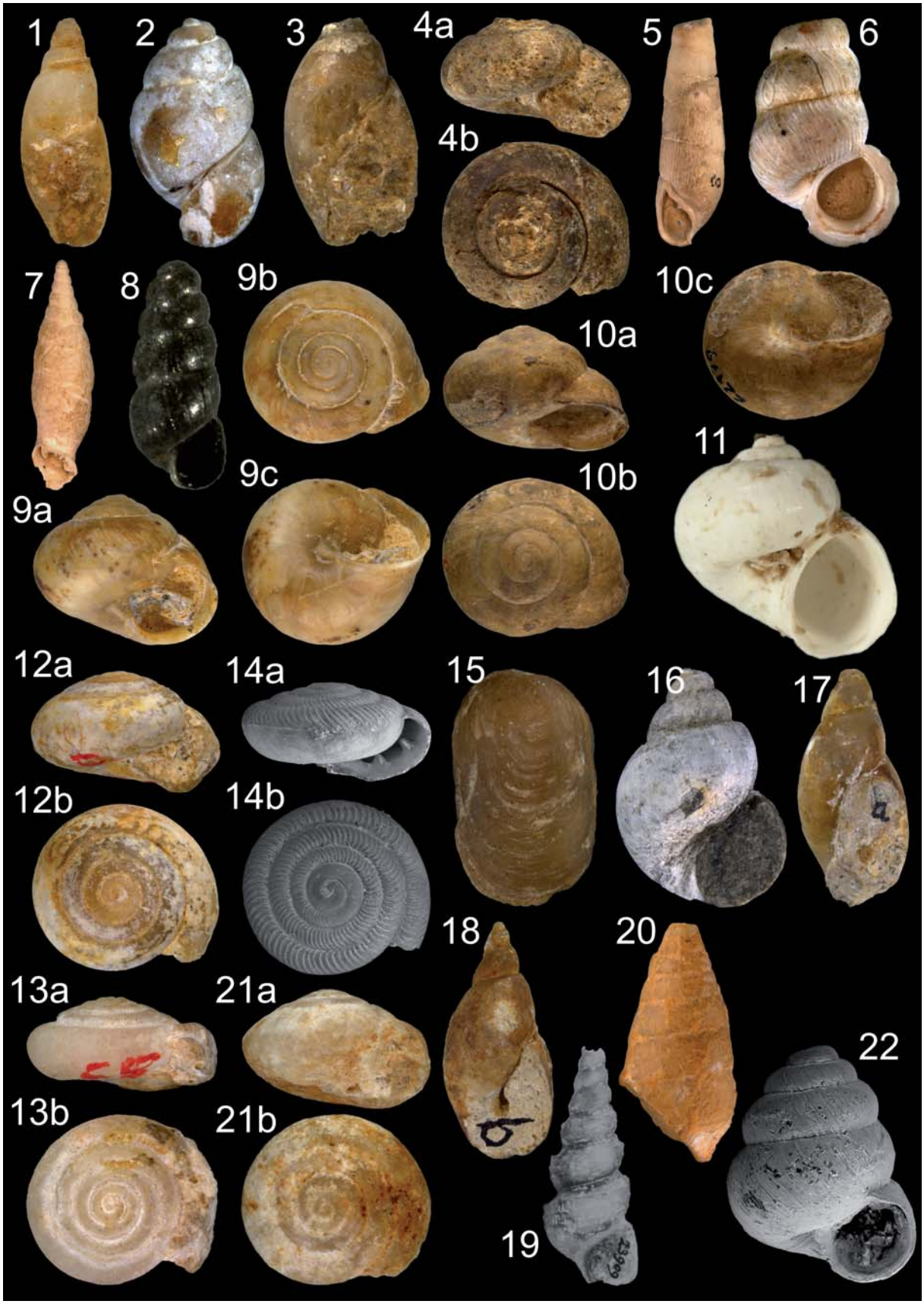


Plate 5

Fig. 1. *Vallonia hoppla hoppla* Gerber, 1996, paratype #1 (SMNS 106398; H = 1.1 mm, D = 2.3 mm).
Fig. 2. *Vallonia hoppla hoppla* Gerber, 1996, paratype #2 (SMNS 106398; D = 2.5 mm).
Fig. 3. *Vallonia hoppla hoppla* Gerber, 1996, paratype #3 (SMNS 106398; D = 2.4 mm).
Fig. 4a–c. *Omphalosagda hydrobiarum* Jooss, 1911, lectotype (SMNS 106399; H = 15.8 mm; D = 10.3 mm).
Fig. 5a, b. "*Acanthinula*" *imperforata* (Miller, 1907), holotype (SMNS 27618; H = 3.2 mm; D = 4.1 mm).
Fig. 6. *Melanopsis impressa* Krauss, 1852, syntype (SMNS 106400; H = 15.9 mm).
Fig. 7a–c. *Pseudochloritis incrassata* (Klein, 1853), syntype(?) (SMNS 22737-1; H = 12.4 mm, D = 20.6 mm).
Fig. 8a–c. *Pseudochloritis incrassata* (Klein, 1853), syntype of *Pseudochloritis inflexa* C.R. Boettger, 1909 (SMNS 22736; H = 16.8 mm, D = 24.7 mm).
Fig. 9. *Palaeoglandina gracilis insignis* (Jooss, 1918b), holotype (SMNS 106401; H = 29.3 mm).
Fig. 10a–c. *Tropidomphalus insignis* (Zieten, 1832), neotype (SMNS 23910-a; H = 27.1 mm, D = 34.2 mm).
Fig. 11. *Radix socialis* (Zieten, 1832), syntype of *Radix socialis intermedia* (Klein, 1846) (SMNS 23905; H = 18.3 mm).
Fig. 12a–c. *Planorbarius cornu* (Brongniart, 1810), syntype of *Planorbis crassus involutus* Jooss, 1912 (SMNS 23926; H = 7.4 mm, D = 16.4 mm).
Fig. 13a–c. *Megalotachea joossi* (Pfeffer, 1930), holotype (SMNS 106402; H = 18.9 mm, D = 25.8 mm).
Fig. 14a, b. "*Helix*" *joossii* Miller, 1907, syntype (SMNS 27642; H = 4.5 mm, D = 7.4 mm).
Fig. 15. *Strobilops joossii* (Gottschick, 1911), syntype (SMNS 106403; H = 1.5 mm, D = 1.9 mm).
Fig. 16a–c. *Gyraulus kleini* Gottschick & Wenz, 1916, syntype of *Planorbis laevis* Klein, 1846 and *Gyraulus kleini* (SMNS 25263/2005; H = 1.0 mm, D = 3.6 mm).
Fig. 17. *Triptychia kleini* Schnabel, 2006, lectotype of *Clausilia grandis* Klein, 1846 and *Triptychia kleini* (SMNS 106404-a; H = 14.2 mm).
Fig. 18. *Triptychia kleini* Schnabel, 2006, paralectotype of *Clausilia grandis* Klein, 1846 and *Triptychia kleini* (SMNS 106404-b; H = 19.0 mm).
Fig. 19a, b. *Gyraulus kraussii* (Klein, 1846), syntype (SMNS 106405; H = 0.8 mm, D = 2.5 mm).

