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Phymatoceratidae (Ammonitina) fauna from the Lower Jurassic of the Gerecse Mts (Hungary)

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Phymatoceratidae (Ammonitina) fauna a Gerecse hegység alsó-jura rétegeiből

Összefoglalás

A tanulmány a Gerecse hegység középső toarci Ammonitina-együttesének feldolgozásához kíván hozzájárulni a Phymatoceratidae családhoz tartozó 5 nemzetség (*Phymatoceras, Furloceras, Denckmannia, Mouterdeiceras, Haugia*) taxonómiai és paleobiogeográfiai kérdéseinek tárgyalásával, valamint 23 faj leírásával. Figyelemre méltó az ÉNy-európai Provinciára jellemző *Denckmannia* és *Haugia* nemzetségek jelenléte. A Dunántúli-középhegység toarci ammoniteszfaunáinak általános tulajdonságai a Mediterrán–Kaukázusi Birodalom Mediterrán Provinciájának szubmediterrán határterületeiről ismert faunákkal való rokonságra utalnak.

Tárgyszavak: Phymatoceratidae, Ammonitina, toarci, jura, Gerecse hegység

Abstract

In this paper the taxonomic problems of the family Phymatoceratidae, represented by five genera (*Phymatoceras, Furloceras, Denckmannia, Mouterdeiceras, Haugia*) and 23 species, are briefly discussed. The fauna described here from the Middle Toarcian ammonite assemblage of the Gerecse Mts (NE Transdanubian Range) consists of both Mediterranean and NW European taxa. The assemblage is allied to the Submediterranean border zones of the Mediterranean Province (Mediterran–Caucasian Realm).

Keywords: Phymatoceratidae, Ammonitina, Middle Toarcian, Jurassic, Gerecse Mts, Hungary

Introduction

This paper offers a detailed taxonomic treatment of the genera *Phymatoceras*, *Furloceras*, *Mouterdeiceras*, *Denckmannia*, and *Haugia* from the ammonite assemblages of the Gerecse Mts (Transdanubian Range, Hungary). As such, it represents a contribution to the comprehensive treatment of the Toarcian-Aalenian ammonite material deposited in the Natural History Museum of the Faculty of Science of Eötvös Loránd University, Budapest. Research on Phymatoceratidae is significant from a stratigraphic point of view; the genera comprise index taxa for the Middle?Upper Toarcian subdivisions in the NW European Province, and allow correlation with other regions. In addition, the range of some genera and species are important for palaeobiogeographic comparisons.

The material (approximately 15,000 ammonite specimens) was collected bed-by-bed from four abandoned quarries (Pisznice, Kis-Gerecse, Bánya Hill, Tölgyhát – Figure 1) by the staff of the Geological Institute of Hungary between 1976 and 1982. The material represents a Mediterranean-style fauna, with the dominance of suborders Phylloceratina and Lytoceratina, and characteristic Mediterranean Ammonitina genera; however, NW European Ammonitina taxa are also recognizable. The first taxonomic, quantitative and palaeobiogeographic analyses were provided by GÉCZY 1984, 1985, 1990. The detailed revision of the Middle Toarcian Ammonitina material was carried out by GÉCZY & SZENTE 2007; furthermore two little known exposures were studied by GÉCZY et al. 2008 (Kis-Teke Hill), and GALÁCZ et al. 2011 (Pisznice – Crocodile Section). Taxonomic treatment of

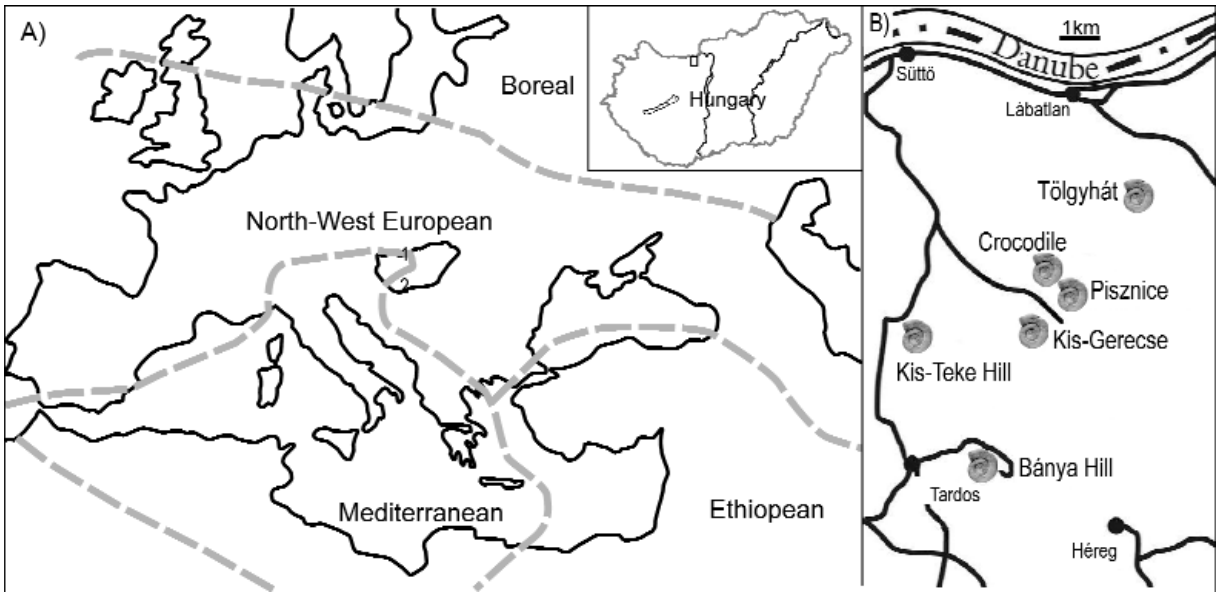

Figure 1. A) Middle Toarcian ammonite faunal provinces in Europe and W Asia: (PAGE 2008), 1 – Gerecse Mts, 2 – Mecsek Mts; B) Location of Toarcian sections examined in the Gerecse Mts

1. ábra. *A) Középső-toarci ammonitesz faunaprovinciák Európában és Nyugat-Ázsiában (PAGE 2008), 1 – Gerecse, 2 – Mecsek; B) Toarci szelvények a Gerecse hegységben*

Toarcian Ammonitina was presented by e.g. KOVÁCS & GÉCZY 2008, and KOVÁCS 2009, 2010, 2013. Based on the twofold affinity of the assemblage, a detailed palaeogeographic framework can be delineated with a Submediterranean transitional area between the two western Tethyan faunal provinces.

The lithostratigraphy of the Jurassic sequences in the Gerecse Mts was established by CSÁSZÁR et al. 1998, and KNAUER 2012. The Middle – Upper Toarcian successions are represented by the Kisgerecse Marl Formation; this is thin-bedded, red nodular marl with variable carbonate and clay content, and is typical of the Harpoceras serpentinum – Dumortieria meneghinii Zones. The biostratigraphic subdivision of the Middle Toarcian in the Gerecse sections was provided by GÉCZY & SZENTE 2007. Two subzones and six horizons can be recognized in the Hildoceras bifrons Zone: the Hildoceras sublevisoni Subzone (Hildoceras sublevisoni, Hildoceras tethysi, Hildoceras lusitanicum horizons), and the Hildoceras bifrons Subzone (Hildoceras apertum, Hildoceras bifrons, Hildoceras semipolitum horizons). Due to condensation, the Tethysi–Lusitanicum, and the Apertum–Bifrons horizons cannot be distinguished in all sections. The Merlaites gradatus Zone has been subdivided into three subzones. The lower boundary of the Merlaites clausus Subzone coincides with the first occurrence of the *M. clausus* (MERLA), or *Crassiceras* taxa. *Collina gemma* BONARELLI forms a biohorizon in this subzone. The base of the Pseudogrammoceras subregale Subzone is defined by *P. subregale* PINNA, or the genus *Podagrosites*. The Merlaites alticarinatus Subzone is indicated by the first occurrence of *M. alticarinatus* (MERLA). The subdivision of the Grammoceras thouarsense Zone has been analysed by KOVÁCS 2013. The base of the Pseudogrammoceras bingmanni Subzone coincides with the appearance of e.g. *P. differens* ERNST, or *P. andaluciensis* GÓMEZ et RIVAS. The Grammoceras striatulum Subzone is defined by *G. striatulum* (SOWERBY) or *G. penestriatulum* BUCKMAN but is dominated by *P. mediterraneum* GÓMEZ et RIVAS. The Pseudogrammoceras fallaciosum Subzone and biohorizon are indicated by the occurrence of species belonging to *P.* gr. *fallaciosum* (BAYLE). The biostratigraphic subdivision of the Middle to lower Upper Toarcian in the Gerecse sections is shown on Figure 2.

