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Attila Vörös is currently the Head of Research Group for Paleontology of the Hungarian Academy of SciencesHungarian Natural History Museum, where he has been a curator of invertebrate palaeontology since 1970. University degrees (Eötvös Loránd University, Budapest): Dr. rer. nat. (M. Sc.) (1971) Habilitation (2000), Professor h. c. (2007). Academic degrees (Hungarian Academy of Sciences): C. Sc. (1985), D. Sc. (1997), Corresponding Member (2004). Currently he is Vice-President of the Section of the Earth Sciences of the Hungarian Academy of Sciences. He is Voting Member of the Subcommision on Triassic Stratigraphy (International Commission on Stratigraphy) and Honorary Member and Vice-President of the Hungarian Geological Society. His main fields of scientific interest are Mesozoic palaeontology, stratigraphy and palaeogeography.

The present volume is dedicated to the systematic description of the Pliensbachian brachiopod fauna of the Bakony Mountains. With 5705 identified brachiopod specimens, the fauna consists of 95 species belonging to 38 genera and thus, it is one of the most diverse among the Pliensbachian brachiopod faunas of the Mediterranean faunal province and probably of the world. The discovery of this exceptionally rich fauna is chiefly due to the very ambitious projects of J. Konda, director of the Geological Institute of Hungary in the 1960's, who initiated a voluminous and detailed collecting work that lasted for almost two decades and were focussed on the Jurassic of the Bakony Mountains. The fossils (ammonoids, brachiopods, bivalves and gastropods) were transferred to the Paleontological Department of the Eötvös University, Budapest, to B. Géczy who, in 1968, entrusted the present author to work on the then almost unknown, but promising Pliensbachian brachiopods. After some preliminary taxonomical results (Vörös 1970a, 1978, 1983a), the paleoecological, stratigraphical, and paleobiogeographical aspects of the fauna were published (Vörös 1970b, 1973, 1974, 1977, 1980, 1983b, 1986, 1987, 1988, 1993a, 1994, 2001) and some more general problems of adaptation, extinctions and diversity changes of the phylum Brachiopoda (Vörös 1993b, 1995, 2002, 2005) were also discussed, always with regard to the Bakony fauna. The full paleontological documentation of the Pliensbachian brachiopod fauna of the Bakony Mountains has been long awaited and now it is done.

The introductory part of the monograph contains a chapter on the stratigraphy and paleogeography of the Pliensbachian of the Bakony Mountains, including concise, illustrated descriptions of the sections, where the brachiopods have been collected from.

The main part is the systematic palaeontology of the fauna, consisting descriptions of 95 species belonging to 38 genera. Five of the genera and seven of the species are described here as new taxa. A remarkable feature of the taxonomic composition of the fauna is the complete absence of the "inarticulates" (Lingulida, Craniida), whereas all orders of the "articulates", i. e. the Rhynchonelliformea, which existed in the Jurassic, are profusely represented, with the exception of the Thecideida. The descriptions are illustrated with more than seventy drawings of transverse serial sections, and a dozen of hand drawings showing the reconstructed internal parts of dorsal valves. At the end, 29 photographic plates demonstrate the external features of the described brachiopod species.

The author wishes to express his sincere thanks to Prof. Barnabás Géczy for the continuous scientific support and the consistent encouragement to prepare this monograph. Many thanks are also due to those many colleagues, who have assisted me in various ways during the course of my work, whose names will not be listed here. The publication of the monograph was sponsored by the grant No. T43341 of the Hungarian National Research Fund (OTKA). Essential financial and technical support was given by the Geological Institute of Hungary whose kind permission for publishing this monograph as a volume of the Geologica Hungarica series is much appreciated. Special thanks are due to O. Piros and D. Simonyi for the careful editing and computer graphic work.

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Diverse Pliensbachian brachiopods in red limestone, from the locality Fenyveskút (Lókút)

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Contents

Introduction

One of the most important peaks of diversity in the history of the Mesozoic brachiopods is recorded in the Early Jurassic, including the Pliensbachian. A comprehensive compilation on Jurassic brachiopods by ALMÉRAS (1964) shows that the number of brachiopod species per ages increases from the Hettangian (80) to the Pliensbachian (490), drops to 120 in the Toarcian and never reaches again the high species diversity of the Pliensbachian. This secondary flourishing of the phylum appeared a little earlier in the Mediterranean province of the Tethys (DULAI 2001, VÖRÖS & DULAI 2007), but the stratigraphical importance of the widespread and rich Pliensbachian brachiopod faunas was recognized and manifested by the historical usage of the "Strati a *Terebratula Aspasia*" by the classical Italian authors (GEMMELLARO 1874, CANAVARI 1880a).

Our detailed research, carried out in the last decades, documented that one of the most diverse Pliensbachian brachiopod faunas is found in the Bakony Mountains (Hungary). The discovery of this exceptionally rich fauna is chiefly due to the very ambitious projects of J. KONDA, director of the Geological Institute of Hungary in the 1960's, who initiated a voluminous and detailed collecting work that lasted for almost two decades and were focussed on the Jurassic of the Bakony Mountains. Several dozens of artificial trenches were excavated on the vegetation- and soil-covered hillsides, and bed-by-bed collection of fossils was made by well-trained teams, involving the palaeontologists. The greatly increased stratigraphical knowledge and the enormous amount of fossils served as a firm basis for the palaeontological studies of the next decades. The majority of fossils (ammonoids, brachiopods, bivalves and gastropods) was transferred to the Palaeontological Department of the Eötvös University, Budapest. The extremely rich ammonoid faunas were studied by B. GÉCZY who, in 1968, entrusted me to work on the then almost unknown, but promising Pliensbachian brachiopods. The fauna, consisting of more than 6000 specimens, proved to be extremely diverse: the approximately one hundred species represent most of the major orders of the phylum Brachiopoda, existing in the Early Jurassic, except the Lingulida, Craniida and Thecideida. After some preliminary taxonomical results (VÖRÖS 1970a, 1978, 1983a), the palaeoecological, stratigraphical, and palaeobiogeographical aspects of the fauna were published (VÖRÖS 1970b, 1973, 1974, 1977, 1980, 1983b, 1986, 1987, 1988, 1993a, 1994, 2001) and some more general problems of adaptation, extinctions and diversity changes of the phylum Brachiopoda (VÖRÖS 1993b, 1995, 2002, 2005) were also discussed, always with regard to the Bakony fauna. The full palaeontological documentation of the Pliensbachian brachiopod fauna of the Bakony Mountains has been long overdue. The present volume is dedicated to the systematic description of the fauna, with an introduction to the stratigraphy.

Acknowledgements

First of all, I want to express my sincere thanks to Prof. Barnabás GÉCZY who was my teacher, not only at the University but also later; he always supported my progress in science and he suggested (and even forced) me to work on the Pliensbachian brachiopods of the Bakony Mountains, and consistently encouraged me to prepare this monograph.

Thanks are due to the late Dr. József KONDA, former director of the Geological Institute of Hungary, who organized the voluminous collecting work in the Jurassic of the Bakony Mountains, and supported the study of the fossils providing the basis of the present monograph.

Special thanks are also due to those who have assisted me in various ways during the course of my work. I am greatly indebted to the late Prof. Derek AGER who encouraged and helped me in many ways; though he has never taught me officially, I regard myself as a student of him: the wide scope and the brilliant ideas characterizing his works have essentially influenced my way of thinking. Prof. András GALÁCZ, my schoolmate and office-mate for years, and co-author in many papers, greatly improved my approach to scientific problems; he was a good companion in the field in Hungary and abroad. I am indebted to my younger colleagues (Drs. J. SZABÓ, M. KÁZMÉR, I. FŐZY, J. PÁLFY, I. SZENTE, A. DULAI) for advices and valuable discussions. The manifold technical assistance of Dr. Gy. PITTER is gratefully acknowledged. Some of the serial sections have been prepared by A. DULAI; the brachiopod photographs have been taken by Á. MAROSFALVI, K. BABÁK and E. HANKÓ. In database management and digitalizing M. BOSNAKOFF and E. HANKÓ helped me very much; their effort is deeply acknowledged. The manuscript was critically rewieved by A. DULAI; the introductory part of the text was kindly read by J. PÁLFY; their useful comments and advices significantly improved the present work.

I am grateful to Prof. L. KORDOS (Geological Museum, Geological Institute of Hungary, Budapest), Drs. H. LOBITZER and F. STOJASPAL (Geologische Bundesanstalt, Wien), the late Dr. R. FÖRSTER (Bayerische Staatssammlung, München), Dr. H. RIEBER (Paläontologisches Institut und Museum, Universität Zürich), Prof. G. PAVIA (Università di Torino), Dr. G. PINNA (Università di Milano), Dr. L. ALTICHIERI (Università di Padova), Prof. W. LANDINI (Università di Pisa), Dr. R. MANNI (Università di Roma), Profs B. D'ARGENIO and E. TADDEI RUGGIERO (Università di Napoli), Prof. R. CATALANO and Dr. L. GATTO (Università di Palermo), Prof. F. LENTINI (Università di Catania), Dr. E. S. TKHORZHEVSKY (Kharkov University) and Dr. S. LONG (Natural History Museum, London) for access to the collections in their charge and occasional loaning of specimens.

The final part of the research and the publication of the monograph was sponsored by the grant No. T43341 of the Hungarian National Research Fund (OTKA). Essential financial and technical support was given by the Geological Institute of Hungary whose kind permission for publishing this monograph as a volume of the Geologica Hungarica series is much appreciated. Special thanks are due to O. PIROS, D. SIMONYI and A. PENTELÉNYI for the careful editing and computer graphic work.

Previous research

The history of the knowledge on Early Jurassic (Liassic) brachiopods of the Bakony Mountains begins, just as in so many fields of the geology of Hungary, with the French scientist BEUDANT (1822). In the course of his pioneering "voyage" across Hungary in 1818, he gave a geological sketch of the Bakony Mountains and noticed small, sharply ribbed "terebratules" in the Jurassic red crinoidal limestones in the southern part of the Bakony (BEUDANT 1822, vol. 2, pp. 432 and 435.).

The next author to mention Liassic brachiopods from the Bakony Mountains is the Hungarian Benedictine monk, F. RÓMER (1860). In his book devoted to the archaeological finds of the region, he wrote with high enthusiasm about the "[red marble … with terebratulas of exceptional beauty]" which he obtained by "[…hammering the blocks of stones to bits, beneath the shady trees]". RÓMER (1860) mentioned Jurassic brachiopods from Fenyőfő, Kőris-hegy and from the surroundings of Olaszfalu.

The first list of Liassic brachiopod species was published by PAUL (1862) who made geological mapping for the Geological Institute of Vienna. The five brachiopod species collected from the Kőris-hegy were known from the classical Hierlatz fauna and point to a Sinemurian age.

The monograph of BÖCKH (1874) was a milestone in the progressing knowledge on the Jurassic of the Bakony Mountains. This was the first comprehensive geological description of the area (commissioned by the independent Geological Institute of Hungary), with a rich palaeontological documentation. The 16 Liassic brachiopod species (12 of them as new), described and figured on lithographic plates, came from the Lower Liassic (mainly from the Sinemurian), but the faunal lists included the representatives of the Pliensbachian brachiopods "*Terebratula aspasia*" and "*Terebratula adnethica*" from Szentgál and Úrkút (BÖCKH 1874, pp. 25, 28.). Hence, BÖCKH's monograph is, in fact, the starting point in the history of research of the Pliensbachian brachiopods of the Bakony Mountains.

