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Citation style: Bodrogi Ilona, Yazykova-Flidlider Elena A., Fogarasi Atilla, Baldi-Beke M. (2001). Revision of the Upper Cretaceous ammonite fauna of the Bakony Mountains (Hungary). "Acta Geologica Polonica" (2001, vol 51, No. 1, s. 93-99).

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Acta Geologica Polonica, Vol. 51 (2001), No. 1, pp. 93-99

Revision of the Upper Cretaceous ammonite fauna of the Bakony Mountains (Hungary).

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with contributions of
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ABSTRACT:

BODROGI, I. & YAZYKOVA-FLIDLIDER, E.A. 2001. Revision of the Upper Cretaceous ammonite fauna of the Bakony Mountains (Hungary). *Acta Geologica Polonica*, **51** (1), 93-99. Warszawa.

A revision of the ammonites from the Bakony Mountains (Hungary) based on collections of the Geological Institute of Hungary (MAFI) in Budapest, revealed the following sequence of faunas. The youngest Campanian ammonites from the South Bakony are three specimens of *Pachydiscus* (*P.*) *praecolligatus* COLLIGNON, 1955 from the Sümeg area; this is a typical Campanian species. Two specimens of former "Lower Maastrichtian *Pachydiscus neubergicus* (HAUER)" from Haraszt quarry have been re-determined as Early Campanian *Eupachydiscus levyi* (GROSSOUVRE, 1894). The fragmentary specimen of *Mortoniceras* sp. has been determined as *Texanites* (*Texanites*) sp. from the Upper Santonian. Two ammonite zones can be recognised for these sequences: *Texanites* sp. (Santonian) and *Eupachydiscus levyi* (Lower Campanian).

Key words: Upper Cretaceous, Santonian, Campanian, Ammonites, Hungary.

INTRODUCTION

For nearly twenty years there has been considerable debate about the Upper Cretaceous parastratigraphy of the Bakony Mountains, Hungary (Text-fig. 1), based on palynomorphs, foraminifera and nannoplankton (SIDÓ 1980, 1982; FÉLEGYHÁZY 1983, 1985; PARTÉNYI 1986; BODROGI 1993, 1995; BODROGI & *al.* 1995, 1996). Recent revision of the biostratigraphy of the Upper Cretaceous of the Bakony Mountains was based on foraminifers and nannoplankton. It has proven that Maastrichtian formations are absent in the area between Bakonyjákó and Sümeg. The stratigraphical extent of the marine succession is re-evaluated and considered to be Lower Santonian to Campanian (*G. calcarata* Zone), in contrast with the Upper Santonian to Upper Maastrichtian range determined from palynomorphs by F. GÓCZÁN (1973), BÓNA (in HAAS & *al.* 1984), F. GÓCZÁN & Á. SIEGL-FARKAS (1989) and A. SIEGL-FARKAS (1983, 1993, 1994). Since the beginning of the century (LÓCZY 1913) until the present day (HAAS & *al.* 1984, BERCZI-MAKK & *al.* 1996), the existence of Maastrichtian strata has been inferred from the occurrence of *Pachydiscus* (*P.*) *neubergicus* (HAUER) in the vicinity of Sümeg. These discrepancies point to the need for a revision of the ammonite fauna.