Systematic palaeontology

Suborder Ammonitina HYATT, 1889
Superfamily Hildoceratoidea HYATT, 1867
Family Phymatoceratidae HYATT, 1867

The family- or subfamily-level interpretation of the taxon is has been discussed in the literature. Recently, HOWARTH 2013 offered a general classification, and placed *Phymatoceras* HYATT, *Paronychoceras* GUEX, *Furloceras* ELMI et RULLEAU, *Brodieia* BUCKMAN, *Pseudomercaticeras* ARKELL, *Crassiceras* ARKELL, *Haugia* BUCKMAN, and *Esericeras* BUCKMAN in the family Phymatoceratidae. This assumption differs from those presented in the literature published in the previous decade (VENTURI & FERRI 2001, FAURÉ 2002, BÉCAUD et al. 2005, RULLEAU 2007, VENTURI & BILOTTA 2008, VENTURI et al. 2010, KOVÁCS & GÉCZY 2008, and KOVÁCS 2013). *Pseudomercaticeras* and *Crassiceras* are generally classified within Mercaticeratinae GUEX, while *Esericeras* belongs to Grammoceratinae BUCKMAN. In this paper the classification by LACROIX 2011 is accepted with some generic and suprageneric emendations. Seven genera are included in this family: *Phymatoceras*, *Furloceras*, *Haugia*, *Paronychoceras*, *Mouterdeiceras* ELMI et RULLEAU,

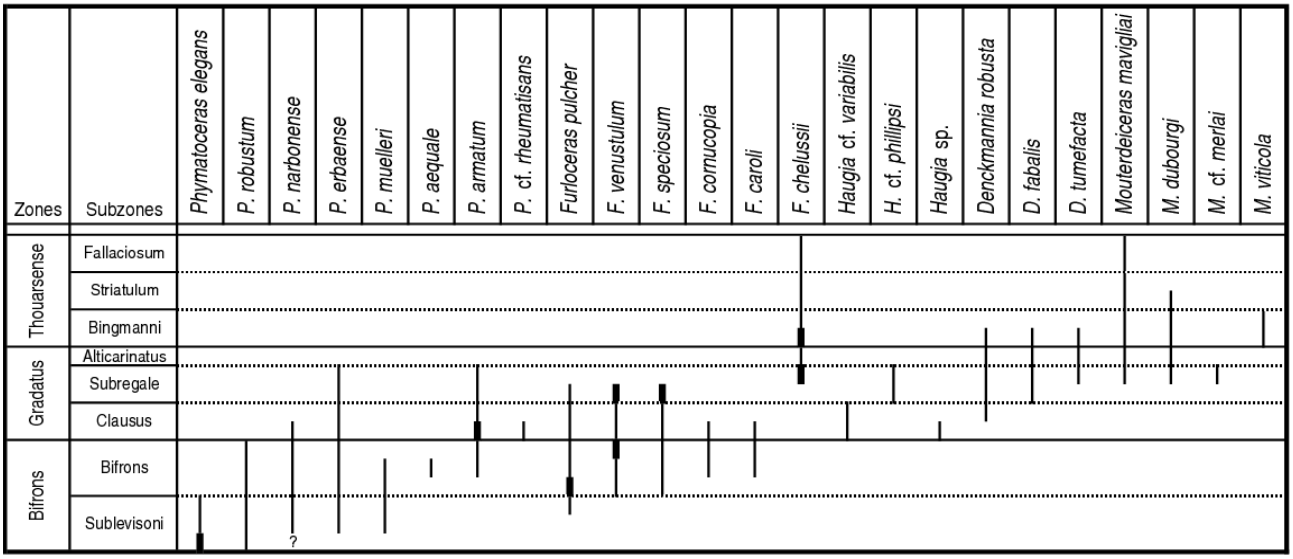

Figure 2. Chronostratigraphic distribution of the Phymatoceratidae in the Gerecse Mts (thin line denotes 1–5 specimens, thick line denotes 6–10 specimens)
2. ábra. *A Phymatoceratidae fajok kronosztratigráfiai elterjedése a Gerecse hegységben (vékony vonal: 1–5 példány, vastag vonal: 6–10 példány)*

Denckmannia Buckman, *Yakounia* Jakobs et Smith. *Yakounia* is typical of the Late Toarcian in North America, while the microconch *Paronychoceras* has never been recorded in Hungary yet. However, all the other genera occur in the Gerecse assemblages. The phylogeny of the family has been studied by Rulleau 2007; the connection between the Middle Toarcian environmental change and the morphological features of the Phymatoceratidae and Grammoceratinae genera were detailed by Guex 2006 and Guex et al. 2012. The family shows a worldwide range: specimens occur in the Middle–Upper Toarcian of Europe, North Africa, Madagascar, Oman, Turkey, the Caucasus, Iran, Tibet, Japan, Thailand, North and South America, and (?)Pakistan.

In the four Gerecse sections (Pisznice, Kis-Gerecse, Bánya Hill, Tölgyhát), Phymatoceratidae appear in the Sublevisoni Subzone being present in 4% of the Ammonitina fauna, with a larger proportion of 23% in the Bifrons Subzone. The family flourishes in the Gradatus Zone with 35% in the Clausus, and 36% in the Subregale–Alticarinatus Subzones. However, phymatoceratidae show a decline in their respective proportions in the Thouarsense Zone, with 28% in the Bingmanni, and 10% in the Striatulum–Fallaciosum Subzones; they are not evident in the fauna. The stratigraphic range of Phymatoceratidae taxa known from the Gerecse sections is shown on Figure 2.

Genus *Phymatoceras* Hyatt, 1867

Type-species: *Phymatoceras robustum* Hyatt, 1867. Lectotype: *Ammonites Tirolensis* (Hauer) in Dumortier, 1874, pl. 24, figs 1–2; designated by Buckman 1898, and recently refigured by Lacroix (2011, pl. 85, fig. 3).

Diagnosis: Evolute coiling, wide suboval or subrectangular section; convex flanks; a wide, carinate–sulcate venter; strong, radiate or rectiradiate, simple or bifurcating ribs; umbilical nodes; a hildoceratid suture-line: simple, long, wide external (E) and lateral (L) lobes; straight and short umbilical (U) lobes; a wide external saddle (ES), and an asymmetrically divided 1st lateral saddle (LS1).

Remarks: The earliest representatives, *P. elegans* and *P. robustum,* coappear with the genus *Hildoceras* at the base of the Bifrons Zone being descendants of the genus *Hildaites*. *Furloceras*, is a characteristic Mediterranean taxon derived from *Phymatoceras* in the upper Bifrons Zone. *Phymatoceras* differs from *Furloceras* in its evolute form, with lower and wider whorls, and coarse, irregular ornamentation. Around the Bifrons–Variabilis zone boundary, there are two other genera, *Haugia* and *Denckmannia,* which have their origins in the *Phymatoceras* which appears mainly in NW regions of Europe. Both *Rarenodia* Venturi and *Praerycites* Venturi were regarded as synonyms of *Phymatoceras* by Howarth 2013. However, *Rarenodia* has been widely regarded as the earliest representative of the Hammatoceratidae. The latter appear in the Serpentinum Zone, while *Praerycites* is probably the ancestor of the Erycitinae (Géczy et al. 2008, Kovács & Géczy 2008, Rulleau 2009).

Phymatoceras elegans (Merla, 1933)
(Plate I: 1a–b)

1933 *Denckmannia elegans* n. sp. – Merla, p. 17, pl. 1, figs 3, 5, 12, pl. 8, fig. 1
1967 *Phymatoceras* cf. *elegans* (Merla) – Géczy, p. 143, pl. 9, fig. 10
1975 *Phymatoceras elegans* (Merla) – Venturi, p. 213, figs 12/b–d, 16/b-d, pl. 26, figs 2–5, 8
non 1976 *Phymatoceras (Phymatoceras) elegans* (Merla) – Ohmert, pl. 5, fig. 3
2007 *Furloceras iserense* (Oppel in Merla) – Géczy & Szente, pl. 5, fig. 3
2011 *Phymatoceras elegans* Merla – Lacroix, p. 220 (partim), pl. 85, figs 1–2

Material: 15 specimens in a mediocre state of preservation (2014.1.1–15).

Description: Evolute coiling; wide umbilicus; convex flank, rounded, bisulcate venter; and a suboval–subrectangular whorl-section. The ribbing is irregular with well-developed, rursiradiate, simple or paired ribs.

Remarks: The ornamentation of *P. (P.) elegans,* identified with regular, single ribs by Ohmert 1976, from the Variabilis Zone is closer to that of *Podagrosites aratus* (Buckman). The *Furloceras* cf. *comense* specimen recorded in Géczy & Szente 2007 (p. 235: Pisznice Section, Bed 132) is here determined as *P. elegans* (2014.1.15).

Distribution: Mediterranean Province (Italy, Spain, Greece, Turkey, Morocco, Algeria, Hungary), France. Gerecse sections: Sublevisoni Subzone.

Phymatoceras robustum Hyatt, 1867
(Plate I: 2)

1867 *Phymatoceras robustum* – Hyatt, p. 88
1966 *Phymatoceras robustum* (Hyatt) – Géczy, p. 16, fig. 8, pl. 1, fig. 2, pl. 37, fig. 1
2002 *Phymatoceras robustum* Hyatt – Fauré, p. 720, pl. 15, figs 10–11 (*cum syn.*)
2008 *Phymatoceras robustum* Hyatt – Géczy et al., pl. 2, fig. 7
2011 *Phymatoceras robustum* Hyatt – Lacroix, p. 220, pl. 85, figs 3–5

Material: 12 specimens in varying states of preservation (2014.2.1–12).

Description: Evolute coiling; a slightly convex flank; a low, broad, bisulcate venter; with a subquadrate section. The ribs are strong, flexuous and rursiradiate. There are mainly paired ribs which emerge irregularly at the umbilical nodes.

Remarks: The species is close to *P. elegans*, but differs in that it has a more robust form with stronger ribs.

Distribution: France, Spain, Austria, Poland, Bulgaria, Morocco, Algeria, the Caucasus, Chile, Hungary (Bakony Mts: Csernye, Szentgál). Gerecse sections: Bifrons Zone.

Phymatoceras robustum Hyatt morphotype *muelleri* Géczy, 1966

1966 *Phymatoceras robustum muelleri* n. subsp. – Géczy, p. 17, fig. 9, pl. 1, fig. 1, pl. 37, fig. 2
1975 *Phymatoceras robustum muelleri* Géczy – Venturi, p. 214 (partim), figs 15, 16/a, 18, pl. 26, fig. 7
2007 *Furloceras* cf. *muelleri* (Géczy) – Géczy & Szente, pl. 7, figs 2–3

Material: Five poorly-preserved specimens (2014.3.1–5).

Description: Evolute coiling; convex flank; a rounded, broad, bisulcate venter; with a wide, suboval whorl-section. The ribs are coarse, rursiradiate, and they are mostly paired; without strong umbilical nodes.

Remarks: This rare morphotype is closely allied to *P. robustum*, but it differs in suboval section, and in finer, more rursiradiate ribbing.

Distribution: Hungary, Italy. Gerecse sections: middle Sublevisoni – middle Bifrons Subzones.

Phymatoceras armatum (Merla, 1933)
(Plate I: 3, Plate II: 3–4)

1933 *Denckmannia armata* n. sp. – Merla, p. 20, pl. 1, fig. 6, pl. 2, figs 1–3
1968 *Phymatoceras (Phymatoceras) armatum* (Merla) – Pelosio, p. 162, pl. 19, fig. 7, pl. 22, fig. 5
1975 *Phymatoceras (Phymatoceras) armatum* (Merla) – Dezi & Ridolfi, p. 26, figs 68–69

Material: 19 specimens in varying state of preservation (2014.7.1–19).