Here, it is worth making a short detour to the field of Sinemurian brachiopods. After the impressive start (BÖCKH 1874), the research on the Sinemurian of the Bakony Mountains went on efficiently: KOCH (1875) reported on a rich fauna from Kőris-hegy, Szépalmapuszta and Kardosrét; later, ORMÓS (1937) published the detailed description and photographic documentation of 47 brachiopod species from Kék-hegy. Recently the research got new impetus: the detailed and comprehensive works by DULAI (1990, 1992, 2002, 2003) raised the knowledge of the Sinemurian brachiopods of the Bakony Mountains to a high international standard.

As for the Pliensbachian brachiopods, the next, although poorly documented, step was made by the renowned fossil hunter and excellent amateur geologist, D. LACZKÓ (1898) who collected numerous brachiopods from "Hierlatz and Adnet facies" south of Lókút (Mohoskő, at that time also called Szögle). The fossils were identified by LÓCZY (1898) who mentioned 43 brachiopod species, without listing the names. Luckily, I traced this material (or at least a part of it) in the Geological Museum of the Geological Institute of Hungary. In the few dozens of specimens, I was able to identify 15 Pliensbachian brachiopod species (besides 4 Sinemurian and 2 Bajocian ones).

Very little progress was made in the next decades. "*Rhynchonella piccininii*" was reported by VADÁSZ (1909) from Szentgál, "*Pygope aspasia*" by NOSZKY (1943) from Hárskút (Közöskúti-árok), then "*Terebratula (Pygope) adnethensis*" by NOSZKY (1945) from the slope of Papod, but figures were not given. Surprisingly, the first illustration of a Pliensbachian brachiopod from the Bakony Mountains is credited to TASNÁDI KUBACSKA (1962, pp. 74–78) who, in his book on palaeopathology, figured some aberrant specimens of "*Pygope adnethensis*" from Lókút and Eplény.

In the explanatory notes to the 1:200 000 geological map sheet of Veszprém, the knowledge on the Jurassic of the Bakony Mountains was summarized by NOSZKY (1972) (the manuscript was accepted in 1969). Although NOSZKY mentioned that the Pliensbachian brachiopod fauna is very diverse, he listed only five species: "*Rhynchonella piccininii*", "*Terebratula punctata*", "*T. adnethensis*", "*Glossothyris aspasia*" and "*Waldheimia* ? *rotzoana*".

In the meantime, a decisive change in the research of the Jurassic brachiopods (and of the Jurassic of the Bakony in general) started at the middle of the 1960's. In the course of a very ambitious project to enlarge the knowledge on the Jurassic stratigraphy of the Bakony, stimulated and managed by Dr. J. KONDA, then the director of the Geological Institute of Hungary, new excavations and fossil collection were carried out. The extremely rich Pliensbachian fauna (mainly ammonoids, but also brachiopods, bivalves and gastropods) was forwarded to the Palaeontological Department of the Eötvös University (Budapest) for a detailed study. The ammonoids have been determined and evaluated by Prof. B. GÉCZY who, at the same time, entrusted me with the study of brachiopods. The results of these brachiopod studies are summarized in the present monograph.

The Pliensbachian Stage in the Bakony Mountains

Stratigraphy and palaeogeography

The chronostratigraphy of the Pliensbachian of the Bakony Mountains is based on the detailed ammonoid biostratigraphy developed by GÉCZY (1971a, b, 1972a, 1974, 1976, 1982) which was partly refined by DOMMERGUES et al. (1983) and GÉCZY & MEISTER (1998) (Table 1).

The lithostratigraphical subdivision of the various Pliensbachian sedimentary rocks of the Bakony Mountains will be outlined and discussed in the next section, devoted to the sedimentary environments.

Apart from local differences in the sedimentary environment, the Jurassic System of the Bakony Mountains is characterized by undisturbed, relatively deep water deposition, therefore the Pliensbachian Stage is not delimited by true sequence stratigraphical boundaries (Fig. 1). Where they are present, the Pliensbachian sediments develop continuously from the Sinemurian ones. The upper boundary is usually well-marked by a general hiatus, or abrupt change in the lithology; this is due to the onset of the Early Toarcian anoxic event (JENKYNS 1988, JENKYNS et al. 1991, VAN DE SCHOOTBRUGGE et al. 2005).

The general features of the Jurassic sedimentary evolution of the Bakony Mountains were outlined by GALÁCZ & VÖRÖS (1972), GALÁCZ (1988) and VÖRÖS & GALÁCZ (1998), a detailed study focussed on the Pliensbachian sedimentary environments was published by VÖRÖS (1986).

The Jurassic sedimentation started with a major facies change: the breakup of the former wide carbonate platform which dominated the latest Triassic palaeogeography. This tectonic disintegration and subsidence produced a pattern of relatively shallow and deep depositional sites and this bottom topography influenced significantly the sedimentation processes for most of the Jurassic. Two types of sedimentary successions appeared: continuous sequences ("basinal

Table 1. The Substages and zonal subdivision of the Pliensbachian Stage in the Bakony Mountains (after GÉCZY 1976 and GÉCZY & MEISTER 1998)

Stages	Substages	Ammonoid Zones
PLIENSBACHIAN	**Upper Pliensbachian (Domerian)**	Spinatum Zone
		Margaritatus Zone*
	Lower Pliensbachian (Carixian)	Davoei Zone
		Ibex Zone
		Jamesoni Zone

*In GÉCZY's earlier works the lower part of the Margaritatus Zone was referred to as a separate Stokesi Zone.

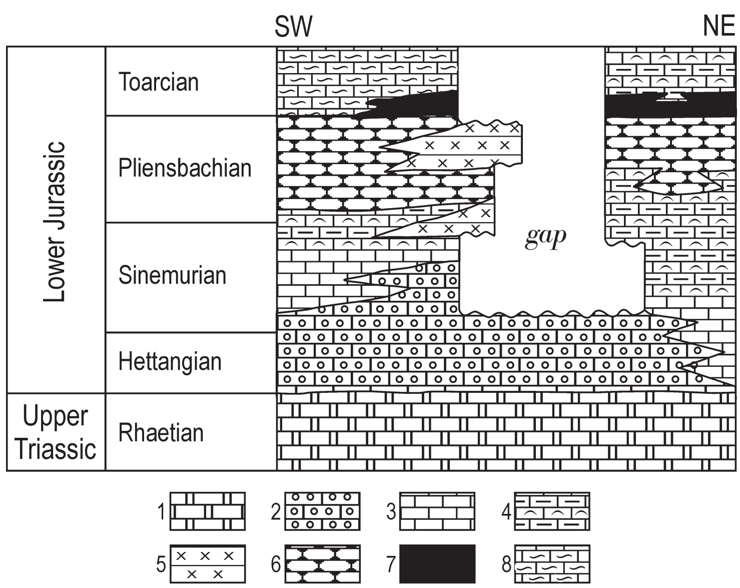


Figure 1. Chrono- and lithostratigraphical scheme of the Lower Jurassic formations of the Bakony Mountains. Legend: 1: Dachstein Limestone, 2: Kardosrét Limestone, 3: Pisznice Limestone, 4: Isztimér Formation (Sinemurian, Pliensbachian) and Eplény Formation (Toarcian), 5: Hierlatz Limestone, 6: Tűzkövesárok Limestone, 7: Úrkút Formation (black shale, Mn-ore), 8: Kisgerecse Formation (Modified from VÖRÖS & GALÁCZ 1998)

sequences”), and successions with repeated hiatuses (“condensed sequences”, i.e. successions deposited on submarine topographic highs).

The Pliensbachian was an interval when the basement topography of bottom elevations and intervening deeper basins was very pronounced (Fig. 2). This pattern can be explained by differential subsidence of blocks bounded by normal faults, because significant angular disconformity was never found anywhere between the top of the carbonate platform and the overlying beds.

The tops of the submarine highs are characterized by rather incomplete red nodular limestone sequences interrupted by hard-grounds which suggest non-deposition, submarine erosion or sediment removal; the overall thickness is no more than one metre. Near the margins of the horsts the blocks are deeply penetrated by neptunian dykes which are filled with material otherwise swept away (i.e. into the deeper basins) by currents. The fissure-filling materials are usually pink or red crinoidal limestones with benthonic fauna: brachiopods, gastropods, bivalves, etc.

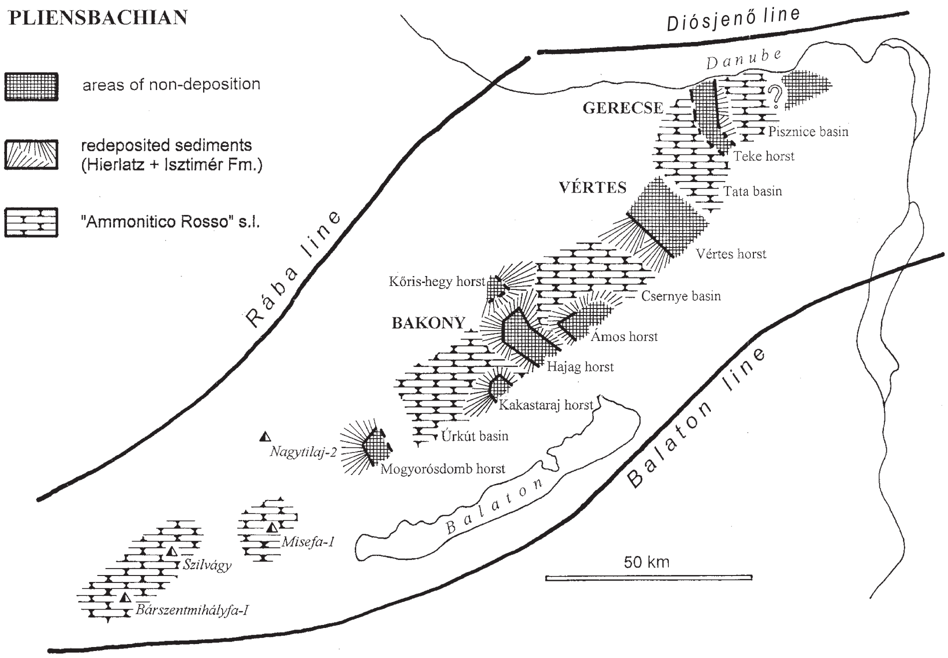


Figure 2. Palaeogeography of the Transdanubian Range in the Pliensbachian. The “horst and basin” pattern prevails. (Redrawn after VÖRÖS & GALÁCZ 1998)

In the basinal areas different types of biocalcarenites and allodapic limestones accumulated, sometimes with evidences of redeposition (e.g. gradation, current-related cross-bedding, see GALÁCZ & VÖRÖS 1989). A characteristic rock-type is the coarse-grained brachiopodal-crinoidal limestone (Hierlatz Limestone, see VÖRÖS 1991), which was deposited near the submarine fault zones, sometimes as the matrix of scarp breccias (e.g. in Kericser, GÉCZY 1971b). Toward the inner parts of the basins the crinoidal limestone becomes finer grained, then interfingers with well-bedded grey or pink cherty limestone (Isztimér Formation) and, more distally, with mostly nodular red limestone of “Rosso Ammonitico” type (Tűzkövesárok Formation). (See the next section for further details.) The thickness of the Pliensbachian part of these successions varies between 5 and 20 m.