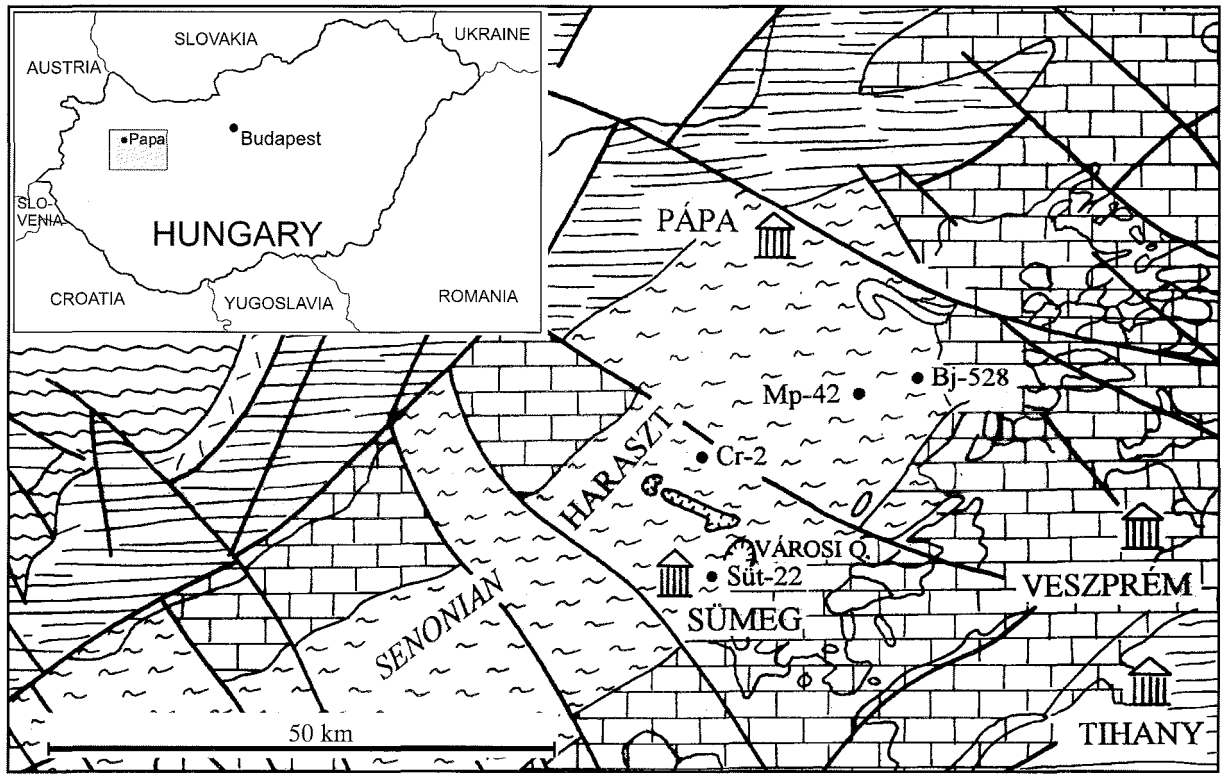

Fig. 1. Geological map (after TARI 1995) of the investigated area

The sedimentology, stratigraphy and correlation of the Upper Cretaceous sequences of the Bakony Mountains, based on the new data from ammonites, foraminifers and nannoplankton, have been recently published (BODROGI & *al.* 1997, 1998). We give here new data from the Sümeg Süt-22 borehole section (Text-fig. 2) and a revision of the ammonite collection.

All the ammonites were derived from the Rendek Member of the Polány Marl Formation, with the exception of *Placenticeras polyopsis* (DUJARDIN) that was derived from the Csingervolgy Member of the Jákó Marl. All the ammonites were re-determined (again, with the exception of *P. polyopsis*).

SÜMEG SÜT-22 BOREHOLE SECTION (TEXT-FIG. 2)

This borehole was drilled in the central part of the Sümeg Harazt area, near the Harazt and Városi quarries (Text-fig. 1). This is the type-section of Jákó Marl and Ajka Coal Formations in the Sümeg area. The 149,7 m thick Upper Cretaceous sequences were deposited over the Late Aptian Crinoidea Tata Limestone Formation and are overline by clastics.

The lithostratigraphy and subdivision of the borehole is as follows (*after* HAAS & *al.* 1984): Ajka Coal Formation (101,0 – 162,7 m), ?Coniacian – Lower Santonian; Jákó Marl Formation (38,5 – 101,0 m), Upper Santonian (Csingervolgy Member, 70,0 – 101,0 m, and Upper Member, 38,5 – 70,0 m); Polány Marl Formation (Rendek Member, 13,0 – 38,5 m), Upper Santonian – Lower Campanian.

For more detail lithological description of the units see HAAS & *al.* (1984). The pelitic marine intercalations in the upper part contain foraminifera (BODROGI 1995, unpublished) of Late Santonian age. The Rendek Member of the Polány Marl is interpreted as distal gravity mass flow deposits (HAAS 1981, HAAS & *al.* 1984, BÉRCZI-MAKK & *al.* 1996).

SYSTEMATIC PALEONTOLOGY

Order Ammonoidea ZITTEL, 1884
Suboder Ammonitina HYATT, 1889
Superfamily Desmoceratacea ZITTEL, 1895
Family Pachydiscidae SPATH, 1922

