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Revision of the Jurassic Cephalopod Holotypes in the Collections of the Geological Survey of Austria in Vienna

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Revision
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Revision der jurassischen Cephalopoden-Holotypen in der Sammlung der Geologischen Bundesanstalt in Wien

Zusammenfassung

In der vorliegenden Arbeit werden 32 Cephalopoden-Holotypen des Jura aus der Sammlung der Geologischen Bundesanstalt in Wien revidiert. Sie wurden von AMMON (1875), EMMRICH (1853), FURLANI (1910), GRIESBACH (1868), HAUER (1853, 1854, 1856), NEUMAYR (1870a, 1873), OPPEL (1862), PIA (1914), RAKÚS (1993, 1994, 1999a, b, c), SCHWEIGERT et al. (2000), TIETZE (1872), TRAUTH (1938) und WÄHNER (1882) erstbeschrieben. Die Exemplare wurden vermessen und abgebildet sowie der taxonomische Status überprüft.

Abstract

In the present paper 32 Jurassic cephalopod holotypes in the collections of the Geological Survey of Austria in Vienna are revised. They had been first described by AMMON (1875), EMMRICH (1853), FURLANI (1910), GRIESBACH (1868), HAUER (1853, 1854, 1856), NEUMAYR (1870a, 1873), OPPEL (1862), PIA (1914), RAKÚS (1993, 1994, 1999a, b, c), SCHWEIGERT et al. (2000), TIETZE (1872), TRAUTH (1938) and WÄHNER (1882). The specimens have been measured and figured and the taxonomic status has been verified.

Introduction

Between 1975 and 1986 various catalogues on type specimens in the collections of the Geological Survey of Austria in Vienna (GBA) have been published contributing to different groups of fossils and strata. They gave concise information on type specimens and figured specimens in form of similarly edited lists. In 2010 the tradition of catalogues has been continued in another form. Even, if they are not all done in the same way, most of them are equal in concentrating on holotypes and giving additional information including modern taxonomic and stratigraphic classification of the specimens as well as illustrations. The present catalogue is the first dealing with the Jurassic focusing on cephalopod holotypes, of which 32 specimens are available. Almost all holotypes have been newly photographed for a modern presentation except for *Angulaticeras marmoreum* (OPPEL, 1862) as BLOOS (1988) published it well illustrated.

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New species of Jurassic cephalopods including aptychi based on single specimens (holotypes by monotypy) have been erected in chronological order by EMMRICH (1853), HAUER (1853, 1854, 1856), OPPEL (1862; see also BLOOS, 1988), GRIESBACH (1868), TIETZE (1872), AMMON (1875), NEUMAYR (1870a, 1873), WÄHNER (1882), FURLANI (1910), PIA (1914), TRAUTH (1938), RAKÚS (1993, 1994, 1999a, b, c) and SCHWEIGERT et al. (2000). The last two authors (RAKÚS, 1993, 1999a; SCHWEIGERT et al., 2000) also selected lectotypes like DONOVAN (1958), WESTERMANN (1964), GETTY (1973), COX (1988), SARTI (1990), BLOOS (1994) and DIETZE et al. (2001). Concise information on the lectotypes is given in Table 1.

Further new species based on syntypes have been published in many of the above mentioned publications and mainly within the monographs of NEUMAYR (1870b, 1871, 1879), GEYER (1886, 1893), VACEK (1886) and WÄHNER (1886, 1894), to a lesser extent by VADÁSZ (1908), HAAS (1913, 1915), KUDERNATSCH (1852), ROSENBERG (1909) and TRAUTH (1935) the material of which is also housed in the GBA. All of the material mentioned herein is also included in the so-called OeTyp-database (ÖAW, 2009), where besides type specimens also figured specimens and reference material can be searched for in Austrian paleontological collections.

coll. no.	species	lectotype designation	locality
1856/001/0004	*Epophioceras ultraspiratum costosa* (VADÁSZ, 1908)	GETTY (1973): 24	Enzesfeld, Austria
1856/001/0006/01	*Paltechioceras tardecrescens* (HAUER, 1856)	GETTY (1973): 21, Pl. 4, Figs. 2a–b	Adnet, Austria
1856/001/0010	*Echioceras deciduum* (HYATT, 1867)	DONOVAN (1958): 17	Adnet, Austria
1856/001/0014/01	*Paltechioceras hierlatzicum* (HAUER, 1856)	GETTY (1973): 11	Hierlatz, Austria
1856/001/0036	*Echioceras haueri* (BUCKMAN, 1914)	GETTY (1973): 13, Pl. 1, Fig. 11	Adnet, Austria
1870/004/0001	*Indosphinctes patina* (NEUMAYR, 1870)	COX (1988): 24, Pl. 6, Fig. 4, Pl. 7, Fig. 1	Brieltal, Gosau, Austria
1873/003/0065/01	*Presimoceras teres* (NEUMAYR, 1873)	SARTI (1990): 50, Fig. 9A	Csofranka, Romania
1879/003/0003	*Geyeroceras subcylindricum* (NEUMAYR, 1879)	RAKÚS (1993): 949, Pl. 3, Fig. 2	Zlambach, Austria
1879/003/0004/01	*Togaticeras togatum* (NEUMAYR, 1879)	RAKÚS (1993): 946, Pl. 3, Fig. 7	Zlambach, Austria
1879/003/0006/01	*Nevadaphyllites glaberrimus* (NEUMAYR, 1879)	RAKÚS (1993): 946, Pl. 1, Fig. 2	Zlambach, Austria
1886/002/0034/01	*Tmaegophioceras laevis* (GEYER, 1886)	GETTY (1973): 25	Hierlatz, Austria
1886/002/0045/01	*Angulaticeras angustisulcatum* (GEYER, 1886)	RAKÚS (1993): 350	Hierlatz, Austria
1886/005/0029/c	*Csernyeiceras subaspidoides* (VACEK, 1886)	SCHWEIGERT et al. (2000): 3–5, Text-Fig. 1a	Cap San Vigilio, Italy
1886/005/0046/01	*Docidoceras longalvum* (VACEK, 1886)	WESTERMANN (1964): 48, Pl. 6, Figs. 1–2	Cap San Vigilio, Italy
1999/086/0002b	*Exomiloceras altum* (HAUER, 1856)	RAKÚS (1999a): 322, Text-Fig. 2, Pl. 1, Fig. 1	Adnet, Austria
1891/002/0002	*Arietites anastreptoptychus* (WÄHNER, 1891)	BLOOS (1994): 46, Pl. 4, Fig. 1, Text-Fig. 11a	Schreinbach, Adnet, Austria

Tab. 1.
Lectotypes of Jurassic cephalopods stored in the collections of the Geological Survey of Austria.

List of Holotypes

The holotypes are ordered alphabetically and chronologically, according to author and then year of publication. Within a publication it is ordered according their appearance in the original text. The index at the end of the paper helps finding species names.

AMMON, L. v., 1875: Die Jura-Ablagerungen zwischen Regensburg und Passau.

Perisphinctes progeron AMMON, 1875

(Pl. 1, Figs. 1–4)

Dimensions:	D	H	W	O	H/W	O/D (%)
	133	46	39	49	1.18	36.8

Coll. No.: GBA 1875/004/0002.
Type: Holotype by monotypy.
Type level: Upper Jurassic, Early Kimmeridgian, Söldenau Formation.
Type locality: Söldenau, Lower Bavaria, Germany.
Type reference and figure: AMMON, L. v., 1875. Die Jura-Ablagerungen zwischen Regensburg und Passau, Theodor Ackermann Verlag München: p. 181, Pl. 1, Figs. 2a–b.

Remarks: The specimen is preserved as an internal cast of a phragmocone in yellowish micritic limestone, the body chamber is broken and lost. The suture line is visible but badly preserved. The specimen was refigured by GEYER (1961: p. 31, Pl. 7, Fig. 2) as *Lithacoceras* (*Progeronia*) *progeron*, and GRÖSCHKE (1985: p. 58, Text-Fig. 20b, Pl. 6, Fig. 4) as *Progeronia progeron*. It is the type species of the genus *Progeronia* (ARKELL, 1953: p. 38). Its stratigraphic range in Lower Bavaria is Weißjura γ (Early Kimmeridgian, GEYER, 1961; ARKELL, 1953), in Betic Cordilliera it occurs in the *Platynota* – *Strombecki* Zones (OLÓRIZ, 1978).

Revised name: ***Progeronia progeron* (AMMON, 1875)**.

Perisphinctes suberinus AMMON, 1875

(Pl. 2, Figs. 1–2; Pl. 3, Figs. 1–2)

Dimensions:	D	H	W	O	H/W	O/D (%)
	189.5	57.5	42	68	1.37	35.9

Coll. No.: GBA 1875/004/0004.
Type: Holotype by monotypy.
Type level: Upper Jurassic, Early Kimmeridgian, Söldenau Formation.
Type locality: Söldenau near Ortenburg, Lower Bavaria, Germany.
Type reference and figure: AMMON, L. v., 1875. Die Jura-Ablagerungen zwischen Regensburg und Passau, Theodor Ackermann Verlag München: p. 183, Pl. 2, Figs. 1 a–c.

Remarks: An adult specimen preserved as an internal cast filled with yellowish micritic limestone. The suture line was figured by AMMON (1875: Pl. 2, Fig. 1c) and is in good accordance with the real specimen. This holotype was re-figured by SCHNEID (1944: p. 38, Pl. 9, Fig. 1) as *Ataxioceras suberinum*, and by GEYER (1961: p. 62, Pl. 13, Fig. 1) and GRÖSCHKE (1985: p. 63, Text-Fig. 20a, Pl. 6, Fig. 1) as *Ataxioceras (Ataxioceras) suberinum*. Its stratigraphic range is Early Kimmeridgian, Weißjura γ2 sensu GEYER (1961), equivalent to lower part of the *Hypselocyclum* Zone (sensu ATROPS, 1982).

Revised name: ***Ataxioceras (Ataxioceras) suberinum* (AMMON, 1875)**.

EMMRICH, H., 1853: Jb. k. k. Geol. R.-A., 4/1

Ammonites keindelii EMMRICH, 1853

(Pl. 4, Figs. 1–3)

Dimensions:	D	H	W	O	H/W	O/D (%)
	52	20.5	17	18	1.21	34.6

Coll. No.: GBA 1853/003/0001.
Type: See remarks.
Type level: Lower Jurassic, "*Jamesoni* Schichten".
Type locality: Gastetter Graben near Marquartstein, Bavaria, Germany.
Type reference and figure: HAUER, F. v., 1856. Denkschr. k. k. Akad. Wiss. Wien, math.-naturwiss. Cl., 11, p. 53, Pl. 17, Figs. 8–9.

Remarks: The specimen is preserved as an internal cast in red marly limestone. EMMRICH (1853) did not figure the type specimen which would represent a holotype by monotypy. Later, HAUER (1856: p. 53, Pl. 17, Figs. 8–9) figured an ammonite under the name *Ammonites brevispina* SOWERBY which he considered to be the type specimen. HAUER stated that he received this specimen directly from H. EMMRICH. In the original description, EMMRICH specified, that the ultimate whorl bears 23 ribs and has a flat venter (in accordance with the original figure by HAUER), but the revised specimen has 27 ribs and the venter is arched. Moreover, EMMRICH mentioned that the fauna comes from "Fleckenmergel" from Gastetter Graben ("Amaltheenmergel" – "Graukalkfazies"), but the here revised specimen is an internal mold preserved in red limestone. The fact that the figuration by HAUER does not match with the "type" specimen was already observed by WIEDENMAYER (1980: p. 146) and BLAU (1998: p. 230). BLAU concluded, that it does not represent the type specimen of EMMRICH and labelled it as *Epideroceras* sp. 1. In conclusion, we agree with his opinion and we do not consider the specimen registered under the coll. no. GBA 1853/003/0001 to be the holotype of *"Ammonites" keindelii* EMMRICH, 1853, which is regarded to be lost. Nevertheless, as far as we can suppose from the original description, the specimen of EMMERICH most probably belongs to the genus *Epideroceras*.

Revised name: ***Epideroceras* sp.**

FURLANI, M., 1910: Jb. k. k. Geol. R.-A., 60/1

Virgatosphinctes pseudoulmensis FURLANI, 1910

(Pl. 4, Fig. 4)

Dimensions:	D	H	W	O	H/W	O/D (%)
	~80	~26	-	~32	-	~40

Coll. No.: GBA 1910/001/0001.
Type: Holotype by monotypy.
Type level: Late Jurassic, Lemeš Facies.
Type locality: Mt. Lemeš, Middle Dalmatia, Croatia.
Type reference and figure: FURLANI, M., 1910. Jb. k. k. Geol. R.-A., 60/1: p. 74, Pl. 3, Fig. 1.

Remarks: Flattened external cast in yellowish marly limestone. The suture line is partly visible only near the beginning of the body chamber and is badly preserved. It belongs to the subgenus *Subplanitoides,* which is a microconch of *Usseliceras.* The specimen comes from the "Fleckenkalk", which is of Late Kimmeridgian to Early Tithonian age. Rarely quoted species (see CECCA, 1990: p. 45).

Revised name: ***Usseliceras (Subplanitoides) pseudoulmensis* (FURLANI, 1910)**.

Oppelia dinarica FURLANI, 1910

(Pl. 4, Figs. 5–8)

Dimensions:	D	H	W	O	H/W	O/D (%)
complete specimen	122	67	-	14	-	11.5
half (as figured by FURLANI)	117	62.5	-	11	-	9.4

Coll. No.: GBA 1910/001/0022.
Type: Holotype by monotypy.
Type level: Late Jurassic, Kimmeridgian, Lemeš Facies.
Type locality: Mt. Lemeš, Middle Dalmatia, Croatia.
Type reference and figure: FURLANI, M., 1910. Jb. k. k. Geol. R.-A., 60/1: p. 81, Pl. 4.

Remarks: Flattened external cast in yellowish marly limestone with shell accumulation of bivalve *Aulacomyella problematica* (FURLANI, 1910; see Pl. 4, Fig. 5). Lost part of the figured fragmented specimen was found in the collection (labelled as *Oppelia* sp. group of *Opp. flexuosa*) and the complete specimen is figured here for the first time. Based on the original description, it comes from the thin bedded limestone with cherts and it is associated with an Early to Late Kimmeridgian fauna.

Revised name: ***Taramelliceras dinaricus* (FURLANI, 1910)**.

GRIESBACH, K., 1868: Jb. k. k. Geol. R.-A., 18/1

Ammonites vindobonensis GRIESBACH, 1868
(Pl. 5, Figs. 1–3)

Dimensions:	D	H	W	O	H/W	O/D (%)
	127	31	30	67	1.03	52.8

Coll. No.: GBA 1868/003/0001.
Type: Holotype by monotypy.
Type level: Middle Jurassic, Early Bajocian.
Type locality: Ober St. Veit near the so-called "Abdecker" (renderer), Vienna, Austria.
Type reference and figure: GRIESBACH, K., 1868. Jb. k. k. Geol. R.-A., 18/1: p. 126, Pl. 4.