The uneven bottom topography remained the main control on deposition for the whole Jurassic, and even during the Early Cretaceous in the Transdanubian Range. The surface area of the topographic highs became smaller in time, thus the maximum areal distribution of submarine highs can be traced in the Pliensbachian. Most topographic highs shown in Fig. 2 were identified by incomplete and condensed sequences, but some (e.g. the Kőris-hegy horst) were inferred from the occurrence and distribution of proximal coarse biocalcarenites.

The Jurassic (including the Pliensbachian) sedimentary facies and evolution of the Bakony Mountains bear similarities to those of some South and East Alpine areas. A combined model for the tectono-sedimentary evolution of the Bakony Mountains and the central segment of the Southern Alps was developed by VÖRÖS & GALÁCZ (1998) (Fig. 3).

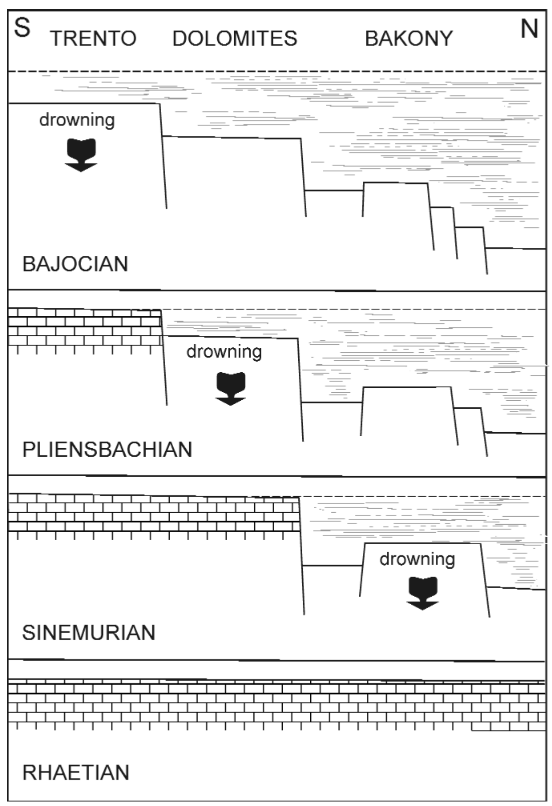


Figure 3. The main steps of the Jurassic palaeotectonic evolution of the continental margin along a south–north transect from Trento to Bakony. The South Alpine and the Transdanubian territories are envisaged as forming a continuous palaeogeographic domain in the Early Mesozoic. Brick pattern: active carbonate platform, dashed line: sea level. (Redrawn after VÖRÖS & GALÁCZ 1998)

Sedimentary environments

Several authors discussed the sedimentological and facies aspects of the Jurassic of the Bakony Mountains but detailed studies (mainly on the basis of microfacies) were published only by GÉCZY (1961), SZABÓ-DRUBINA (1962) and more comprehensively by KONDA (1970). Based on these studies and on my own experience in the field and laboratory, I outlined a more or less coherent picture of the Pliensbachian palaeogeography and sedimentary environments of the Bakony Mountains (VÖRÖS 1986). This model served as a basis of the palaeoecological evaluation of the Pliensbachian brachiopod fauna and was developed into a wider synthesis on the Jurassic tectono-sedimentary evolution of the Transdanubian Range (GALÁCZ 1988, VÖRÖS 1989, VÖRÖS & GALÁCZ 1998).

The various limestones occurring in the Pliensbachian of the Bakony Mountains are classified into five main types. The five lithologies correspond to five sedimentary environments which differed both in their depth and in their distance from the submarine horsts.

Lithologies

(A) Red, micritic, manganiferous limestones

In the fine-grained carbonate matrix shells or skeletal fragments of brachiopods, ammonoids, echinoderms and gastropods, rarely bivalves and solitary corals appear, usually stained or encrusted by ferro-manganese oxides. Mn-oxide nodules and crusts are frequent. The rock is massive or thick-bedded; it occurs in condensed, discontinuous sequences or in neptunian dykes. Its boundaries to the under- and overlying formations are sharp; frequently hardgrounds develop on these and on the internal bedding surfaces.

In thin sections the rock is a biomicrite with packstone or wackestone texture. In the micritic matrix ammonoid, brachiopod and echinoid skeletal debris, benthonic forams, small ammonoids and gastropods and Mn-oxide coated extraclasts and intraclasts are recorded. Most of the biogenic particles show traces of bioerosion. The original aragonitic shell material (e. g. of ammonoids) was dissolved during early diagenesis and the voids were filled with internal micrite sediment and/or secondary spar (Fig. 4).

Depositional environment: This rock type and this kind of reduced sequences are frequent in many other areas in the Mediterranean Jurassic; these are regarded as characteristic formations of submarine highs (WENDT 1970, BERNOULLI & JENKYNS 1974, BÖHM et al. 1999, DI STEFANO et al. 2002). This interpretation was also accepted for the Bakony localities (GALÁCZ & VÖRÖS 1972, VÖRÖS & GALÁCZ 1998). The fragmentation of the shell material, the extra- and intraclasts and the sedimentary gaps are due to increased current activity and bioerosion on the tops of the submarine highs. Among bioero-

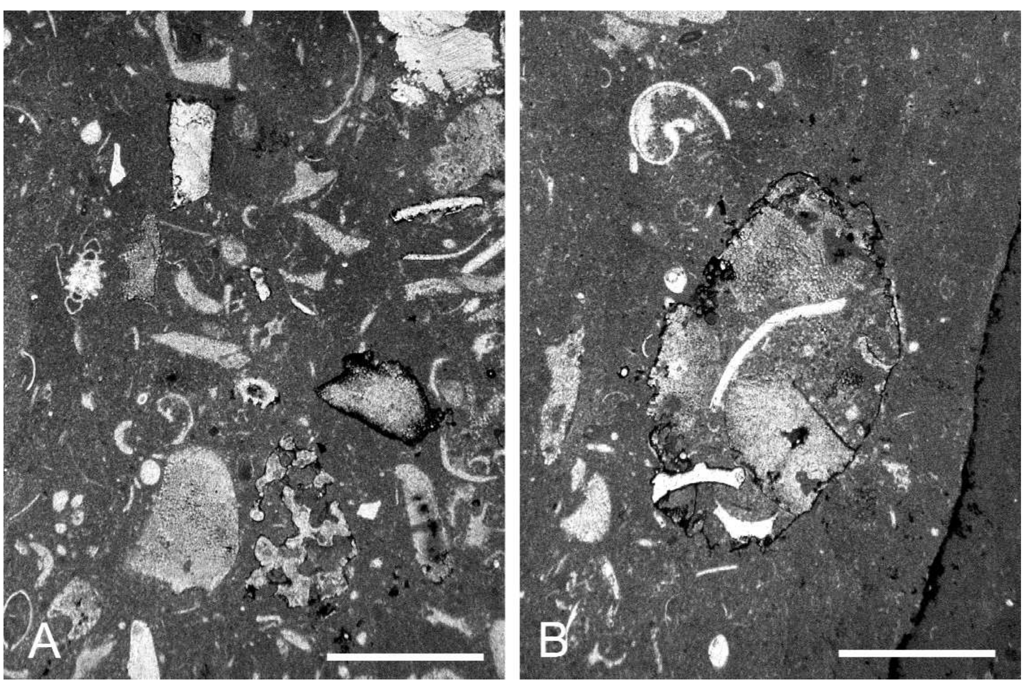
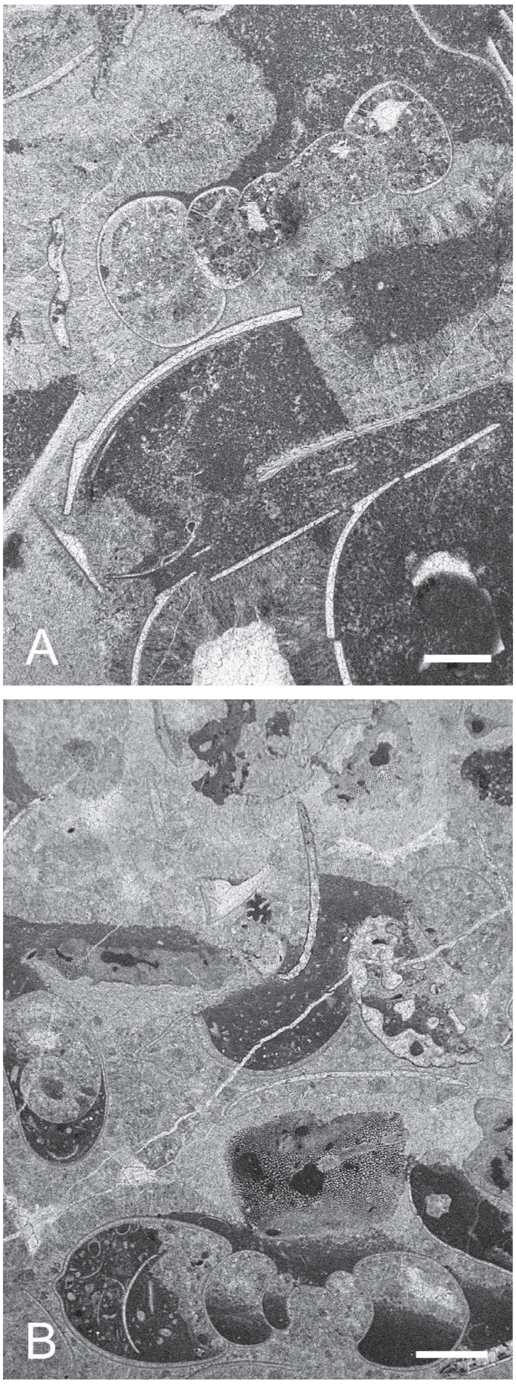


***Figure 4**. Lithology (A): red, micritic, manganiferous limestone. **A:** biomicrite of wackestone texture. Note the heavily bioeroded bioclasts (lower right corner); Ostracode double valve and *Involutina liassica* on the left. Közöskút. **B:** biomicrite of mudstone texture with bioeroded intraclast in the centre. Közöskút. Scale bar = 0.1 mm

sional traces, algal borings occur only sporadically in the Pliensbachian of the Bakony (VÖRÖS 1973a) thus the top of the submarine horsts were probably below the euphotic zone (i. e. more than 100 m below sea level) where the ferro-manganese crusts grew as deep-water stromatolites (BÖHM & BRACHERT 1993).