Genus *Pachydiscus* ZITTEL, 1884

TYPE SPECIES: *Ammonites neubergicus* HAUER (1858,

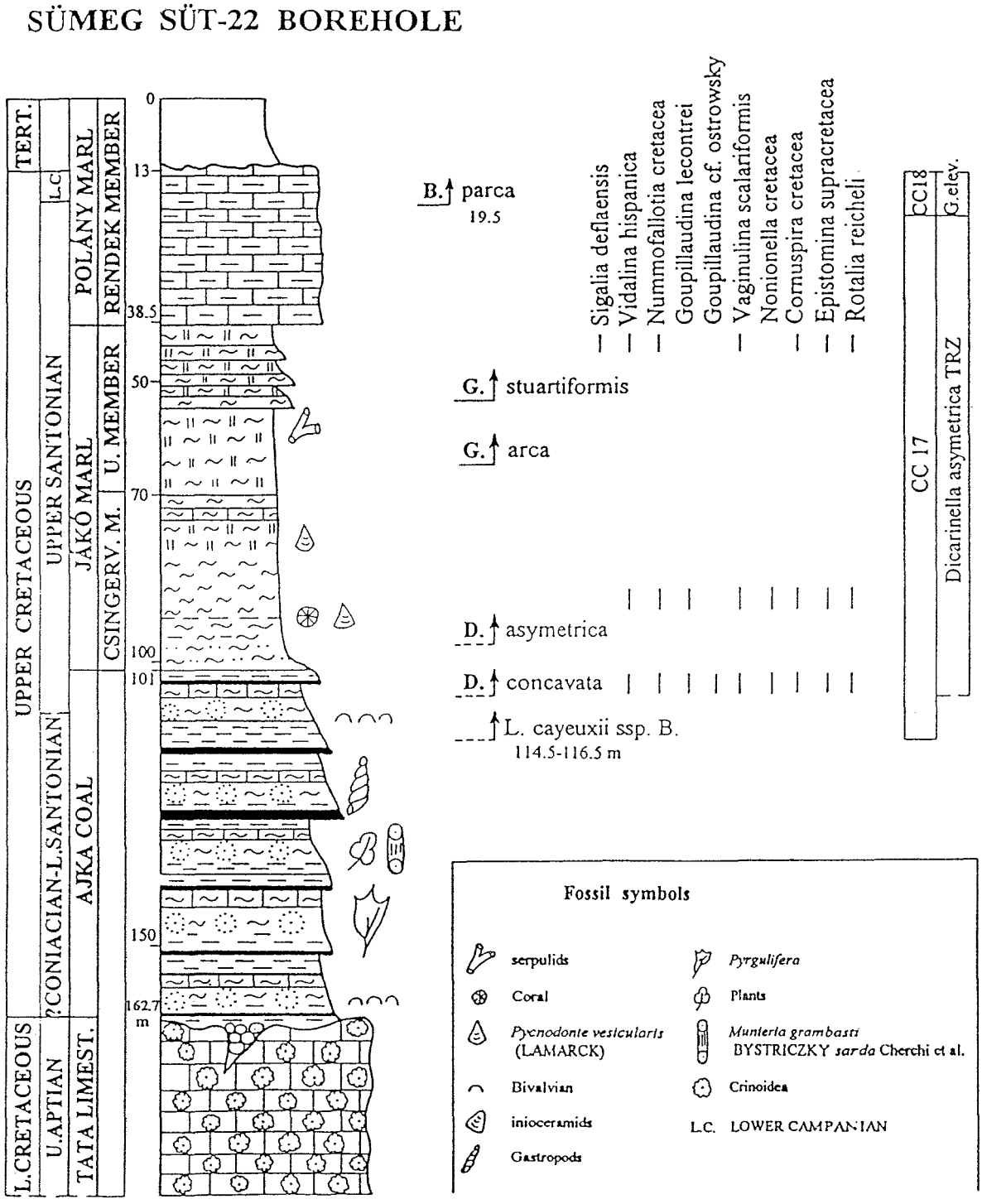

Fig. 2. Sümeg Süt-22 borehole section with foraminifera and nannoplankton events

p. 12, Pl. 2, Figs1-4, by subsequent designation of DE GROSSOUVRE, 1894, p. 177).

Pachydiscus (*Pachydiscus*) *praecolligatus* COLLIGNON, 1955
(Pls 2-3; Pl. 4, Fig. 1)

1952. *Pachydiscus praecolligatus*; COLLIGNON, p. 66, Pl. 21, Fig. 1; Pl. 25, Figs 2-3.
1955. *Pachydiscus praecolligatus;* COLLIGNON, p.64, Text-fig.19, Pl. 21, Fig.1; Pl. 25, Figs 2-3.
1970. *Pachydiscus precolligatus* COLLIGNON; COLLIGNON, p.40, Pl. 624, Fig. 2313.
1994. *Pachydiscus (Pachydiscus) precolligatus* COLLIGNON; WIEDMANN *in* GISCHLER & *al.*, p. 234, Pl. 43/6, 7; Fig. 16b.

HOLOTYPE: Designated by COLLIGNON (1952) *Pachydiscus praecolligatus*, p. 66, Pl. 21, Fig. 1(= 1955, p. 64, Fig. 19, Pl. 21, Fig. 1), Campanian, Madagascar.

MATERIAL: Three specimens, K-2728 and S-373 1a,b (two examples) from the Sümeg area, South Bakony, Hungary (Museum of the Hungarian Geological Institute - MAFI), collected by K. PAPP.

DESCRIPTION: Specimen K-2728 moderately well preserved internal mould; specimen S 373 1b worn and corroded; specimen S-373 1a fragmentary. Coiling moderately involute, involution reaching over 70% in some specimens; moderately compressed. Umbilicus comprising estimated 20-24% of diameter. Ventral side rounded. Whorl section broadly rounded to subtriangular, higher than wide. Whorl section with small number of blunt ribs and small tubercles.

OCCURRENCE: Campanian of Madagascar; Lower Campanian of Spain; the specimens from Hungary are Early Campanian in age (they were collected in Sümeg area, South-Bakony).

Genus *Eupachydiscus* SPATH, 1922

TYPE SPECIES: *Ammonites isculensis* REDTENBACHER, 1873; WRIGHT, 1957, p. L380.

Eupachydiscus levyi (GROUSSOUVRE, 1894)
(Pl. 4, Fig. 2; Pl. 5)

1894. *Pachydiscus levyi*; DE GROSSOUVRE, p. 178, Pl. 21; Pl. 30, Figs 1-2.
1922. *Eupachydiscus levyi* GROSSOUVRE; SPATH, p. 124.
1938. *Eupachydiscus levyi* GROSSOUVRE; COLLIGNON, p. 14, Text-fig. A; Pl. 3, Fig. 3.
1955. *Eupachydiscus levyi* GROSSOUVRE; COLLIGNON, p. 34, Fig. 5.
1977. *Eupachydiscus levyi* GROSSOUVRE; COLLIGNON, p. 30, Pl. 619, Fig. 2305.
1980. *Eupachydiscus levyi* GROSSOUVRE; BŁASZKIEWICZ, p. 41, Pl. 31, Figs 1-2.
1994. Eupachydiscus levyi (GROSSOUVRE); WIEDMANN *in* GISCHLER & *al.*, p. 236, Pl. 43, Figs 8-9.
1997. *Eupachydiscus levyi* (GROSSOUVRE); ATABEKIAN *in* ARKADEV & *al.*, p. 123, Pl. 48, Fig. 4; Pl. 49, Figs 1-3.
1998. *Eupachydiscus levyi* (GROSSOUVRE); KENNEDY & JAGT, p. 159, Pl. 4, Figs 1-3; Pl. 5, Figs 1-3; Pl. 6, Figs 3-4

HOLOTYPE: *Pachydiscus levyi* GROSSOUVRE, 1894, p. 178, Pl. 21, from Lower Campanian of Carriéres de Contes-les-Pins, the Alps.

MATERIAL: The two specimens (K-8645 and S-448) from the Sümeg area, South Bakony, Hungary (Museum of the Hungarian Geological Institute - MAFI), collected by J. NOSZKY.