Description: Moderately evolute coiling; a broad, bisulcate venter; with a subquadrate whorl-section. The ribs are coarse, rectiradiate. Three–four ribs emerge where there are pronounced umbilical tubercles.

Remarks: The taxon was placed within genus *Furloceras* by Elmi & Rulleau 1995. However, the coarse, nodulate ornamentation is closer to that of *P. robustum*. *P. armatum* resembles *Denckmannia rude* (Simpson), but differs due to its narrower whorls and its less robust ornamentation. Given its irregular and coarse sculpture, and its late appearance (Bifrons horizon), it is probably a transitional form between *Phymatoceras* and *Denckmannia*.

Distribution: Italy, Southern Spain, France, Greece, Morocco, Hungary (Bakony Mts). Gerecse sections: Bifrons–Subregale Subzones.

Phymatoceras narbonense (Buckman, 1898)
(Plate I: 4a–b)

1874 *Ammonites Lilli* (v. Hauer) – Dumortier, p. 86, pl. 21, figs 1–2
1898 *Lillia narbonensis* – Buckman, p. 14, pl. 2, figs 3–4
1976 *Phymatoceras narbonense* (Buckman) – Gabilly, p. 37, pl. 1, fig. 1, pl. 2, figs 1–2 (*cum syn.*)
2011 *Phymatoceras narbonense* (Buckman) – Lacroix, p. 222, pl. 86, fig. 2 (holotype refigured)
2013 *Phymatoceras* gr. *narbonense* Buckman – Metodiev et al., p. 75, figs 4/e–f, 5/a

Material: 10 specimens in varying states of preservation (2014.4.1–10).

Description: Large, evolute coiling; slightly convex flanks; a low, broad, carinate venter without sulci; with a subrectangular whorl-section. The ribs are rursiradiate, sigmoid, bifurcating, and rarely trifurcating.

Remarks: The species is characterized by the low variability of its sculpture.

Distribution: France, Spain, Portugal, Italy, Germany, Luxembourg, Bulgaria, Romania, Bosnia-Herzegovina, Montenegro, Algeria, Argentina, the Caucasus. Gerecse sections: upper Sublevisoni to lower Clausus Subzones.

Phymatoceras narbonense (Buckman) morphotype *aequale* Géczy, 1967

1967 *Phymatoceras narbonense aequale* n. subsp. – Géczy, p. 142, fig. 24, pl. 7, fig. 1
2007 *Phymatoceras aequale* Géczy – Géczy & Szente, pl. 5, fig. 1

Material: One specimen in a mediocre state of preservation (2014.5.1).

Description: Evolute coiling; parallel flanks; a rounded, carinate venter without sulci; with a subrectangular section. The ribs are sigmoid, mostly bifurcating on the inner whorls, and on the external whorls they arise at tubercles. The preserved part of the body chamber is about a half whorl in length.

Remarks: This rare morphotype is allied to *P. narbonense* in size, but it differs due to its more convex flanks with umbilical nodes, and its rectiradiate ribs. *Furloceras speciosum* differs due to its stronger, less sinuous ribbing, and larger tubercles. GABILLY (1976) considered *P. aequale* as being closer to *Denckmannia fabalis*, but the latter differs due to its wide subtriangular section of its external whorls.

Distribution: The Gerecse specimen came from the Bifrons Subzone of the Bánya Hill Section.

Phymatoceras erbaense (HAUER, 1856)

1856 *Ammonites Erbaensis* – HAUER, p. 42, pl. 11, figs 10–14
1967 *Phymatoceras* sp. aff. *erbaense* (HAUER) – GÉCZY, p. 144, pl. 9, fig. 5
1975 *Phymatoceras erbaense* (HAUER) – VENTURI, fig. 17/a–b, pl. 26, figs 9–11, pl. 29, fig. 11
2007 *Furloceras erbaense* (HAUER) – GÉCZY & SZENTE, pl. 5, fig. 2, pl. 7, fig. 1
2008 *Furloceras erbaense* (HAUER) – GÉCZY et al., pl. 2, fig. 10

Material: 23 specimens in varying state of preservation (2014.6.1–23).

Description: Evolute coiling; a bisulcate venter; and a subquadrate whorl-section. It has irregular ribbing with rectiradiate or slightly rursiradiate simple and paired ribs. About five stronger, V-shape paired ribs emerge at the bullae on each whorl, followed by narrow and deep constrictions.

Remarks: *P. erbaense* was placed within genus *Furloceras* by ELMI & RULLEAU 1995; however, its morphology is closer to that of the species belonging to *Phymatoceras* (VENTURI & FERRI 2001).

Distribution: Austria, Germany, England, France, Poland, Bulgaria, Portugal, Southern Spain, Italy, Greece, Algeria, Morocco, North and South America, Hungary (Bakony Mts, Úrkút). Gerecse sections: upper Sublevisoni to Subregale Subzones.

Phymatoceras cf. *rheumatisans* (DUMORTIER, 1874)
(Plate I: 5a–b)

1874 *Ammonites rheumatisans* nov. sp. – DUMORTIER, p. 88, pl. 25, figs 1–2
1966 *Phymatoceras (Phymatoceras) rheumatisans* (DUMORTIER) – KOTTEK, p. 44, text-fig. 11, pl. 1, fig. 4
2002 *Denckmannia* (?) aff. *rheumatisans* (DUMORTIER) – FAURÉ, p. 721, pl. 16, fig. 9
2011 *Denckmannia* (?) *rheumatisans* (DUMORTIER) – LACROIX, p. 241, pl. 96, fig. 2

Material: Two wholly septate, fragmentary specimens (2014.8.1–2).

Description: Evolute coiling; a low, bisulcate venter; a broad carina; with a subrectangular section. The ribs similar to those of *P. erbaense*, but irregular, and somewhat coarser.

Remarks: The classification of the species is discussed in the literature. Based on the evolute coiling and the ornamentation, here it has been placed within *Phymatoceras*. The specimen presented here was mentioned as *Denckmannia pseudoerbaensis* GABILLY by GÉCZY & SZENTE 2007, while the latter species differs due to its wider whorls and broader ribs. The poor preservation does not enable a more certain description to be made.

Distribution: France, Greece, (?)Germany. Gerecse Mts: Clausus Subzone of the Bánya Hill Section.

Genus *Furloceras* ELMI et RULLEAU, 1995

Type-species: *Hildoceras (Lillia) Chelussii* PARISCH et VIALE, 1906. It was designated by ELMI & RULLEAU 1995.

Diagnosis: Evolute to moderately evolute coiling; with a moderately wide, subrectangular to subtrapezoid section; tricarinate-bisulcate venter; tabulate and carinate in larger specimens; dense, bifurcating or single ribs; small umbilical tubercles that tend to disappear on the body chamber; a hildoceratid suture-line: it has a simple E, long, ramified L, straight, and short U lobes, a wide ES, and an asymmetrically divided LS1.

Remarks: *Furloceras* differs from both *Phymatoceras* and *Denckmannia* due to its more compressed whorls, denser ribs, smaller tubercles, and from *Phymatoceras* because of its more ramified lobes. The genus is one of the descendants of *Phymatoceras*. In the Gerecse sections the earliest representative (*F. pulcher*) appears in the uppermost Sublevisoni Subzone. The genus is typical of the Bifrons Subzone to Variabilis/Gradatus Zone in the Mediterranean and the NW European Provinces, and it represented by a single species [*F. crassicosta* (MERLA)] in the Upper Toarcian of North America.

Furloceras chelussii (PARISCH et VIALE, 1906)
(Plate II: 1, 5a–b)

1906 *Hildoceras (Lillia) Chelussii* n. f. – PARISCH & VIALE, p. 156, pl. 11, figs 10–11
1968 *Phymatoceras (Chartronia) chelussii* PARISCH et VIALE – PELOSIO, p. 174, pl. 21, figs 3, 9, pl. 22, fig. 12, pl. 23, fig. 12
2001 *Furloceras chelussii* (PARISCH et VIALE) – VENTURI & FERRI, p. 217, fig. b
2011 *Furloceras chelussii* (PARISCH et VIALE) – LACROIX, pl. 111, figs 1, 3

Material: 24 specimens in varying states of preservation (2014.9.1–24).

Description: Large size, evolute, compressed coiling; a slightly convex flank; a narrow, carinate venter; with subrectangular whorl-section. The body chamber is 3/4 of a whorl in length and the peristome is simple and oblique. The ribs are strong, single or paired, rectiradiate, and slightly sinuous. Complete adults have about 7 whorls, and reach 260 mm diameter.

Remarks: The Gerecse specimens agree well with the type. The fragmentary *Mouterdeiceras* cf. *escherilobatum* specimen

recorded by Géczy & Szente 2007 (p. 234, Kis-Gerecse Section, Bed 66) is determined here as *F. chelussii* (2014.9.24).

Distribution: Italy, Spain, Portugal, France, Greece, Bulgaria, Albania, Morocco, (?)Caucasus. Gerecse sections: upper Subregale to Fallaciosum Subzones.

Furloceras pulcher (Merla, 1933)
(Plate II: 2)

1933 *Phymatoceras pulcher* n. sp. – Merla, p. 30, pl. 3, figs 1–2, 6
1933 *Phymatoceras anomalum* n. sp. – Merla, p. 31, pl. 3, figs 5, 10
1966 *Phymatoceras (Chartronia) fabale pulchrum* (Merla) – Kottek, p. 54, fig. 15, pl. 2, fig. 1
1975 *Chartronia pulchra* (Merla) – Venturi, pl. 27, fig. 4
2007 *Furloceras anomalum* (Merla) – Géczy & Szente, pl. 6, figs 3–8
? 2013 *Phymatoceras anomalum* Merla – Metodiev et al., p. 75, fig. 5/b–c

Material: 21 specimens in varying states of preservation (2014.10.1–21).

Description: Moderately evolute coiling; a slightly convex flank; a low, carinate venter. The whorl-section subrectangular on the inner part, while on the last whorl it issubtrapezoid . The ribs moderately are strong, sinuous, slightly rursiradiate, and they bifurcate at the short primaries above the umbilical margin.