Lithostratigraphy: The attribution of this rock type to one of the formations distinguished in the Pliensbachian of the Bakony is debated. On the basis of mass occurrence of brachiopods and other fossils, earlier authors (e. g. KONDA 1970, p. 192) assigned it to the Hierlatz Limestone, but the micritic matrix and the complete lack of the sparry calcite cement strongly contradict to this. Later, by its red colour, micritic matrix, and mostly regular bedding, this lithology was included to the Tűzkövesárok Formation; however, the latter, as a "Rosso Ammonitico" facies, is typically nodular, clayey and lacks the mass occurrence of fossils (except ammonoids). Recently, an informal lithostratigraphic name, the Répásárok Member of the Tűzkövesárok Formation was suggested for this rock type (I. FŐZY, pers. comm.).

Occurrence: Lower Pliensbachian: Szentgál, Gombáspuszta (sections Fg–I, Fg–II, Fg–IV), Szentgál, Tűzköves-hegy (sections T–I, T–II, T–III), Kisnyerges (Kisnyerges-árok), Közöskút (Közöskúti-árok); Upper Pliensbachian: Eplény (Manganese-ore mine).



(B) Hierlatz-type limestones

This rock is made up mainly of ammonoid and brachiopod shells, locally crinoids, and is cemented by sparry calcite. Gastropods and bivalves occur subordinately. Red, pink or yellow micritic void-fillings and geopetal structures are frequent; locally micrite matrix may prevail over sparite. All these provide the rock with a peculiar variegated appearance. Extraclasts from older Jurassic rocks occur, sometimes in masses, as scarp breccias. Manganese-oxide stainings or crusts are rare on the shell fragments and extraclasts. The rock forms massive or thick-bedded sequences of several metres in thickness; scarp breccias prevail at the base. The underlying surface is uneven or is dissected by fissures; the overlying beds usually develop gradually and follow continuously. Hierlatz-type limestones also occur as neptunian dykes deeply penetrating the underlying massive limestones.

In thin section the rock is a biosparite or biomicrite with grainstone or packstone texture. Sometimes almost intact ammonoid and brachiopod shells predominate but echinoderms (mainly crinoid ossicles) and benthonic smaller forams are also abundant. Ostracods, sponge spicules, fragments of solitary corals and calcareous sponges occur sporadically. Some of the skeletal fagments and extraclasts are bioeroded. At least two generations of cement can be observed. The first one is void-lining radial-fibrous carbonate, cementing the grains; the second generation is void-filling, rhombohedral, blocky calcite. Micrite infiltrations precede and sometimes succeed the first generation of cement. All these early diagenetic features point to very rapid submarine lithification (Fig. 5).

Depositional environment: According to the sedimentary model developed by VÖRÖS (1991), the Hierlatz limestone is a specific "by-pass margin" deposit associated with submarine rocky slopes. The submerged carbonate platform was disintegrated along fault scarps. Fissures opening from time to time in response to extensional tectonics acted as traps, accumulating the skeletal debris and lime mud swept there, as well as the skeletons of organisms that lived on the rocky wall of the fissures. The other, more extensive site of deposition of the Hierlatz limestone was at the foot of the submarine escarp-

Figure 5. Lithology (B): Hierlatz-type limestone. **A:** Coarse-grained biosparite with micritic infillings; grainstone-packstone. Note the ammonoid, other molluscan and brachiopod shells, partly with traces of bioerosion, and the great amount of early cement, in the form of void-lining fibrous spar. Papod (locality C). **B:** Coarse-grained biosparite with micritic geopetal structures; grainstone. The ammonoid and other molluscan shells, echinoid and coral(?) skeletal elements, partly with traces of bioerosion are cemented by prevalent early spar. Kericser, Bed 20. Scale bar = 0.1 mm

ments. Here it forms coarsely bedded talus-like accumulations, often associated with scarp breccias. At the same time, tectonic movements produced fresh, barren rock surfaces and triggered rock avalanches, spreading talus blocks around the escarpments. This sudden increase in the available rock surface area greatly enhanced the growth of benthonic communities (brachiopods, crinoids, etc.). Another factor, possibly related to rejuvenation of tectonic movements, may be the activity of submarine cold seeps carrying nutrients to the starving environment and supporting chemosynthetically-based communities (Vörös 1995).

The local occurrence of algal borings (Vörös 1973a) proves that the submarine horsts reached up to the euphotic zone, thus the depth of deposition of the different types of the Hierlatz limestone might have had a wide range from one hundred to several hundred metres.

Lithostratigraphy: The Hungarian Commission on Stratigraphy has not introduced a local name for this formation, instead, the official Austrian name "Hierlatz Formation" is applied.

Occurrence: Lower and Upper Pliensbachian: Kericser, Papod (A, B, C), (grab samples 81, 82, 84, 86, 87), Mohoskő (grab sample 85); Upper Pliensbachian: Fenyveskút.

(C) Red or yellow crinoidal limestones

The echinoderm coquina contains a few brachiopods and very scarce ammonoids and gastropods. The skeletal elements have a size range from few microns (fragments) to centimetres (crinoid calyces and echinoid spines). The bedding is variable from massive to thick-bedded or platy; intercalations with other lithologies are common. Cross-bedding occurs rarely; silicification is prevalent. The rock forms continuous and relatively thick (tens of metres) sequences generally with gradual transition from the underlying and to the overlying formations.

In thin section it is a biosparite with a grainstone texture. Besides the prevalent echinoderm skeletal material, the rock contains brachiopod and mollusc shell fragments, sponge spicules, and a few ostracods and foraminifers. Biomicrite intraclasts occur frequently. The intragranular spaces, as it is usual in crinoidal limestones, are filled with syntaxial rim cement (Fig. 6).

Depositional environment: Redeposited crinoidal limestones interbedded with basinal limestones or marls are widespread and well-known in the Mediterranean Lower Jurassic. These are interpreted as turbidites or fluxoturbidites, depending on their sedimentological features and the size of the sedimentary bodies (Bernoulli & Jenkyns 1970, Jenkyns 1971, Kälin & Trümpy 1977, Catalano & D'Argenio 1983, Böhm 1992), or gravity flows generated by storm events (Jach 2005). In the Pliensbachian of the Bakony graded bedding is rare and the basinal crinoidal limestone bodies cannot be traced farther than 2 km in distance from the submarine highs. Thus, they are not true turbidites but the term fluxoturbidite may be applied to them. The massive, homogeneous crinoidal limestones correspond to the proximal parts of the fluxoturbidites, whereas the thinner interbeds in more basinal sediments represent the distal parts. "Contour" currents might spread the finer debris over larger areas. The depth of deposition is estimated as several hundreds of metres.

Lithostratigraphy: This rock type belongs definitely to the Isztimér Formation which comprises also the more distal, sponge spiculitic and cherty facies.

Occurrence: Városlőd, Kopasz-hegy, Határ-árok, Lókút, Lókúti-domb (only the uppermost beds), Kőris-hegy (A) (grab samples 1, 3), Kőris-hegy (B) (grab samples 4, 5).

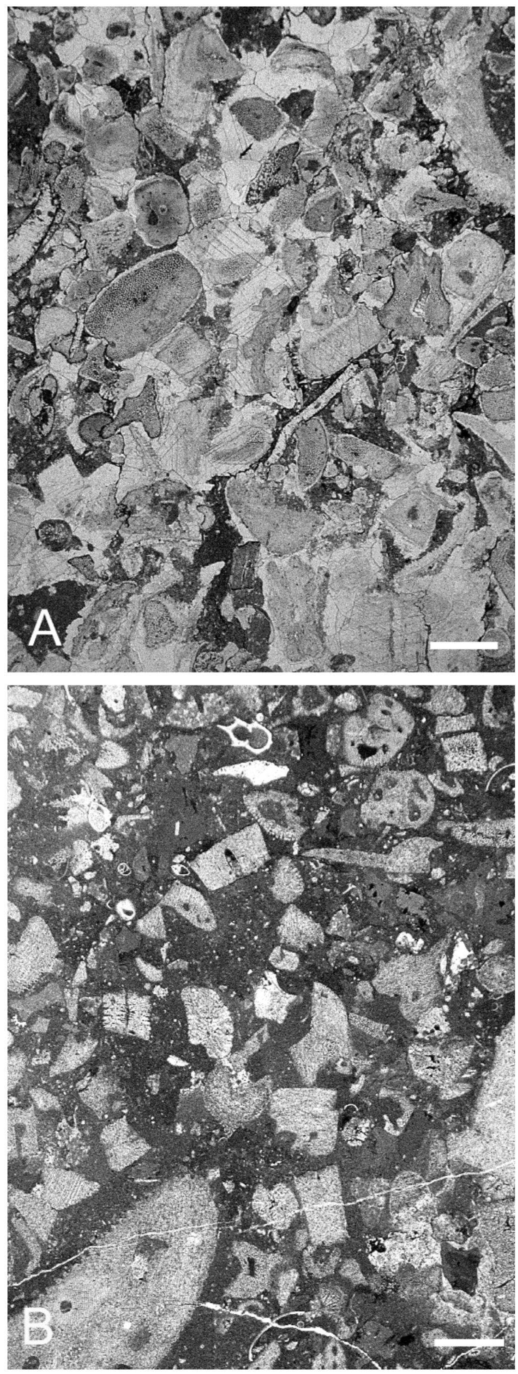


Figure 6. Lithology (C): crinoidal limestone. **A:** medium sorted crinoidal biosparite; grainstone. The syntaxial rim cement is predominant; the remaining spaces are filled with micrite. Mohoskő. **B:** poorly sorted crinoidal biomicrite; packstone. Besides the partly bioeroded echinoid skeletal elements, foraminifers and ostracods appear also. Kőris-hegy (locality A). Scale bar = 0.1 mm

(D) Grey or pink spiculitic cherty limestones

This fine-grained limestone shows nodular or wavy bedding; its rare fossils are ammonoids, brachiopods, scarce gastropods and bivalves. Calcitic shells (e. g. brachiopods) are commonly replaced by silica. Chert nodules and lenses are widespread and they are often dark grey or dark brown in contrast to the light colour of the host rock. In some sequences the chert appears as thick and coherent beds and may prevail over the limestone ("limy chert"). This lithology occurs in relatively thick (several tens of metres) and continuous sequences; it may be intercalated with crinoidal limestones and/or nodular red limestones ("Rosso Ammonitico").

In thin section the limestone is a biomicrite (biomicrosparite) with packstone or wackestone texture. The most abundant grains are the sponge spicules, but echinoderm fragments, benthonic forams and ostracods also occur. The original siliceous material of the sponge spicules is commonly dissolved and replaced by calcite (Fig. 7).