DESCRIPTION: Both specimens well-preserved internal moulds. Medium to large size for genus. Semi-involute, involution[?] reaching over 70%, moderately compressed. Ventral side rounded. Whorl section oval and high, higher than wide. Umbilicus comprising estimated 30-34% of diameter; moderately narrow, shallow, with a low, steep wall. Ornament consisting of strong, coarse ribs. These pro-sinuos on flanks, primaries starting with umbilical tubercle near umbilical edge, 1-3 shorter secondary streams intercalated on flanks, all ribs crossing rounded venter with pronounced sinuosity (16 primary ribs corresponding to 36 external ribs per whorl).

DISCUSSION: These specimens are similar to the holotype, which has 14 primary and 36 external ribs per whorl.

OCCURRENCE: Lower Campanian of Europe, Crimea, Caucasus and Middle Asia; upper Lower Campanian of Madagascar. The Hungary specimens are from the Lower Campanian of the Sümeg area, South-Bakony.

Superfamily Hoplitaceae H.DOUVILLE, 1890
Family Placenticeratidae HYATT, 1900
Genus *Placenticeras* MEEK, 1870

TYPE SPECIES: *Ammonites placenta* DE KAY, 1828.

Placenticeras cf. *polyopsis* (DUJARDIN, 1837)
(Pl. 1, Fig. 2)

1837. *Ammonites polyopsis;* DUJARDIN, p. 237, Pl. 17, Fig. 12
1983. *Placenticeras polyopsis* (DUJARDIN); KENNEDY & WRIGHT, p. 856, Figs 1-4; Pls 86-88 (and synonymy).
1986. *Placenticeras polyopsis* (DUJARDIN); KENNEDY, Pl. 21, Figs 5-9.
1986. *Placenticeras polyopsis* (DUJARDIN); PARTÉNYI, p. 519, Figs 1-2.
1994. *Placenticeras polyopsis* (DUJARDIN); GISCHLER & *al.*, p. 238, Pl. 43, Figs 10-12.

LECTOTYPE: The original of DUJARDIN (1837, Pl. 17, Fig. 12) from Touraine, France; designated by KENNEDY and WRIGHT 1983, p. 856.

MATERIAL: One fragmentary specimen (K-14583) from the Sümeg area, South Bakony, Hungary (Museum of the Hungarian Geological Institute - MAFI).

DESCRIPTION: One fragmentary specimen (K-14583) from the Upper Santonian marls is referred to this species by SUMMESBERGER (PARTÉNYI 1986). Partial whorl with slightly convex sides and narrow venter; faint falcate ribs and umbilical tubercles.

OCCURRENCE: Lower and Middle Santonian of Spain; Upper Santonian of Germany, Austria, France, U.K. and North America.

Superfamily Acanthocerataceae GROSSOUVRE, 1894
Family Collignoniceratidae WRIGHT & WRIGHT, 1951
Subfamily Texanitinae COLLIGNON, 1984
Genus *Texanites* SPATH, 1932
Subgenus *Texanites* SPATH, 1932

TYPE SPECIES: *Ammonites texanus* ROEMER, 1852, (SPATH 1932).

Texanites (*Texanites*) sp.
(Pl. 1, Fig. 1)

MATERIAL: One fragmentary specimen (1983/2) of an internal mould from the Sümeg area, South Bakony, Hungary (Museum of the Hungarian Geological Institute - MAFI).

DESCRIPTION: Specimen referred to *Texanites* based on its generally compressed sides, high whorl section, narrow venter with entire keel and straight ribs having 4 equally spaced tubercles (umbilical, ventrolateral and 2 lateral).

OCCURRENCE: This specimen was collected from the Upper Santonian of the Sümeg area, South Bakony, Hungary. It is similar to *Texanites* (*Texanites*) *texanus* (ROEMER) from the Santonian of North America and North Africa.

CONCLUSIONS

1. Forms formerly identified as Maastrichtian *Pachydiscus* (*P.*) *neubergicus* (HAUER) (one specimen [?] collected by K. PAPP (Nr.K-2728) and 2 specimens collected by KOCSIS) are revised as Lower Campanian *Pachydiscus* (*P.*) *praecolligatus* COLLIGNON. The latter was described by COLLIGNON from the Campanian of Madagascar (COLLIGNON 1955, p. 64, Fig. 19, Pl. 21, Fig. 1). At present, this species is also known from the Lower Campanian of Spain (GISCHLER & *al.* 1994, p. 234, Pl. 43/6; Fig. 16B).

2. Another two specimens, that were also determined previously as Maastrichtian *Pachydiscus* (*P.*) *neubergicus*, are re-determined as the Lower Campanian *Eupachydiscus levyi* (GROSSOUVRE) (collected by KOCSIS – S-448 and another – by NOSZKY, K-8645). *Eupachydiscus levyi* was described by GROSSOUVRE from the Lower Campanian of Alps Mountains (GROSSOUVRE 1894, p. 178, Pl. 21). This species is also known from the Lower Campanian of Spain, France, Poland and Madagascar (COLLIGNON 1932, 1938, 1955, 1970; GISCHLER & *al.*, 1994).

3. One fragmentary specimen (1983/2), referred earlier to *Mortoniceras* sp. (BUDAI & VINCZE 1981, unpubl.), is determined here as *Texanites* sp., a view supported by SUMMESBERGER (pers. comm. 1995). [?]

4. Specimen K-14583 was determined as *Placenticeras polyopsis* (DUJARDIN) by H. SUMMESBERGER (PARTENYI 1986). We conclude that this specimen cannot be identified with confidence.