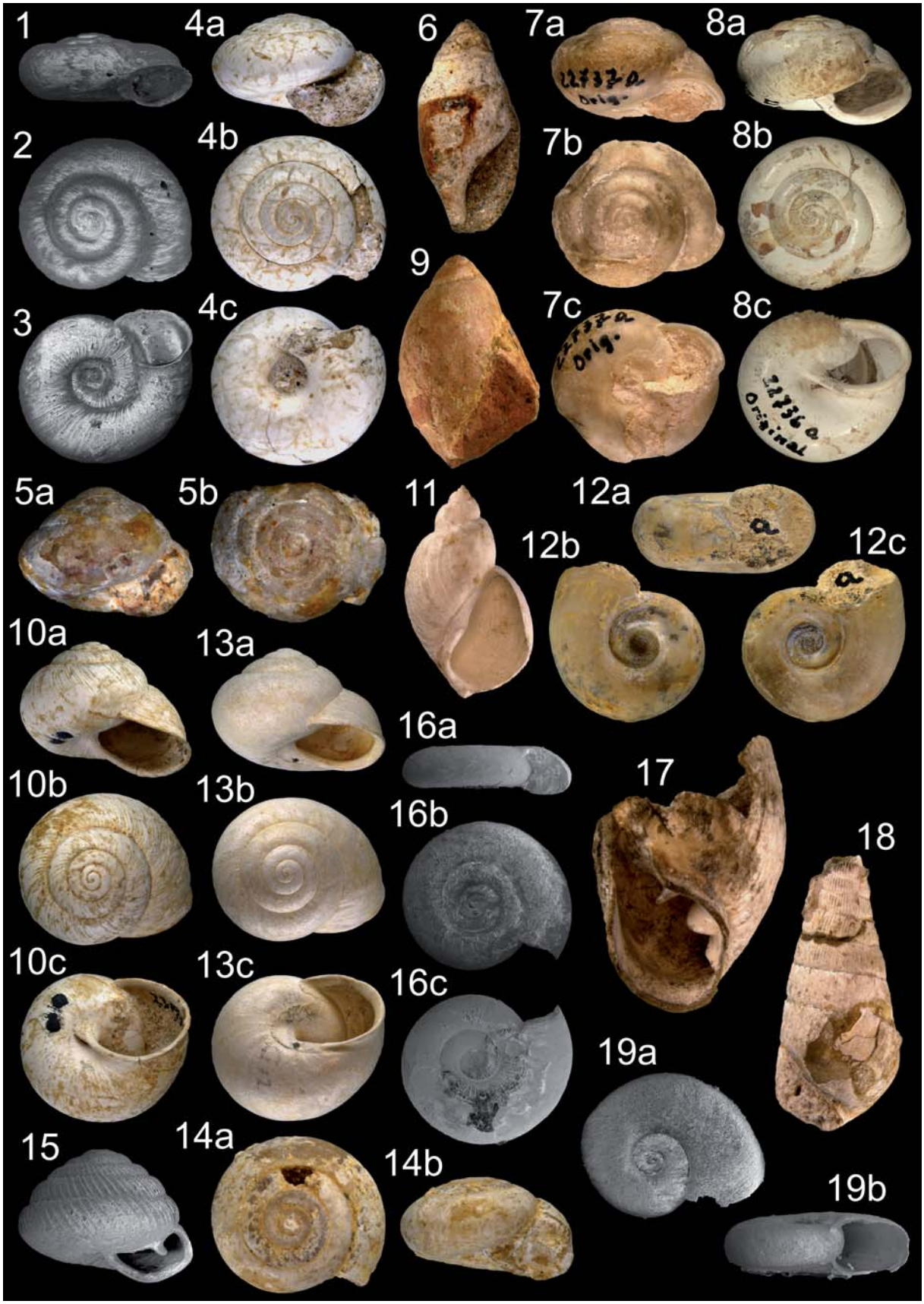


Plate 6

Fig. 1. *Vallonia laxa* Gerber, 1996, paratype #1 (SMNS 106406; H = 1.1 mm, D = 2.4 mm).
Fig. 2. *Vallonia laxa* Gerber, 1996, paratype #2 (SMNS 106406; D = 2.1 mm).
Fig. 3. *Vallonia laxa* Gerber, 1996, paratype #3 (SMNS 106406; D = 2.6 mm).
Fig. 4a–c. *Palaeotachea dentula* (Quenstedt, 1867), syntype of *Helix pachystoma* Klein, 1853 and *Cepaea lepida* Wenz, 1919 (SMNS 105004; H = 8.9 mm, D = 14.2 mm).
Fig. 5a–c. *Klikia*? *praeosculina* (Miller, 1907) , syntype of *Helix leubii* Miller, 1907 (SMNS 36777; H = 7.4 mm; D = 11.1 mm).
Fig. 6a–c. *Planorbarius lincki* (Schütze *in* Branca & Fraas, 1908), lectotype (SMNS 11902-a; H = 2.7 mm, D = 5.2 mm).
Fig. 7. *Limax lingulatus* Sandberger, 1875, syntype (SMNS 22756; H = 5.3 mm; D = 3.8 mm).
Fig. 8a–c. *Joossia insignis* (Zieten, 1832), holotype of *Helix (Campylaea) insignis maior* Miller, 1900 (SMNS 4779-a; H = 35.1 mm, D = 38.1 mm).
Fig. 9a, b. *Proserpina*? *milleri* (Fulton, 1915), syntype of *Helicina(?) trochiformis* Miller, 1907 and *Helicina milleri* (SMNS 27633; D = 4.52 mm).
Fig. 10. *Radix socialis* (Zieten, 1832), syntype of *Lymnaea turrita milleri* Jooss, 1913 (SMNS 27633; H = 29.2 mm).
Fig. 11. *Cochlicopa milleri* Wenz, 1919, syntype of *Cionella exigua* Miller, 1907 and *Cochlicopa milleri* (SMNS 27628; H = 5.0 mm).
Fig. 12. *Palaeoglandina milleri* (Pilsbry, 1909), lectotype of *Glandina ovata* Miller, 1907 and *Poiretia milleri* (SMNS 27617-b; H = 42.4 mm).
Fig. 13. *Oxyloma minima* (Klein, 1853), syntype (SMNS 106410; H = 6.1 mm).
Fig. 14a, 4b. *Miodiscula miocaenica* (Gottschick & Wenz, 1927), syntype (SMNS 15817-131; H = 1.8 mm, D = 3.2 mm).
Fig. 15a–c. *Janulus moersingensis* Jooss, 1918, holotype (SMNS 106411; H = 3.1 mm, D = 5.8 mm).
Fig. 16a, b. *Vallonia lepida* (Reuss, 1849), neotype of *Vallonia moguntiaca* Wenz, 1915 (SMNS 106412; H = 2.4 mm, D = 2.3 mm).
Fig. 17. *Leucochroopsis kleinii* (Klein, 1846), holotype of *Helix mucronata* Klein, 1846 (SMNS 106413; D = 4.7 mm).
Fig. 18a, b. *Theodoxus obtusangula* (Krauss, 1852), holotype (SMNS 106414; H = 8.1 mm).
Fig. 19. *Triptychia oligocaenica* (Miller, 1907), holotype (SMNS 27647; H = 26.5 mm).
Fig. 20a, b. *Pleurodiscoides* (*Pleurodiscoides*) *orbicularis* (Klein, 1846), syntype (SMNS 106415; H = 8.7 mm, D = 16.5 mm).
Fig. 21. *Pseudoleacina elongata* (Miller, 1907), syntype of *Oleacina ovulina* Miller, 1907 (SMNS 27637; H = 7.0 mm).