Depositional environment: The Lower Jurassic cherty limestone series known from other Alpine or Mediterranean areas have been interpreted as allodapic sequences deposited in deeper basins within carbonate platforms or between submarine

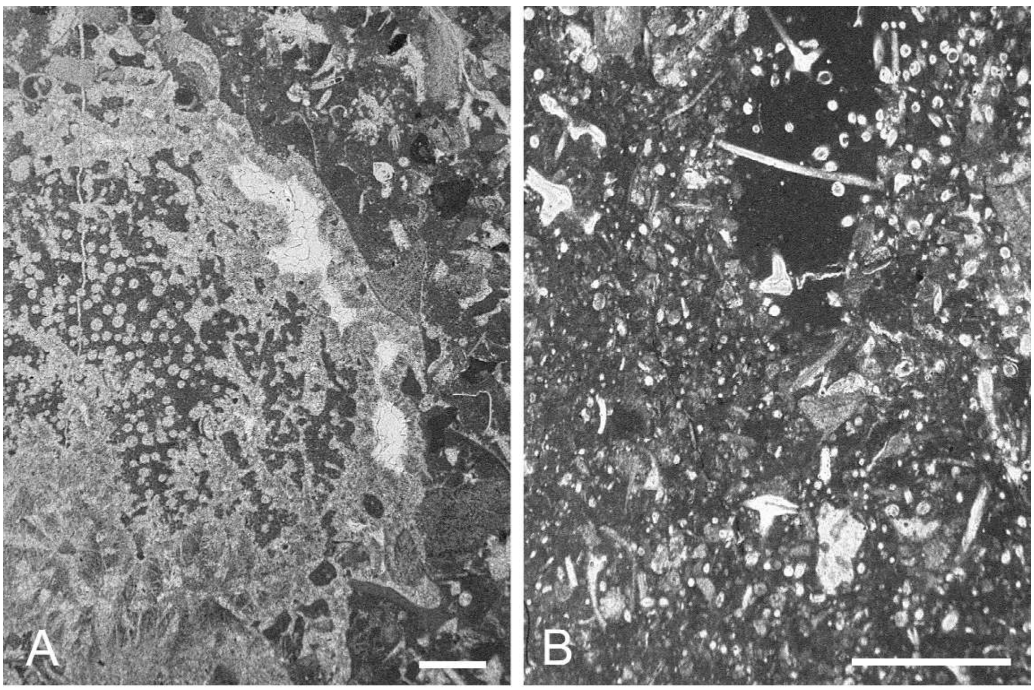


Figure 7. Lithology (D): spiculitic, cherty limestone. **A:** poorly sorted biomicrite with packstone to boundstone texture. The complex structure on the left is interpreted as a coherent sponge skeleton. Kőris-hegy (locality B). **B:** well-sorted biomicrite to biomicrosparite; wackestone texture with a mass of disarticulated siliceous sponge spicules. Lókút (Spinatum Zone). Scale bar = 0.1 mm

plateaus (Bernoulli 1964, Bernoulli & Jenkyns 1970, Tollmann 1976). The chert was formed in the course of the diagenesis by mobilization of the material of siliceous sponge spicules. The spicules were redeposited from shallower areas (Lackschewitz et al. 1991, Böhm 1992, and recent analogy in Roux et al. 1991), but some sponges might have lived even in the basins (Jach 2005). The depth of deposition could have been several hundred metres.

Lithostratigraphy: This rock type is the typical representative of the Isztimér Formation, which, however, includes also the bedded crinoidal members.

Occurrence: Középhát, Büdöskút, Lókút, Lókúti-domb, Bocskor-hegy.

(E) Red, nodular ammonite limestones ("Rosso Ammonitico")

This fine-grained limestone has a nodular or flaser-bedding with clayey interlaminations and coatings around the nodules. The most common fossils are ammonoids and other cephalopods (nautilids, belemnoids, *Atractites*); brachiopods are subordinate, bivalves and gastropods are rare. This rock type occurs in continuous sequences, underlain, as a rule, by spiculitic cherty limestones; interfingering between these two lithologies are common.

In thin section it is a biomicrite with wackestone or mudstone texture. Ammonite shell fragments, embryonic ammonoids and small benthonic foraminifers are the most abundant skeletal grains (Fig. 8).

Depositional environment: The "Rosso Ammonitico" is a well-known and characteristic, but, with regards to its depth and mode of deposition, a very debated formation of the Mediterranean Jurassic (Hallam 1975). Classical palaeogeographical studies reached in widely different conclusions (fewer than hundred metres: Wendt 1970, Sturani 1971,

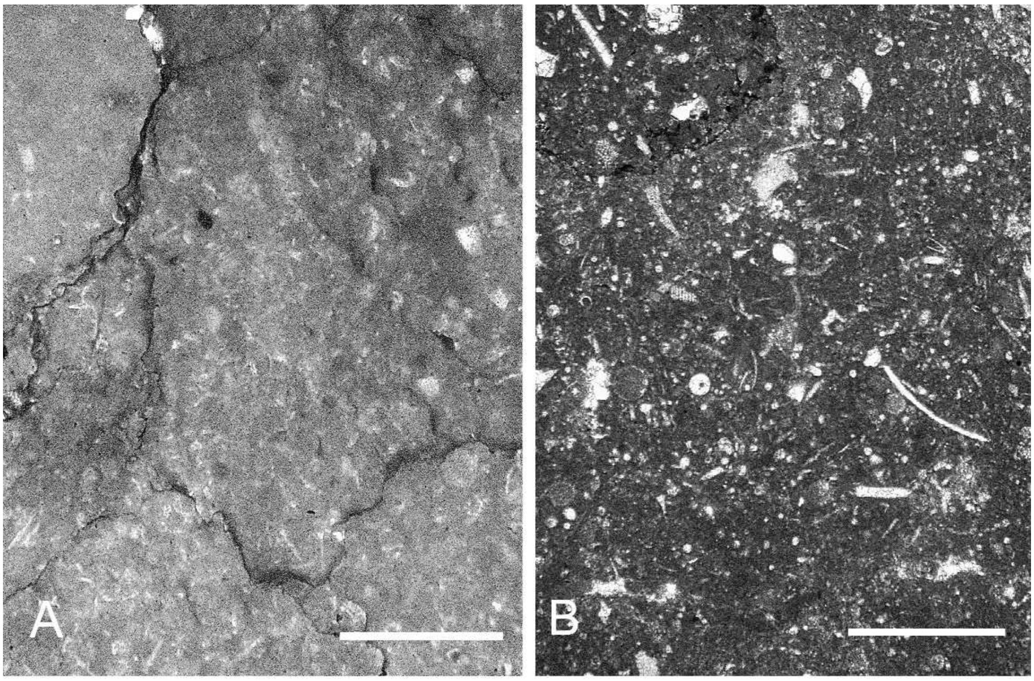


Figure 8. Lithology (E): nodular ammonitic limestone. **A:** biomicrite with mudstone texture. Note the stylolithic clay seams around the incipient limestone nodules. Lókút, Bed 458. **B:** biomicrite with mudstone to wackestone texture. Frequent biogenic elements are molluscan fragments, foraminifers and "ghosts" of radiolarians. Hamuháza, Bed 4. Scale bar = 0.1 mm

MASSARI 1979, vs. several thousand metres: GARRISON & FISCHER 1969). This strongly suggests a too much generalized interpretation; in fact, not all limestones are typical "Rosso Ammonitico" which are red and nodular. The Alpine "Rosso Ammonitico" has always deposited on submerged carbonate platforms, i. e. on thinned continental crust; for isostatic reasons, these areas might not subside to several thousand metres depth. Therefore, in prudent palaeogeographical syntheses the depositional depth of the "Rosso Ammonitico" was estimated between 800 and 1100 m (WINTERER & BOSELLINI 1981, BERTOTTI et al. 1993), or 200 to 800 m (BÖHM 1992). The nodular structure of the limestone may be partly due to bioturbation (FÜRSICH 1973, DOMMERGUES et al. 1981), partly to diagenetic processes (JENKYNS 1974) or a combination of the two (CLARI & MARTIRE 1996). In the Pliensbachian of the Bakony, the geographical distribution and the intercalations show that this lithology has been formed in the basins, farthest from the submarine highs but not necessarily deeper than the spiculitic cherty limestones. This "Rosso Ammonitico" appears to have been deposited in such places and periods where and when the allodapic material has not influenced the sedimentation.

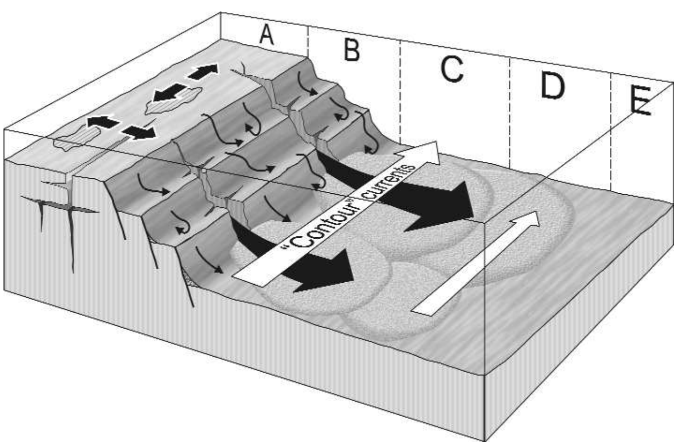


Figure 9. Depositional model showing the sedimentary environments and the spatial relationships of the five main lithological types recognized in the Pliensbachian of the Bakony. A: top of submarine high, B: escarpment and foot of submarine high, C: transition to basin, D and E: basin interior, black arrows: sediment transport by water movements and gravitation, light arrows: bottom currents. (Modified and redrawn after VÖRÖS 1986, 1989)

Lithostratigraphy: In the Bakony, this rock-type is typical of the Tűzkövesárok Formation.

Occurrence: Lókút (only the middle part of the Pliensbachian portion of the section), Hamuháza, Bakonycsernye (Tűzköves-árok).

Interpretation

Fig. 9. summarises the depositional environments and the spatial relationships of the five lithologies described above. The physiographic domains, corresponding to different depositional environments, are the following: (A) top of submarine high; (B) escarpment and foot of submarine high; (C) transition to basin; (D and E) basin interior. This physiographic picture was the effect of the drowning and tectonic dissection of the Late Triassic to Hettangian "Dachsteinkalk" carbonate platform. The resulted steep rocky escarpments along the repeatedly active fault zones were fundamental elements of the sedimentary and biotic environments.

Analogous models have been developed for many areas of the Alpine–Mediterranean Jurassic, where the sedimentation took place on submarine highs and intervening basins and was strongly influenced by fault zones and submarine escarpments (Colacicchi & Pialli 1971, Bernoulli & Jenkyns 1974, Winterer & Bosellini 1981, Böhm 1992, Santantonio 1993, Di Stefano et al. 2002). The role of (partly rotational) block faulting which resulted in neptunian dykes and megabreccias were particularly emphasized (Wendt 1971, Trift & Graciansky 1988, Lackschewitz et al. 1991, Mišík & Sýkora 1993, Longhitano et al. 1995, Böhm et al. 1995) and hints to Early Jurassic submarine vent activity along fault zones were also reported (Polgári et al. 2004, Jach 2005). These analogies support the validity of the model developed for the Pliensbachian of the Bakony.

Sections and localities

Pliensbachian brachiopods have been collected from more than 30 sections and localities of the Bakony Mountains. After lumping some less significant and closely spaced grab sampling points, 25 sections and localities are listed below, and plotted on the locality map (Fig. 10).