Remarks: Internal cast in grey micritic limestone. The specimen is adult as inferred from the crowding of the last sutures. Never cited species, coming from the Early Bajocian *Humphriesianum* Zone.

Revised name: ***Stephanoceras (Stephanoceras) vindobonensis* (GRIESBACH, 1868)**.

HAUER, F. v., 1854: Sitz.-Ber. k. k. Akad. Wiss., math.-naturwiss. Cl., 13/2

Ammonites janus HAUER, 1854
(Pl. 5, Figs. 4–7)

Dimensions:	D	H	W	O	H/W	O/D (%)
	25	10.5	8	6.8	1.31	27.2

Coll. No.: GBA 1854/001/0003.
Type: Holotype by monotypy.
Type level: Lower Jurassic, Sinemurian, Hierlatz Limestone.
Type locality: Hierlatz, Hallstatt, Upper Austria, Austria.
Type reference and figure: HAUER, F. v., 1854. Sitz.-Ber. k. k. Akad. Wiss., math.-naturwiss. Cl., 13: p. 408, Pl. 1, Figs. 7–10.

Remarks: The specimen was refigured by GEYER (1886: p. 239, Pl. 2, Fig. 23) as *Oxynoticeras janus* (HAUER). It is the type specimen, but represents a teratologic individual with extensively deformed ornamentation. The "keel-like" periventral structure is serrated, and reminiscent of some Upper Pliensbachian amaltheids, but this character is completely unknown among Sinemurian ammonites. This character is also reflected by one of the old labels accompanying the specimen, proposing its attribution to the genus *Amaltheus* (*Amaltheus janus*). It is highly probable that the "keel" is just a "keel-shaped" cicatrice after some extensive injury of the ammonite mantle. Normal ornamentation could be visible on the inner whorls of the specimen, before being injured, but this is impossible to prove without its partial destruction. The suture line is almost symmetrical with only minor differences between the whorl sides. HAUER's figure of the suture line (1854: Pl. 1, Fig. 10) was drawn from the "smooth" side of the whorl. If possible, this kind of material should be avoided from the taxonomical use on the level of type material. We consider the holotype as very poor and virtually useless.

Revised name: **?*Oxynoticeras* sp.**

HAUER, F. v., 1856: Denkschr. k. k. Akad. Wiss. Wien, math.-naturwiss. Cl., 11

Ammonites tirolensis HAUER, 1856
(Pl. 6, Figs. 6–7)

Coll. No.: GBA 1856/001/0024.
Type: Holotype by monotypy.
Type level: Lower Jurassic, Toarcian.
Type locality: Waidring bei Kössen, Tyrol, Austria.
Type reference and figure: HAUER, F. v., 1856. Denkschr. k. k. Akad. Wiss. Wien, math.-naturwiss. Cl., 11: p. 41, Pl. 7, Figs. 1–3.

Remarks: The original illustrations differ from the reality in several aspects. The specimen is not as complete and nicely preserved as one could suppose from HAUER's drawings; in fact, it is an internal cast, representing fragmented phragmocone without body chamber. The whorl section also differs from the original figure of HAUER (1856: Pl. 7, Fig. 2), it is not quadrangular, but trapezoidal. Its quadrangular section was used by previous authors as one of the principal characters distinguishing it from *Phymatoceras robustum* HYATT, 1867, which is morphologically very close (e.g., GÉCZY, 1966). Their morphological resemblance is underlined by the fact, that the specimen, initially determined as *Ph. tirolense* by DUMORTIER (1874: Pl. 24), served for the type specimen of *Ph. robustum.* But there are differences in the ornamentation. The tubercles are less pronounced and they fade out much earlier in *Ph. tirolense* than in *Ph. robustum* (e.g., see RULLEAU, 2006, for the refiguration of the type specimen of *Ph. robustum*). However, to note the juvenile and subadult specimens of these two species are very difficult to separate. The suture line was well figured by the original author (HAUER, 1856: Pl. 7, Fig. 3).
The genus *Phymatoceras* is restricted to the Middle Toarcian *Bifrons – Variabilis* Zones (e.g., DONOVAN et al., 1981).

Revised name: ***Phymatoceras tirolensis* (HAUER, 1856)**.

Ammonites petersi HAUER, 1856
(Pl. 7, Figs. 1–3)

Dimensions:	D	H	W	O	H/W	O/D (%)
	~124	49.5	~49	47.5	~1.01	~38.3

Coll. No.: GBA 1856/001/0063.
Type: Holotype by monotypy.
Type level: Lower Jurassic.
Type locality: Kammerkaralpe, Tyrol, Austria.
Type reference and figure: HAUER, F. v., 1856. Denkschr. k. k. Akad. Wiss. Wien, math.-naturwiss. Cl., 11: p. 65, Pl. 21, Figs. 1–3.

Remarks: Internal cast in red micritic limestone with one side completely corroded. Type species of the genus *Ectocentrites* CANAVARI (1888). The collection contains a large specimen resembling the specimen figured by HAUER (1856: Pl. 21, Figs. 1–2), but more fragmented, and a part of a body chamber, which belongs without doubts to the same taxon, possibly also to the same specimen. A part of the cast was smoothed to see the suture line, which was first figured by the original author (HAUER, 1856: Pl. 21, Fig. 3), correctly redrawn and refigured by WÄHNER (1898: p. 156, Pl. 20 [= 62], Fig. 5). Its stratigraphic range is Middle – Late Hettangian (see BÖHM et al., 1999: p. 186).

Revised name: ***Ectocentrites petersi* (HAUER, 1856)**.

Ammonites grohmanni HAUER, 1856

(Pl. 8, Figs. 1–4)

Dimensions:	D	H	W	O	H/W	O/D (%)
	128	47	55	42.5	0.85	33.2

Coll. No.: GBA 1856/001/0064.
Type: Holotype by monotypy.
Type level: Lower Jurassic.
Type locality: Breitenberg southwest of St. Wolfgang, Salzburg, Austria.
Type reference and figure: HAUER, F. v., 1856. Denkschr. k. k. Akad. Wiss. Wien, math.-naturwiss. Cl., 11, p. 65, Pl. 23, Figs. 1–3.

Remarks: The specimen is preserved as slightly corroded internal cast in red marly limestone. The suture line is well figured by the original author (HAUER, 1856: Pl. 23, Fig. 3). The last quarter of the last preserved whorl was artificially smoothed, which caused simplification of the suture line in this part. RULLEAU (1998) discussed the taxonomic position of the species, pointing to similarities between some internal molds of *Lytoceras cornucopiae* (YOUNG & BIRD, 1822) and the revised species. Material desribed by POMPECKJ (1896) from the Swabian Jurassic originates from the Pliensbachian deposits. The type specimen of HAUER comes from red limestones. In the Breitenberg Quarry these limestones are Sinemurian and Pliensbachian, maybe even Toarcian in age (BÖHM, 1992: p. 132; MEISTER & BÖHM, 1993: p. 169). One of the old labels accompanying the specimen precises its position to be Middle Liassic, "*Davoei* Schichten" (late Early Pliensbachian).

Revised name: ***Lytoceras grohmanni* (HAUER, 1856)**.

Nautilus sturi HAUER, 1853

(Pl. 6, Figs. 1–5)

Dimensions:	D	H	W	O	H/W	O/D (%)
	64	34	40	11	0.85	17.2

Coll. No.: GBA 1856/001/0068.
Type: Holotype by monotypy.
Type level: Lower Jurassic, "*Angulatus* Schichten".
Type locality: Enzesfeld, Lower Austria, Austria.
Type reference and figure: HAUER, F. v., 1856. Denkschr. k. k. Akad. Wiss. Wien, math.-naturwiss. Cl., 11: p. 68, Pl. 24, Figs. 6–7.

Remarks: Recrystallized shell is partly preserved, showing presence of thin longitudinal striae on the ventral and ventro-lateral parts and thin radial striae on the flanks. The species was first mentioned by HAUER in 1853 (p. 736), but the figuration of the type specimen came from his later work (HAUER, 1856). The original figure of the type specimen is idealized, the real specimen is more heavily corroded on the ventral area, and the recrystallized shell is not preserved to the extent shown by the author.

Revised name: ***Cenoceras sturi* (HAUER, 1853)**.

NEUMAYR, M., 1870a: Jb. k. k. Geol. R.-A., 20/2

Nautilus mojsisovicsi NEUMAYR, 1870a

(Pl. 7, Figs. 4–6)

Dimensions:	D	H	W	O	H/W	O/D (%)
	57	~30	~37.5	~12	~0.8	~21

Coll. No.: GBA 1870/004/0004.
Type: Holotype by monotypy.
Type level: Jurassic, "Macrocephalen Schichten".
Type locality: Brieltal near Gosau, Upper Austria, Austria.
Type reference and figure: NEUMAYR, M., 1870a. Jb. k. k. Geol. R.-A., 20/2: p. 151, Tab. 7, Fig. 1.

Remarks: The specimen still bears recrystallized shell, internal whorls are filled with red micritic limestone. The figuration of the type specimen by NEUMAYR is slightly idealized. In fact, the ventro-lateral edge is pronounced and relatively sharp (the feature is not shown on the original drawing, Pl. 7, Fig. 1b), and the ornamentation on the venter consists of adapically oriented V shaped ribs with higher angle than on the drawing. Moreover, the umbilicus is narrower than on the original figure. The taxon was assigned to the genus *Cymatonautilus* by TINTANT (1969: p. 77, Pl. A, Figs. 2 a–b), who, based on associated ammonites, precised its stratigraphic age to the latest Early Callovian.

Revised name: ***Cymatonautilus mojsisovicsi* (NEUMAYR, 1870a)**.

NEUMAYR, M., 1873: Abh. k. k. Geol. R.-A., 5/6

Haploceras jungens NEUMAYR, 1873

(Pl. 9, Figs. 1–4)

Dimensions:	D	H	W	O	H/W	O/D (%)
	31.5	11	7.5	12	1.47	38.1

Coll. No.: GBA 1873/003/0020.
Type: Holotype by monotypy.
Type level: Upper Jurassic, "*Acanthicus* Schichten".
Type locality: Zlambach near St. Agatha, Upper Austria, Austria.
Type reference and figure: NEUMAYR, M., 1873. Abh. k. k. Geol. R.-A., 5/6: p. 162, Tab. 31, Fig. 7.

Remarks: Internal cast in greenish limestone. The suture line is poorly and only partially visible. The figure by NEUMAYR corresponds well to the revised specimen, labelled as holotype, however, it is more damaged than on the figure, which was probably caused by later manipulation with the material.

Revised name: ***Glochiceras (Lingulaticeras) jungens* (NEUMAYR, 1873)**.

Perisphinctes cimbricus NEUMAYR, 1873

(Pl. 9, Figs. 5–8)

Dimensions:	D	H	W	O	H/W	O/D (%)
	66	18.5	20.5	34	0.9	52

Coll. No.: GBA 1873/003/0047.
Type: Holotype by monotypy.
Type level: Upper Jurassic, "*Acanthicus* Schichten".
Type locality: Campo Rovere, Sette Communi, Italy.
Type reference and figure: NEUMAYR, M., 1873. Abh. k. k. Geol. R.-A., 5/6: p. 179, Pl. 39, Fig. 2.

Remarks: Internal cast in pinkish micritic limestone. The suture line is badly visible. The stratigraphic range of the species is Late Kimmeridgian *Cavouri – Beckeri* Zones (OLÓRIZ et al., 1999; SARTI, 1985; CARACUEL & OLÓRIZ, 1999). It was assigned to the genus *Biplisphinctes* by OLÓRIZ (1978: p. 440).

Revised name: ***Biplisphinctes cimbricus* (NEUMAYR, 1873)**.

Oppel, A., 1862: Paläont. Mitt. Mus. k. bayer. Staates, 3

Ammonites marmoreus Oppel, 1862

Coll. No.: GBA 1856/001/0034.
Type: Holotype by monotypy.
Type level: Lower Jurassic, Hettangian.
Type locality: Adnet, Salzburg, Austria.
Type reference and figure: Oppel, A., 1862. Paläont. Mitt. Mus. k. bayer. Staates, 3: p. 130.

Remarks: The specimen is completely corroded from one side and filled with red micritic limestone. It shows preserved calcified shell, which was partly removed and smoothed in the past to see the suture line. It is figured in Hauer (1856: p. 49, Pl. 14, Figs. 1–3) under the name *Ammonites charmassei* d'Orbigny and in Bloos (1988: p. 6, Pl. 1, Figs. 1–3, Text-Fig. 3a) as *Angulaticeras marmoreum* (Oppel). Bloos (1988) was the first who accepted this specimen being the holotype, because Oppel (1862: p. 130) refers in his footnote to Hauer's plate 14 (Figs. 1–3).

Revised name: ***Angulaticeras marmoreum* (Oppel, 1862).**

Pia, J. v., 1914: Abh. k. k. Geol. R.-A., 23/1

Oxynoticeras virgatum Pia, 1914

(Pl. 11, Figs. 1–3; Pl. 12, Fig. 1)

Dimensions:	D	H	W	O	H/W	O/D (%)
complete specimen	176	86	~36	38	~2.39	21.6
end of phragmocone	156	74	36	35	2.06	22.4

Coll. No.: GBA 1914/002/0003.
Type: Holotype by monotypy.
Type level: Lower Jurassic, "*Oxynotus* Schichten".
Type locality: Adnet, Salzburg, Austria.
Type reference and figure: Pia, J. v., 1914. Abh. k. k. Geol. R.-A., 23/1: p. 10, 33, Pl. 4, Fig. 4, Pl. 6, Fig. 4, Pl. 8, Fig. 2.

Remarks: Internal cast in red marly limestone. Relatively open umbilicus, blunt keel on the internal cast and slightly flexuous ribbing with some of the ribs bifurcated above the middle of the flanks are reminiscent of the genus *Gleviceras*. However, its general resemblance with some schlotheimiids is to note (*Angulaticeras*). The suture line was well figured by the original author (Pia, 1914: Pl. 8, Fig. 2).

Revised name: ***Gleviceras virgatum* (Pia, 1914)**.

Oxynoticeras simillimum Pia, 1914

(Pl. 9, Figs. 12–14)

Dimensions:	D	H	W	O	H/W	O/D (%)
	114	68.5	~27	-	~2.54	-

Coll. No.: GBA 1914/002/0008.
Type level: Lower Jurassic, "*Oxynotus* Schichten".
Type locality: Adnet, Salzburg, Austria.
Type reference and figure: Pia, J. v., 1914. Abh. k. k. Geol. R.-A., 23/1: p. 16, 63, Pl. 3, Fig. 2, Pl. 7, Fig. 9, Pl. 10, Fig. 1.