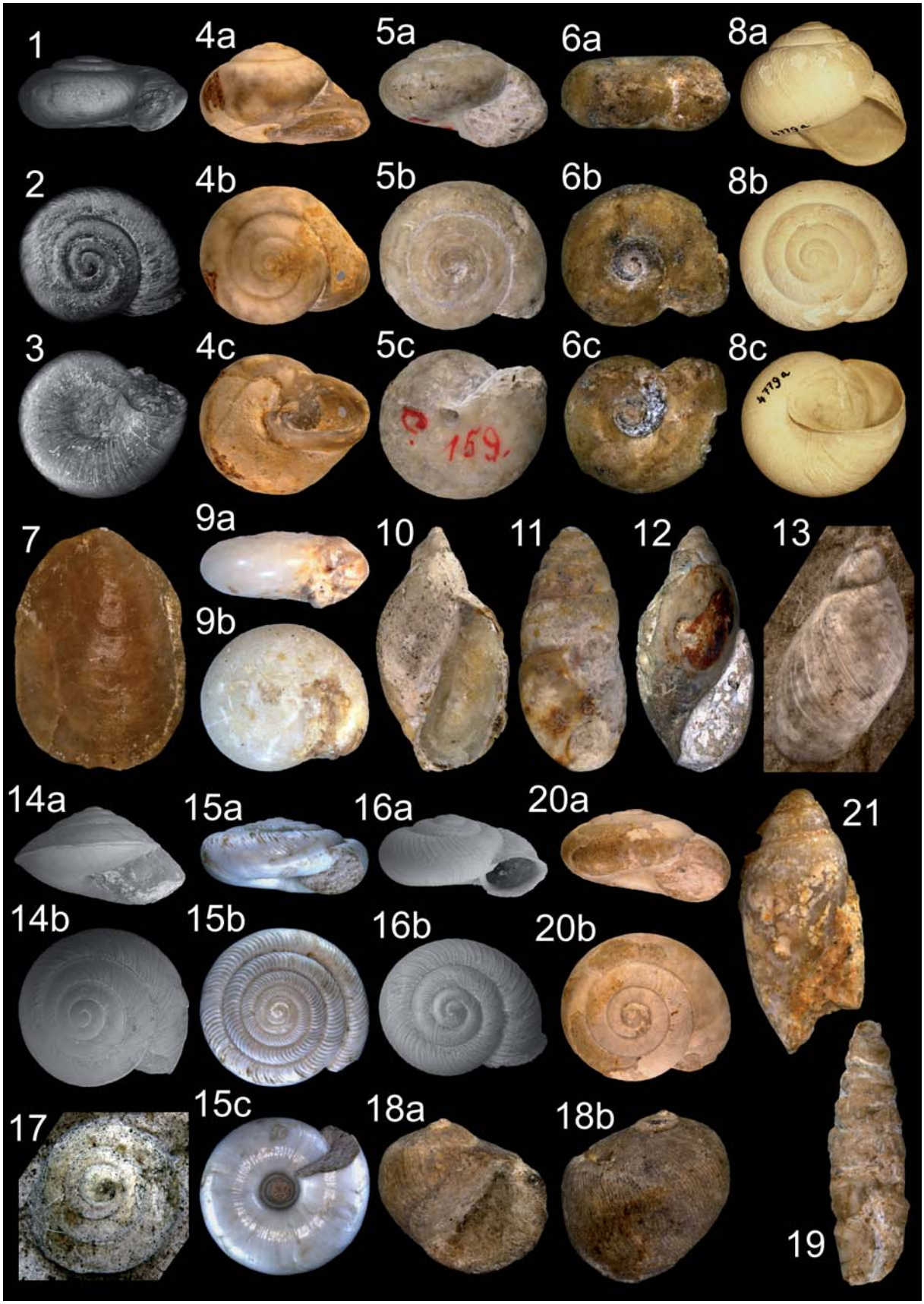


Plate 7

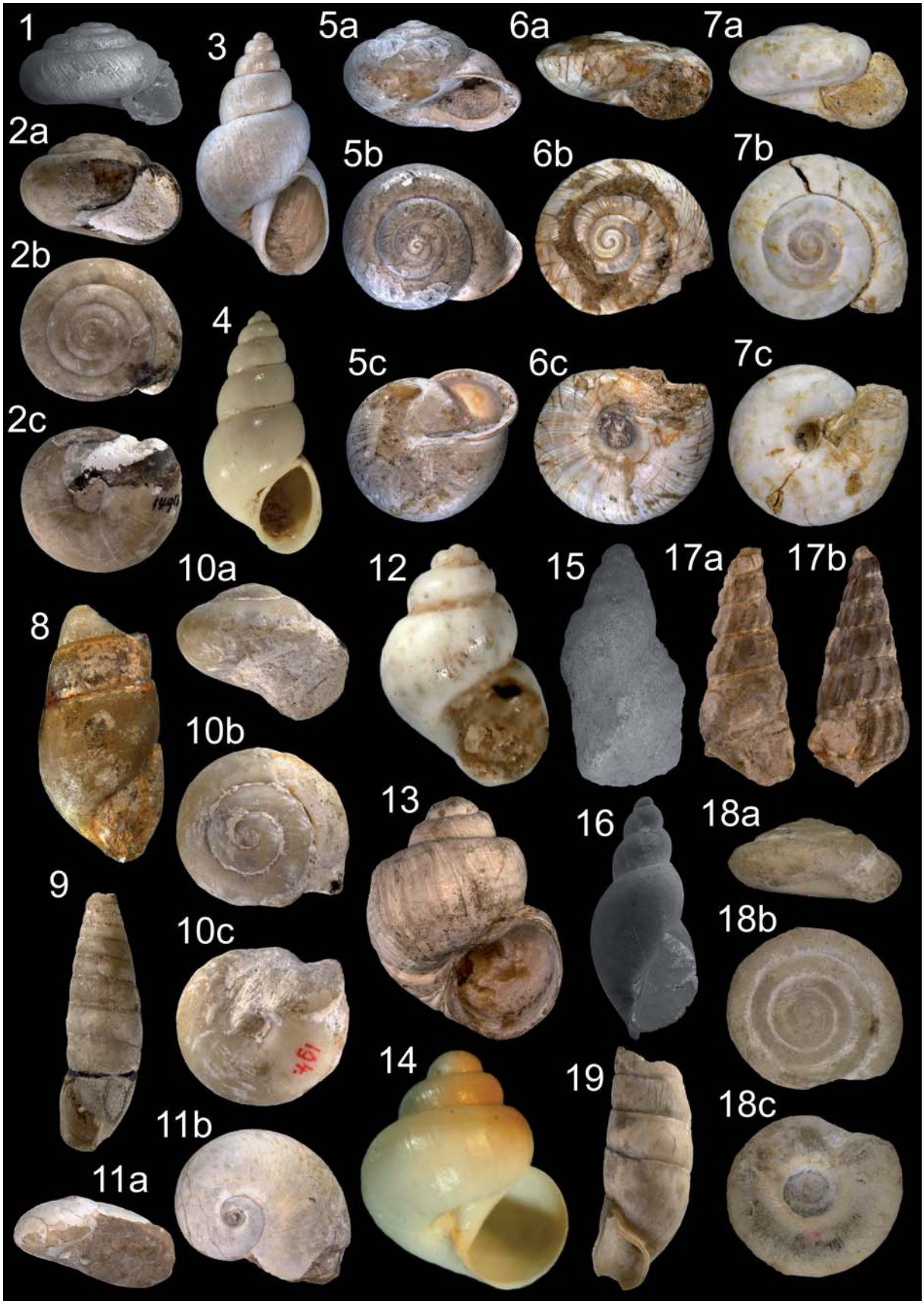
Fig. 1. *Granaria crassiventer* nom. nov. for *Pupa (Torquilla) schuebleri pachygastra* (Miller, 1900), syntype (SMNS 106416; H = 9.9 mm).
Fig. 2. *Ferrissia deperdita* (Desmarest, 1814), holotype of *Ancylus palustris* Clessin, 1877 (106417; H = 1.2 mm, D = 2.7 mm).
Fig. 3. *Neniopsis physoides* (Miller, 1907), holotype (SMNS 27648; H = 10.9 mm).
Fig. 4a, b. *Strobilops uniplicata plana* (Clessin, 1885), holotype (SMNS 106418; H = 1.0 mm, D = 2.1 mm).
Fig. 5a–c. *Planorbarius cornu* (Brongniart, 1810), syntype of *Planorbis platystoma* Klein, 1853 (SMNS 25211/2005; H = 4.5 mm, D = 7.7 mm).
Fig. 6a, b. *Archaeozonites*? *praecostatus* (Jooss, 1918), syntype (SMNS 65614; H = 16.1 mm; D = 24.9 mm).
Fig. 7a, b. *Klikia*? *praeosculina* (Miller, 1907), syntype (SMNS 27624; H = 5.8 mm; D = 9.2 mm).
Fig. 8a–c. *Aegopinella*? *procellaria* (Jooss, 1918), syntype (SMNS 106419; H = 3.7 mm; D = 7.7 mm).
Fig. 9. *Gyraulus protocrescens* Nützel & Bandel, 1993, holotype (SMNS 25669; H = 0.5 mm, D = 1.4 mm).
Fig. 10. *Gyraulus protocrescens* Nützel & Bandel, 1993, paratype #1 (SMNS 25668; D = 1.3 mm).
Fig. 11. *Gyraulus protocrescens* Nützel & Bandel, 1993, paratype #2 (SMNS 25711; D = 1.4 mm).
Fig. 12. *Punctum pumilio* Jooss, 1918, syntype #1 (SMNS 106420; H = 1.1 mm, D = 2.0 mm).
Fig. 13a, b. *Punctum pumilio* Jooss, 1918, syntype #2 (SMNS 106420; D = 2.1 mm).
Fig. 14a–c. *Omphalosagda pyramidalis* (Jooss, 1912), holotype (SMNS 23917; H = 11.72 mm; D = 14.8 mm).
Fig. 15. *Gastrocopta (Albinula) acuminata* (Klein, 1846), syntype of *Pupa quadridentata* Klein, 1853 (SMNS 106421; H = 2.1 mm).
Fig. 16. *Triptychia randeckiana* (Kranz, 1908), lectotype (SMNS 101212; H = 16.3 mm).
Fig. 17. *Triptychia randeckiana* (Kranz, 1908), paralectotype (SMNS 101213; H = 17.2 mm).
Fig. 18a, b. *Omphalosagda pyramidalis* (Jooss, 1912), syntype of *Zonites (Archaeozonites) risgoviensis* Jooss, 1912 (SMNS 23916-a; H = 11.8 mm, D = 17.1 mm).
Fig. 19. *Gyraulus rotundostomus* Nützel & Bandel, 1993, holotype (SMNS 25705; H = 1.5 mm, D = 2.3 mm).
Fig. 20. *Gyraulus rotundostomus* Nützel & Bandel, 1993, paratype #1 (SMNS 25710; D = 2.0 mm).
Fig. 21. *Gyraulus rotundostomus* Nützel & Bandel, 1993, paratype #2 (SMNS 25710; D = 1.7 mm).
Fig. 22. *Cochlostoma salomoni* (Geyer, 1914), lectotype (SMNS 13519-a; H = 7.8 mm).
Fig. 23. *Milax sandbergeri* (Clessin, 1877), syntype (SMNS 22754; H = 5.4 mm, D = 3.8 mm).
Fig. 24. *Cochlostoma scalarinum saueri* (Geyer, 1914), lectotype (SMNS 106422-a; H = 6.2 mm).
Fig. 25. *Gyraulus kraussii* (Klein, 1846), holotype of *Planorbis (Dilatata) kraussii scalaris* Miller, 1900 (SMNS 106424; H = 6.5 mm).
Fig. 26. *Emarginaria schaefferiana* (Boettger, 1877), lectotype (SMNS 106425-a; H = 5.9 mm, D = 4.4 mm).