Remarks: The species shows a low variability with respect to the strength of its ribs. The lectotype (Merla 1933, pl. 3, fig. 1, refigured by Lacroix 2011, pl. 111, fig. 2) was designated by Donovan 1958. *F. pulcher* was considered as a synonym of *F. chelussii* by Elmi & Rulleau 1995; however, based on the different ornamentation, its validity is accepted here. On the other hand, given that *F. pulcher* and *P. anomalum* Merla exhibit very few morphological differences, here the latter is regarded as *F. pulcher*, not as *F. chelussi* (see Elmi & Rulleau 1995).

Distribution: Italy, Austria, Greece, Spain, Tunisia, (?)Caucasus, Hungary (Bakony Mts). Gerecse sections: upper Sublevisoni to Subregale Subzones.

Furloceras venustulum (Merla, 1933)
(Plate I: 6–7, Plate IV: 1)

1933 *Chartronia venustula* n. sp. – Merla, p. 25, pl. 2, figs 9–12
1975 *Chartronia venustula* (Merla) – Venturi, p. 217 (partim), figs 21/a–c, 22/a–e, pl. 27, figs 1–2, 6, pl. 28, fig. 8
2001 *Furloceras venustulum* (Merla) – Venturi & Ferri, p. 214, p. 217, fig. e
2008 *Furloceras venustulum* (Merla) – Géczy et al., pl. 2, figs 8–9, 13

Material: 22 specimens in varying states of preservation (2014.11.1–22).

Description: Moderately evolute coiling;a slightly convex flank; a low, tricarinate-bisulcate venter; with a subrectangular section. The ribs are strong, rursiradiate, and bi- or trifurcating at short primaries or umbilical nodes.

Remarks: *F. venustulum* was regarded as a synonym of *F. chelussii* by Elmi & Rulleau 1995; however, it differs its ornamentation, having with characteristic "refracted" ribbing.

Distribution: Italy, Southern Spain, Portugal. Gerecse sections: Bifrons–Subregale Subzones.

Furloceras speciosum (Merla, 1933)

1933 *Chartronia speciosa* n. sp. – Merla, p. 24, pl. 2, fig. 13
1966 *Phymatoceras speciosum* (Merla) – Géczy, p. 18, fig. 10, pl. 1, fig. 4, pl. 37, fig. 3
1975 *Phymatoceras speciosum* (Merla) – Venturi, figs 19/b–c, 20/a–c, e–g, pl. 27, figs 7, 9, pl. 28, fig. 4, pl. 29, fig. 10
2001 *Furloceras speciosum* (Merla) – Venturi & Ferri, p. 217, fig. g
2007 *Furloceras speciosum* (Merla) – Géczy & Szente, pl. 7, fig. 4

Material: 12 specimens in varying states of preservation (2014.12.1–12).

Description: Large size, evolute coiling; a slightly convex flank; a broad, low, slightly rounded, carinate venter, with a shallow sulci; and a subrectangular to subtrapezoid whorl-section. It has a trong, rectiradiate to gently rursiradiate ribs which bi- or trifurcate at well-developed umbilical tubercles.

Distribution: Italy, Greece, Algeria, Hungary, (?)Argentina. Gerecse sections: Bifrons to lower Subregale Subzones.

Furloceras cornucopia (Merla, 1933)
(Plate III: 2a–b)

1905 *Hildoceras comense* Buch — Fucini, p. 112, pl. 6, fig. 2
1933 *Denckmannia cornucopia* n. sp. — Merla, p. 22, pl. 2, figs 4, 6–8, pl. 8, fig. 6
1952 *Denckmannia* cf. *cornucopia* Merla – Nicotra, p. 78, pl. 3, fig. 9
1998 *Phymatoceras* aff. *cornucopiae* Merla (sensu Gabilly) — Rulleau, pl. 18, figs 9–10
2008 *Phymatoceras cornucopia* (Merla) — Metodiev, fig. 5/k
2008 *Furloceras cornucopia* (Merla) — Géczy et al., pl. 2, fig. 14

Material: Five specimens in mediocre states of preservation (2014.13.1–5).

Description: Evolute coiling; a convex flank; a wide, low, carinate and sulcate venter; with a rounded subquadrate whorl-section. It has strong, paired ribs which emerge at umbilical tubercles.

Remarks: *F. cornucopia* was interpreted as a synonym of *Denckmannia fabalis* (Simpson) by Donovan 1958. This identification was accepted in the literature for decades; however, Elmi & Rulleau 1995 recognized again the validity of the taxon, and designated the lectotype [Merla, l.c. fig. 4 = *A. comensis* IVa forma, Meneghini 1867–1881, pl. 7, fig. 3, refigured by Pinna 1969, pl. 2, fig. 3 as *P.* (*Chartronia*) *fabale*]. Consequently, the specimens recorded from Mediterranean localities under the name *fabale* (e.g. Zanzucchi 1963, Kottek 1966, Pelosio 1968, Dezi & Ridolfi 1975, Venturi 1975), are considered here as *F. cornucopia*. The two species are somewhat similar, but *D. fabalis* is characterized by sinuous, rectiradiate ribbing, and its stratigraphic range is typical of the Variabilis/Gradatus Zone, while *F. cornucopia* appears in the Bifrons

Zone, and its ribbing is rursiradiate. *F. cornucopia* was incorrectly regarded as a synonym of *Phymatoceras crassicosta* MERLA by JAKOBS 1997.

Distribution: Italy, Greece, Bulgaria, France, Spain, Algeria. Gerecse Mts: Bifrons to lowermost Clausus Subzones.

Furloceras caroli (MERLA, 1933)

1933 *Phymatoceras Caroli* n. sp. – MERLA, p. 32, pl. 3, figs 3–4
1966 *Brodieia caroli* (MERLA) – KOTTEK, p. 59, pl. 3, fig. 3
1975 *Chartronia caroli* (MERLA) – VENTURI, figs 21/d, 22/f, pl. 27, fig. 3, pl. 28, fig. 9
2007 *Furloceras caroli* (MERLA) – GÉCZY & SZENTE, pl. 6, figs 1–2
2008 *Furloceras caroli* (MERLA) – GÉCZY et al. p. 38, pl. 2, figs 11–12

Material: Four specimens in mediocre states of preservation (2014.14.1–4).

Description: Medium-size, evolute coiling; a slightly convex flank; a tricarinate-bisulcate venter; and a narrow, subtrapezoid whorl-section. It has dense and sinuous secondary ribs which bifurcate from short primaries.

Remarks: *F. caroli* differs from other species of the genus due to its narrow and elongated whorl-section, and its fine, dense ribbing.

Distribution: Italy, Greece, Hungary. Gerecse sections: Bifrons to Clausus Subzones.

Genus *Denckmannia* BUCKMAN, 1898

Type-species: *Denckmannia tumefacta* BUCKMAN, 1898.

Diagnosis: Moderately evolute coiling; a wide, subrectangular to suboval section; a carinate-bisulcate venter; well-developed, paired, sigmoid ribs; strong umbilical tubercles and bullae; and a hildoceratid suture-line: relatively simple E, long L, straight, short U lobes, wide ES, asymmetrically divided LS1.

Remarks: The taxon was considered as a synonym of *Phymatoceras* by HOWARTH 2013. It markedly differs, however, from its ancestor *Phymatoceras* in morphology; this is due to its more involute coiling, much stronger ribs and bullae, and also its stratigraphic and biogeographic ranges. The genus is typical of the Variabilis Zone in the NW European Province, and it appears in the Upper Toarcian of North and South America. The occurrence of *Denckmannia* in the Mediterranean Bakony and Gerecse assemblages is of palaeobiogeographic significance. The genus can be found in the Clausus to lower Bingmanni Subzones of the Gerecse Mts.

Denckmannia tumefacta BUCKMAN, 1898

1898 *Denckmannia tumefacta* BUCKMAN – BUCKMAN, Suppl., p. 19, pl. 1, figs 7–10
1966 *Phymatoceras tumefactum* (BUCKMAN) – GÉCZY, p. 23, fig. 15, pl. 2, fig. 3, pl. 37, fig. 7
1976 *Denckmannia tumefacta* BUCKMAN – GABILLY, p. 59, text-figs 39, 64–66, pl. 7, figs 1–2 (*cum syn.*)
2007 *Denckmannia tumefacta* BUCKMAN – GÉCZY & SZENTE, pl. 10, fig. 1
2011 *Denckmannia tumefacta* BUCKMAN – LACROIX, p. 235, pl. 92, fig. 1, pl. 97, fig. 1

Material: Five specimens in mediocre states of preservation (2014.15.1–5).

Description: Large size, moderately evolute coiling; a convex flank; its venter is low, broad with shallow sulci and high carina on its inner whorls, and it is high and rounded without sulci on the last whorl. The inner part of the whorl-section is subquadrate, while it is convex-subrectangular on the last whorl. Paired ribs emerge at umbilical nodes; they vary in strength and width, and they are slightly rursiradiate and straight on the inner whorls, and sigmoid on the last whorl.

Remarks: The *D. pseudoerbaensis* n. subsp. specimen recorded by GÉCZY & SZENTE 2007 (p. 235, Pisznice Section, Bed 112) is determined here as *D. tumefacta* (2014.15.5).

Distribution: England, France, northern Spain, North America, Hungary (Bakony Mts). Gerecse sections: Subregale–Bingmanni Subzones.

Denckmannia robusta (DENCKMANN, 1887)
(Plate III: 3, Plate IV: 3)

1887 *Ammonites* (? *Lillia*) *robustus* n. sp. – DENCKMANN, p. 73, pl. 7, fig. 1, pl. 10, fig. 7
1976 *Denckmannia robusta* (DENCKMANN) – GABILLY, p. 55, text-figs 34–35, tabl. 4, pl. 3, figs 4–5, pl. 5, figs 1–3
2007 *Denckmannia robusta* (DENCKMANN) – RULLEAU, p. 75, pl. 27, fig.4
2011 *Denckmannia robusta* (DENCKMANN) – LACROIX, p. 233, pl. 89, fig. 5, pl. 91, fig. 1

Material: Six specimens in varying states of preservation (2014.16.1–6).

Description: Large size, moderately evolute coiling, convex flank, subrectangular whorl-section. Venter low, broad and tricarinate-bisulcate on inner whorls, sulci absent on the last whorl. Ventral conella on the body chamber. Strong, paired ribs emerge at large umbilical tubercles; they are rectiradiate and straight on the inner, while sigmoid on the last whorl.