Remarks: Internal cast in red marly limestone. Due to extensive corrosion the specimen lacks the majority of diagnostic features and was probably never used in ammonite literature. It has an extremely involute coiling with almost occluded umbilicus and a blunt keel. The external half of the flanks on the less corroded side of the figured specimen seems to be smooth or almost smooth; there are only signs of two or three ribs near the umbilical margin. This could indicate its attribution to the genus *Radstockiceras* or *Oxynoticeras.* The suture line was well figured by the original author (Pia, 1914: Pl. 10, Fig. 1).

Revised name: **?*Radstockiceras* sp.**

Oxynoticeras parvulum Pia, 1914

(Pl. 9, Figs. 9–11)

Dimensions:	D	H	W	O	H/W	O/D (%)
	57.5	~33.5	~14	3.5	~2.39	6.1

Coll. No.: GBA 1914/002/0009.
Type: Holotype by monotypy.
Type level: Lower Jurassic, "*Oxynotus* Schichten".
Type locality: Adnet, Salzburg, Austria.
Type reference and figure: Pia, J. v., 1914. Abh. k. k. Geol. R.-A., 23/1: p. 16, 68, Pl. 5, Fig. 1, Pl. 7, Fig. 17, Pl. 12, Fig. 18.

Remarks: Internal cast in red marly limestone. The morphology of the specimen with involute coiling, very small umbilicus and sharp keel is reminiscent of the genus *Radstockiceras*. On the other hand, the ornamentation consists of relatively sparsely spaced radiate ribs, which are adorally curved near the ventro-lateral margin, and is characteristic of the genus *Gleviceras*. The suture line was figured correctly by the original author (Pia, 1914: Pl. 12, Fig. 18).

Revised name: ***Gleviceras parvulum* (Pia, 1914)**.

Paroxynoticeras subundulatum Pia, 1914

(Pl. 10, Figs. 1–3)

Dimensions:	D	H	W	O	H/W	O/D (%)
	170	71.5	~34	42	~2.1	24.7

Coll. No.: GBA 1914/002/0014.
Type: Holotype by monotypy.
Type level: Lower Jurassic, "*Oxynotus* Schichten".
Type locality: Adnet, Salzburg, Austria.
Type reference and figure: Pia, J. v., 1914. Abh. k. k. Geol. R.-A., 23/1: p. 21, 76, Pl. 5, Fig. 2, Pl. 13, Fig. 7.

Remarks: Internal cast in grey marly limestone. The suture line was figured correctly by the original author (Pia, 1914: Pl. 13, Fig. 7). Guex et al. (2008: p. 77) and Rakús (1994) noted that it is almost inseparable from *Paroxynoticeras undulatum* (Pia, 1914), except for the suture line with a clearly smaller external lobe (E), and the first and second lateral saddle (S1, S2) which are not pyramidal and almost of the same height.

Revised name: ***Paroxynoticeras subundulatum* Pia, 1914**.

Rakús, M., 1993: Jb. Geol. B.-A., 136/4

Fergusonites neumayri Rakús, 1993

(Pl. 12, Figs. 2–3)

Coll. No.: GBA 1879/003/0005.
Type: Holotype.
Type level: Lower Jurassic, Early Hettangian.
Type locality: Zlambach near St. Agatha, Upper Austria, Austria.
Type reference and figure: Rakús, M., 1993. Jb. Geol. B.-A., 136/4: p. 944, Pl. 3, Fig. 5.

Remarks: The specimen was first figured by Neumayr (1879: Pl. 1, Fig. 18) as *Phylloceras* nov. form cf. *partschi* Štúr.

RAKÚS (1993: p. 945) precised its stratigraphic age as Early Hettangian *Planorbis* Zone.

Revised name: ***Fergusonites neumayri* RAKÚS, 1993**.

RAKÚS, M., 1994: Palaeopelagos Spec. Publ., 1

Juraphyllites planispiroides RAKÚS, 1994

(Pl. 12, Figs. 4–6)

Dimensions:	D	H	W	O	H/W	O/D (%)
	21.2	9.5	5	4.2	1.9	19.8

Coll. No.: GBA 1886/002/0014.
Type: Holotype.
Type level: Lower Jurassic, Late Sinemurian, Hierlatz Limestone.
Type locality: Hierlatz, Hallstatt, Upper Austria, Austria.
Type reference and figure: RAKÚS, M., 1994. Palaeopelagos Spec. Publ., 1: p. 301, Pl. 1, Fig. 5.

Remarks: Internal cast with the beginning of the body chamber. Phragmocone filled with sparitic cement. The specimen was first figured by GEYER (1886: Pl. 2, Fig. 3) as *Rhacophyllites* cf. *planispira* (REYNÉS). RAKÚS (1994: p. 301) labelled the type specimen as lectotype, but its correct status is holotype. According this author, although very similar to *J. planispira, J. planispiroides* differs from it in its suture line (S_1) and stratigraphic position, which is restricted to *Oxynotum* and *Raricostatum* Zones. The suture line figured by RAKÚS (1994: Fig. 5) does not belong to the type specimen although it is very similar to it and can be considered as typical.

Revised name: ***Juraphyllites planispiroides* RAKÚS, 1994**.

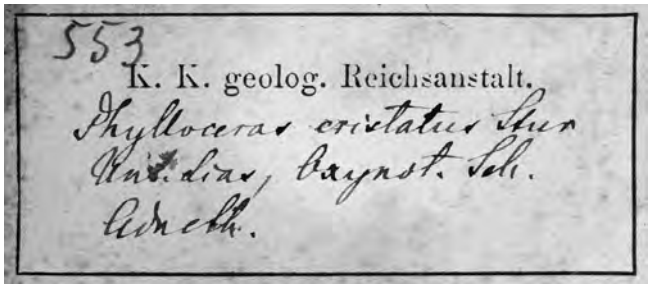
RAKÚS, M., 1999a: Abh. Geol. B.-A., 56/2

Harpophylloceras cristatum RAKÚS, 1999a

(Text-Fig. 1; Pl. 12, Figs. 7–9)

Dimensions:	D	H	W	O	H/W	O/D (%)
	45.5	19.5	12.5	12	1.56	26.4

Coll. No.: GBA 1999/086/0001.
Type: Holotype.
Type level: Lower Jurassic, Late Sinemurian.
Type locality: Adnet, Salzburg, Austria.
Type reference and figure: RAKÚS, M., 1999a. Abh. Geol. B.-A., 56/2: p. 320, Text-Fig. 1, Pl. 3, Fig. 2–3.



Text-Fig. 1.
Original label of *"Phylloceras cristatus* ŠTÚR*"* (holotype of *Harpophylloceras cristatum* RAKÚS, 1999a), handwriting of Dionýz Štúr.

Remarks: Internal cast in red micritic limestone. RAKÚS assigned the authorship of this and two other species from the same paper (*Bouhamidoceras adnethicum, Polymorphites mutans*) to the former director of the "Geologische Reichsanstalt", Dionýz Štúr, however, these were never published by him. Štúr is considered here as the author of the original labels of the revised specimen (Text-Fig. 1), but the authorship of the species has to be assigned to RAKÚS (1999a). The suture line was figured correctly by this author. RAKÚS also precised the stratigraphic position of *Harpophylloceras cristatum* as *Oxynotum* Zone.

Revised name: ***Harpophylloceras cristatum* RAKÚS, 1999a**.

Bouhamidoceras adnethicum RAKÚS, 1999a

(Pl. 13, Figs. 1–3)

Dimensions:	D	H	W	O	H/W	O/D (%)
	113	53.5	~21	14.5	~2.55	12.8

Coll. No.: GBA 1999/086/0006b.
Type: Holotype.
Type level: Lower Jurassic, Late Sinemurian.
Type locality: Adnet, Steinbruch Langmoos, Salzburg, Austria.
Type reference and figure: RAKÚS, M., 1999a. Abh. Geol. B.-A., 56/2: p. 324, Text-Fig. 7, Pl. 2, Fig. 4.

Remarks: Internal cast of phragmocone without body chamber in red micritic limestone. The suture line is partly corroded, but figured correctly by the author (RAKÚS, 1999a: Text-Fig. 7). RAKÚS assigned the authorship of this species to the former director of "Geologische Reichsanstalt" Dionýz Štúr, however, it was never published by him. Štúr is considered here as the author of the original label (actually lost) of the revised specimen, but the authorship of the new species has to be assigned to RAKÚS (1999a). He used the status of lectotype for the here revised specimen. As he is the author of the new species, and the type specimen was chosen by him, its status has to be a holotype. RAKÚS (1999a) precised its stratigraphic position as *Oxynotum* Zone.

Revised name: ***Bouhamidoceras adnethicum* RAKÚS, 1999a**.

?*Bouhamidoceras sturi* RAKÚS, 1999a

(Pl. 13, Figs. 4–6)

Dimensions:	D	H	W	O	H/W	O/D (%)
	103	54	20	9.5	2.7	9.2

Coll. No.: GBA 1999/086/0007.
Type: Holotype.
Type level: Lower Jurassic, "Arieten Schichten".
Type locality: Adnet, Salzburg, Austria.
Type reference and figure: RAKÚS, M., 1999a. Abh. Geol. B.-A., 56/2: p. 324, Text-Fig. 8, Pl. 2, Fig. 1.

Remarks: Internal cast of phragmocone without body chamber in red micritic limestone. To note, the no. 407 cited by RAKÚS (1999a: p. 324) is not an old inventory number, but a Štúr-collection number. RAKÚS (1999a) noted that the stratigraphic position of the specimen is unclear, probably Early Sinemurian or early Late Sinemurian (?).

Revised name: **?*Bouhamidoceras sturi* RAKÚS, 1999a**.

Polymorphites mutans RAKÚS, 1999a

(Text-Fig. 2; Pl. 14, Figs. 1–4)

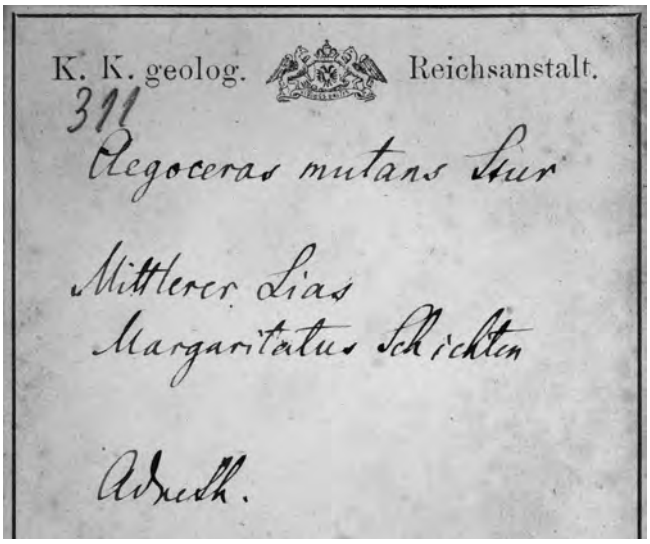
Dimensions*:	D	H	W	O	H/W	O/D (%)
	64.5	13.5	~8	38.5	~1.69	59.7

*taken in the maximal non-deformed diameter of the specimen

Coll. No.: GBA 1999/086/0011a.
Type: Holotype.
Type level: Lower Jurassic, Pliensbachian, "*Margaritatus* Schichten".
Type locality: Adnet, Salzburg, Austria.
Type reference and figure: RAKÚS, M., 1999a. Abh. Geol. B.-A., 56/2: p. 328, Text-Fig. 12, Pl. 3, Fig. 4–5.

Remarks: RAKÚS assigned the authorship of this species to the former director of "Geologische Reichsanstalt" Dionýz Štúr, however, it was never published by him. Štúr is considered here as the author of the original label (Text-Fig. 2) of the revised specimen, but the authorship of the new species has to be assigned to RAKÚS (1999a). He used the status of lectotype for the here revised specimen. As he is the author of the new species and the type specimen was chosen by him, its status has to be a holotype. RAKÚS (1999a: p. 328) stated its stratigraphic position as "probably Pliensbachian", even though the original label of Štúr precises as coming from "*Margaritatus* Schichten" which should be Late Pliensbachian in age.

Revised name: ***Polymorphites mutans* RAKÚS, 1999a**.



Text-Fig. 2.
Original label of "*Aegoceras mutans* ŠTÚR" (holotype of *Polymorphites mutans* RAKÚS, 1999a), handwriting of Dionýz Štúr.

RAKÚS, M., 1999b: Abh. Geol. B.-A., 56/2

Togaticeras goisernense RAKÚS, 1999b

(Pl. 14, Fig. 8)

Dimensions:	D	H	W	O	H/W	O/D (%)
	31.2	10.8	-	11.6	-	37.2

Coll. No.: GBA 1999/087/0003.
Type: Holotype.
Type level: Lower Jurassic, Early-Middle Hettangian.
Type locality: Zlambach Graben, Goisern, Upper Austria, Austria.
Type reference and figure: RAKÚS, M., 1999b. Abh. Geol. B.-A., 56/2: p. 331, Pl. 1, Fig. 1, Text-Fig. 3.

Remarks: RAKÚS (1999b) precised the stratigraphic position of the new species as Early to Middle Hettangian.

Revised name: ***Togaticeras goisernense* RAKÚS, 1999b**.

RAKÚS, M., 1999c: Abh. Geol. B.-A., 56/2

?*Gleviceras geyeri* RAKÚS, 1999c

(Pl. 14, Figs. 5–7)

Dimensions:	D	H	W	O	H/W	O/D (%)
	46.5	17	~10	-	~0.59	-

Coll. No.: GBA 1886/002/0036.
Type: Holotype.
Type level: Lower Jurassic, Late Sinemurian, Hierlatz Limestone.
Type locality: Hierlatz, Hallstatt, Upper Austria, Austria.
Type reference and figure: RAKÚS, M., 1999c. Abh. Geol. B.-A., 56/2: p. 355, Text-Fig. 26, Pl. 4, Fig. 1.

Remarks: Internal cast of a phragmocone in white crinoidal limestone. It was first figured by GEYER (1886: Pl. 3, Fig. 13) as *Arietites* ? nov. sp. indet. RAKÚS designated the type specimen as lectotype in the text (RAKÚS, 1999c: p. 355), but as holotype on the plate (Pl. 4, Fig. 1). The suture line is rather correctly figured by the original author, but the first lateral saddle is badly visible and its shape is questionable. The stratigraphic position of the new species was precised as *Oxynotum* Zone.

Revised name: ***?Gleviceras geyeri* RAKÚS, 1999c**.