Plate 8

Fig. 1a, b. *"Cepaea" schneideri* Jooss, 1924, syntype (SMNS 44967/2005; H = 20.8 mm, D = 28.5 mm).
Fig. 2. *Pomatias (Neobembridgia) schneidi* (Jooss, 1912), syntype (SMNS 23925; H = 9.4 mm).
Fig. 3. *Granaria schuebleri* (Klein, 1846), neotype (SMNS 100110-1; H = 8.3 mm).
Fig. 4. *Nematurella zilchi* Schlickum, 1960 (= syntype #1 of *Hydrobia semiconvexa* Sandberger, 1875) (SMNS 106428; H = 5.5 mm).
Fig. 5. *Nematurella zilchi* Schlickum, 1960 (= syntype #1 of *Hydrobia semiconvexa* Sandberger, 1875) (SMNS 106428; H = 4.3 mm).
Fig. 6a, b. *Theodoxus serratiliniformis* (Geyer, 1914), lectotype (SMNS 13514-a; H = 8.9 mm, D = 9.6 mm).
Fig. 7a, b. *Megalotachea silvana* (Klein, 1853) (SMNS 22738; H = 18.9 mm, D = 12.6 mm).
Fig. 8. *Theodoxus cyrtocelis* (Krauss, 1852), syntype of *Neritina sparsa* Krauss, 1852 (SMNS 106430; D = 5.7 mm).
Fig. 9a–c. *Pseudochloritis insignis* (Zieten, 1832), holotype of *Helix steinheimensis* Klein, 1846 (SMNS 106431; H = 20.3 mm, D = 25.5 mm).
Fig. 10a–c. *Apula coarctata* (Klein, 1853); syntype? of *Klikia (Klikia) coarctata steinheimensis* Jooss, 1918 (SMNS 106432; H = 5.8 mm, D = 10.5 mm).
Fig. 11. *Radix socialis* (Zieten, 1832), syntype of *Lymnaea socialis striata* Klein, 1846 (SMNS 23904; H = 16.0 mm).
Fig. 12a–c. *Leucochroopsis apicalis* (Reuss, 1860), syntype of *Helix subapicalis* Sandberger, 1872 (SMNS 14917; H = 6.9 mm; D = 10.1 mm).
Fig. 13. *Vallonia subcyclophorella* (Gottschick, 1911), lectotype? of *Helix* (*Vallonia) subcostata* Clessin, 1913 (SMNS 106433; H = 1.0 mm, D = 2.0 mm).
Fig. 14. *Vallonia subcyclophorella* (Gottschick, 1911), paralectotype? #1 of *Helix* (*Vallonia) subcostata* Clessin, 1913 (SMNS 45162/2005; D = 2.0 mm).
Fig. 15. *Vallonia subcyclophorella* (Gottschick, 1911), paralectotype? #2 of *Helix* (*Vallonia) subcostata* Clessin, 1913 (SMNS 45162/2005; D = 2.1 mm).
Fig. 16a–c. *Vitrea subdiaphana* (Clessin, 1885), holotype (SMNS 22755; H = 1.4 mm, D = 2.3 mm).
Fig. 17a–c. Possible syntypes (see text) of *Hippeutis subfontanus* (Clessin, 1877) (SMNS 106434; H = 0.6 mm, D = 2.3 mm).
Fig. 18. *Granaria* sp., syntype of *Pupa (Torquilla) subfusiformis* Sandberger, 1875 (SMNS 100112; H = 5.8 mm).
Fig. 19a–c. *Perpolita subhammonis* (Gottschick, 1928), holotype (SMNS 15817; H = 1.9 mm, D = 3.7 mm).
Fig. 20a–c. *Aegopinella subnitens* (Klein, 1853), lectotype (SMNS 106435-a; H = 2.6 mm, D = 5.6 mm).

Plate 9

Fig. 1. *Lucilla subteres* (Clessin, 1877), syntype (SMNS 68501; H = 1.4 mm, D = 2.2 mm).
Fig. 2a–c. *Pseudochloritis subtilisticta* (Sandberger, 1875), syntype (SMNS 14913; H = 17.5 mm, D = 24.8 mm).
Fig. 3. *Galba truncatula* (O.F. Müller, 1774), holotype of *Lymnaea subtruncatula* Clessin, 1885 (SMNS 106436; H = 6.8 mm).
Fig. 4. *Heleobia subventrosa* (Gottschick, 1921), syntype (SMNS 15817; H = 4.5 mm).
Fig. 5a–c. *Megalotachea silvana* (Klein, 1853), syntype of *Helix (Macularia) subvermiculata* Sandberger, 1875 (SMNS 10920; H = 15.7 mm, D = 23.9 mm).
Fig. 6a, b. *"Helicopsis" suevica* Gottschick & Wenz, 1927, syntype (SMNS 22828; H = 3.1 mm, D = 6.1 mm).
Fig. 7a–c. *Zonitoides suevicus* (Jooss, 1918), holotype (SMNS 106441; H = 3.1 mm, D = 5.0 mm).
Fig. 8. *"Palaeostoa" suevica* (Miller, 1907), syntype (SMNS 27646; H = 13.1 mm).
Fig. 9. *Triptychia suevica* (Sandberger, 1875), syntype (SMNS 106438; H = 28.8 mm).
Fig. 10a–c. *Galactochilus* sp., syntype of *Helix suevica* Sandberger, 1875 (SMNS 14914; H = 16.0 mm, D = 20.2 mm).
Fig. 11a, b. *Vitrina suevica* Sandberger, 1872, holotype (SMNS 106439; H = 4.4 mm, D = 8.1 mm).
Fig. 12. *Pseudamnicola suevicus* (Gottschick, 1928), syntype (SMNS 15817; H = 1.7 mm).
Fig. 13. *Viviparus suevicus* Wenz, 1919, syntype (SMNS 106437; H = 39.4 mm).
Fig. 14. *Hydrocena trolli* Schlickum, 1979b, paratype (SMNS 106442; H = 2.1 mm).
Fig. 15. *Stagnicola*? *truncatuliformis* (Schütze, 1908), lectotype (SMNS 11898-a; H = 4.4 mm).
Fig. 16. *Lymnaea* (s.l.) *turrita* Klein, 1853, lectotype (SMNS 106443-a; H = 5.5 mm).
Fig. 17a, b. *Tinnyea lauraea* (Mathéron, 1843), syntype of *Melania turrita* Klein, 1846 (SMNS 106444; H = 24.2 mm).
Fig. 18a–c. *Discus diezi ulmensis* (Jooss, 1918), syntype (SMNS 106445; H = 2.0 mm, D = 4.0 mm).
Fig. 19. *Triptychia ulmensis* (Sandberger, 1875), lectotype (SMNS 22181-a; H = 31.3 mm).



Appendix 1: Systematic list of taxa

Here is presented a list of the species/subspecies whose types can be found in the SMNS collection. The classification follows Bouchet et al. (2005), with modifications by Nordsieck (2014). Superfamilies in each greater group are listed in alphabetical order for ease of use. Subfamilies are omitted in cases, where a taxon could not be attributed to one.

GASTROPODA INCERTAE SEDIS
Melania bulimoides Klein, 1846

NERITIMORPHA
CYCLONERITIMORPHA
Superfamily Helicinoidea Férussac, 1822
Family Proserpinidae Gray, 1847
Proserpina milleri (Fulton, 1915) [= *trochiformis* Miller, 1907]

Superfamily Hydrocenoidea Troschel, 1857
Family Hydrocenidae Troschel, 1857
Hydrocena trolli Schlickum, 1979b

Superfamily Neritoidea Rafinesque, 1815
Family Neritidae Rafinesque, 1815
Subfamily Neritininae Poey, 1852
Theodoxus crenulatus (Klein, 1853)
Theodoxus cyrtocelis (Krauss, 1852) [with syn. *sparsa* Krauss, 1852)
Theodoxus obtusangula (Krauss, 1852)
Theodoxus serratiliniformis (Geyer, 1914)

CAENOGASTROPODA
ARCHITAENIOGLOSSA
Superfamily Cyclophoroidea Gray, 1847
Family Aciculidae Gray, 1850
Acicula flachi (Clessin, 1911)
Family Craspedopomatidae Kobelt & Möllendorff, 1898
Craspedopoma elegans (Miller, 1907)
Family Diplommatinidae L. Pfeiffer, 1857
Subfamily Cochlostomatinae Kobelt, 1902
Cochlostoma dubium (Miller, 1907)
Cochlostoma excellens (Jooss, 1912c)
Cochlostoma ebfraasii (Jooss, 1902) [syn. *fraasi* auct.]
Cochlostoma salomoni (Geyer, 1914)
Cochlostoma scalarinum saueri (Geyer, 1914)
Family Ferussinidae Wenz, 1923 (1915)
Ferussina [*anomphalus* ssp.?] *capellinii* (Sandberger, 1873)
Family Megalomastomatidae Blanford, 1864
Megalomastoma? dietleni Miller, 1907