5. The revision of the Late Cretaceous ammonite fauna from the Sümeg-Csabrendek area demonstrate that the ammonite-bearing layers are Santonian to Campanian and not Maastrichtian, as previously thought (BODROGI & *al.* 1998). Two ammonite zones could be recognised for these sequences: the *Texanites* Zone in the Santonian, and the *Eupachydiscus levyi* Zone in the Lower Campanian.

Acknowledgements

The authors thank Director K. BREZSNYANSZKY, KORDOS and T. BUDAI (Budapest) for the material and support of this project. The sincere thanks are to Herbert Ch. KLINGER (Cape Town), W. James KENNEDY (Oxford), Jake M. HANCOCK (London), Herbert SUMMESBERGER (Wien) and Ashot A. ATABEKIAN (St.-Petersburg) for their help in ammonite revision. The authors offer their gratitude to I. WALASZCZYK (Warsaw) for helpful discussions and to J. CRAMPTON (New Zealand) for suggestions and linguistic correction markedly improving the final version of this paper.

The researches were supported by the Hungarian National Science Foundation (OTKA) Projects Nos. T 015783 and T 033234.

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Manuscript submitted: 10th January 2000
Revised version accepted: 10th October 2000

PLATE 1

1 – *Texanites* (*Texanites*) sp., N 1983/2; *Texanites* Zone, Upper Santonian, Hungary, South Bakony Mountains, Sümeg area

2 – *Placenticeras* cf. *polyopsis* (DUJARDIN), N K-14583; *Texanites* Zone, Upper Santonian, Hungary, South Bakony Mountains, Sümeg area

The scale bar is one centimeter

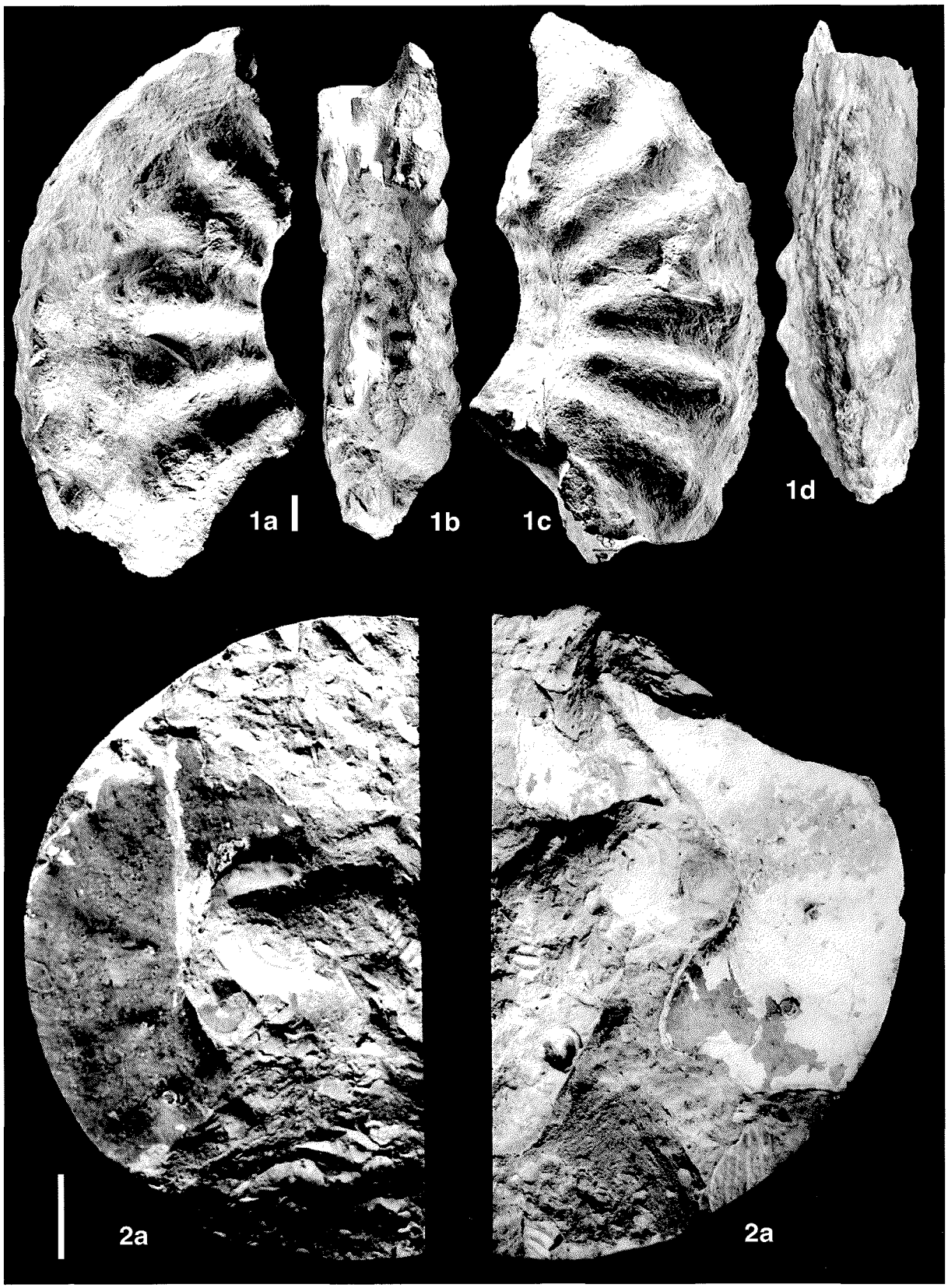
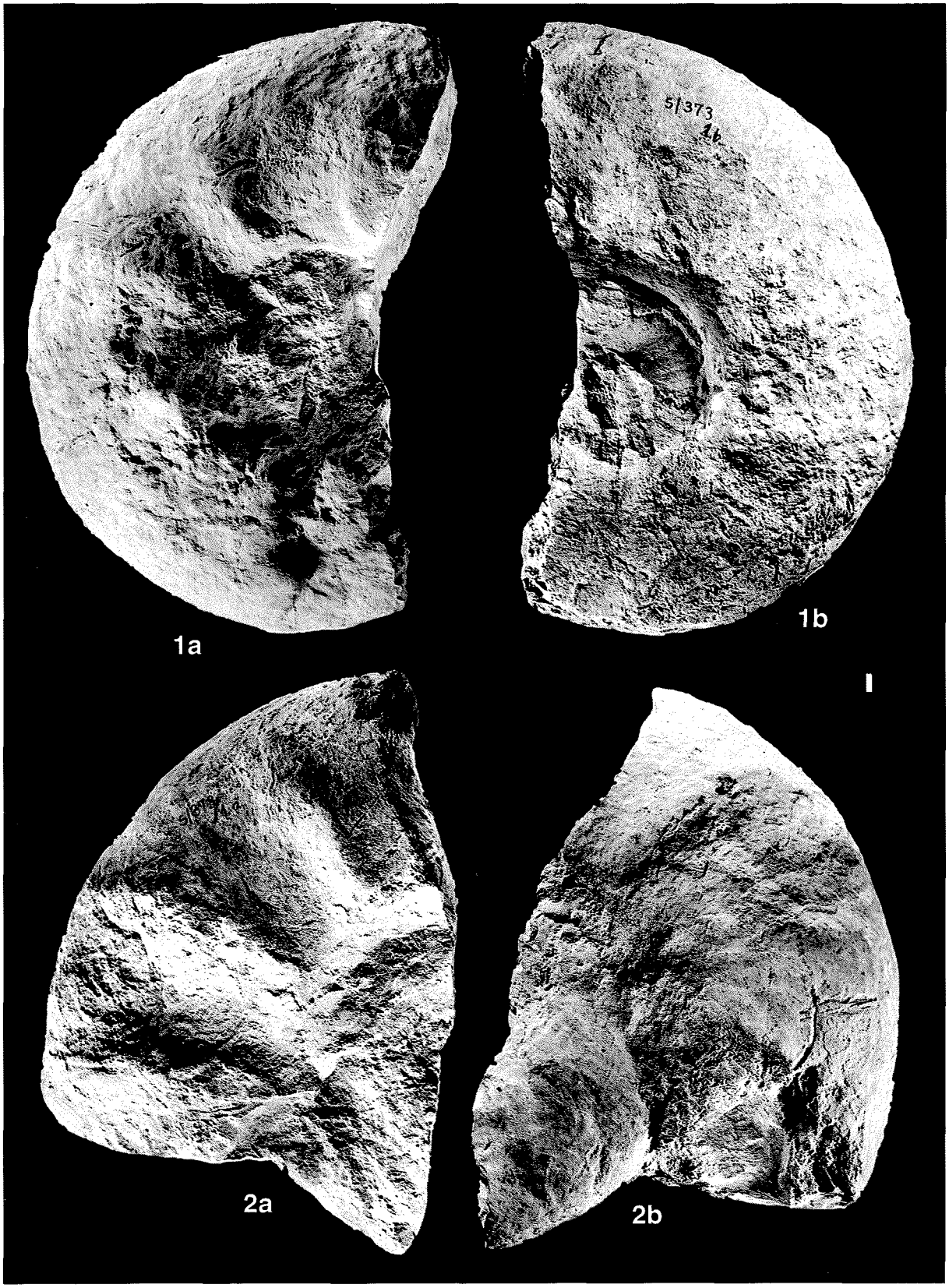