Dudresnayiceras suessi tuberculatum RAKÚS, 1999c

(Pl. 14, Figs. 9–10)

Dimensions:	D	H	W	O	H/W	O/D (%)
	~18	5.8	~3	7	~1.93	~38.9

Coll. No.: GBA 1999/088/0042.
Type: Holotype.
Type level: Lower Jurassic, Late Sinemurian, Hierlatz Limestone.
Type locality: Hierlatz, Hallstatt, Upper Austria, Austria.
Type reference and figure: RAKÚS, M., 1999c. Abh. Geol. B.-A., 56/2: p. 363, Text-Fig. 41, Pl. 5, Fig. 5.

Remarks: The specimen was apparently collected from white crinoidal limestones. RAKÚS (1999c) designated the type specimen as lectotype in the text (RAKÚS, 1999c: p. 363), but as holotype on the plate (Pl. 5, Fig. 5). He precised the stratigraphic position of the new subspecies as *Oxynotum* Zone.

Revised name: ***Dudresnayiceras suessi tuberculatum* RAKÚS, 1999c**.

SCHWEIGERT, G., DIETZE, V. & BALLE, T., 2000: Stuttgarter Beitr. Naturk., Ser. B (Geol. Paläont.), 294

Onychoceras vacekii SCHWEIGERT, DIETZE & BALLE, 2000

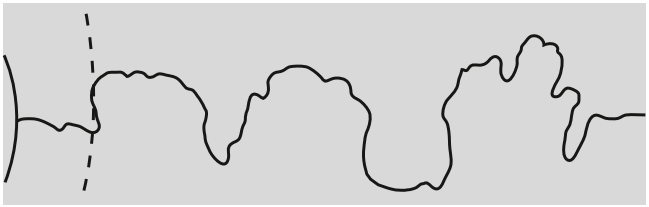
(Text-Fig. 3; Pl. 14, Figs. 12–15)

Dimensions:	D	H	W	O	H/W	O/D (%)
	11.3	3.91	3.96	3.76	0.99	33.3

Coll. No.: GBA 1886/005/0051.
Type: Holotype.
Type level: Middle Jurassic, Early Aalenian, San Vigilio Formation.
Type locality: Cap San Vigilio, Lake Garda, Lombardy, Italy.
Type reference and figure: SCHWEIGERT et al., 2000: p. 7, Text-Fig. 3a.

Remarks: Already figured by VACEK (1886: p. 101, Pl. 17, Fig. 9) as *Sphaeroceras* cf. *globosum* SCHÜBLER in ZIETEN, 1831. Specimen with recrystallized shell, filled with yellowish micritic limestone. The suture line is simple, figured here for the first time (Text-Fig. 3). Sensu SCHWEIGERT et al. (2000) *O. vacekii* is a dimorphic counterpart of *Csernyeiceras subaspidoides* (VACEK, 1886) and its stratigraphic range is Early Aalenian, *Comptum* Subzone.

Revised name: ***Onychoceras vacekii* SCHWEIGERT, DIETZE & BALLE, 2000.**



Text-Fig. 3.
Suture line of *Onychoceras vacekii* SCHWEIGERT, DIETZE & BALLE, 2000, drawn at D = 9 mm. Holotype. Original of *Sphaeroceras* cf. *globosum* SCHÜBLER in ZIETEN, 1831 figured by VACEK (1886: p. 101, Pl. 17, Fig. 9). GBA 1886/005/0051.

TIETZE, E., 1872: Jb. k. k. Geol. R.-A., 22

Ammonites margaritatus muntjanae TIETZE, 1872
(Pl. 14, Figs. 16–19)

Dimensions:	D	H	W	O	H/W	O/D (%)
	~41	17.2	~12.5	13.4	~1.38	~32.7

Coll. No.: GBA 1872/002/0002.
Type: Holotype by monotypy.
Type level: Lower Jurassic, Late Pliensbachian.
Type locality: Muntjana near Bersaska, Banat, Romania.
Type reference and figure: TIETZE, E., 1872. Jb. k. k. Geol. R.-A., 22: p. 102, Pl. 2, Fig. 5.

Remarks: Cast in dark-grey fine-grained, sandy limestone, probably with a part of the body chamber. The specimen bears strong ribs with strong ventro-lateral tubercles from the innermost uncovered whorls on, with very scarce intercalated thinner ribs of the same shape, but without tubercles on the last preserved whorl. The style of ornamentation ranges this specimen to the group of strongly ornamented and tuberculed species: *A. salebrosus* HYATT, 1867, *A. gibbosus* (SCHLOTHEIM, 1820), *A. subnodosus* (YOUNG & BIRD, 1828), *A. gloriosus* HYATT, 1867 and *A. costatus* (QUENSTEDT, 1885). *A. salebrosus* shows different ornamentation of the inner whorls, which are finely ribbed. The last mentioned species, *A. costatus*, is morphologically closest to the revised specimen. It is considered as synonym of *A. gloriosus* by HOWARTH (1958). The same author considered TIETZE's species as belonging either to *A. gibbosus* or to *A. salebrosus* (HOWARTH, 1958: p. 18). A different opinion expressed POPA et al. (1977), who included the specimen to the species *A. gloriosus* and we are following here this opinion.
Revised name: ***Amaltheus gloriosus* HYATT, 1867**.

TRAUTH, F., 1938: Palaeontographica, 88

Lamellaptychus inflexicosta var. *cincta* TRAUTH, 1938
(Pl. 14, Fig. 11)

Coll. No.: GBA 1938/003/0004.
Type: Holotype by monotypy.
Type level: Upper Jurassic, Tithonian.
Type locality: Gams, Hieflau, Styria, Austria.
Type reference and figure: TRAUTH, F., 1938. Palaeontographica, 88: p. 191, Pl. 13, Fig. 21.

Remarks: The taxon is very rarely cited in the ammonite literature (GASIOROWSKI, 1962a, b). The size of this fragmented specimen is large (43 mm), the valve is rather thick and ribbing is relatively simple. These features are more typical of *Punctaptychus* than of *Lamellaptychus*, however, its attribution to *Punctaptychus* remains questionable, because it lacks the punctate layer in its apical part.

Revised name: ***?Punctaptychus inflexicosta cincta* (TRAUTH, 1938)**.

WÄHNER, F., 1882: Beitr. Paläont. Österr.-Ung. Orients, 2/3

Aegoceras latimontanum WÄHNER, 1882
(Pl. 15, Figs. 1–3)

Dimensions:	D	H	W	O	H/W	O/D (%)
	157	44	28	79	1.57	50.3

Coll. No.: GBA 1882/005/0002.
Type: Holotype by monotypy.
Type level: Jurassic, Middle Hettangian.
Type locality: Breitenberg, Tyrol, Austria.
Type reference and figure: WÄHNER, F., 1882. Beitr. Paläont. Österr.-Ung. Orients, 2/3: p. 85, Pl. 20, Fig. 1.

Remarks: Large macroconch form, with recrystallized shell filled with brown-greenish limestone. The last three suture lines are crowded, the final peristome is broken. It is to note that one of the original labels show the determination *Aegoceras longipontinus* (OPPEL, 1862: p. 129). In fact *Psiloceras (Discamphiceras) longipontinum* and *Kammerkarites latimontanum* are morphologically very close, but WÄHNER's species is more compressed with much more arched venter bearing a blunt keel. The precise stratigraphic position in the type section is unknown; however, in the Bosc section (Ardèche, France, ELMI & MOUTERDE, 1965; MOUTERDE & CORNA, 1997) it is co-occurring with *Waehneroceras (W.) portlocki* (WRIGHT, 1881) in the *Portlocki* Subzone, *Liasicus* Zone.

Revised name: ***Kammerkarites latimontanus* (WÄHNER, 1882)**.

Acknowledgements

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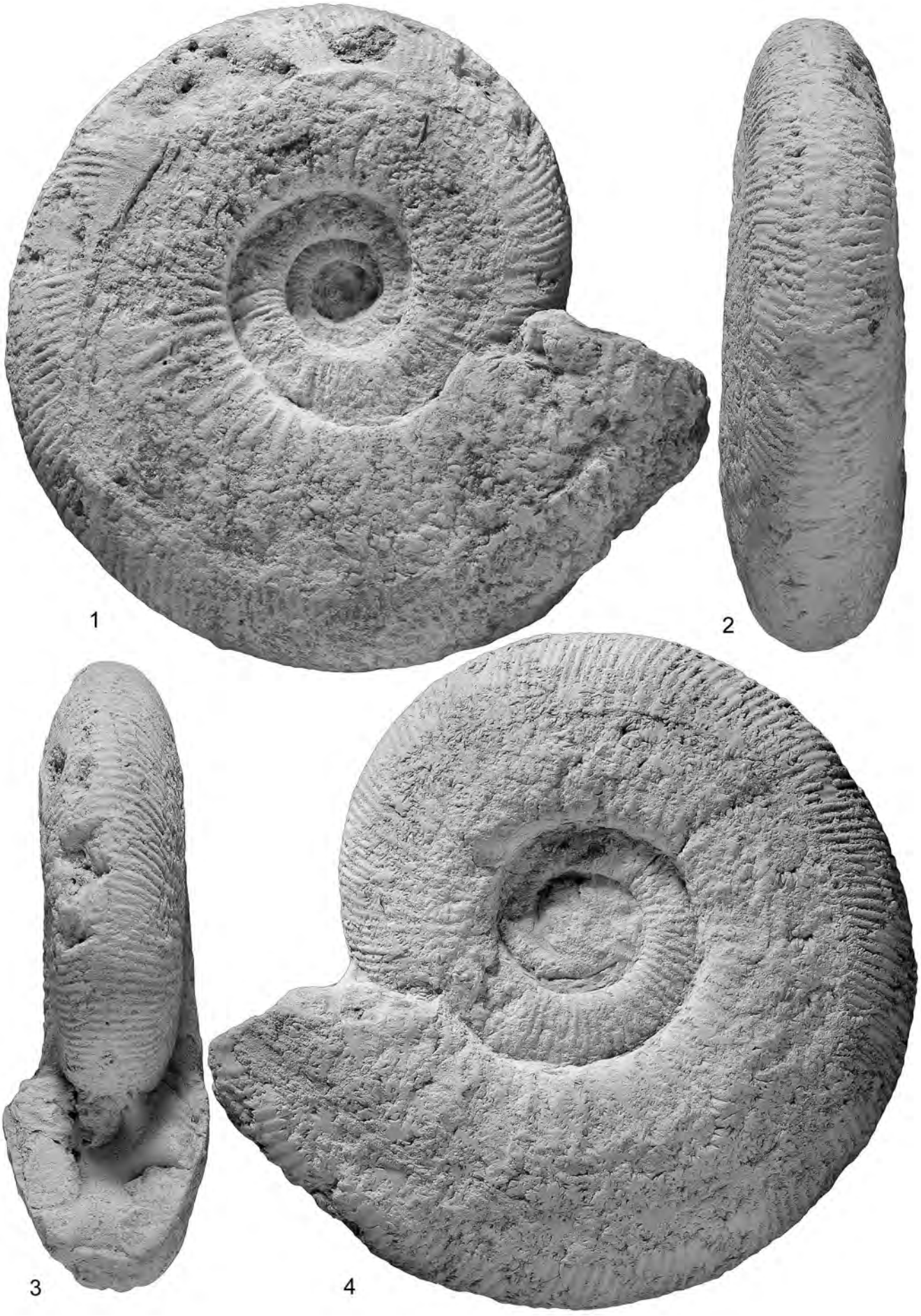
Plate 1

Figs. 1–4: *Progeronia progeron* (AMMON, 1875). Holotype. Fully septate phragmocone. Specimen figured by AMMON (1875: p. 181, Pl. 1, Fig. 2 a–b). GBA 1875/004/0002.

Natural size.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3
4

Plate 2

Figs. 1–2: *Ataxioceras (Ataxioceras) suberinum* (AMMON, 1875). Holotype. Specimen figured by AMMON (1875: p. 183, Pl. 2, Figs. 1 a–c). GBA 1875/004/0004.

The position of the last suture line is indicated by an asterisk. Natural size (Fig. 1) and slightly reduced (Fig. 2).

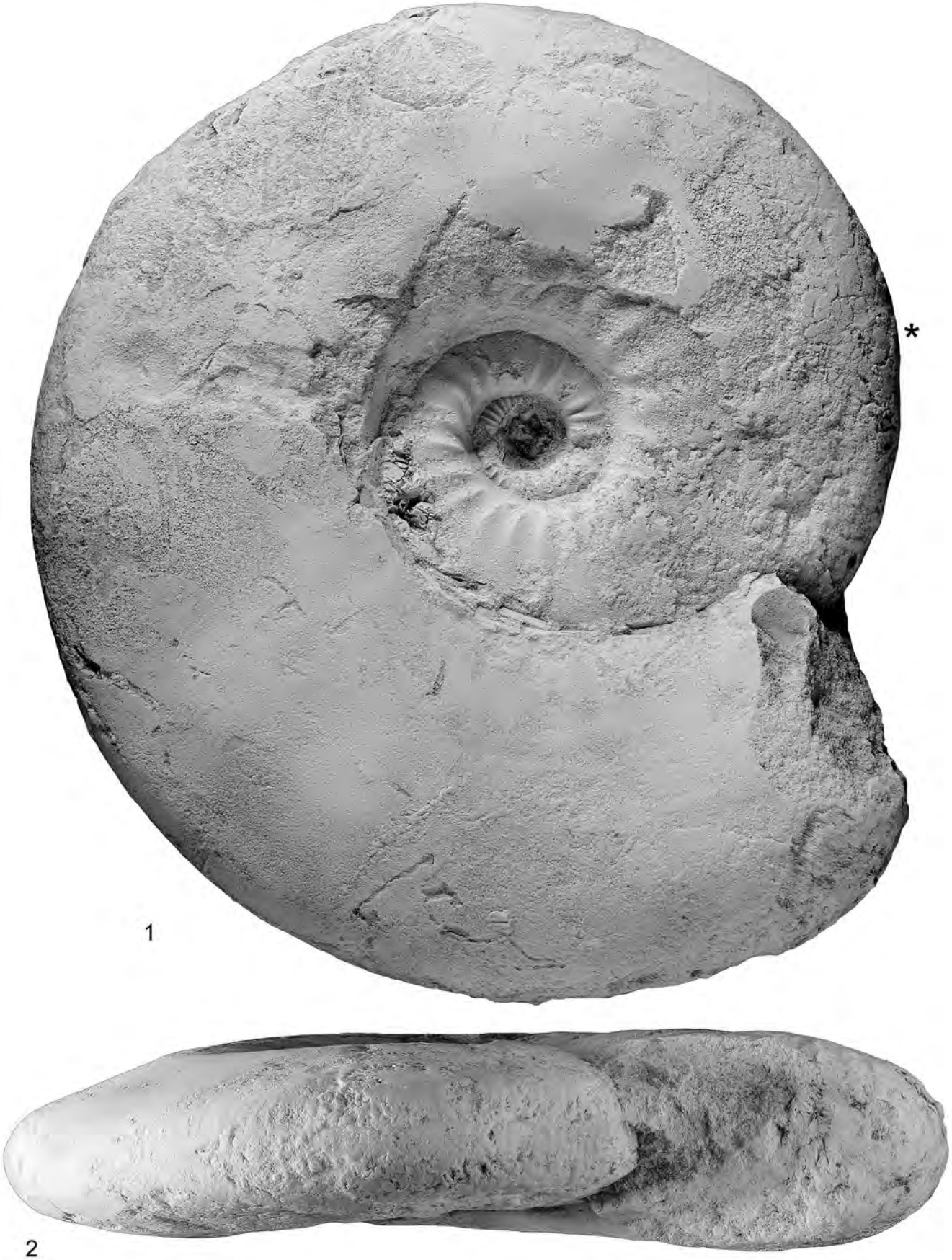
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Plate 3

Figs. 1–2: *Ataxioceras (Ataxioceras) suberinum* (AMMON, 1875). Holotype. Specimen figured by AMMON (1875: p. 183, Pl. 2, Figs. 1 a–c). GBA 1875/004/0004.