Superfamily Viviparoidea Gray, 1847 (1833)
Family Viviparidae Gray, 1847 (1833)
Subfamily Viviparinae Gray, 1847 (1833)
Viviparus suevicus Wenz, 1919 [= *varicos*a Krauss, 1852]

SORBEOCONCHA
Superfamily Cerithioidea Fleming, 1822
Family Melanopsidae H. Adams & A. Adams, 1854
Melanopsis impressa Krauss, 1852
Family Pachychilidae P. Fischer & Crosse, 1892
Tinnyea lauraea (Mathéron, 1843) [syn. *turrita* Klein, 1846, *grossecostata* Klein, 1852]

LITTORINIMORPHA
Superfamily Littorinoidea Children, 1834
Family Pomatiidae Newton, 1891 (1828)
Subfamily Pomatiinae Newton, 1891 (1828)
Pomatias (Neobembridgia) arneggensis Wenz, 1923 [= *scalaris* Miller, 1907]
Pomatias (Neobembridgia) antiquus schneidi (Jooss, 1912b) [= *schneidti* Jooss, 1912a, nom. nud.]

Superfamily Truncatelloidea Gray, 1840
Family Bithyniidae Gray, 1857
Bithynia glabra (Zieten, 1832) [syn. *gracilis* Sandberger, 1872]
Bithynia? eocaenica (Miller, 1907)
Family Cochliopidae Tryon, 1866
Heleobia?subventrosa (Gottschick, 1921)
Heleobia? semiconvexa (Sandberger, 1875)
Family Hydrobiidae Stimpson, 1865
?Subfamily Hydrobiinae Stimpson, 1865
Nematurella zilchi Schlickum, 1960
Ctyrokya conoidea (Krauss, 1852)
Subfamily Pseudamnicolinae Radoman, 1977
Pseudamnicola suevicus (Gottschick, 1928)
*Pseudamnicola? giraudi (*Dollfus, 1908)

HYGROPHILA
Superfamily Lymnaeoidea Rafinesque, 1815
Family Lymnaeidae Rafinesque, 1815
Subfamily Lymnaeinae Rafinesque, 1815
Galba? *conica* (Miller, 1907)
Galba? *eocaenica* (Miller, 1907)
Galba subtruncatula (Clessin, 1885) [?= *truncatula* (O.F. Müller, 1774)]
Galba truncatuliformis (Schütze *in* Branca & Fraas, 1907)
Lymnaea brancai (Schütze *in* Branca & Fraas, 1907)
Lymnaea gracilis (Jooss, 1912)
Lymnaea turrita Klein, 1853
Lymnaea turrita milleri Jooss, 1913
Radix socialis (Zieten, 1832) [syn. *elongata* Klein, 1846, *intermedia* Klein, 1846, *striata* Klein, 1846]
Stagnicola fabulum (Brongniart, 1810) [syn. *amerbachensis* Jooss, 1912a]

Superfamily Planorboidea Rafinesque, 1815
Family Planorbidae Rafinesque, 1815
Subfamily Coretinae Gray, 1847
Planorbarius cornu (Brongniart, 1810) [syn. *involutus* Jooss, 1912a, *platystoma* Klein, 1853]
Planorbarius lincki (Schütze *in* Branca & Fraas, 1908)
Subfamily Planorbinae Rafinesque, 1815
Gyraulus costatus (Klein, 1846)
Gyraulus kraussii (Klein, 1846) [with ? syn. *scalaris* Miller, 1900]
Gyraulus kleini Gottschick & Wenz, 1916 [= *laevis* Klein, 1846]
Gyraulus protocrescens Nützel & Bandel, 1993
Gyraulus rotundostomus Nützel & Bandel, 1993
Subfamily Ancylinae Rafinesque, 1815
Ferrissia dewperdita (Desmarest, 1814) [syn. *palustris* Clessin, 1877]

Subfamily Segmentininae F.C.Baker 1945
Hippeutis subfontanus (Clessin, 1877)

STYLOMMATOPHORA
ELASMOGNATHA
Superfamily Succineoidea Beck, 1837
Family Succineidae Beck, 1837
Subfamily Succineinae Beck, 1837
Oxyloma minima (Klein, 1853)

ORTHURETHRA
Superfamily Cochlicopoidea Pilsbry, 1900 (1879)
Family Cochlicopidae Pilsbry, 1900 (1879)
Cochlicopa milleri Wenz, 1919 [= *exigua* Miller, 1907]

Superfamily Pupilloidea Turton, 1831
Family Chondrinidae Steenberg, 1925
Granaria? bythiniformis (Miller, 1907)
Granaria helicidarum (Jooss, 1923)
Granaria crassiventer nom. nov. [= *pachygastra* Miller, 1900]
Granaria schuebleri (Klein, 1846) [= *antiqua* Zieten, 1832]
Family Gastrocoptidae Pilsbry, 1918
Gastrocopta acuminata (Klein, 1846) [with syn. *quadridentata* Klein, 1853]
Family Pleurodiscidae Wenz, 1923
Pleurodiscoides (*Pleurodiscoides*) *orbicularis* (Klein, 1846)
Family Strobilopsidae Wenz, 1915
Strobilops costata (Clessin, 1877) [with syn. *bilamellatus* Clessin, 1885]
Strobilops joossii (Gottschick, 1911)
Strobilops uniplicata A. Braun, 1851) [syn. *planus* Clessin, 1885]
Family Valloniidae Morse, 1864
Acanthinula? *imperforata* (Miller, 1907)
Acanthinula hesslerana Jooss, 1911a
Vallonia costata (Müller, 1774) [syn. *costataeformis* Jooss, 1912c]
Vallonia hoppla hoppla Gerber, 1996
Vallonia laxa Gerber, 1996
Vallonia lepida (Reuss, 1849) [syn. *moguntiaca* Wenz, 1915]
Vallonia sucyclophorella (Gottschick, 1911) [syn. *subcostata* Clessin, 1911]

Superfamily Enoidea B.B. Woodward, 1903 (1880)
Family Enidae B.B. Woodward, 1903 (1880)
Palaeomastus arneggensis (Miller, 1907)

SIGMURETHRA
Superfamily Clausilioidea Gray, 1855
Family Clausiliidae Gray, 1855
Clausiliidae *incertae sedis*
"*Clausilia*" *undatistria* (Boettger, 1877)
Subfamily Clausiliinae Gray, 1855
Emarginaria schaefferiana (Boettger, 1877)
Subfamily Laminiferinae Wenz, 1923
Laminifera arneggensis Miller, 1907
Laminifera excellens Jooss, 1927
Subfamily Eualopiinae H. Nordsieck, 1985
Neniopsis physoides (Miller, 1907)
Family Filholiidae Wenz, 1923
Triptychia antiquior (Miller, 1907)
Triptychia escheri (Sandberger, 1875)
Triptychia kleini Schnabel, 2006 [= *grandis* Klein, 1846]
Triptychia oligocaenica (Miller, 1907)
Triptychia randeckiana (Kranz, 1908)
Triptychia suevica (Sandberger, 1875)
Triptychia ulmensis (Sandberger, 1875)
?Family Palaostoidae Nordsieck, 1986
Palaeostoa? *suevica* (Miller, 1907)

Superfamily Testacelloidea Gray, 1840
Family Oleacinidae H. Adams & A. Adams, 1855
Pseudoleacina eburnea (Klein, 1953)
Pseudoleacina elongata (Miller, 1907) [with syn. *ovulina* Miller, 1907]
Palaeoglandina gracilis (Zieten, 1832) [syn. *antiqua* Klein, 1852]
Palaeoglandina gracilis insignis (Jooss, 1918b)
Palaeoglandina milleri (Pilsbry, 1909) [= *ovata* Miller, 1907]
Palaeoglandina wagneri (Miller, 1907)
Family Testacellidae Gray, 1840
Testacella zellii Klein, 1853

Superfamily Punctoidea Morse, 1864
Family Discidae Thiele, 1931 (1866)
Discus antiquus (Miller, 1907)
Discus costatus (Gottschick, 1911)
Discus diezi ulmensis (Jooss, 1918b)
Discus globosus (Miller, 1907)
Discus euglyphoides (Sandberger, 1872) [syn. *undorfensis* Clessin, 1894]
Discus wenzi (Jooss, 1918b)
Family Helicodiscidae H.B. Baker, 1927
Lucilla subteres (Clessin, 1877)
Family Punctidae Morse, 1864
Punctum pumilio Jooss, 1918b