Distribution: Germany, France. Gerecse sections: Clausus–Bingmanni Subzones.

Denckmannia fabalis (SIMPSON, 1855)

1855 *Ammonites fabalis* n. sp. – SIMPSON, p. 77-78
1976 *Denckmannia fabalis* (SIMPSON) – GABILLY, p. 68, text-figs 44–45, 67, tabl. 8, pl. 4, fig. 4, pl. 9, figs 5–6 (*cum syn.*)
2008 *Denckmannia fabalis* (SIMPSON) – METODIEV, fig. 5/c–d
2008 *Denckmannia fabale* (SIMPSON) – GÉCZY et al., pl. 3, fig. 1
2011 *Denckmannia fabalis* (SIMPSON) – LACROIX, p. 238, pl. 93, fig. 3, pl. 94, fig. 1, pl. 95, figs 1–2

Material: Three specimens in mediocre states of preservation (2014.17.1–3).

Description: Large size, moderately evolute coiling; a convex flank; a rounded and carinate venter, with a subrectangular to suboval section. Two–three strong, rectiradiate, sigmoid ribs emerge at umbilical bullae.

Remarks: The species differs from *F. cornucopia* in its ornamentation (see above).

Distribution: England, France, Luxembourg, Northern Spain, Bulgaria, Morocco, Hungary (Bakony Mts), South America. Gerecse sections: Subregale–Bingmanni Subzones.

Genus *Mouterdeiceras* ELMI et RULLEAU, 1995

Type-species: *Mouterdeiceras dubourgi* ELMI et RULLEAU, 1995.

Diagnosis: Evolute, compressed coiling; a subrectangular to subtrapezoid section; a tabulate or tricarinate-bisulcate venter; rursiradiate, slightly sigmoid, bifurcating or single ribs; and a hildoceratid suture-line: simple E, long, wide, moderately ramified L, straight, short U lobes, wide ES, and an asymmetrically divided, wide LS1.

Remarks: According to HOWARTH 2013, *Mouterdeiceras* is a synonym of *Furloceras*. The validity, however, is accepted here even though the differences of morphology, stratigraphic and biogeographic distributions are considerable. Although the genus occurs in both provinces, there is a difference between the NW European and the Mediterranean Provinces regarding the repartition of the respective species: *M. dubourgi* and *M. viticola* are typical of the Thouarsense Zone in NW Europe, whereas *M. mavigliai*, *M. merlai*, *M. masciadrii* (PELOSIO), *M. tirolense* (HAUER), and *M. escherilobatum* (GÉCZY) are present in the upper Gradatus to Bonarelli/Thouarsense Zones in the Mediterranean region. The genus is also known from the Upper Toarcian of South America and Japan. Based on revision, the specimens of *M. masciadrii* from the Gerecse Mts recorded by GÉCZY & SZENTE 2007 and KOVÁCS & GÉCZY 2008 without any description are determined here as *M. dubourgi* or *M. mavigliai*.

Mouterdeiceras dubourgi ELMI et RULLEAU, 1995
(Plate IV: 4a–b)

1967 *Phymatoceras tirolense* (HAUER) – GÉCZY, p. 141, fig. 23, pl. 8
1987 *Phymatoceras evolutum* MERLA – ELMI & BENSHILI, p. 54, figs 4–5
1995 *Mouterdeiceras dubourgi* n. sp. – ELMI & RULLEAU, p. 89, figs 1/1–3, 13–14, 2/1–2, 3, pl. 10, figs 1–8, pl. 11, figs 7–8
2011 *Mouterdeiceras dubourgi* ELMI et RULLEAU – GALÁCZ et al., p. 328, pl. 3, fig. 3, pl. 4, fig. 1
2011 *Mouterdeiceras dubourgi* ELMI et RULLEAU – LACROIX p. 262, pl. 112, fig. 4

Material: Nine specimens in varying states of preservation (2014.18.1–9).

Description: Evolute coiling; slightly convex, subparallel flanks; a low, tricarinate-bisulcate venter; and a subrectangular section. The ribs are strong, convex, and are projected onto the ventrolateral part. On the penultimate whorl some ribs bifurcate at the umbilical margin without any tubercles.

Remarks: The species resembles *M. masciadrii* in morphology, but differs because it has rursiradiate ribs. The *P. tirolense* (HAUER) recorded by GÉCZY 1967 was interpreted as *M. dubourgi* by GALÁCZ et al. 2011. The morphology of the *P. evolutum* MERLA figured by ELMI & BENSHILI (1987, figs 4–5) is very close to that of *M. dubourgi*.

Distribution: France, Morocco, Algeria, Hungary (Bakony and Gerecse Mts). Gerecse sections: upper Subregale to lower Striatulum Subzones.

Mouterdeiceras dubourgi ELMI et RULLEAU morphotype *mavigliai* (PELOSIO, 1968)
(Plate IV: 2)

1968 *Phymatoceras (Phymatoceras) mavigliai* n. sp. – PELOSIO, p. 164, pl. 22, figs 1, 16
non 1973 *Phymatoceras* (?) gr. *mavigliai* VENZO – GUEX, pl. 1, fig. 2
1975 *Phymatoceras (Phymatoceras) mavigliai* PELOSIO – PINNA & SPEZIA, p. 194, pl. 15, fig. 4
2007 *Mouterdeiceras dubourgi* ELMI et RULLEAU – RULLEAU, p. 78, pl. 33, fig. 1

Material: Six specimens in varying states of preservation (2014.19.1–6).

Description: Evolute coiling; a slightly convex flank; low, narrow and tricarinate-bisulcate venter; and a subrectangular section. The ribs are rectiradiate or slightly rursiradiate, dense, single or paired, and almost straight.

Remarks: *M. mavigliai* is closely allied to *M. dubourgi* in morphology, but differs due to its finer and denser ribs. The taxon is recognized here as the Mediterranean variant of the nominate species. The *M. dubourgi* presented by RULLEAU 2007 (pl. 33, fig. 1) differs from the holotype (ELMI & RULLEAU 1995, pl. 10, figs 1–2); its overall morphology is closer to that of the holotype of *M. mavigliai* (PELOSIO, l.c., pl. 22, fig. 16).

Distribution: Italy, Morocco, (?)France. Gerecse sections: upper Subregale to Fallaciosum Subzones.

Mouterdeiceras cf. *merlai* (PELOSIO, 1968)
(Plate III: 1a–b)

1968 *Phymatoceras (Phymatoceras) merlai* n. sp. – PELOSIO, p. 157, pl. 19, fig. 11, pl. 21, figs 2, 4
1975 *Phymatoceras (Phymatoceras) merlai* PELOSIO – PINNA & SPEZIA, p. 194, pl. 15, fig. 3

Material: Two fragmentary specimens (2014.20.1–2).

Description: Evolute coiling; a convex flank; a wide, tricarinate-bisulcate venter; and a rounded subtrapezoid whorl-section. The ribs are well-developed, slightly rursiradiate, and paired. Irregularly placed, wide constrictions are also present.

Remarks: The fragment of the body chamber figured here is similar to that of the holotype (PELOSIO, 1968, pl. 19, fig. 11), but the state of preservation does not allow a precise identification to be made.

Distribution: Italy, Southern Spain. Both Gerecse specimens came from the Subregale Subzone of the Piszkice Section (Bed 113).

Mouterdeiceras viticola ELMI et RULLEAU, 1995
(Plate V: 4a–b)

1978 *Phymatoceras* (*Chartronia*) n. sp? – DEZI & RIDOLFI, p. 63, figs 94–95
1995 *Mouterdeiceras viticola* n. sp. – ELMI & RULLEAU, p. 90, figs L'–5, 11–12, 3, pl. 11, figs 1–6
2002 *Mouterdeiceras viticola* ELMI et RULLEAU – FAURÉ, p. 722, pl. 17, fig. 12
2007 *Mouterdeiceras viticola* ELMI et RULLEAU – RULLEAU, p. 78, text-fig. 19/9, pl. 32, fig. 5
2011 *Mouterdeiceras viticola* ELMI et RULLEAU – LACROIX p. 263, pl. 112, figs 1, 3

Material: Two specimens in mediocre states of preservation (2014.21.1–2).

Description: Evolute coiling; subparallel and slightly convex flanks; a low and tricarinate-bisulcate venter; and a subrectangular whorl-section. The ribs are strong, paired, rursiradiate, slightly sigmoid, and they rise at umbilical tubercles.

Remarks: The species differs from *M. dubourgi* due to its sharper and less sigmoid ribbing. The morphology of the *P.* (*Chartronia*) n. sp? specimens figured by DEZI & RIDOLFI (1978, figs 94–95) is closely allied to that of *M. viticola*.

Distribution: France, (?)Italy. Gerecse Mts: Bingmanni Subzone of the Bánya Hill and of the Tölgyhát "A" Sections.

Genus *Haugia* BUCKMAN, 1888

Type-species: *Ammonites variabilis* D'ORBIGNY, 1844. It was designated by BUCKMAN 1888.

Diagnosis: Compressed, involute to moderately involute coiling; a moderately convex flank; a high venter with tall carina; strong, bi- or trifurcating, sigmoid ribs; regular umbilical tubercles; hildoceratid suture-line: short, simple E, long, simple L, straight, short U lobes, wide ES, and an asymmetrically divided LS1.

Remarks: Two subgenera are distinguished within the genus: *Haugia* BUCKMAN, 1888 (=*Haugiella* GABILLY, 1974) macroconch form, and *Brodieia* BUCKMAN, 1898 [type-species: *H.* (*Brodieia*) *curva* BUCKMAN, 1898] microconch form. The former is rare, while the latter is unknown from the Gerecse assemblages. The genus is a descendant of *Phymatoceras*, and is probably the ancestor of *Pseudogrammoceras* BUCKMAN. Some species of the Mediterranean genus *Merlaites* GABILLY are similar in morphology, but clearly differ with respest to ventral grooves, the development of the carina, and the absence of umbilical tubercles. *Haugia* is typical of the Variabilis Zone in the NW European Province, where its species are subzonal and horizon indices; however, it rarely appears in the Gradatus Zone of Mediterranean localities as well. Besides, it is known from the Upper Toarcian of North Africa, Madagascar, the Caucasus, Iran, North and South America, Japan and Thailand. (Two specimens are described here from a newly-excavated Toarcian section of the Bánya Hill Quarry. The comprehensive analysis of its fauna is in preparation).