1a
1b
1c
1d
2a
2a

PLATE 2

Pachydiscus (*Pachydiscus*) *praecolligatus* COLLIGNON; *Eupachydiscus levyi* Zone, Lower Campanian, Hungary, South Bakony Mountains, Sümeg area; 1 – N S/373-1b, 2 – N S/373-1a.

The scale bar is one centimeter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1b
1a
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I
2a
2b

PLATE 3

Pachydiscus (*Pachydiscus*) *praecolligatus* COLLIGNON; *Eupachydiscus levyi* Zone, Lower Campanian, Hungary, South Bakony Mountains, Sümeg area; 1 – N S/373-1b, 2 – N S/373-1a, 3 - N K-2728.

The scale bar is one centimeter

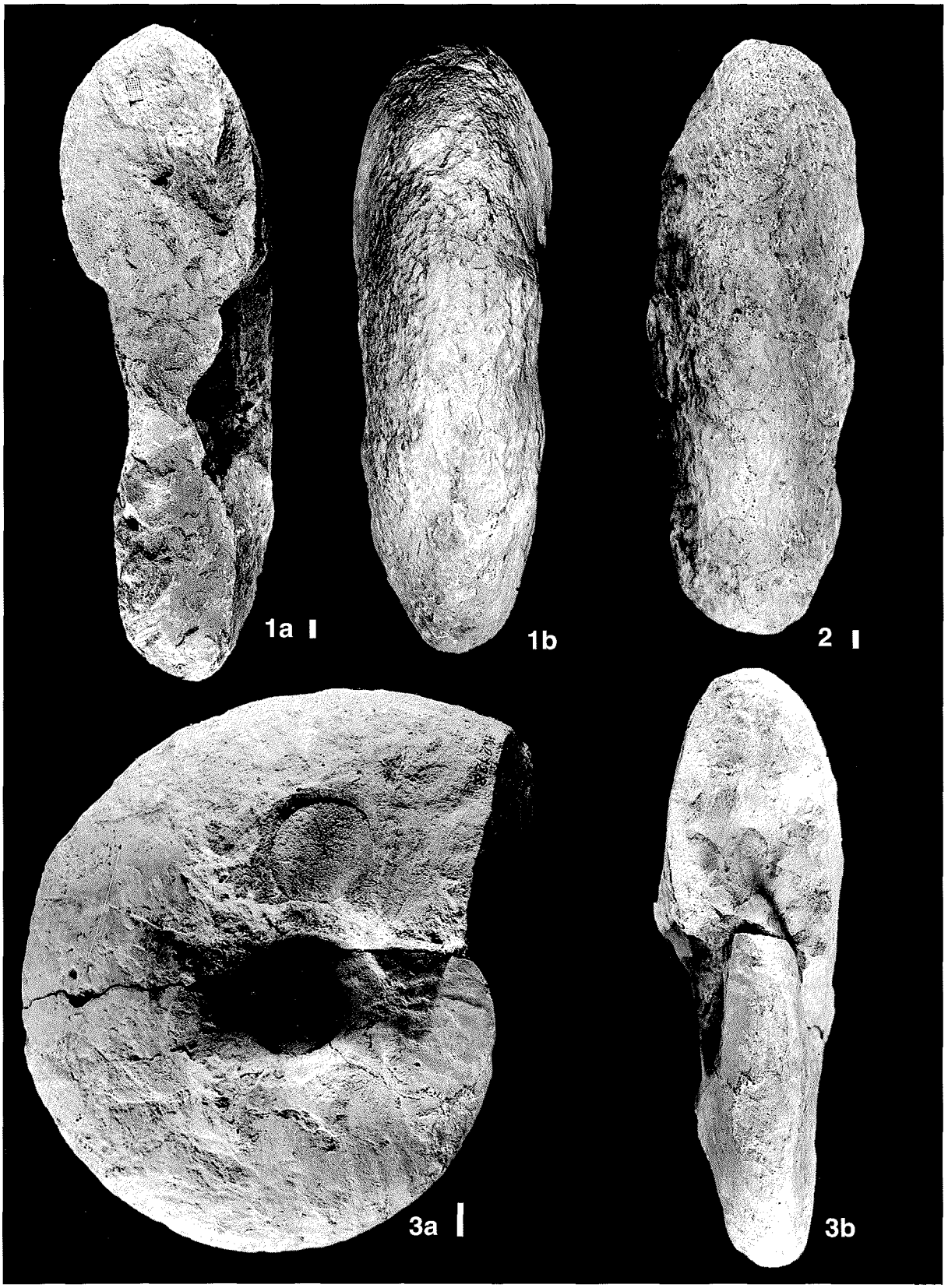

1a
1b
2
3a
3b

PLATE 4

1 – *Pachydiscus* (*Pachydiscus*) *praecolligatus* COLLIGNON, N K-2728; *Eupachydiscus levyi* Zone, Lower Campanian, Hungary, South Bakony Mountains, Sümeg area.

2 - *Eupachydiscus levyi* (GROSSOUVRE), N K-8645; *Eupachydiscus levyi* Zone, Hungary, South Bakony Mountains, Haraszt quarry, Sümeg area.