Superfamily Gastrodontoidea Tryon, 1866
Family Gastrodontidae Tryon, 1866
Janulus gottschicki (Jooss, 1912c)
Janulus moersingensis (Jooss, 1918b)
Zonitoides suevicus (Jooss, 1918b)
Family Oxychilidae Hesse, 1927 (1879)
Oxychilus? *globosus* (Miller, 1907)
Subfamily Godwiniinae Cooke, 1921
Aegopinella procellaria (Jooss, 1918b)
Aegopinella subnitens (Klein, 1853)
Perpolita boettgeriana (Clessin, 1877)
*Perpolita subhammonis (*Gottschick, 1928)
Family Pristilomatidae Cockerell, 1891
Vitrea ammoni (Clessin, 1894)
Vitrea subdiaphana (Clessin, 1885)
***incertae sedis*: Family Grandipatulidae Pfeffer, 1930**
Grandipatula alsatica (Jooss, 1918a)

Superfamily Parmacelloidea P. Fischer, 1856 (1855)
Family Milacidae Ellis, 1926
Milax crassus (Clessin, 1894)
Milax diezi (Clessin, 1894)
Milax gracilior (Sandberger, 1875)
Milax sandbergeri (Clessin, 1885)

Superfamily Zonitoidea Mörch, 1864
Family Archaeozonitidae Pfeffer, 1930
Archaeozonites angulosus Miller, 1907
Archaeozonites? arneggensis (Miller, 1907)

Archaeozonites carinatus Miller, 1907
Archaozonites deplanatus Miller, 1907
Archaeozonites eocaenicus Miller, 1907
Archaeozonites praecostatus (Jooss, 1918b)
Miozonites algiroides badensis (Jooss, 1923)
Omphalosagda hydrobiarum (Jooss, 1911a)
Omphalosagda pyramidalis (Jooss, 1912a) [with syn. *risgoviensis* Jooss, 1912a, *carinata* Jooss, 1912]

Superfamily Limacoidea Lamarck, 1801
Family Limacidae Lamarck, 1801
Limax crassissimus Jooss, 1902
Limax lingulatus Sandberger, 1875
Family Vitrinidae Fitzinger, 1833
Vitrina suevica Sandberger, 1872

Superfamily Helicoidea Rafinesque, 1815
Family Elonidae Gittenberger, 1977, subfamily Eloninae Gittenberger, 1977; or family Helicidae Rafinesque, 1815, subfamily Ariantinae Mörch, 1864
Galactochilus braunii ehingensis (Klein, 1846) [syn. *suevicus* Sandberger, 1875]
Tropidomphalus (Pseudochloritis) alveus (Sandberger, 1875) [= *alveum* Jooss, 1918]
Tropidomphalus (Pseudochloritis) incrassatus (Klein, 1853) [with syn. *inflexa* C. Boettger, 1909, *dilatatus* Jooss, 1918b]
Tropidomphalus (Pseudochloritis) subtilistictus (Sandberger, 1875)
Tropidomphalus (Joossia) insignis (Zieten, 1832) [with syn. *steinheimensis* Klein, 1846, *maior* Miller, 1900]
Family Elonidae Gittenberger, 1977, subfamily Klikiinae, H. Nordsieck, 1986; or family Helicidae Rafinesque, 1815, subfamily Klikiinae H. Nordsieck, 1986
Apula coarctata (Klein, 1853) [with syn. *steinheimensis* Jooss, 1918b]
Klikia? *joossii* (Miller, 1907)
Klikia praeosculina (Miller, 1907) [with syn. *blaviana* Miller, 1907 and *leubii* Miller, 1907]
Family Helicidae Rafinesque, 1815
Subfamily Helicinae Rafinesque, 1815
Palaeotachea convexitesta (Jooss, 1912b) [with syn. *depressa* Jooss, 1912b]
Palaeotachea subsulcosa (Thomä, 1845) [syn. *crepidostoma* Sandberger, 1872]
Palaeotachea dentula (Quenstedt, 1867) [syn. *pachystoma* Klein, 1853, *lepida* Wenz, 1919]
Palaeotachea renevieri (Maillard, 1892) [syn. *coniuncta* Berz & Jooss, 1927]
Cepaea? *schneideri* Jooss, 1923 [sp. inquirenda]
Megalotachea elevata (Berz & Jooss, 1927)
Megalotachea eversa (Deshayes, 1851) [syn. *baumbergeri* Jooss, 1923]
Megalotachea silvana (Klein, 1853) [with syn. *subvermiculata* Sandberger, 1875]
Megalotachea sylvestrina (Schlotheim, 1820) [syn. *geniculata* Sandberger, 1872]
Megalotachea? joossi (Pfeffer, 1930)
Family Helicodontidae Kobelt, 1904
Protodrepanostoma invotutum angitortum Jooss, 1912c
Protodrepanostoma involutum deplanatum (Jooss, 1911b)
Family Hygromiidae Tryon, 1866
Subfamily Hygromiinae Tryon, 1866
Helicopsis? *suevica* Gottschick & Wenz, 1927
Leucochroopsis kleinii (Klein, 1846) [syn. *mucronata* Klein, 1846, *carinulata* Klein, 1853]
Leucochroopsis helicidarum (Jooss, 1918b) [species inquirenda]
Leucochroopsis apicalis (Reuss, 1860) [syn. *subapicalis* Sandberger, 1872]
Loganiopharynx constrictelabiatus (Miller, 1907)
Miodiscula miocaenica (Gottschick & Wenz, 1927)
Family Sphincterochilidae Zilch, 1960 (1910)
Wenzia fraasi (Jooss, 1912a)

Appendix 2: List of taxa by authorship

Here, the same list is ordered by author and date. See "References" section for the full citation. A '*' indicates an invalid nominal species/subspecies name because of subjective synonymy (see main text) and a '†' indicates that the species has a new name (see main text for more details).

Berz, K.C. & Jooss, C.H.
1927 *Cepaea renevieri coniuncta**
1927 *Cepaea renevieri elevata*

Boettger, C.R.
1909 *Pseudochloritis inflexa**

Boettger, O.
1877 *Clausilia (Emarginaria) schaefferiana*
1877 *Clausilia (Pseudidyla) undatistria*

Clessin, S.
1877 *Ancylus palustris**
1877 *Planorbis (Hippeutis) subfontanus*
1877 *Helix (Patula) subteres*
1877 *Hyalinia boettgeriana*
1877 *Strobilus costatus*
1885 *Lymnaea subtruncatula**
1885 *Amalia sandbergeri*
1885 *Strobilus bilamellatus**
1885 *Strobilus planus**
1885 *Hyalina subdiaphana*
1894 *Patula undorfensis**
1894 *Amalia crassa*
1894 *Amalia diezi*
1894 *Hyalina ammoni*
1911 *Acme flachi*
1913 *Helix* (*Vallonia) subcostata**

Dollfus, G.F.
1908 *Valvata (Cincinna) giraudi*

Fulton, H.C.
1915 *Helicina milleri*

GERBER, J.
1996 *Vallonia hoppla hoppla*
1996 *Vallonia laxa*

GEYER, D.
1914 *Pomatias salomoni*
1914 *Pomatias scalarinum saueri*
1914 *Neritina serratiliniformis*

GOTTSCHICK, F.
1911 *Patula (Charopa) costata*
1911 *Strobilus joossii*
1911 *Helix (Vallonia) subcyclophorella*
1921 *Hydrobia subventrosa*
1928 *Amnicola suevicus*
1928 *Zonitoides subhammonis*

GOTTSCHICK, F. & WENZ, W.
1916 *Gyraulus multiformis kleini*
1927 *Helicopsis suevica*
1927 *Trochoidea miocaenica*

JOOSS, C.H.
1902 *Pomatias ebfraasii*
1902 *Limax crassissimus*
1911a *Acanthinula hesslerana*
1911a *Omphalosagda hydrobiarum*
1911b *Helicodonta involuta deplanata*
1912a *Planoris crassus involutus**
1912a *Limnophysa amerbachensis amerbachensis**
1912a *Limnophysa amerbachensis gracilis*
1912a *Zonites (Archaeozonites) pyramidalis*
1912a *Zonites (Archaeozonites) risgoviensis risgoviensis**
1912a *Zonites (Archaeozonites) risgoviensis carinata**
1912a *Plebecula fraasi*
1912b *Ericia schneidi*
1912b *Palaeotachea convexitesta convexitesta*
1912b *Palaeotachea convexitesta depressa**
1912c *Pomatias (Rhabdotakra) excellens*
1912c *Helicodonta involuta angitorta*
1912c *Patula gottschicki*
1912c *Vallonia costataeformis**
1913 *Lymnaea turrita milleri*
1918a *Zonites* (*Grandipatula) alsatica*
1918b *Galactochilus alveum*
1918b *Zonites (Aegopis) praecostatus*
1918b *Janulus moersingensis*
1918b *Poietia (Palaeoglandina) gracilis insignis**
1918b *Klikia (Klikia) coarctata steinheimensis**
1918b *Hygromia (Trichiopsis) helicidarum*
1918b *Hyalinia (Hyalinia) procellaria*
1918b *Punctum pumilio*
1918b *Pyramidula (Gonyodiscus) wenzi*
1918b *Pyramidula (Gonyodiscus) ulmensis*
1918b *Tropidomphalus dilatatus*
1918b *Hyalinia (Polita) suevicus*
1923 *Zonites (Aegopis) algiroides badensis**
1923 *Cepaea eversa baumbergeri**
1923 *Cepaea schneideri**
1923 *Abida helicidarum*
1927 *Laminifera excellens*