Haugia cf. *variabilis* (D'ORBIGNY, 1844)
(Plate V: 3a–b)

1844 *Ammonites variabilis* nov. sp. – D'ORBIGNY, p. 350, pl. 113, figs 1–4
1976 *Haugia (Haugia) variabilis variabilis* (D'ORBIGNY) – GABILLY, p. 82, text-figs 49, 68, 72, tabl. 10, pl. 10, figs 7–8, pl. 12, figs 1–2, pl. 13, figs 1–2 (*cum syn.*)
2011 *Haugia variabilis* (D'ORBIGNY) – LACROIX, p. 245, pl. 99, figs 2, 4–5, pl. 100, figs 1–3, pl. 102, fig. 1, pl. 103, fig. 1

Material: One poorly-preserved specimen (2014.22.1).

Description: Medium-sized, moderately involute coiling; a convex flank, a high venter; and a suboval section. A ventral conella indicates a hollow-floored keel. Two–three sigmoid ribs emerge at umbilical tubercles.

Remarks: The specimen is close to the type and the examples represented in the literature; however, the poor state of preservation does not allow an exact arrangement.

Distribution: France, Spain, England, Germany, Luxembourg, Bulgaria, Algeria, Morocco, Japan, the Caucasus, (?)Italy, (?)Slovakia. Gerecse Mts: Gradatus Zone of the Bánya Hill Quarry Section.

Haugia cf. *phillipsi* (SIMPSON, 1843)
(Plate V: 1)

1843 *Ammonites Phillipsi* – SIMPSON, p. 36
1913 *Ammonites phillipsi* SIMPSON – BUCKMAN, p. 85b, pl. 85
? 1963 *Haugia* cfr. *variabilis* (D'ORBIGNY) – ZANZUCCHI, p. 140, pl. 17, fig. 6
1976 *Haugia (Haugia) phillipsi* (SIMPSON) – GABILLY, p. 94, text-figs 52–53, pl. 16, figs 1–6 (*cum syn.*)
2011 *Haugia phillipsi* (SIMPSON) – LACROIX, p. 251, pl. 109, fig. 1

Material: One poorly-preserved specimen (2014.23.1).

Description: Large size, moderately evolute, discoid coiling; a slightly convex flank; a high venter carinate with conella; and a narrow, suboval section. Three broad, gently sigmoid ribs rise at umbilical nodes.

Remarks: The specimen resembles *H. phillipsi* in its overall morphology; however the poor state of preservation makes it impossible to give an exact description. Other species with sparse and broad ribbing, and somewhat weakly developed umbilical nodes [*H. navis* (DUMORTIER), *H. briordensis* (DUMORTIER)] differ from *H. phillipsi* because they have much wider whorl.

Distribution: England, France, Spain, Bulgaria, (?)Germany, (?)Italy. Gerecse Mts: Gradatus Zone of the Bánya Hill Quarry Section.

Haugia sp.
(Plate V: 2a–b)

Material: Two fragmentary specimens (2014.24.1–2).

Description: The phragmocone figured here is characterized by evolute, compressed coiling; a slightly convex flank; and a narrow, suboval whorl-section. The moderately high venter is carinate with a conella. Gently flexuous, paired ribs emerge at the umbilical margin. There is no trace of tubercles.

Remarks: *H. evoluta* GABILLY seems to bear the closest morphological similarity to the Gerecse specimens (see GABILLY 1976, pl. 11, figs 1–2, LACROIX 2011, pl. 99, fig. 1, and METODIEV 2008, fig. 5/a); nevertheless, the use of an open nomenclature seems reasonable.

Distribution: The specimens were collected from the Clausus Subzone of the Kis-Gerecse Section.

Conclusion

The survey of the family Phymatoceratidae completes the general picture of the Toarcian ammonite faunal composition of the Gerecse Mts. Besides Mediterranean taxa, the relatively frequent occurrence of the characteristic NW European genus *Denckmannia*, and the sporadic appearance of the genus *Haugia* are remarkable. The results verify the mixed palaeobiogeographic feature of the fauna. Although the dominance of Phylloceratina and Lytoceratina is thought to be a clear Mediterranean feature, the co-existence of Mediterranean and NW European Ammonitina genera indicates a need for a palaeobiogeographic approach, given the a presumed Submediterranean transitional area between the two faunal provinces.

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Kézirat beérkezett: 2013. 12. 05.

Plate I — I. tábla

All figures are shown in their natural size. Specimens coated with ammonium chloride. * indicates end of phragmocone. Photos by I. SZENTE (Plate 1: 6–7, Plate 4: 1), and by Z. KOVÁCS. – *Az ábrázolt példányok természetes nagyságúak és ammonium-kloriddal vannak bevonva. A lakókamra kezdetét * jelzi. Fotó: SZENTE I.: 1. tábla: 6–7, 4. tábla: 1, és KOVÁCS Z.)*
Abbreviations of measurements (*Rövidítések*): D – diameter (*átmérő*), H – whorl-height (*kanyarulatmagasság*), W – whorl-width (*kanyarulatszélesség*), U – umbilical-width (*köldökátmérő*), L – length of fragment (*fragmentum hossza*).

1a–b. *Phymatoceras elegans* (MERLA), 2014.1.1, lateral and ventral views, Kis-Gerecse, Bed 100, Sublevisoni horizon, (D: 78, H: 20, W: 15, U: 42).
2. *Phymatoceras robustum* HYATT, 2014.2.1, lateral view, Kis-Gerecse, Bed 89, Bifrons horizon, (D: 62, H: 18, W: 17, U: 29).
3. *Phymatoceras armatum* (MERLA), 2014.7.1, lateral view, Pisznice, Bed 121, Bifrons horizon, (D: 64, H: 19, W: 15, U: 32).
4a–b. *Phymatoceras narbonense* (BUCKMAN), 2014.4.1, lateral and ventral views, Bánya Hill, Bed 37, Bifrons horizon, (D: 93, H: 27, W: 20, U: 43).
5a–b. *Phymatoceras* cf. *rheumatisans* (DUMORTIER), 2014.8.1, ventral and lateral views, Bánya Hill, Bed 35, Clausus Subzone, (L: 93, H: 26, W: 21).
6. *Furloceras venustulum* (MERLA), 2014.11.1, lateral view, Kis-Teke Hill, Bed K13, Gradatus Zone, (D: 52, H: 20, W: 12, U: 19).
7. *Furloceras venustulum* (MERLA), 2014.11.2, lateral view, Kis-Teke Hill, Bed K13, Gradatus Zone, (D: 42, H: 15, W: 10, U: 15).

1a–b. *Phymatoceras elegans* (MERLA), 2014.1.1, laterális és ventrális nézet, Kis-Gerecse, 100. réteg, Sublevisoni horizont, (D: 78, H: 20, W: 15, U: 42).
2. *Phymatoceras robustum* HYATT, 2014.2.1, laterális nézet, Kis-Gerecse, 89. réteg, Bifrons horizont, (D: 62, H: 18, W: 17, U: 29).
3. *Phymatoceras armatum* (MERLA), 2014.7.1, laterális nézet, Pisznice, 121. réteg, Bifrons horizont, (D: 64, H: 19, W: 15, U: 32).
4a–b. *Phymatoceras narbonense* (BUCKMAN), 2014.4.1, laterális és ventrális nézet, Bánya-hegy, 37. réteg, Bifrons horizont, (D: 93, H: 27, W: 20, U: 43).
5a–b. *Phymatoceras* cf. *rheumatisans* (DUMORTIER), 2014.8.1, ventrális és laterális nézet, Bánya-hegy, 35. réteg, Clausus szubzóna, (L: 93, H: 26, W: 21).
6. *Furloceras venustulum* (MERLA), 2014.11.1, laterális nézet, Kis-Teke-hegy, K13. réteg, Gradatus zóna, (D: 52, H: 20, W: 12, U: 19).
7. *Furloceras venustulum* (MERLA), 2014.11.2, laterális nézet, Kis-Teke-hegy, K13. réteg, Gradatus zóna, (D: 42, H: 15, W: 10, U: 15).