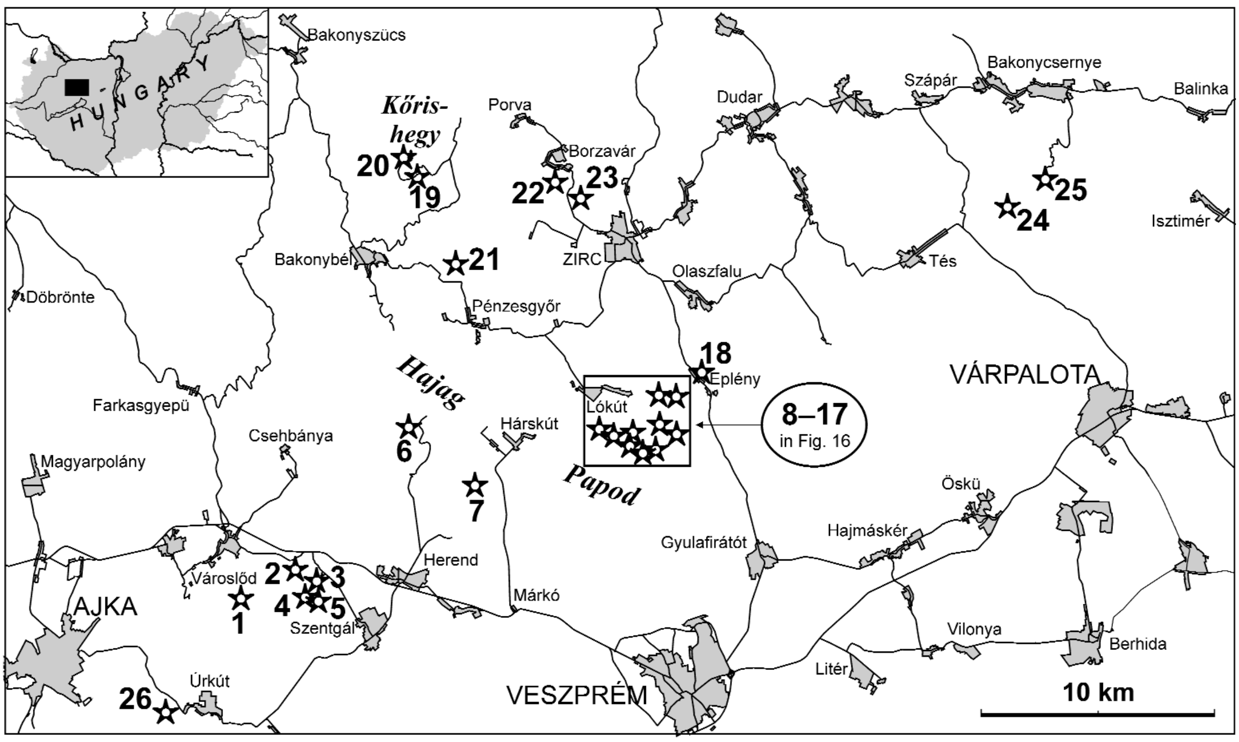


Figure 10. The Pliensbachian brachiopod localities of the Bakony. **1**: Városlőd, Kopasz-hegy, Határ-árok; **2:** Szentgál, Gombás-puszta (sections Fg–I, Fg–II, Fg–IV); **3:** Szentgál, Tűzköves-hegy (section T–I); **4:** Szentgál, Tűzköves-hegy (section T–II); **5:** Szentgál, Tűzköves-hegy (section T–III); **6:** Kisnyerges (*Hárskút*), Kisnyerges-árok; **7:** Közöskút (*Hárskút*), Közöskúti-árok; **8–17:** The closely spaced localities in the Lókút region are shown on a more detailed map in Fig. 16) **18:** Eplény, Manganese-ore mine; **19:** Kőris-hegy (A) (*Bakonybél*), (grab samples 1, 3); **20:** Kőris-hegy (B) *(Bakonybél / Bakonyszűcs)*, (grab samples 4, 5); **21:** Som-hegy *(Bakonybél)*; **22:** Borzavár, Páskom; **23:** Bocskor-hegy *(Zirc)*; **24:** Hamuháza *(Tés / Isztimér)*; **25:** Bakonycsernye, *(Isztimér)*, Tűzköves-árok; **26:** Úrkút, Manganese-ore mine

Geographic names are given in their usual Hungarian form, for ease of finding them on local maps. The English translation of some common vernacular terms in geographic names (often hyphenated to form the latter part of a proper name) is listed as follows (Hungarian words in italics): *árok* = ravine, gully; *domb* = hill; *hát* = hill; *hegy* = mountain, hill; *kő* = cliff; *kút* = well; *puszta* = farm; *völgy* = valley.

Many localities are named after the nearest settlements. In other cases, the names of the ***nearest villages*** are given in parentheses after the locality name, in bold italics, and/or, the names of the *municipalities* where the locality administratively belongs, in italics.

Abbreviations: GIH = collected by the Geological Institute of Hungary, VA = personal collection. Specimen numbers refer to brachiopods identified on species level and does not contain the indeterminable fragments.

Városlőd, Kopasz-hegy, Határ-árok (section), GIH, 19 specimens.
Szentgál, Gombás-puszta (sections Fg–I, Fg–II, Fg–IV), GIH, 36 specimens.
Szentgál, Tűzköves-hegy (section T–I), GIH, 57 specimens.
Szentgál, Tűzköves-hegy (section T–II), GIH, 41 specimens.
Szentgál, Tűzköves-hegy (section T–III), GIH, 13 specimens.
Kisnyerges (*Hárskút*), Kisnyerges-árok (section), GIH, 72 specimens.
Közöskút (*Hárskút*), Közösküti-árok (section), GIH, 102 specimens.
Fenyveskút (*Lókút*), (grab samples p1, p2), GIH, 160 specimens; (grab samples Ny, É, D, 5/a, 5/b, 5/c, scree), VA + A. GALÁCZ, 576 specimens; total: 836 specimens.
Kericser (*Lókút*), (section VI), GIH, 3328 specimens.
Papod (A) (*Lókút*), (grab samples 81, 82), VA, 25 specimens.
Papod (B) (*Lókút*), (grab sample 87), VA, 38 specimens.
Papod (C) (*Lókút*), (grab samples 84, 86), VA, 19 specimens.
Mohoskő (*Lókút* /*Gyulafirátót*), (grab sample 85), VA, 49 specimens.
Középhát (*Lókút* / *Gyulafirátót*), (section XI), GIH, 8 specimens.
Büdöskút (*Lókút* / *Gyulafirátót*), (section X), GIH, 54 specimens.
Lókút, Lókúti-domb, (section IV), GIH, 47 specimens.
Kávás-hegy (*Lókút* / *Gyulafirátót*), (section A), GIH, 23 specimens.
Eplény, Manganese-ore mine (grab sample), GIH + I. SZABÓ, 669 specimens.
Kőris-hegy (A) (*Bakonybél*), (grab samples 1, 3), VA, 26 specimens.
Kőris-hegy (B) *(Bakonybél* / *Bakonyszucs)*, (grab samples 4, 5), VA, 58 specimens.
Som-hegy *(Bakonybél)*, (grab sample), J. SZABÓ, 1 specimen.
Borzavár, Páskom (grab sample), VA, 1 specimen.
Bocskor-hegy *(Zirc)*, (section), GIH, 62 specimens.
Hamuháza *(Tés* / *Isztimér)*, (section), GIH, 113 specimens.
Bakonycsernye, *(Isztimér)*, Tűzköves-árok (section), GIH, 8 specimens.
Úrkút, Manganese-ore mine (grab sample), P. GULYÁS, 3 specimens.

The sections and localities are briefly reviewed below; those which yielded abundant and diverse brachiopod fauna, or have outstanding stratigraphical or palaeogeographical importance, are described and partly illustrated in detail.

Városlőd, Kopasz-hegy, Határ-árok
(coordinates: 47° 07´ 43´´ N / 17° 40´ 15´´ E)

This was an artificial trench, about 2 km southeast from the village Városlőd, excavated by the Geological Institute of Hungary in the early 1970's. The Pliensbachian beds consist of pink or red, fine-grained crinoidal limestone with poorly preserved but relatively diverse brachiopod fauna (Table 2). The sequence represents the Upper Pliensbachian (Domerian).

Szentgál, Gombáspuszta
(sections Fg–I, Fg–II and Fg–IV) (coordinates: 47° 08´ 11´´ N / 17° 41´ 39´´ E)

These sections were excavated and collected bed-by-bed by the Geological Institute of Hungary in the early 1970's, in the walls of a small abandoned quarry at the northwestern foot of the Tűzköves-hegy, a 438 m high hill near the village

Table 2. Stratigraphic distribution and number of identified specimens from the Városlőd (Kopasz-hegy, Határ-árok) section

Városlőd Kopasz-hegy Határ-árok	*Megapringia altesinuata*	*Lokutella liasina*	*Fenyveskutella vighi*	*Paronarhynchia estherae*	*Cisnerospira meneghiniana*	*Rhapidothyris lokutica*	*Eplenyithyris cerasulum*	*Lychnothyris rotzoana*	*Linguithyris aspasia*	sum
Bed No. 1							2		1	3
2										
3										
4										
5				1						1
6			1	1	4				1	7
7				1	1					2
8										
9										
10	1	1						1	1	4
11				1						1
12										
13						1				1
sum	1	1	1	4	5	1	2	1	3	**19**

Table 3. Stratigraphic distribution and number of identified specimens from the Szentgál (Gombáspuszta Fg–I, Fg–II and Fg–IV) sections

Szentgál Gombáspuszta / sections	*Apringia paolii*	*Lokutella liasina*	*Fenyveskutella pseudouhligi*	*Hesperithyris renierii*	*Linguithyris aspasia*	*Securithyris adnethensis*	sum
Fg-I							
Basal bed		1	1		8	1	11
Fg-II							
Bed No. 22	1						1
24						1	1
25					1		1
29					3	1	4
Fg-IV							
Bed No. 1						1	1
2							
3				1	2	1	4
4					2	2	4
5				1	1	1	3
7					1		1
8					3	1	4
9						1	1
sum	1	1	1	2	21	10	**36**

Figure 11. The artificial trench of the section T-III on the Tűzköves-hegy (Szentgál)

Szentgál. The sections Fg–I and Fg–II exposed mostly the Toarcian red ammonitic limestones and some underlying Lower Pliensbachian (Carixian) red limestone layers (GÉCZY 1974). Nine beds of the Fg–IV section of similar lithology represent the Ibex Zone of the Pliensbachian. Their brachiopod fauna is shown in Table 3.