The scale bar is one centimeter

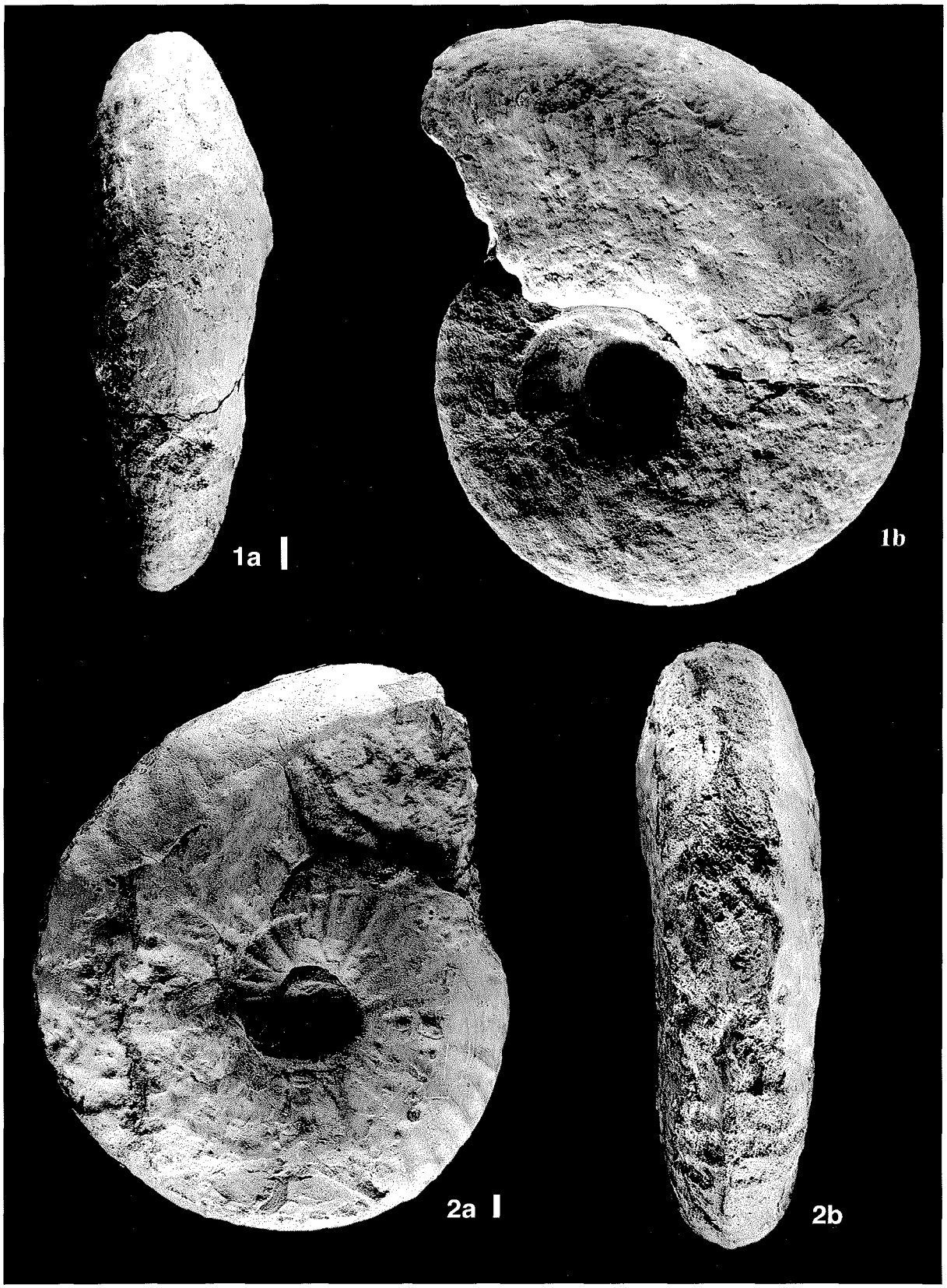
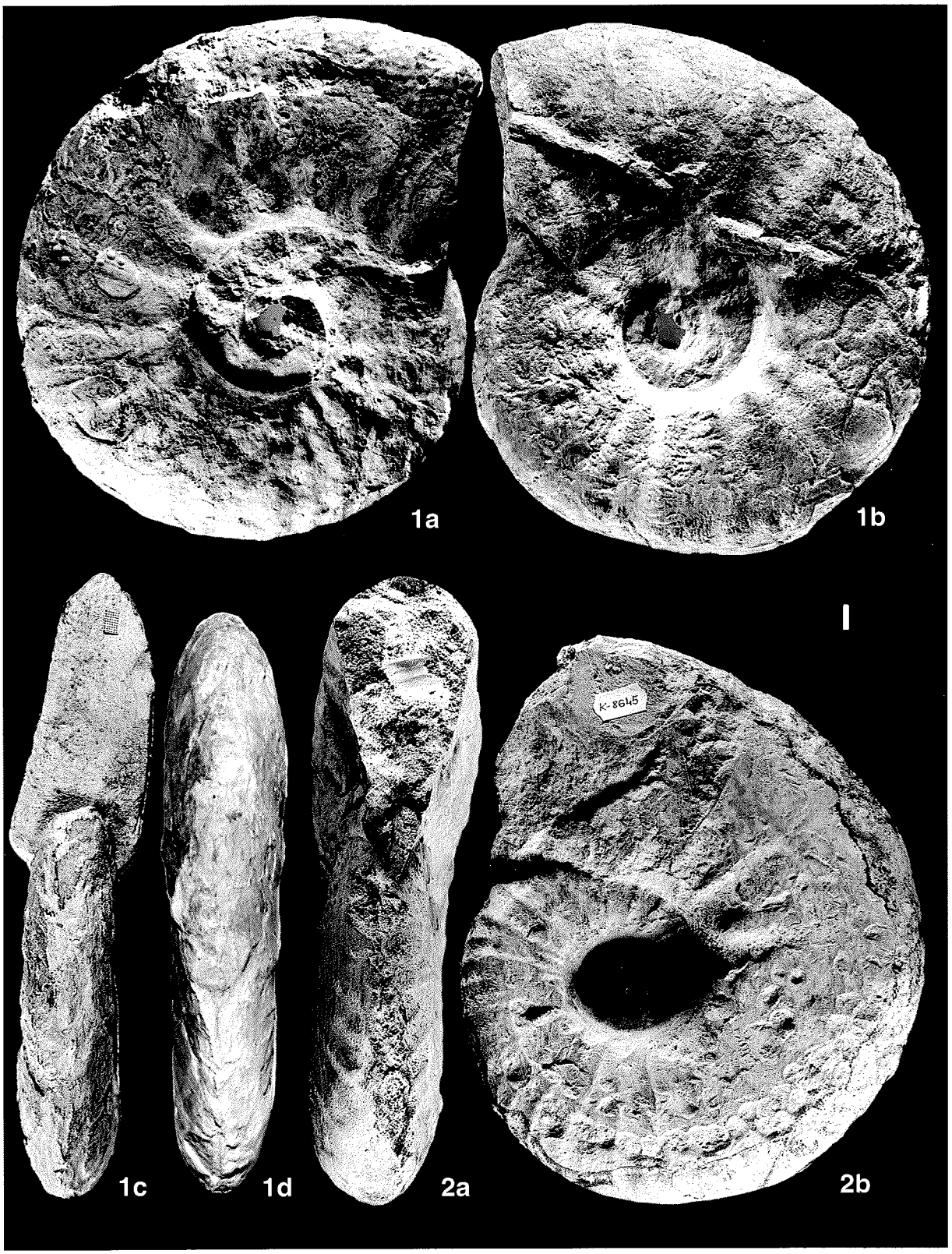

1a
1b
2a
2b

PLATE 5

Eupachydiscus levyi (GROSSOUVRE); *Eupachydiscus levyi* Zone, Hungary, South Bakony Mountains, Haraszt quarry, Sümeg area; 1 – N S-448; 2 – N K-8645.

The scale bar is one centimeter


1a
1b
1c
1d
2a
2b
K-8645