The position of the last suture line is indicated by an asterisk. Natural size (Fig. 1) and slightly reduced (Fig. 2).

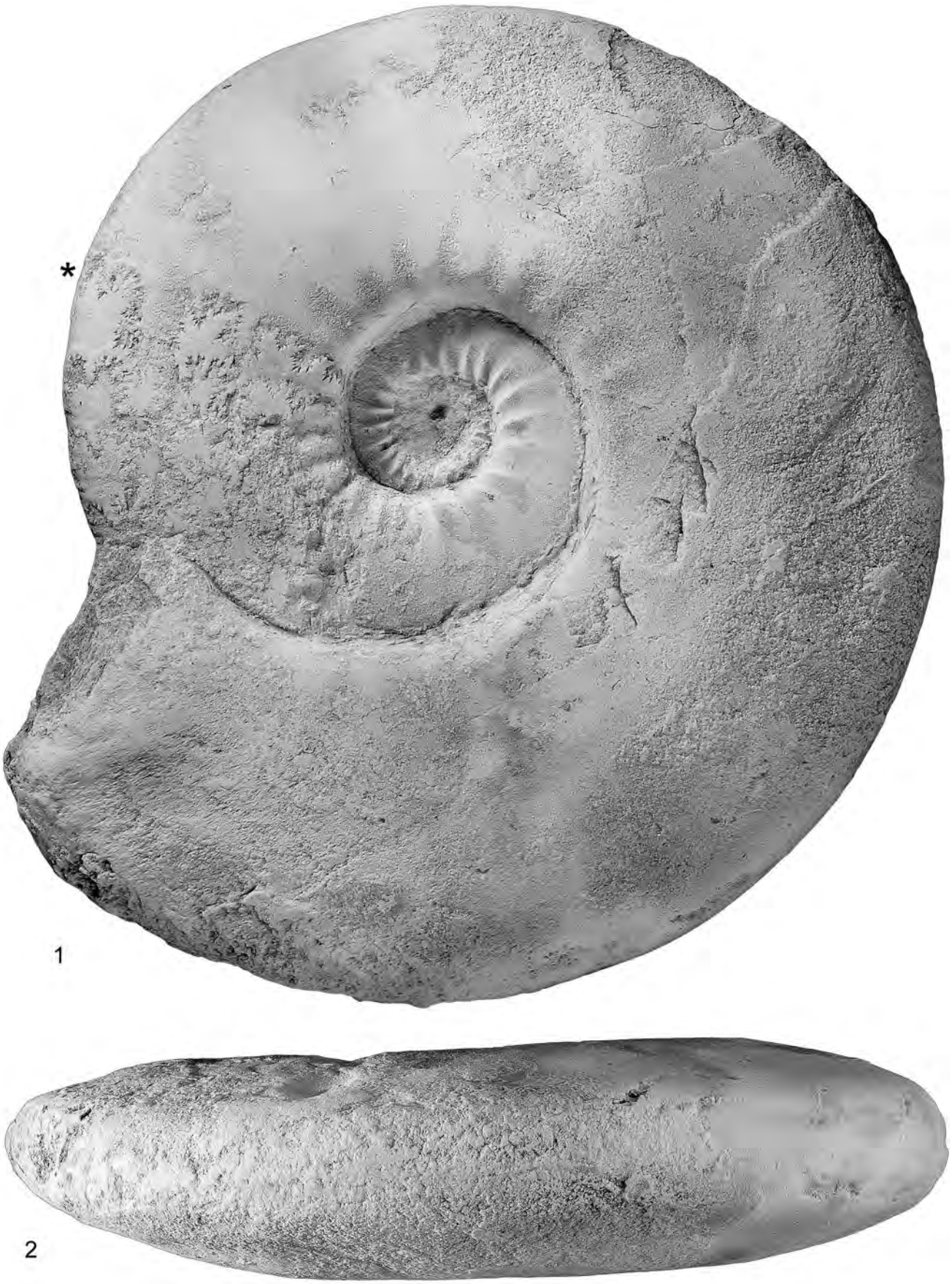
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Plate 4

Figs. 1–3: *Epideroceras* sp. GBA 1853/003/0001.

Fig. 4: *Usseliceras (Subplanitoides) pseudoulmensis* (FURLANI, 1910). Holotype. Specimen figured by FURLANI (1910: p. 74, Pl. 3, Fig. 1). GBA 1910/001/0001.

Figs. 5–8: *Taramelliceras dinaricus* (FURLANI, 1910). Holotype. Specimen figured by FURLANI (1910: p. 81, Pl. 4). Fig. 5: Accumulation of the bivalve *Aulacomyella problematica* (FURLANI, 1910) in the sediment filling the body chamber of the holotype.

The position of the last suture line if observed, is indicated by an asterisk. Natural size.

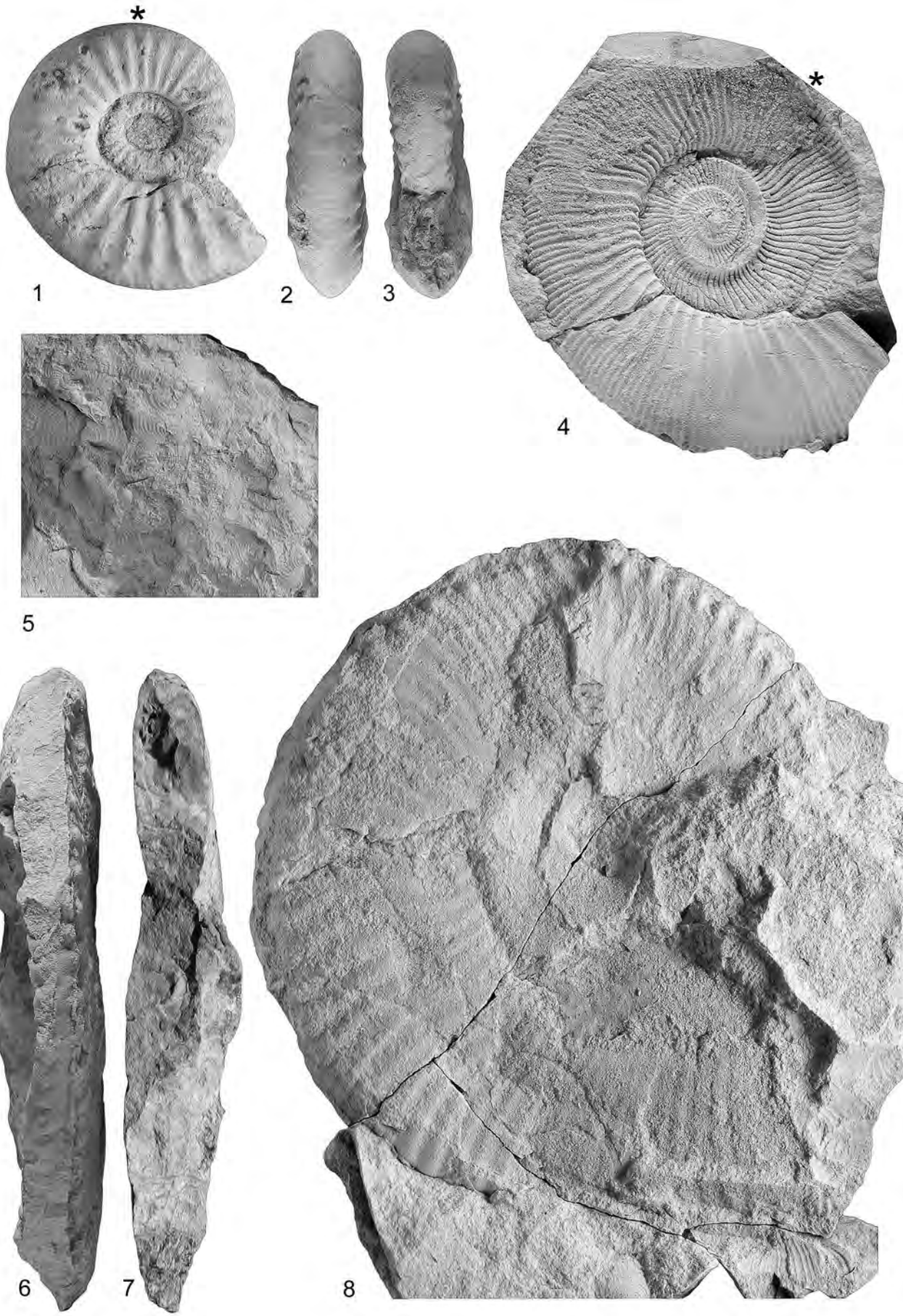
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Plate 5

Figs. 1–3: *Stephanoceras (Stephanoceras) vindobonensis* (GRIESBACH, 1868). Holotype. Specimen figured by GRIESBACH (1868: p. 126, Pl. 4). GBA 1868/003/0001.

Figs. 4–7: ?*Oxynoticeras* sp. Holotype of *Ammonites janus* HAUER, 1854 (1854: p. 408, Pl. 1, Figs. 7–10), in fact an undeterminable teratologic oxynoceratid ammonite. GBA 1854/001/0003.

The position of the last suture line if observed, is indicated by an asterisk. Natural size.

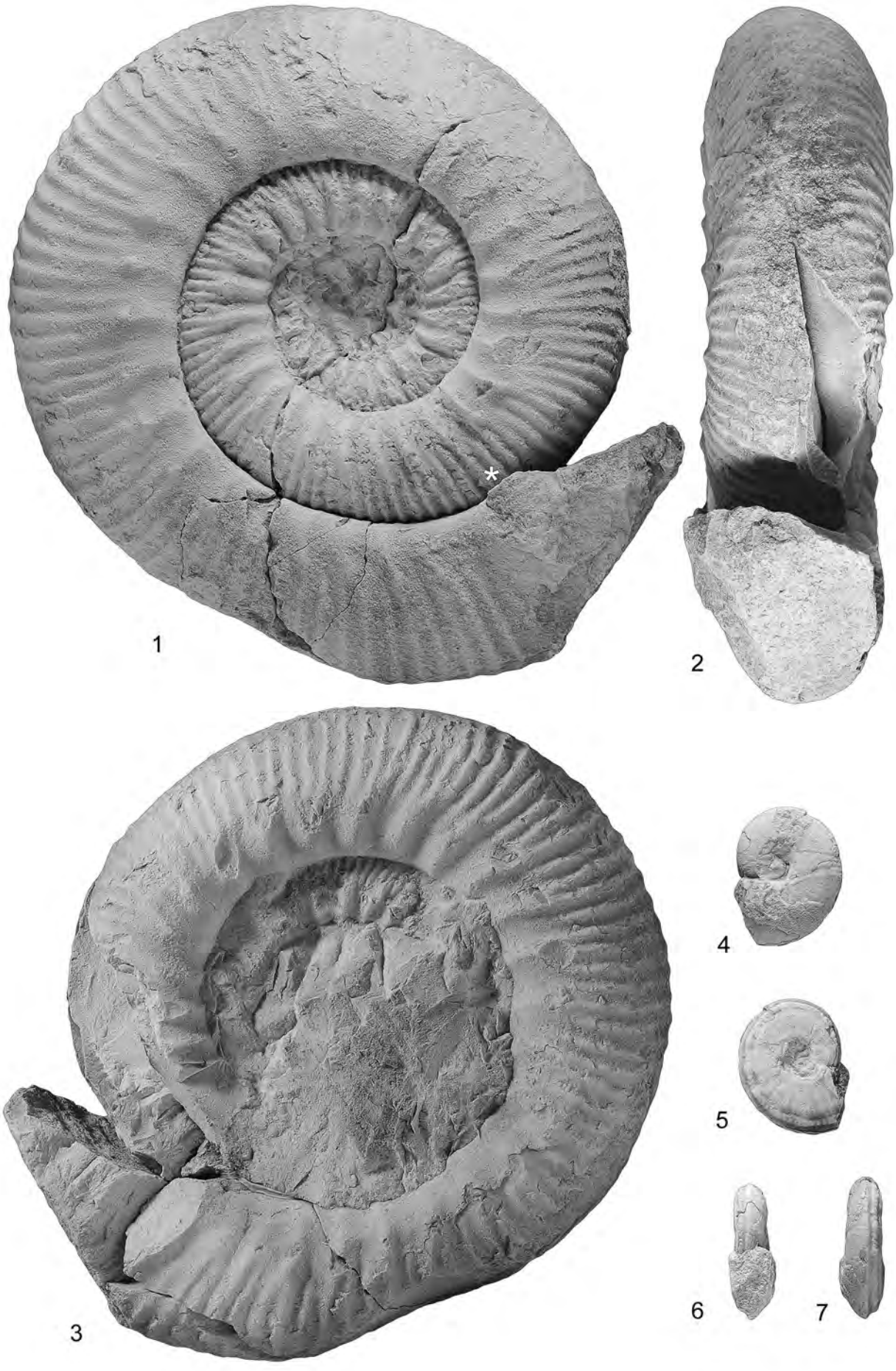
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Plate 6

Figs. 1–5: *Cenoceras sturi* (HAUER, 1856). Holotype. Specimen figured by HAUER (1856: p. 68, Pl. 24, Figs. 6–7). GBA 1856/001/0068.
Figs. 6–7: *Phymatoceras tirolensis* (HAUER, 1856). Holotype. Specimen figured by HAUER (1856: p. 41, Pl. 7, Figs. 1–3). GBA 1856/001/0024.

Natural size.