KLEIN, A. VON
1846 *Melania bulimoides*
1846 *Pupa acuminata*
1846 *Pupa schuebleri*
1846 *Planorbis costatus*
1846 *Planorbis kraussii*
1846 *Planorbis laevis**
1846 *Helix mucronata**
1846 *Lymnaea socialis elongata**
1846 *Lymnaea socialis intermedia**
1846 *Lymnaea socialis striata**
1846 *Melania turrita**
1846 *Clausilia grandis*†
1846 *Helix steinheimensis**
1846 *Helix orbicularis*
1852 *Melania grossecostata**
1852 *Achatina antiqua**
1853 *Helix pachystoma**
1853 *Helix silvana*
1853 *Pupa quadridentata**
1853 *Helix carinulata**
1853 *Lymnaea turrita*
1853 *Helix subnitens*
1853 *Planorbis platystoma**
1853 *Glandina (Achatina) eburnea*
1853 *Succinea minima*
1853 *Testacella zellii*
1853 *Neritina crenulata*
1853 *Helix incrassata*

KRANZ, W.
1908 *Clausilia randeckiana*

KRAUSS, F.
1852 *Paludina conoidea*
1852 *Melanopsis impressa*
1852 *Neritina cyrtocelis*
1852 *Neritina obtusangula*
1852 *Neritina sparsa**
1852 *Paludina varicosa*†

MILLER, K.
1900 *Planorbis (Dilatata) kraussii scalaris**
1900 *Pupa (Torquilla) schuebleri pachygastra*†
1900 *Helix (Campylaea) insignis maior**
1907 *Hyalinia (Conulus) imperforata*
1907 *Archaeozonites angulosus*
1907 *Trochomorpha arneggensis*
1907 *Archaeozonites carinatus*
1907 *Archaeozonites eocaenicus*
1907 *Archaeozonites deplanatus*
1907 *Bithynia eocaenica*
1907 *Cionella exigua*†
1907 *Craspedopoma elegans*
1907 *Patula antiqua*
1907 *Patula globosa*
1907 *Lymnaea conica*
1907 *Lymnaea eocaenica*
1907 *Pupa bythiniformis*
1907 *Helix (Gonostoma) blaviana**
1907 *Helix joossii*
1907 *Helix (Gonostoma) leubii**
1907 *Helix (Gonostoma) praeosculina*
1907 *Laminifera arneggensis*
1907 *Helix constrictelabiata*
1907 *Megalomastoma dietleni*
1907 *Bulimus (Petraeus) arneggensis*

1907 *Clausilia (Balea?) physoides*
1907 *Hyalinia globosa*
1907 *Glandina wagneri*
1907 *Glandina ovata*†
1907 *Melania suevica*
1907 *Pomatias dubius*
1907 *Cyclotus scalaris*†
1907 ?*Helicina trochiformis*†
1907 *Glandina elongata*
1907 *Oleacina ovulina**
1907 *Clausilia antiquior*
1907 *Clausilia oligocaenica*

Nützel, A. & Bandel, K.
1993 *Gyraulus protocrescens*
1993 *Gyraulus rotundostomus*

Pfeffer, G.
1929 *Trachytachea joossi*

Pilsbry, H.A.
1909 *Poiretia milleri*

Salvador, R.B., Höltke, O., Rasser, M.W. & Kadolsky, D.
2015 (herein) *Granaria crassiventer*

Sandberger, F. von
1872 *Bithynia gracilis**
1872 *Helix crepidostoma**
1872 *Helix geniculata**
1872 *Helix subapicalis**
1873 *Strophostoma anomphalus capellinii*
1875 *Helix (Macularia) subvermiculata**
1875 *Limax lingulatus*
1875 *Pupa (Torquilla) subfusiformis*
1875 *Helix alveus*
1875 *Helix suevica**
1875 *Hydrobia semiconvexa*
1875 *Amalia gracilior*
1875 *Clausilia escheri*
1875 *Clausilia suevica*
1875 *Clausilia ulmensis*
1875 *Helix subtilisticta*
1875 *Vitrina suevica*

Schlickum, R.W.
1979 *Hydrocena (Hydrocena) trolli*

Schnabel, T.
2006 *Triptychia (Triptychia) kleini*

Schütze, E.
1907 (in Branca & Fraas) *Lymnaea truncatuliformis*
1907 (in Branca & Fraas) *Lymnaea brancai*
1907 (in Branca & Fraas) *Planorbis (Coretus) lincki*

Wenz, W.
1915 *Vallonia moguntiaca**
1919 *Cochlicopa milleri*
1919 *Viviparus suevicus*
1919 *Cepaea lepida*
1923 *Pomatias arneggensis*

Zieten, C.H. von
1832 *Helix insignis*
1832 *Pupa antiqua*

Appendix 3: Missing type material

Below are listed all nominal species-group taxa (in their original form) of which no type material could be identified in the SMNS collection. Part of this material could still be present in the SMNS but not identified as types, part may be deposited in other institutions, and part (or most) might have actually been lost. In a few cases, type material that had been inventoried in the SMNS collection could not be presently located. More specifically, the material listed below from the works of Gottschick, Wenz, Miller and Klein were probably in the Wenz collection in Frankfurt, which was destroyed during World War II (see also Zilch 1987). Furthermore, we have included below the new taxa which Sandberger (1870–1875) described from southern Germany. While Sandberger's collection is mostly stored in the MUWI (or SMF) collection, he identified some specimens he studied as being kept in the "k. Naturaliensammlung zu Stuttgart" [royal collection of natural objects in Stuttgart]. Moreover, many specimens were provided to Sandberger by others (notably Wetzler, Probst and Miller), but it is not stated whether he just borrowed them or incorporated them into his collection. If he returned them to their original owners, Miller's collection is the only one to have been acquired by the SMNS.

aciculella Sandberger, 1875, *Caecilianella*
acieformis Klein, 1846, *Helix*
albertanus Clessin, 1877, *Planorbis*
alta Clessin, 1911b, *Acme*
alveus Sandberger, 1875, *Omphalosagda*
angulatus Clessin, 1877, *Planorbis (Gyrorbis)*
antiquata Clessin, 1913, *Pupa (Lauria?)*
antiquus Miller, 1907, *Pomatias*
aperta Sandberger, 1895, *Pupa*
applanata Miller, 1907, *Hyalinia*
arneggensis Miller, 1907, *Helix (Parachloraea)*
brevis Miller, 1907, *Clausilia*
bullatus Klein, 1846, *Limnaeus*
buxovillanum Wenz, 1923, *Cochlostoma (Obscurella)*
circumscisa Gottschick, 1920a, *Hyalinia (Gyralina)*
clessini Boettger, 1877, *Clausilia*
coarctata Klein, 1853, *Helix* [lot SMNS 43757/2005, lost]
conica Jooss, 1918b, *Klikia (Klikia) catantostoma*
conicum Klein, 1853, *Cyclostoma*
consobrinus Sandberger, 1875, *Cyclostomus*
costata Jooss, 1918b, *Palaeoglandina gracilis*
costatus Sandberger, 1875, *Archaeozonites*