Szentgál, Tűzköves-hegy
(sections T–I, T–II and T–III)

These sections were excavated and collected bed-by-bed by the Geological Institute of Hungary in the early 1970's. Section T–I lies near the south-western rim of a big abandoned quarry along the railway between the villages Szentgál and Városlőd, close to the railway station Szentgál (coordinates: 47° 08´ 06´´ N / 17° 42´ 01´´ E). It exposed Lower Pliensbachian (Carixian) red limestone beds in less than two metres thickness and the overlying Toarcian; the Upper Pliensbachian is missing. The sections T–II

Table 4. Stratigraphic distribution and number of identified specimens from the Szentgál (Tűzköves-hegy T–I, T–II and T–III) sections

Szentgál Tűzköves-hegy / sections	*Apringia diptycha*	*Lokutella liasina*	*Fenyveskutella pseudouhligi*	*Nannirhynchia gemmellaroi*	*Hesperithyris renierii*	*Viallithyris gozzanensis*	*Securithyris adnethensis*	*Linguithyris aspasia*	*Bakonyithyris apenninica*	*Bakonyithyris pedemontana*	sum
T-I											
Bed No. 5							1	4			5
6	1			1	1		7	13			23
7								2			2
8		1		2		1		5			9
9							2				2
10								2			2
11		1						4			5
12		1			1						2
13					1			1			2
14			1					1			2
16				1				1			2
18							1				1
sum	1	3	1	4	3	1	11	33			**57**
T-II											
Bed No. 16								4			4
17								5			5
18								2			2
20								16			16
21								3			3
22								9	1		10
23										1	1
sum								39	1	1	**41**
T-III											
Bed No. 3							4	9			13
sum							4	9			**13**

and T–III were excavated on the flat top of the Tűzköves-hegy about 500 m southwest of the big quarry (coordinates: 47° 07´ 57´´ N / 17° 41´ 40´´ E). They exposed Lower Pliensbachian (Carixian) red limestone layers resting unconformably on poorly bedded Hierlatz Limestones of Late Sinemurian (Raricostatum Zone) age (GÉCZY 1974) (Figs 11 and 12). Table 4 shows the brachiopod fauna of the three sections.

Figure 12. Close-up view of the boundary between the Upper Sinemurian Hierlatz limestone and the overlying Pliensbachian limestone (lighter colour). Szentgál (Tűzköves-hegy, T–III)

Kisnyerges *(Hárskút)*, Kisnyerges-árok (section) (coordinates: 47° 11´ 17´´ N / 17° 45´ 17´´ E)

Small artificial outcrops were made by the Geological Institute of Hungary in the early 1960's on the Hajag, a 646 m high hill about 5 km west of the village of Hárskút. They exposed red limestones, partly with ferromanganese nodules and crusts, representing condensed and episodic sedimentation. The Lower Pliensbachian (Carixian) beds lie unconformably on Lower Sinemurian red limestones (GÉCZY & MEISTER 2007). The data of the brachiopod fauna of low diversity are shown in Table 5.

Table 5. Stratigraphic distribution and number of identified specimens from the Kisnyerges (Kisnyerges-árok) section

Kisnyerges Kisnyerges-árok	*Apringia paolii*	*Koninckodonta fuggeri*	*Linguithyris aspasia*	*Bakonyithyris apenninica*	*Bakonyithyris avicula*	sum
Bed No. 5	1	2	3			6
6			14	1	1	16
scree			49		1	50
sum	1	2	66	1	2	**72**

Közöskút *(Hárskút)*, Közöskúti-árok (section) (coordinates: 47° 10´ 06´´ N / 17° 47´ 27´´ E) (Fig. 13)

The shallow ravine named Közöskúti-árok runs to the southwest on the western side of the Borostyán-hajag, a 487 m high hill about 2 km south-west of the village of Hárskút. The ravine exposes the gently northward dipping beds of the Hettangian Kardosrét Limestone and the unconformably overlying Lower Pliensbachian (Figs 14, 15), Toarcian and Bajocian red, manganiferous limestones. All these Jurassic members are very reduced in thickness (1 to 2 metres each), and are separated by considerable sedimentary gaps. This is the most typical section charac-

Figure 13**.** Stratigraphical column of the Pliensbachian part of the Közöskút section with the distribution and number of identified brachiopod specimens. Hettang = Hettangian, Pliensb. = Pliensbachian

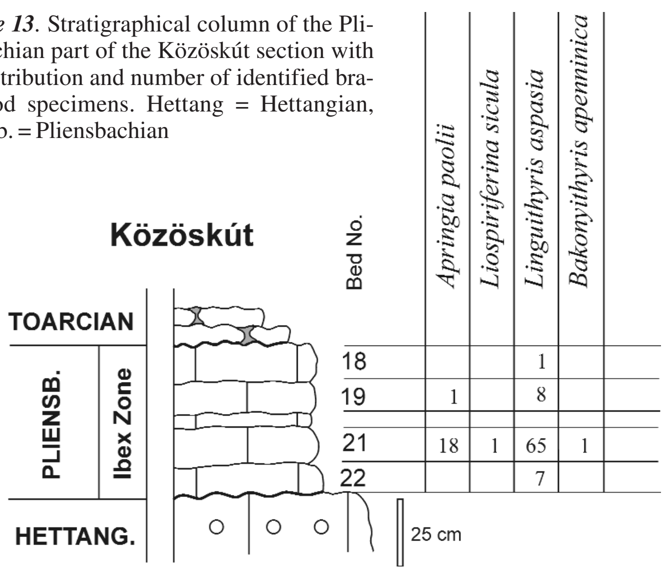


Figure 14**.** Közöskút section. Close-up horizontal view of the paraconformity between the poorly bedded Kardosrét Limestone (Hettangian) and the basal bed (No. 22) of the Pliensbachian red limestone. (The coin marks the boundary)

Figure 15. Közöskút section. Vertical view of the paraconformity between the Kardosrét Limestone (Hettangian) and the Pliensbachian red limestone. In the centre: thin synsedimentary breccia at the base of bed No. 22

terizing the submarine horst facies of the Bakony Jurassic (GALÁCZ & VÖRÖS 1972, VÖRÖS 1986, GALÁCZ 1988, VÖRÖS & GALÁCZ 1998). Detailed bed-by-bed collection of fossils was made by the Geological Institute of Hungary in the late 1960's and a brief description was given by KONDA (1970). The little more than 60 cm thick Pliensbachian part consists of a sequence of five beds of red, massive micritic limestone with plenty of ammonoid and brachiopod shells, usually encrusted with ferro-manganese envelopes. Manganese nodules and crusts on the bedding surfaces are frequent. This limestone, which probably represents the Répásárok Member of the Tűzkövesárok Formation, forms infillings of cavities and dykes in the underlying whitish, oncoidal Kardosrét Limestone. The age of the short Pliensbachian sedimentary episode falls into the Ibex Zone (GÉCZY 1971a, 1976).

Fenyveskút *(Lókút)*, (grab samples p1, p2, Ny, É, D, 5/a, 5/b, 5/c, scree)
(coordinates: 47° 11´22´´N / 17° 51´25´´E)

The richest Jurassic brachiopod locality in the Bakony lies 2 km south of the village of Lókút, at the northern foot of the Papod, a 644 m high hill, in the southern side of the ravine called Répás-árok (Fig. 16). This site, famous for its "big bra-

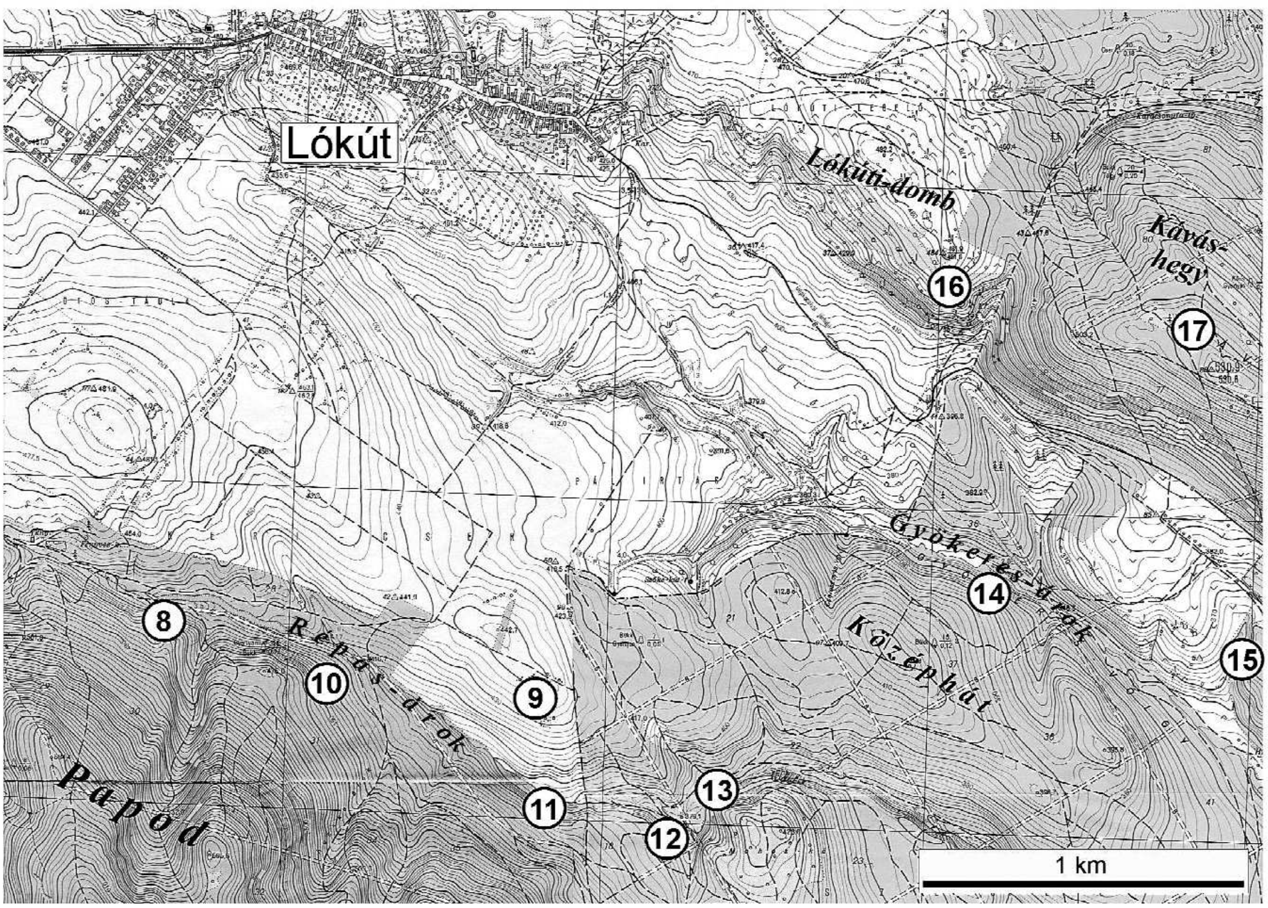


Figure 16. The Pliensbachian brachiopod localities of the Lókut region. **8:** Fenyveskút (*Lókút*), (grab samples p1, p2, Ny, É, D, 5/a, 5/b, 5/c, scree; **9:** Kericser (*Lókút*), (section VI); **10:** Papod (A) (*Lókút*), (grab samples 81, 82); **11:** Papod (B) (*Lókút*), (grab sample 87); **12:** Papod (C) (*Lókút*), (grab samples 84, 86), **13:** Mohoskő (*Lókút / Gyulafirátót*); **14:** Középhát (*Lókút / Gyulafirátót*), (section XI); **15:** Büdöskút (*Lókút / Gyulafirátót*), (section X); **16:** Lókút, Lókúti-domb, (section IV); **17:** Kávás-hegy A (*Lókút / Gyulafirátót*), (section A)

chiopods", was found in the course of geological mapping by the Geological Institute of Hungary in the 1960's when a small trench was also dug which was referred to as "section VIII" (KONDA 1970). However, regular sequence of layers was not found, and bed-by-bed collection was not made here, therefore this locality is no more called a "section".