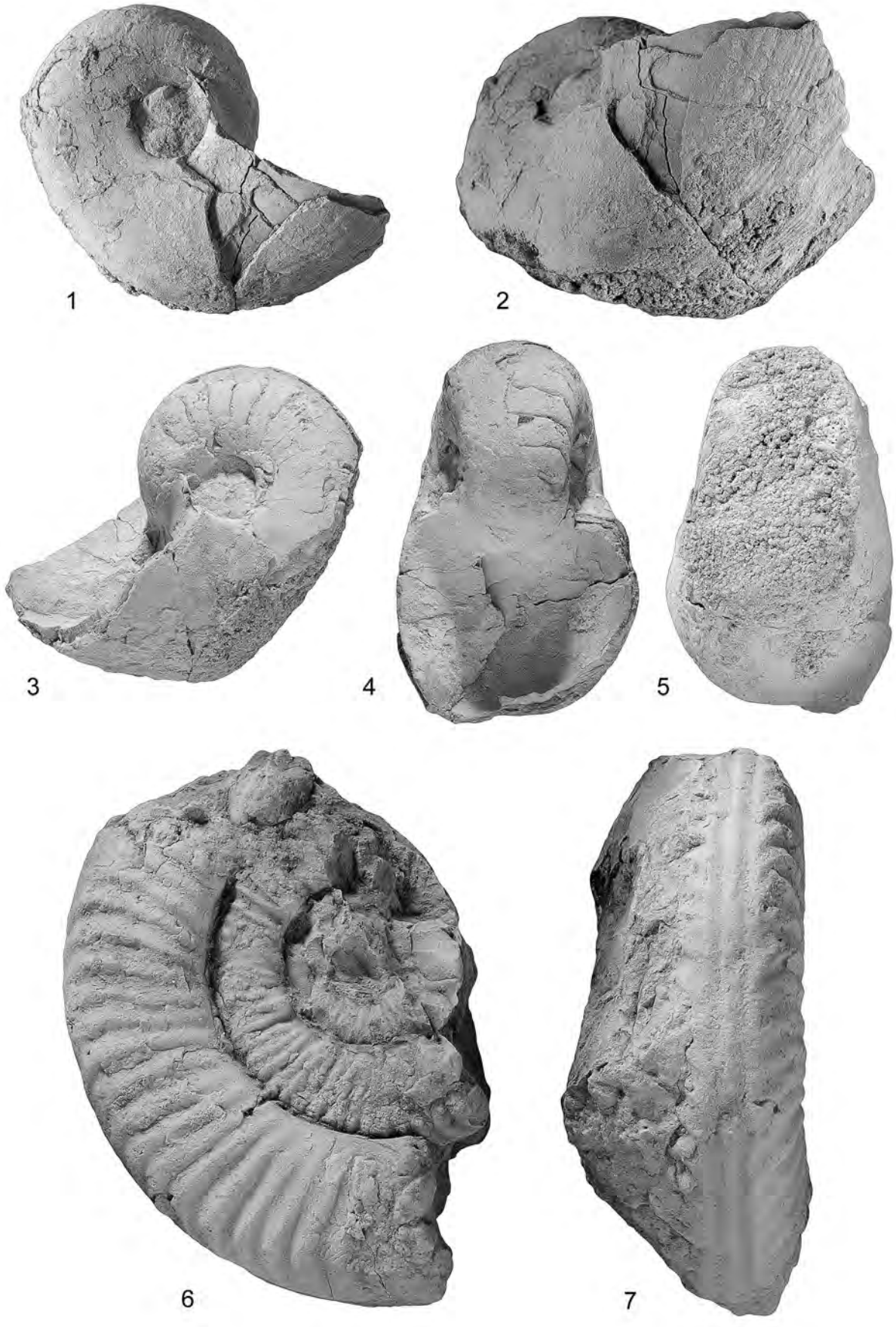
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Plate 7

Figs. 1–3: *Ectocentrites petersi* (HAUER, 1856). Figs. 1–2: Holotype. Specimen figured by HAUER (1856: Pl. 21, Figs. 1–2). Fig. 3: Part of a body chamber, possibly belonging to the same specimen. GBA 1856/001/0063.

Figs. 4–6: *Cymatonautilus mojsisovicsi* (NEUMAYR, 1870a). Holotype. Specimen figured by NEUMAYR (1870a: p. 151, Tab. 7, Fig. 1). GBA 1870/004/0004.

The position of the last suture line if observed, is indicated by an asterisk. Natural size.

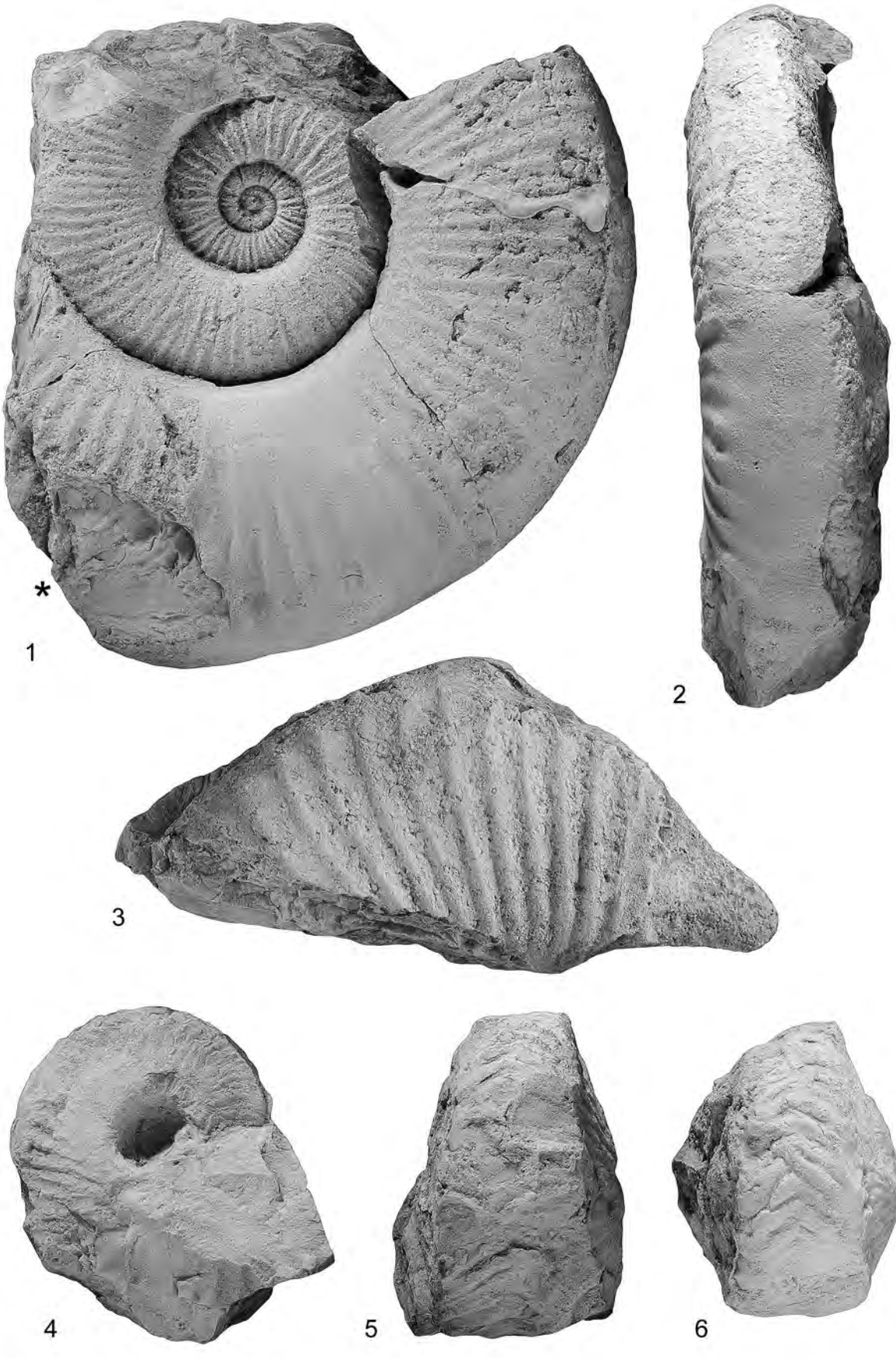
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Plate 8

Figs. 1–4: *Lytoceras grohmanni* (HAUER, 1856). Holotype. Fully septate phragmocone. Specimen figured by HAUER (1856: p. 65, Pl. 23, Figs. 1–3). GBA 1856/001/0064.

Natural size.

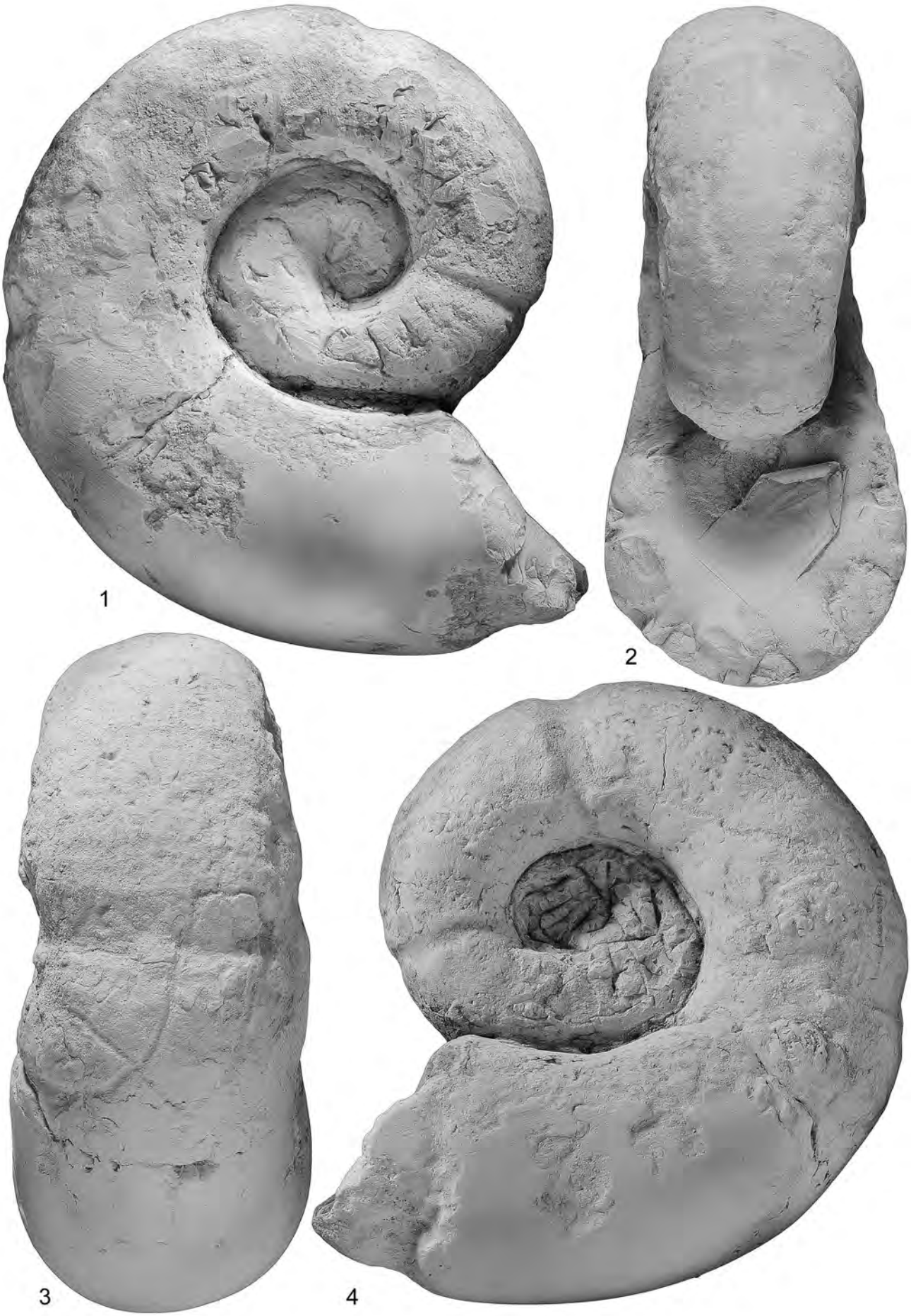
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Plate 9

Figs. 1–4: *Glochiceras (Lingulaticeras) jungens* (NEUMAYR, 1873). Holotype. Specimen figured by NEUMAYR (1873: p. 162, Tab. 31, Fig. 7). GBA 1873/003/0020.

Figs. 5–8: *Biplisphinctes cimbricus* (NEUMAYR, 1873). Holotype. Specimen figured by NEUMAYR (1873: p. 179, Pl. 39, Fig. 2). GBA 1873/003/0047.

Figs. 9–11: *Gleviceras parvulum* (PIA, 1914). Holotype. Specimen figured by PIA (1914: p. 16, 68, Pl. 5, Fig. 1, Pl. 7, Fig. 17, Pl. 12, Fig. 18). GBA 1914/002/0009.

Figs. 12–14: ?*Radstockiceras* sp. Holotype of *Oxynoticeras simillimum* PIA 1914: p. 16, 63, Pl. 3, Fig. 2, Pl. 7, Fig. 9, Pl. 10, Fig. 1). GBA 1914/002/0008.

The position of the last suture line if observed, is indicated by an asterisk. Natural size.