deperditolacustris Gottschick, 1911, *Ancylus (Acroloxus)*
diezi Clessin, 1894, *Patula*
diezi Clessin, 1913, *Pupa (Alaea)*
diezi Clessin, 1913, *Strobilus*
distortus Miller, 1900, *Planorbis (Armiger) costatus*
eckingensis Sandberger, 1875, *Clausilia*
ecostata Sandberger, 1875, *Melania Escheri*
ehingensis Klein, 1846, *Helix*
elegans Klein, 1853, *Achatina* [= *kleiniana* Pilsbry, 1909 nom.nov.]
ellipticus Klein, 1846, *Limnaeus*
elongata Miller, 1900, *Gillia utriculosa*
elongata Jooss, 1911b, *Limnophysa turrita*
elongata Jooss, 1911b, *Melanopsis callosa*
erecta Gottschick, 1920a, *Hyalinia (Hyalinia) subnitens*
erecta Gottschick, 1919, *Vitrina (Vitrina) suevica*
excerpta Clessin, 1913, *Limnaea*
giengensis Klein, 1846, *Helix*
glabraeformis Gottschick, 1911, *Limnaea (Limnophysa)*
globula Clessin, 1913, *Pupa (Alaea)*
gracilis Jooss, 1911b, *Cochlicopa (Zua) lubricella*
gracilis Gottschick & Wenz, 1919, *Negulus suturalis*
grossecostata Klein, 1852, *Melania* [lot SMNS 23909, lost]
grossecostata Gottschick & Wenz, 1919, *Torquilla schuebleri*
gyrorbis Klein, 1846, *Helix*
helvetica Sandberger, 1875, *Clausilia (Triptychia)*
heterodus Miller, 1900, *Pupa (Pupilla)*
hildegardiae Gottschick, 1911, *Oleacina (Boltenia)*
inflata Clessin, 1913, *Pupa (Alaea)*
intermedia Klein, 1846, *Valvata multiformis*
kinkelini Jooss, 1911a, *Limnaea*
kleiniana Pilsbry, 1909, *Poiretia* [nom. nov. for *Achatina elegans* Klein, 1853, non C.B. Adams, 1849]
kleinii Klein, 1846, *Helix*
kleinii Kurr, 1856, *Melanopsis*
kurrii Klein, 1846, *Limnaeus*
lacustriformis Jooss, 1913a, *Limnaea turrita*
latior Gottschick, 1921a, *Hippeutis subfontanus*
lentilii Miller, 1900, *Pupa* [lot SMNS 45287/2005, lost]
lineolatum Sandberger, 1895, *Carychium*
longidens Clessin, 1913, *Pupa (Leucochila)*
loxostoma Klein, 1853, *Achatina*
maior Miller, 1900, *Helix (Macularia) silvestrina*
maior Jooss, 1912b, *Zonites (Archaeozonites) risgoviensis*
major Gottschick, 1928, *Amnicola suevicus*
major Clessin, 1885, *Clausilia (Serrulina) clessini*
major Gottschick & Wenz, 1916, *Cochlicopa subrimata*
major Gottschick, 1920b, *Vallonia subcyclophorella* [lot SMNS 45146/2005]
manca Wenz, 1919f, *Clausilia* [nom. nov. pro *Clausilia wetzleri* Miller, 1907]
miliolum Clessin, 1913, *Pupa (Leucochila)*
milleri Gottschick & Wenz, 1919, *Vertigo angulifera*
minima Gottschick & Wenz, 1916, *Cochlicopa subrimata*
minima Clessin, 1913, *Pupa (Alaea)*
minor Miller, 1900, *Helix (Macularia) silvestrina*
minor Gottschick, 1911, *Helix (Vallonia) subpulchella*
minor Gottschick, 1911, *Hyalinia (Polita) orbicularis*
minor Klein, 1846, *Limnaeus pereger*
minor Miller, 1907, *Strophostoma anomphalus*
minutula Clessin, 1913, *Pupa (Isthmia)*
minutus Klein, 1846, *Bulimus*
miocaenica Clessin, 1913, *Pupa (Isthmia)*
moersingensis Boettger, 1877, *Clausilia (Pseudidyla)*
moguntina Jooss, 1911b, *Limnophysa girondica*
muscicola Clessin, 1913, *Pupa (Alaea)*
nitidulus Clessin, 1877, *Planorbis (Gyraulus) dealbatus*
nobilis Klein, 1846 *Paludina*
noerdlingensis Klein, 1846, *Pupa* [*nomen dubium*, fide Höltke & Rasser, 2013]
normalis Gottschick, 1921b, *Pseudamnicola pseudoglobulus*
nummulina Sandberger, 1875, *Helix*
oblongus Clessin, 1913, *Ancylus*
oepfingensis Wenz, 1918a, *Nematurella*
oxystoma Klein, 1846, *Planorbis*
paludinaeformis Sandberger, 1873, *Succinea* [nom. nov. pro *Succinea paludinoides* Klein, 1846]
paludinoides Klein, 1846, *Succinea*
palustriformis Gottschick, 1911, *Limnaea (Limnaea)*
parvulum Gottschick, 1920a, *Punctum propygmaeum*
perarmata Gottschick & Wenz, 1919, *Vertigo (Alaea) callosa*
perlabiata Gottschick & Wenz, 1919, *Pupilla*
physaeformis Gottschick, 1920c, *Aplexa subhypnorum*
planata Gottschick, 1921a, *Segmentina larteti*
planiuscula Miller, 1907, *Paludina*
praelongata Gottschick & Wenz, 1916, *Limnaea (Radix) dilatata*
priscum Wenz, 1930, *Cochlostoma (Obscurella?)* [nom. nov. pro *Pomatias antiquus* Miller, 1907]
procera Gottschick, 1920b, *Cochlicopa subrimata*
procera Gottschick & Wenz, 1916, *Leucochila acuminata*
quinquedentata Jooss, 1911b, *Vertigo (Alaea) callosa*
radiatula Sandberger, 1872, *Valvata*
recedens Gottschick, 1920a, *Hyalinia (Hyalinia) subnitens*
rotundata Klein, 1846, *Valvata multiformis*
sandbergeri Clessin, 1894, *Patula (Charopa)*
scabiosa Sandberger, 1875, *Helix*
scalaris Miller, 1900, *Carinifex multiformis*
scalaris Gottschick, 1920a, *Hygromia (Trichiopsis) kleini*
scalaris Jooss, 1902, *Planorbis (Gyraulus) Zieteni*
septemgyratiformis Gottschick, 1911, *Planorbis (Gyrorbis)*
sexdentata Gottschick, 1920b, *Azeca*
silvana Jooss, 1918b, *Pyramidula (Gonyodiscus)*
sparsisticta Sandberger, 1875, *Helix*
sparsistictum Jooss, 1918b, *Tropidomphalus*
stagnaliformis Clessin, 1913, *Limnaea*
steinheimensis Miller, 1900, *Bythinella*
steinheimensis Gottschick, 1921b, *Caspia(?)*
steinheimensis Jooss, 1918b, *Poiretia (Palaeoglandina) gracilis*
steinheimensis Miller, 1900, *Pupa (Pupilla)*
steinheimensis Gottschick, 1920b, *Vallonia lepida*
steinheimensis Gottschick & Wenz, 1919, *Vertigo (Alaea) callosa*
steinheimensis Gottschick, 1920a, *Vitrea (Vitrea) procrystallina*
steinheimensis Jooss, 1912c, *Zonites subverticillus* [lot SMNS 45984/2005, lost]
subcarinatus Gottschick, 1921a, *Gyraulus hilgendorfi*
subconoideus Jooss, 1912c, *Strobilus* [lot SMNS 45173/2005, on loan?]
subcostatus Sandberger, 1875, *Archaeozonites*
subcyclophorella Gottschick, 1911, *Helix (Vallonia)* [lot SMNS 15817, lost]
subhypnorum Gottschick, 1920c, *Aplexa*
subinvoluta Sandberger, 1875, *Helix*
subinvolutus Gottschick, 1921a, *Gyraulus multiformis applanatus kleini*
subkleini Gottschick, 1921a, *Gyraulus multiformis applanatus*
subleachi Gottschick, 1921b, *Bythinia gracilis*
submarginalis Klein, 1846, *Helix*
submuscorum Gottschick & Wenz, 1919, *Pupilla*

subpfeifferi Gottschick, 1920b, *Succinea (Amphibina) minima*
subpolita Gottschick, 1921b, *Acme (Platyla)*
subteres Sandberger, 1872, *Planorbis*
suevica Gottschick & Wenz, 1919, *Pupilla iratiana*
suevica Gottschick & Wenz, 1916, *Pyramidula (Gonyodiscus) supracostata*
suevica Gottschick & Wenz, 1919, *Vertigo (Alaea) protracta*
suevicus Sandberger, 1875, *Cyclostomus* [lot SMNS 61803, lost]
suevicus Sandberger, 1875, *Pomatias*
supracostata Sandberger, 1872, *Patula*
terrena Clessin, 1874, *Helix*
tridentiformis Gottschick, 1911, *Cionella (Azeca)*
trochulus Sandberger, 1875, *Hydrobia*
ulmensis Miller, 1907, *Cyclostomus*
ulmensis Wenz, 1918a, *Poiretia (Poiretia) rugulosa*
ulmensis Wenz, 1918a, *Torquilla subvariabilis*
umbilicata Jooss, 1918b, *Klikia (Klikia) coarctata*
undorfensis Boettger, 1877, *Clausilia (Pseudidyla) moersingensis*
undorfensis Clessin, 1894, *Hyalina*
undorfensis Clessin, 1877, *Limnaea*
undorfensis Clessin, 1913, *Pupa (Alaea)*
undorfensis Clessin, 1913, *Strobilus* [p. 104: *Strobilus curdoofensis*]
wetzleri Boettger, 1877, *Clausilia*
wetzleri Miller, 1907, *Clausilia*
zellii Kurr, 1856, *Helix*