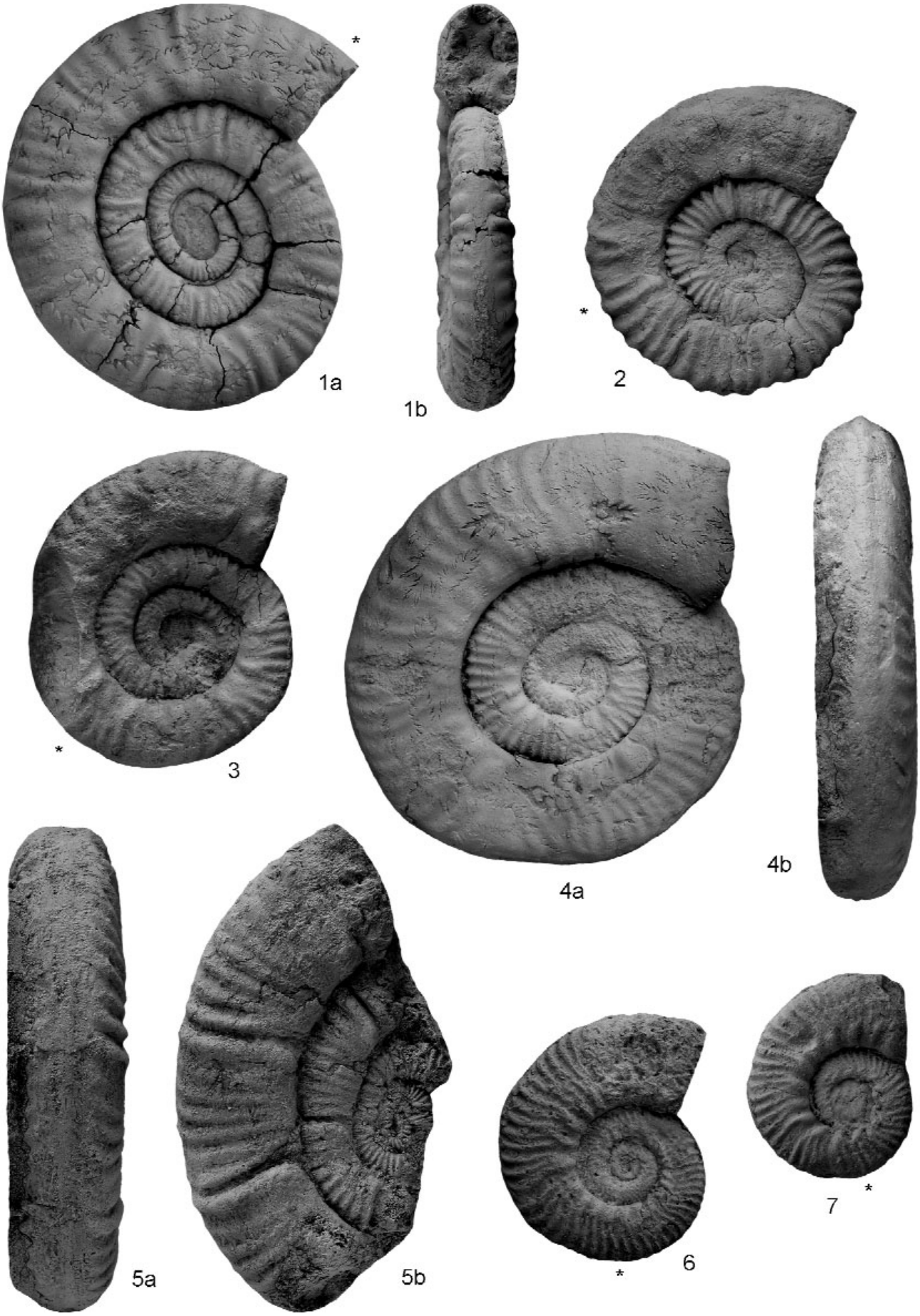
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Plate II — II. tábla

1. *Furloceras chelussii* (Parisch et Viale), 2014.9.1, lateral view, Pisznice, Bed 109, Bingmanni Subzone, (D: 100, H: 28, W: 18, U: 49).
2. *Furloceras pulcher* (Merla), 2014.10.1, lateral view, Bánya Hill, Bed 41, Lusitanicum horizon, (D: 90, H: 29, W: 13, U: 40).
3. *Phymatoceras armatum* (Merla), 2014.7.2, lateral view, Kis-Teke Hill, Bed K14, Gradatus Zone, (D: 37, H: 12, W: 10, U: 17).
4. *Phymatoceras armatum* (Merla), 2014.7.3, lateral view, Kis-Teke Hill, Bed K14, Gradatus Zone, (D: 42, H: 14, W: 12, U: 18).
5a–b. *Furloceras chelussii* (Parisch et Viale), 2014.9.2, lateral and ventral views, Pisznice, Bed 108, Bingmanni Subzone, (D: 131, H: 36, W: 20, U: 66).

1. *Furloceras chelussii* (Parisch et Viale), 2014.9.1, laterális nézet, Pisznice, 109. réteg, Bingmanni szubzóna, (D: 100, H: 28, W: 18, U: 49).
2. *Furloceras pulcher* (Merla), 2014.10.1, laterális nézet, Bánya-hegy, 41. réteg, Lusitanicum horizont, (D: 90, H: 29, W: 13, U: 40).
3. *Phymatoceras armatum* (Merla), 2014.7.2, laterális nézet, Kis-Teke-hegy, K14. réteg, Gradatus zóna, (D: 37, H: 12, W: 10, U: 17).
4. *Phymatoceras armatum* (Merla), 2014.7.3, laterális nézet, Kis-Teke-hegy, K14. réteg, Gradatus zóna, (D: 42, H: 14, W: 12, U: 18).
5a–b. *Furloceras chelussii* (Parisch et Viale), 2014.9.2, laterális és ventrális nézet, Pisznice, 108. réteg, Bingmanni szubzóna, (D: 131, H: 36, W: 20, U: 66).

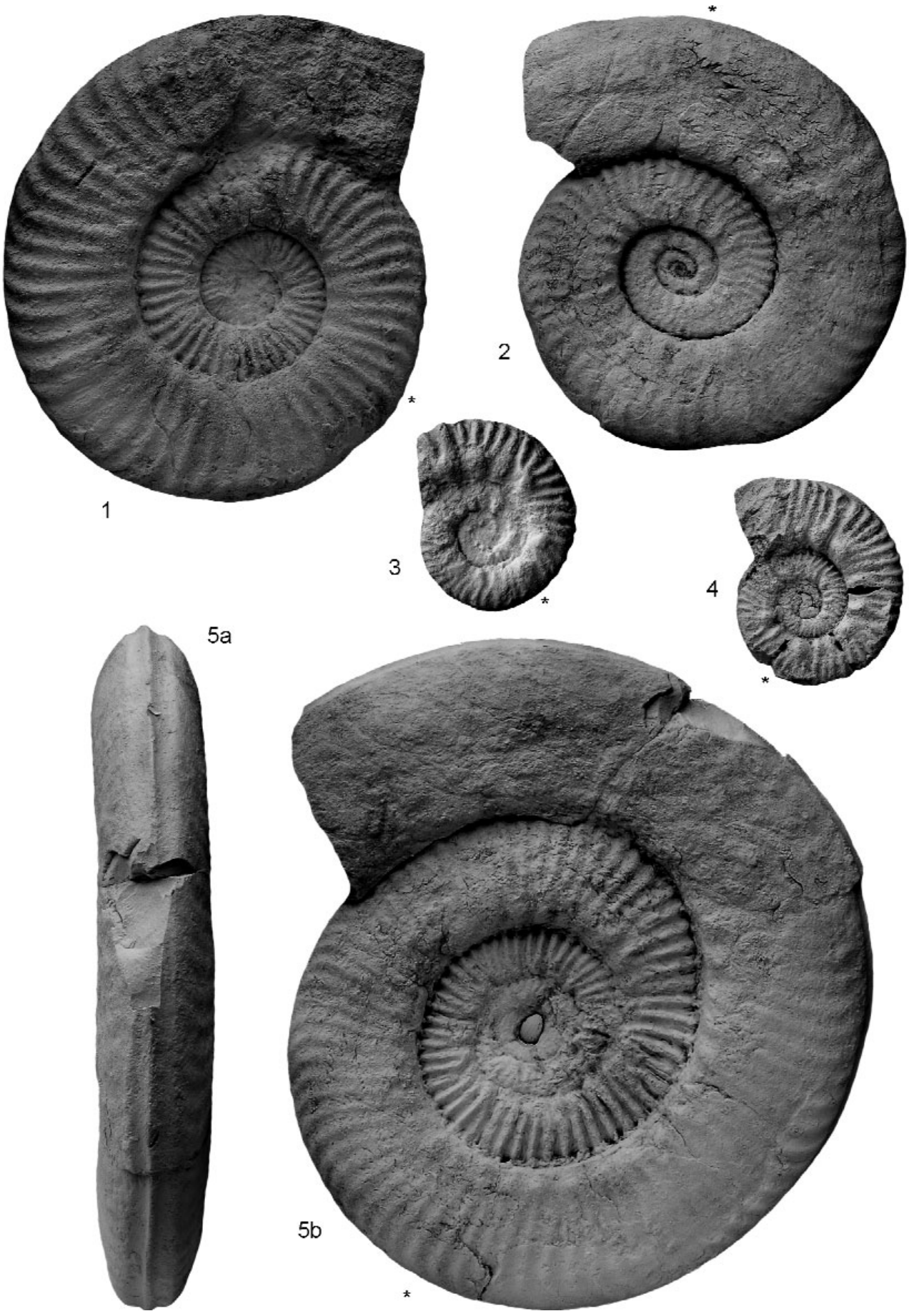
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Plate III — III. tábla

1a–b. *Mouterdeiceras* cf. *merlai* (PELOSIO), 2014.20.1, ventral and lateral views, Pisznice, Bed 113, Subregale Subzone, (L: 70, H: 18, W: 16).
2a–b. *Furloceras cornucopia* (MERLA), 2014.13.1, ventral and lateral views, Pisznice, Bed 121, Bifrons horizon, (D: 72, H: 23, W: 18, U: 32).
3. *Denckmannia robusta* (DENCKMANN), 2014.16.1, lateral view (ventral view on Plate 4: 3), Pisznice, Bed 114, Subregale Subzone, (D: 180, H: 58, W: 38, U: 80).

1a–b. *Mouterdeiceras* cf. *merlai* (PELOSIO), 2014.20.1, ventrális és laterális nézet, Pisznice, 113. réteg, Subregale szubzóna, (L: 70, H: 18, W: 16).
2a–b. *Furloceras cornucopia* (MERLA), 2014.13.1, ventrális és laterális nézet, Pisznice, 121. réteg, Bifrons horizont, (D: 72, H: 23, W: 18, U: 32).
3. *Denckmannia robusta* (DENCKMANN), 2014.16.1, laterális nézet (ventrális nézet: 4. tábla: 3), Pisznice, 114. réteg, Subregale szubzóna, (D: 180, H: 58, W: 38, U: 80).