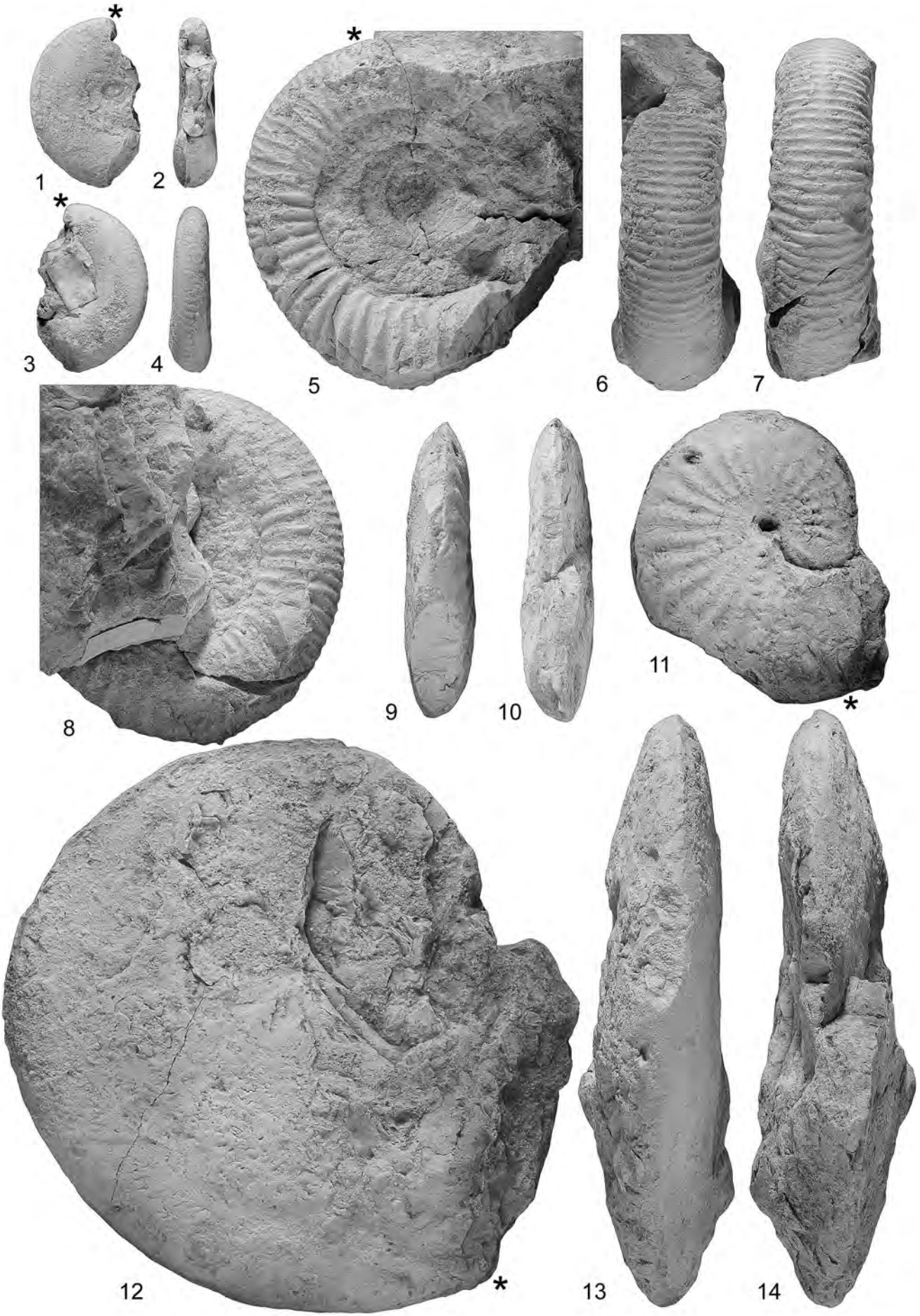
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Plate 10

Figs. 1–3: *Paroxynoticeras subundulatum* PIA, 1914. Holotype. Specimen figured by PIA (1914: p. 21, 76, Pl. 5, Fig. 2, Pl. 13, Fig. 7). GBA 1914/002/0014.

The position of the last suture line is indicated by an asterisk. Natural size (1), slightly reduced (2–3).

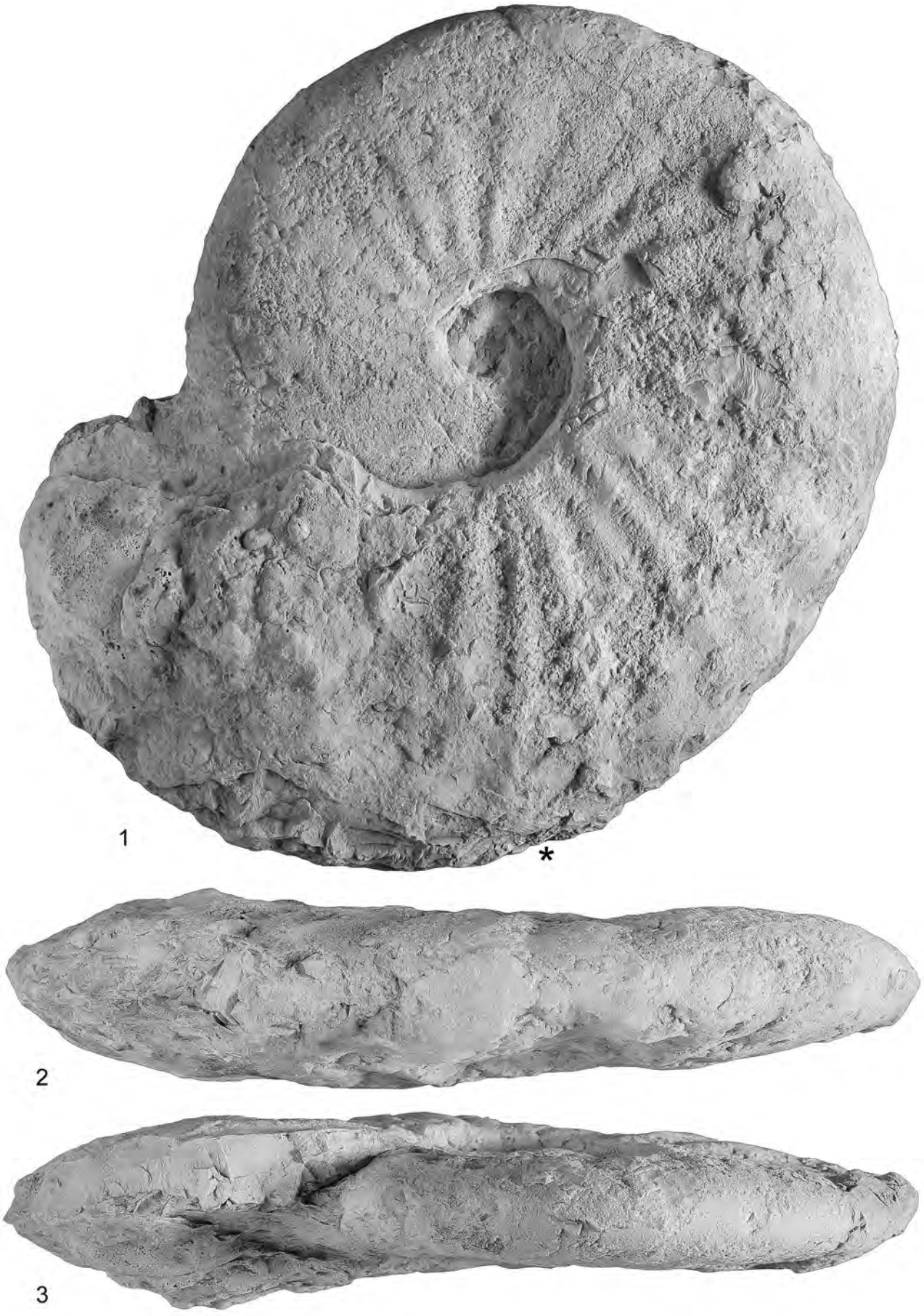
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Plate 11

Figs. 1–3: *Gleviceras virgatum* (PIA, 1914). Holotype. Specimen figured by PIA (1914: p. 10, 33, Pl. 4, Fig. 4, Pl. 6, Fig. 4, Pl. 8, Fig. 2). GBA 1914/002/0003.

The position of the last suture line is indicated by an asterisk. Natural size.

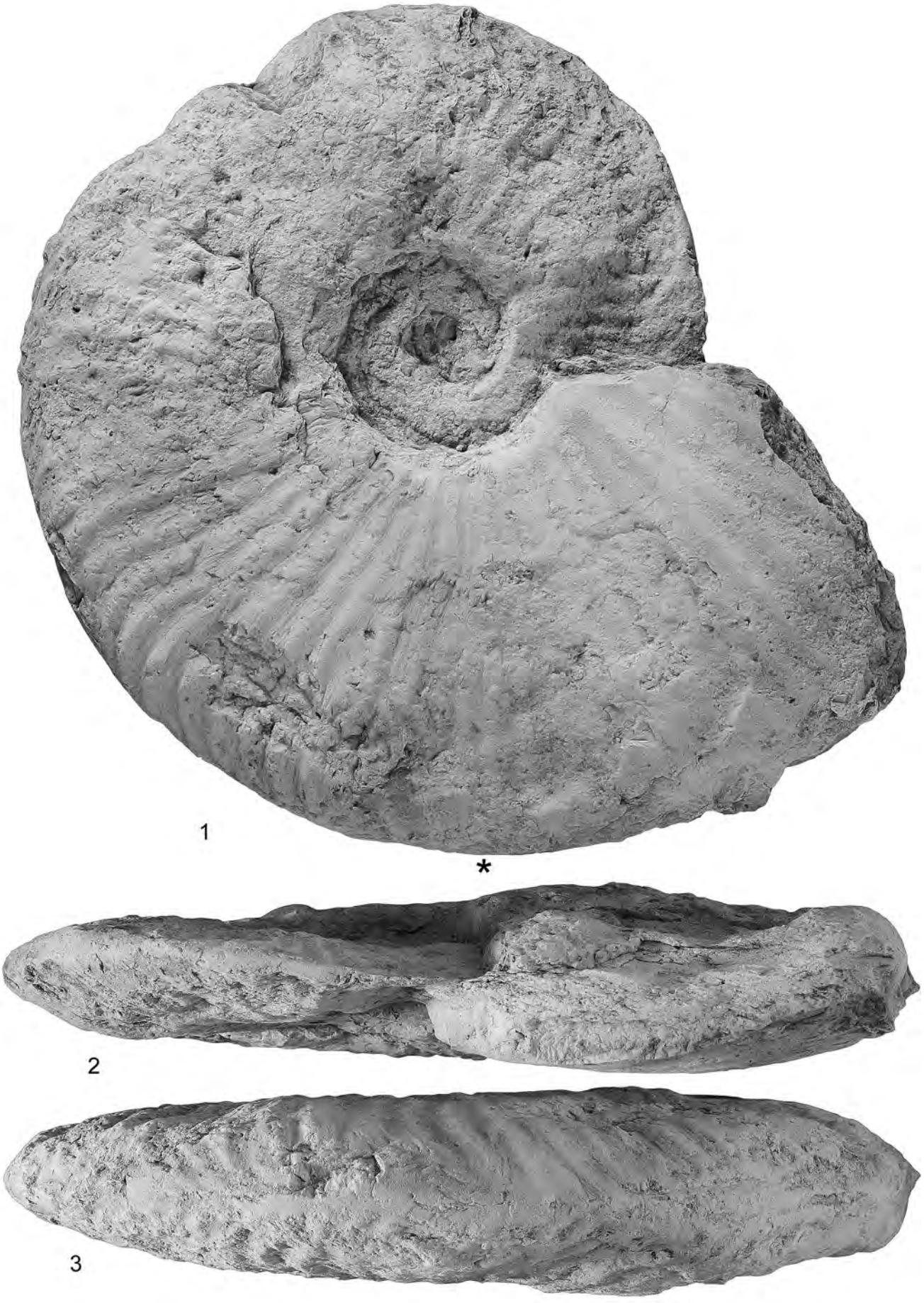

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Plate 12

Fig. 1: *Gleviceras virgatum* (PIA, 1914). Holotype. Specimen figured by PIA (1914: p. 10, 33, Pl. 4, Fig. 4, Pl. 6, Fig. 4, Pl. 8, Fig. 2). GBA 1914/002/0003.

Figs. 2–3: *Fergusonites neumayri* RAKÚS, 1993. Holotype. Original of *Phylloceras* nov. form cf. *partschi* ŠTÚR figured by NEUMAYR (1879: p. 22, Pl. 1, Fig. 18). GBA 1879/003/0005.

Figs. 4–6: *Juraphyllites planispiroides* RAKÚS, 1994. Holotype. Original of *Rhacophyllites* cf. *planispira* (REYNÉS) figured by GEYER (1886: p. 227, Pl. 2, Fig. 3). GBA 1886/002/0014.

Figs. 7–9: *Harpophylloceras cristatum* RAKÚS, 1999a. Holotype. Specimen figured by RAKÚS (1999a: p. 320, Text-Fig. 1, Pl. 3, Fig. 2–3). GBA 1999/086/0001. Asterisk marks the position of the last suture.

Natural size.

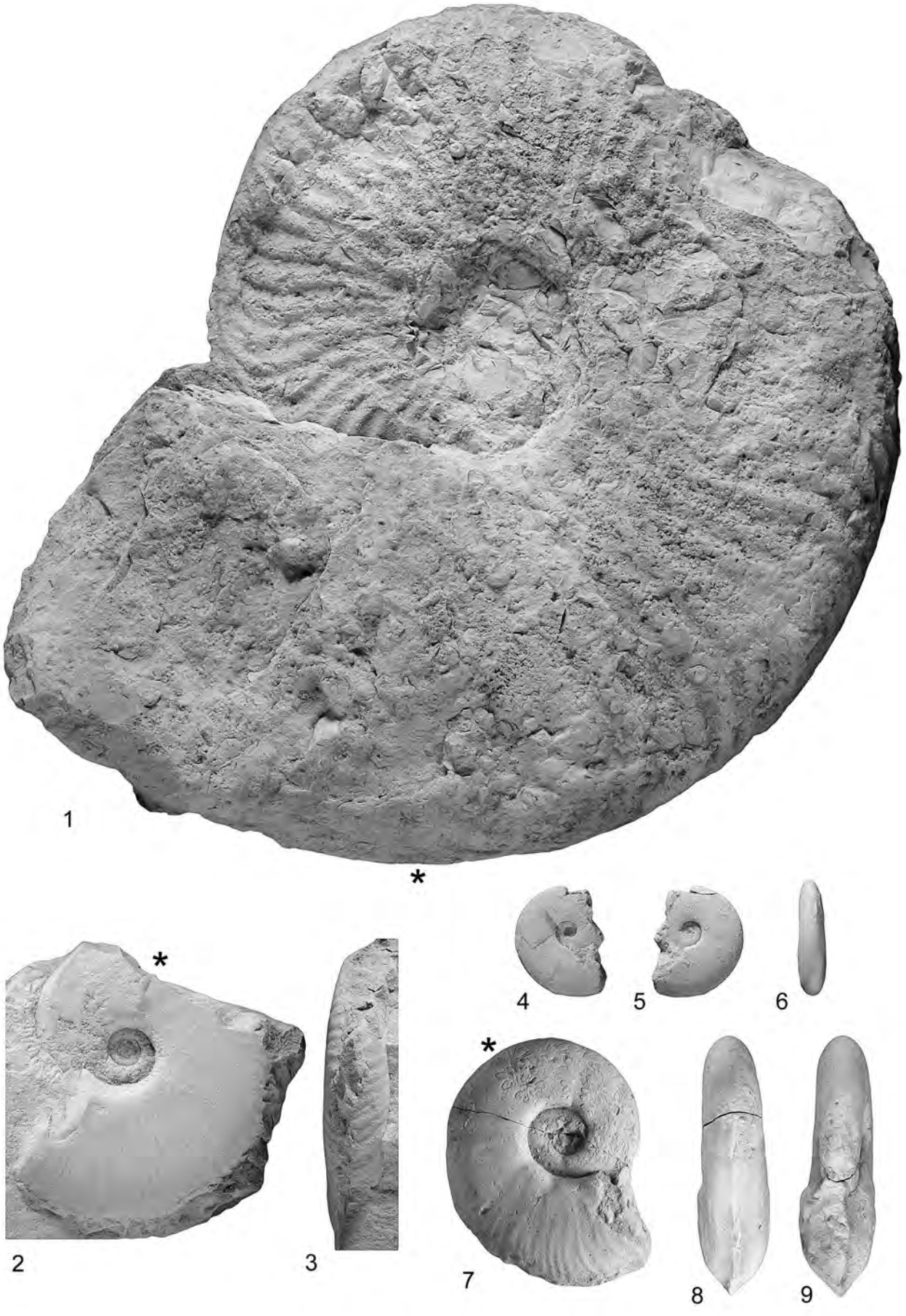
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Plate 13

Figs. 1–3: *Bouhamidoceras adnethicum* RAKÚS, 1999a. Holotype. Specimen figured by RAKÚS (1999a: p. 324, Text-Fig. 7, Pl. 2, Fig. 4). GBA 1999/086/0006b.