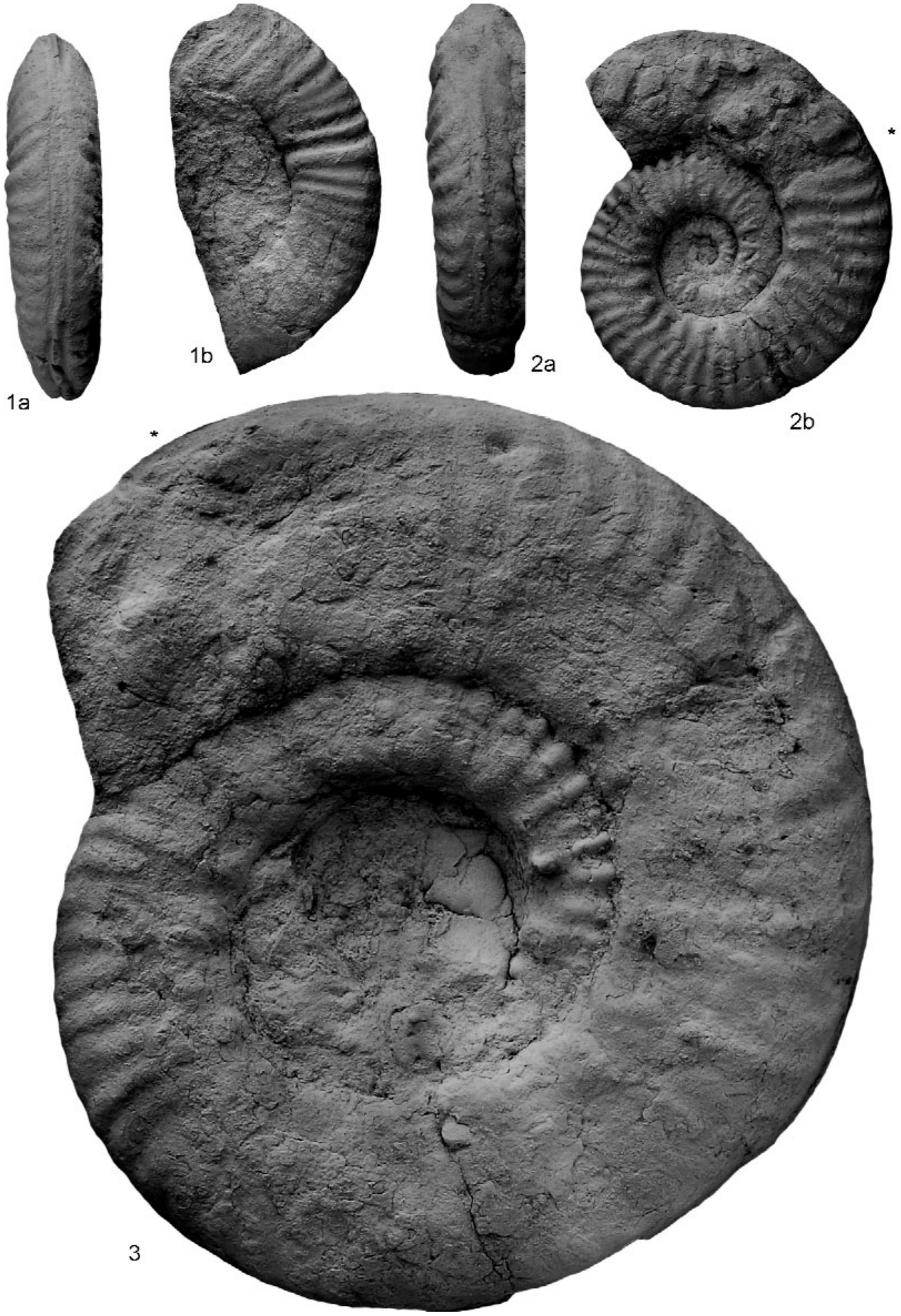
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Plate IV — IV. tábla

1. *Furloceras venustulum* (MERLA), 2014.11.3, lateral view, Kis-Teke Hill, Bed B5, Gradatus Zone, (D: 54, H: 20, W: 12, U: 19).
2. *Mouterdeiceras dubourgi* ELMI et RULLEAU morphotype *mavigliai* (PELOSIO), 2014.19.1, lateral view, Pisznice, Bed 107, Bingmanni Subzone, (D: 130, H: 30, W: 20, U: 75).
3. *Denckmannia robusta* (DENCKMANN), 2014.16.1, ventral view, (lateral view on Plate 3: 3).
4a–b. *Mouterdeiceras dubourgi* ELMI et RULLEAU, 2014.18.1, ventral and lateral views, Kis-Gerecse, Bed 62, Bingmanni Subzone, (D: 114, H: 30, W: 21, U: 60).

1. *Furloceras venustulum* (MERLA), 2014.11.3, laterális nézet, Kis-Teke-hegy, B5. réteg, Gradatus zóna, (D: 54, H: 20, W: 12, U: 19).
2. *Mouterdeiceras dubourgi* ELMI et RULLEAU morphotype *mavigliai* (PELOSIO), 2014.19.1, laterális nézet, Pisznice, 107. réteg, Bingmanni szubzóna, (D: 130, H: 30, W: 20, U: 75).
3. *Denckmannia robusta* (DENCKMANN), 2014.16.1, ventrális nézet (laterális nézet: 3. tábla: 3).
4a–b. *Mouterdeiceras dubourgi* ELMI et RULLEAU, 2014.18.1, ventrális és laterális nézet, Kis-Gerecse, 62. réteg, Bingmanni szubzóna, (D: 114, H: 30, W: 21, U: 60).


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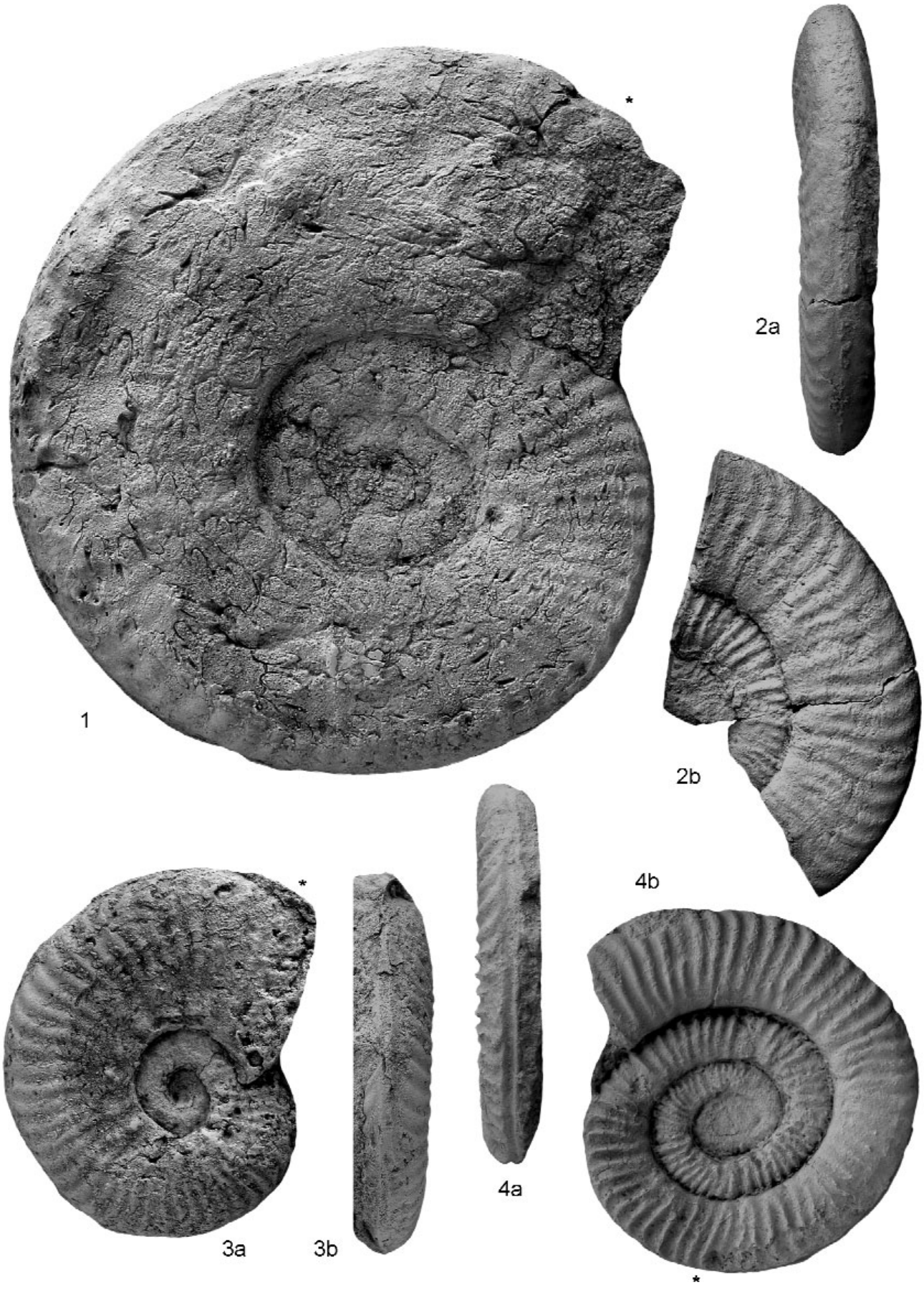
Plate V — V. tábla

1. *Haugia* cf. *phillipsi* (Simpson), 2014.23.1, lateral view, Bánya Hill Quarry, Gradatus Zone, (D: 147, H: 52, W: 26, U: 32) (coll: Z. Kovács).
2a–b. *Haugia* sp., 2014.24.1, ventral and lateral views, Kis-Gerecse, Bed 78, Clausus Subzone, (L: 87, H: 27, W: 16).
3a–b. *Haugia* cf. *variabilis* (d'Orbigny), 2014.22.1, lateral and ventral views, Bánya Hill Quarry, Gradatus Zone, (D: 73, H: 33, W: 18, U: 17) (coll: Z. Kovács).
4a–b. *Mouterdeiceras viticola* Elmi et Rulleau, 2014.21.1, ventral and lateral views, Bánya Hill, Bed 23, Bingmanni Subzone, (D: 73, H: 21, W: 12, U: 38).

1. *Haugia* cf. *phillipsi* (Simpson), 2014.23.1, laterális nézet, Bánya-hegy, Gradatus zóna, (D: 147, H: 52, W: 26, U: 32) (Gyűjtő: Kovács Z.).
2a–b. *Haugia* sp., 2014.24.1, ventrális és laterális nézet, Kis-Gerecse, 78. réteg, Clausus szubzóna, (L: 87, H: 27, W: 16).
3a–b. *Haugia* cf. *variabilis* (d'Orbigny), 2014.22.1, laterális és ventrális nézet, Bánya-hegy, Gradatus zóna, (D: 73, H: 33, W: 18, U: 17) (Gyűjtő: Kovács Z.).
4a–b. *Mouterdeiceras viticola* Elmi et Rulleau, 2014.21.1, ventrális és laterális nézet, Bánya-hegy, 23. réteg, Bingmanni szubzóna, (D: 73, H: 21, W: 12, U: 38).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