Figs. 4–6: ?*Bouhamidoceras sturi* RAKÚS, 1999a. Holotype. Specimen figured by RAKÚS (1999a: p. 324, Text-Fig. 8, Pl. 2, Fig. 1). GBA 1999/086/0007.

Natural size.

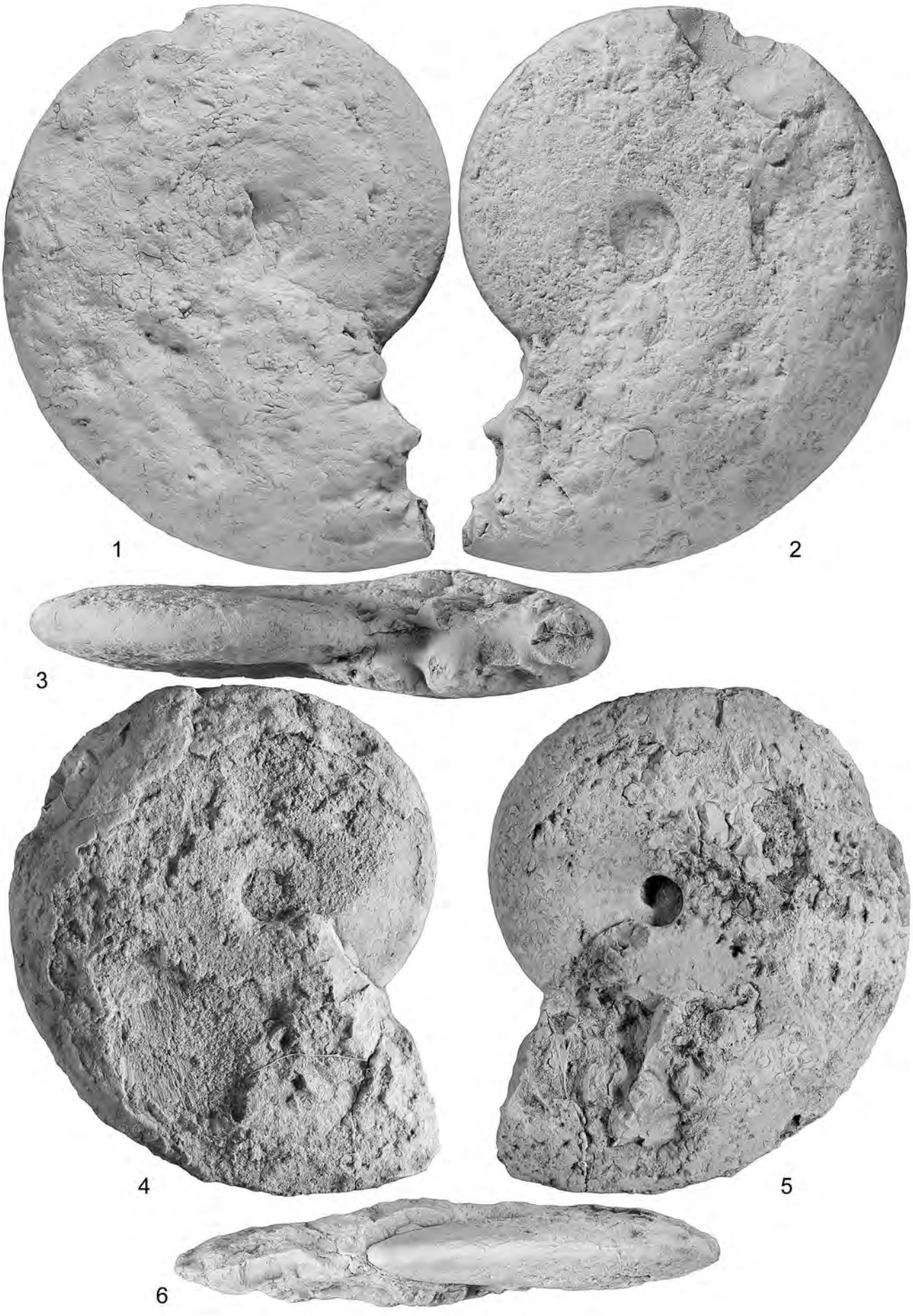
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Plate 14

Figs. 1–4: *Polymorphites mutans* RAKÚS, 1999a. Holotype. Specimen figured by RAKÚS (1999a: p. 328, Text-Fig. 12, Pl. 3, Fig. 4–5). GBA 1999/086/0011a.

Figs. 5–7: ?*Gleviceras geyeri* RAKÚS, 1999c. Holotype. Specimen figured by RAKÚS (1999c: p. 355, Text-Fig. 26, Pl. 4, Fig. 1). GBA 1886/002/0036.

Fig. 8: *Togaticeras goisernense* RAKÚS, 1999b. Holotype. Specimen figured by RAKÚS (1999b: p. 331, Pl. 1, Fig. 1, Text-Fig. 3). GBA 1999/087/0003.

Figs. 9–10: *Dudresnayiceras suessi tuberculatum* RAKÚS, 1999c. Specimen figured by RAKÚS (1999c: p. 363, Text-Fig. 41, Pl. 5, Fig. 5). GBA 1999/088/0042.

Fig. 11: ?*Punctaptychus inflexicosta cincta* (TRAUTH, 1938). Holotype. Specimen figured by TRAUTH (1938: p. 191, Pl. 13, Fig. 21). GBA 1938/003/0004.

Figs. 12–15: *Onychoceras vacekii* SCHWEIGERT, DIETZE & BALLE, 2000. Holotype. Original of *Sphaeroceras* cf. *globosum* SCHÜBLER in ZIETEN, 1831 figured by VACEK (1886: p. 101, Pl. 17, Fig. 9). GBA 1886/005/0051.

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The position of the last suture line if observed, is indicated by an asterisk. Natural size, except 12–15 (x 1.5).

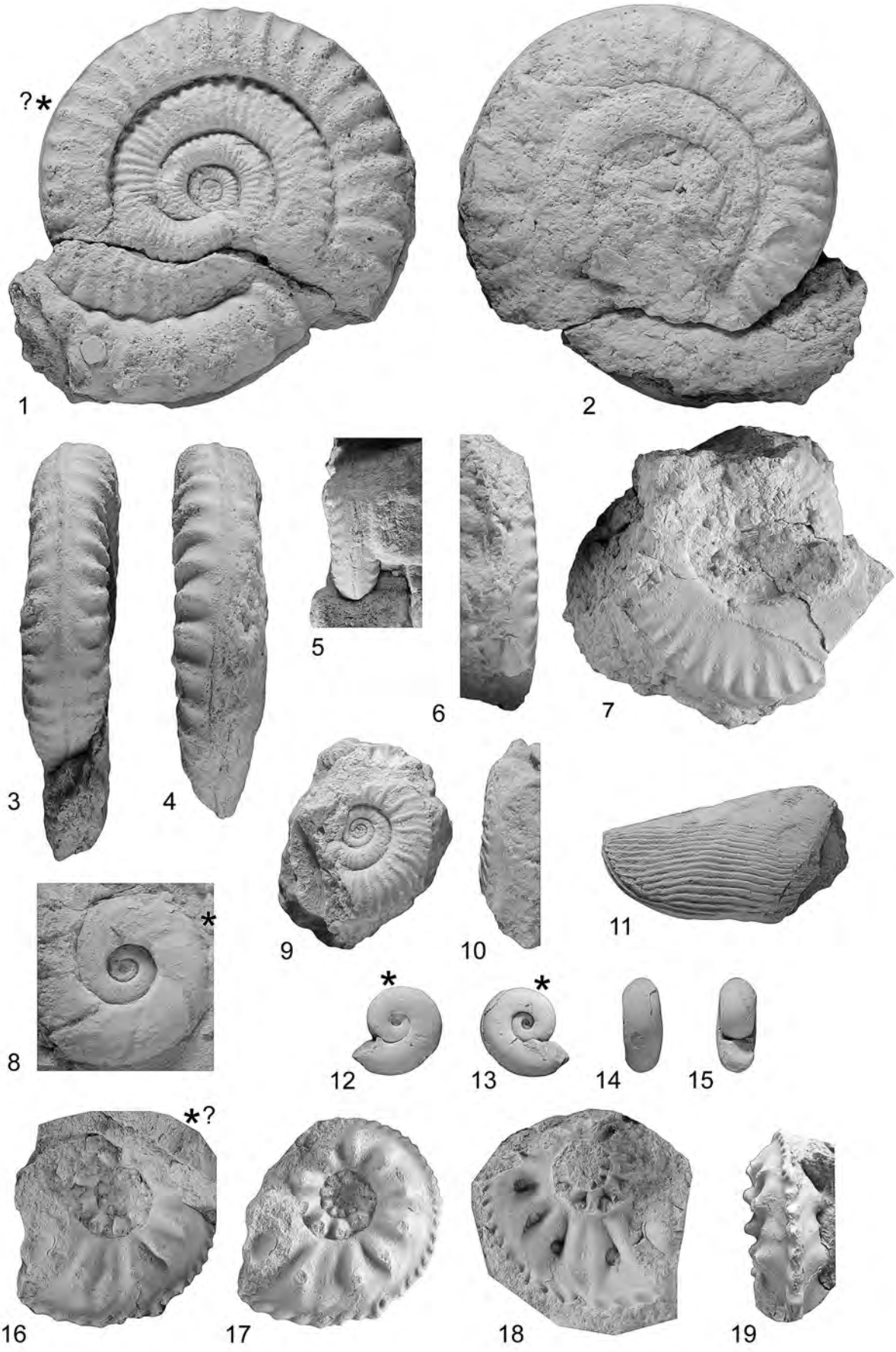
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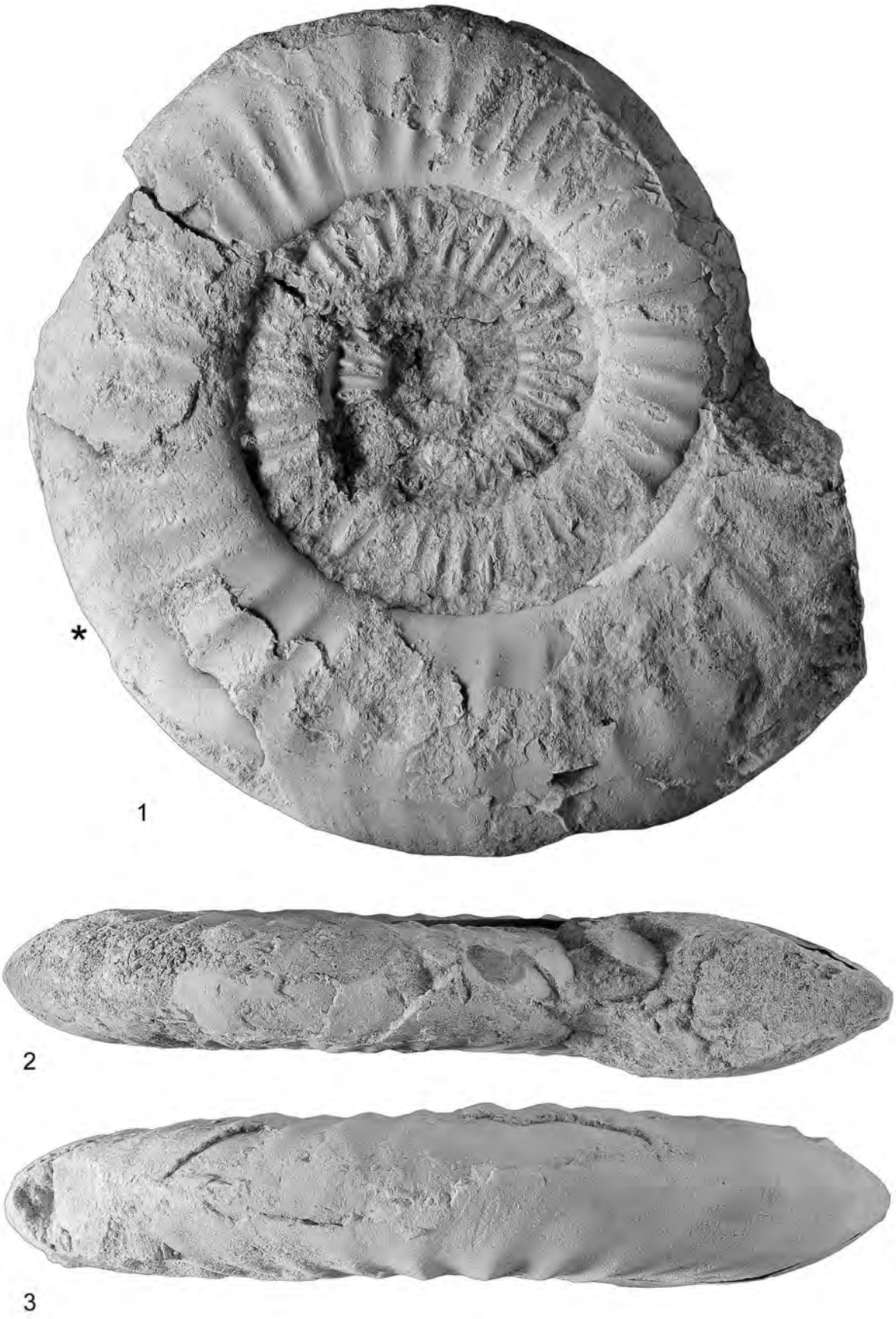
Plate 15

Figs. 1–3: *Kammerkarites latimontanus* (WÄHNER, 1882). Holotype. Specimen figured by WÄHNER (1882: p. 85, Pl. 20, Fig. 1). GBA 1882/005/0002.

The position of the last suture line is indicated by an asterisk. Natural size.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