The conditions of the exposure are rather poor but it is easy to observe that limestone blocks of different size, lithology, colour and texture emerge from the soil and fallen leaves (Fig. 17). During my several visits of the locality, in most cases accompanied by A. GALÁCZ, the following different limestone types were found in this mélange:

— Dachstein Limestone (Rhaetian),
— Kardosrét Limestone (Hettangian),
— white Hierlatz Limestone (Sinemurian),
— pink and ochre brachiopodal limestone (Upper Pliensbachian),
— dark red micritic limestone (Toarcian),
— red brachiopodal limestone (Bajocian).

The size of the blocks varies from a few centimetres to a few metres. Their orientation is chaotic (some of them are upside down, as evidenced by certain primary sedimentary structures, e. g. the geopetal infill of brachiopod valves). Some of the blocks are composite: i. e. "breccia in breccia". We interpreted this unit as a mega-breccia formed along the Jurassic submarine escarpment bordering the Papod submarine horst. Repeated tectonic movements along the fault scarp occurred in the Sinemurian, Late Pliensbachian, and twice in the Bajocian. The matrix of the mega-breccia cannot be directly observed but it is very probable that the youngest sediment (i. e. the Upper Bajocian brachiopodal limestone) forms the matrix fixing the age of the latest breccia formation in the Late Bajocian (GALÁCZ 1988, VÖRÖS & GALÁCZ 1998).

The Pliensbachian pink or ochre limestone yielded an extremely abundant and diverse brachiopod fauna (Table 6) and, besides echinoderm fragments and worm tubes, well preserved bivalves, ammonoids and gastropods have also been collected. The ammonoids indicate a Late Pliensbachian Margaritatus Zone age (B. GÉCZY, pers. comm.).

Kericser *(Lókút)*, (section VI)
(coordinates: 47° 11´ 18´´ N / 17° 52´ 19´´ E) (Fig. 18)

Straddling almost the whole Pliensbachian Stage and providing the richest brachiopod fauna, this section has the greatest value and importance for the present study. The locality lies about 2 km south-east of the village of Lókút, on the northern side of the ravine

Figure 17. Fenyveskút locality. The sampling point 5/c, after an exhaustive collecting campaign by private collectors. The original bedding surfaces of this giant block of the mega-breccia are set as nearly vertical

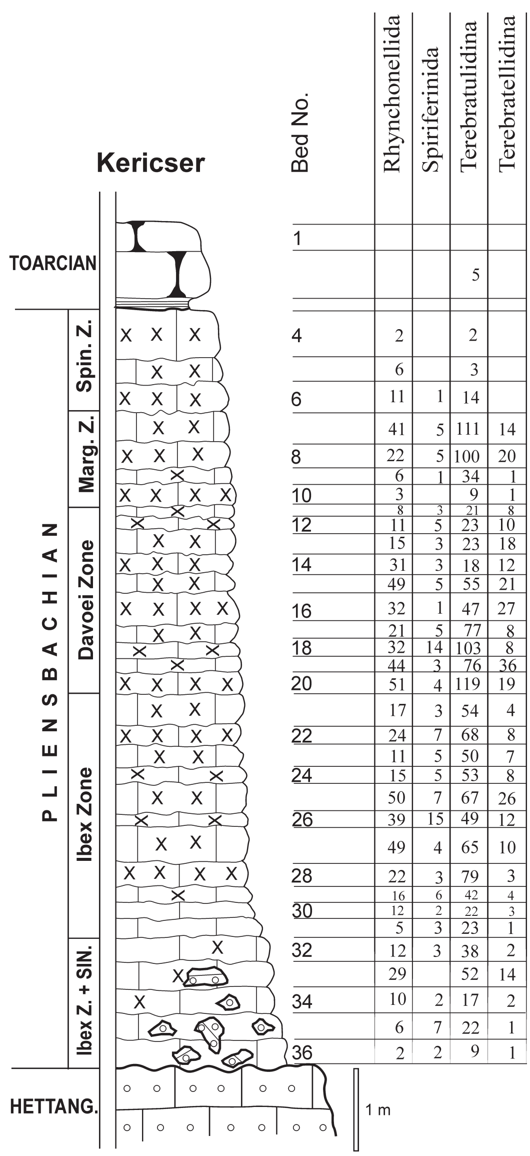


Figure 18. Stratigraphical column of the Kericser section with the distribution and number of identified brachiopod specimens by orders/suborders. Hettang. = Hettangian, Z = Zone, Sin. = Sinemurian, Marg. = Margaritatus, Spin. = Spinatum

Table 6. Distribution and number of identified specimens from the Fenyveskút locality

Fenyveskút	Rhynchonellida																					
	Apringia piccininii	*Apringia paolii*	*Apringia diptycha*	*Serratapringia fraudatrix*	*Serratapringia ? suetii*	*Megapringia stoppanii*	*Megapringia altesinuata*	*Megapringia ? atlaeformis*	*Prionorhynchia ? hagaviensis*	*Prionorhynchia ?.flabellum*	*Prionorhynchia ? catharinae*	*Lokutella liasina*	*Cirpa ? subfurcillata*	*Calcirhynchia hungarica*	*Pisirhynchia pisoides*	*Fenyveskutella vighi*	*Fenyveskutella theresiae*	*Fenyveskutella* aff. *vighi*	*Nannirhynchia reynesi*	*Nannirhynchia sinuata*	*Nannirhynchia gemmellaroi*	*Paronarhynchia.bulga*
Grab sample p1			1			2	7	1	2			1				12						1
p2			4			22	2	2	1							22						
É	3						31					7				42	1			3	4	18
Ny							2															
D	1					2										2						
5/a	2	2				3	7					1				9			2			
5/b																						
5/c	4	13	12	3	1	13	124	1		2		23			1	38			3			
7		4					1															
scree		4	12	4	1	16	5	2	2		1		1	2				1				
sum	10	23	29	7	2	58	179	6	5	2	1	32	1	2	1	125	1	1	5	3	4	19

called Répás-árok. On this southward facing slope covered by shrubby meadows, a more than 20 m long trench was excavated by the Geological Institute of Hungary in the early 1960's. The first descriptions of the stratigraphy were published by KONDA (1970) and GÉCZY (1971a, b).

The lowermost member of the gently northward dipping sequence is the greyish-white, oncoidal Kardosrét Limestone of Hettangian age. Its uneven and fractured top surface is overlain by poorly bedded Lower Pliensbachian red, fossiliferous micritic limestone. In the lowermost four layers of this "lower red limestone" angular fragments of older Jurassic rock types occur. The size of the fragments and blocks varies from a few cm to one metre. The larger blocks are predominantly derived from the Hettangian Kardosrét Limestone; a big block is in definitely overturned position because its underside is covered by a ferromanganese-oxide hardground with encrusting serpulid worm tubes; this obviously represents an original upper surface. These lowermost beds (32–36) yielded a mixed ammonoid fauna which contained, beside the dominant forms of the Ibex Zone, some characteristic Sinemurian ammonoids of the Semicostatum, Obtusum, Oxynotum and Raricostatum Zones, and of the Early Pliensbachian Jamesoni Zone (GÉCZY & MEISTER 2007). According to the field notes of the collecting team: "a lens of grey limestone of a few decimetres across with mass occurrence of small brachiopods" was recorded in Bed 35 (of red limestone layer). This "lens" was later interpreted as a reworked fragment from the Upper Sinemurian Hierlatz Limestone, therefore its brachiopod fauna, dominated by *Pisirhynchia inversa* (OPPEL, 1861), was excluded from the otherwise strictly Pliensbachian brachiopod fauna of the Kericser section. The other aspects of the embedding "lower red limestone", e. g. the very abundant fossils (mainly ammonoids and brachiopods), filled predominantly by sparry calcite, and the poor bedding, suggest that it represents a marginal type of the Hierlatz Limestone. At around Bed 29, with the decrease of the red micrite and the increase of the sparry calcite as cement, this "lower red limestone" passes gradually to the typical white Hierlatz Limestone.

This "white limestone" is the dominant rock type of the Kericser section; its poorly bedded layers measure more than 5 m in thickness. It represents the "bed-like type" of the Hierlatz Limestone as defined by VÖRÖS (1991), interpreted as submarine talus of biodetrital material of very rapid early cementation. The coquina consists mainly of brachiopod, ammonoid and echinoderm, and subordinately gastropod and bivalve skeletal debris or almost intact shells, cemented by at least two generations of spar. Red, pink, or yellow micrite infiltrations become dominant only locally and usually form geopetal structures. This part of the section represents the Lower and (partly) the Upper Pliensbachian (Ibex Zone: Beds 21–31; Davoei Zone: Beds 11–20; Stokesi Subzone of the Margaritatus Zone: Beds 7–10; GÉCZY 1971a, 1971b, GÉCZY & MEISTER 2007).

The uppermost member of the Pliensbachian sequence is the nearly 1.5 m thick "upper red limestone", resting with sharp boundary on the typical Hierlatz Limestone. This brownish-red, fine grained crinoidal limestone still contains abundant brachiopods and ammonoids and may be regarded as a marginal variant of the Hierlatz Limestone, transitional to the Isztimér Formation. According to GÉCZY (1971a, 1971b), these thick layers (Beds 4–6) represent the Spinatum Zone, whereas the upper part of the Margaritatus Zone is missing at the underlying omission surface.

		Athyridida		Spiriferinida						Terebratulida														
Paronarhynchia estherae	*Paronarhynchia* ? cf. *verrii*	*Koninckodonta* cf. *waehneri*	*Koninckodonta fuggeri*	*Cisnerospira meneghiniana*	*Cisnerospira darwini*	*Liospiriferina alpina*	*Liospiriferina obtusa*	*Liospiriferina sicula*	*Liospiriferina* cf. *semicircularis*	*Viallithyris gozzanensis*	*Eplenyithyris cerasulum*	*Securithyris adnethensis*	*Securithyris filosa*	*Linguithyris aspasia*	*Buckmanithyris cornicolana*	*Papodina bittneri*	*Zeilleria mutabilis*	*Zeilleria bicolor*	*Aulacothyris* ? *ballinensis*	*Bakonyithyris pedemontana*	*Bakonyithyris apenninica*	*Bakonyithyris meneghinii*	*Bakonyithyris ovimontana*	Sum Fenyveskút
4					1						3			1		4		1	3	7				51
11			3	1				4		9				6		13			5	3	1			109
1			10													4								124
																								2
1			2											1		1								10
			6					1			1	1		13			2							50
												2					2						4	8
2		1	3		8			3				21					9	1	2	1	3		36	328
						1						8												14
9	1	1	5	1			1	1	1	1	13	16	1	12	3		3	1	3	4	3	1	8	140
28	1	2	29	2	9	1	1	9	1	10	17	48	1	33	3	22	16	3	13	15	7	1	48	**836**

On the top of the Pliensbachian, Lower Toarcian beds are deposited unconformably: after about ten centimetres of yellow marly limestone, two layers of red, nodular ammonitic limestone belong to the Bifrons Zone; the Tenuicostatum and Falciferum Zones are missing (GÉCZY 1971a, 1971b).

The extremely diverse brachiopod fauna of the Kericser section (68 species) is dominated by *Linguithyris aspasia* (ZITTEL, 1869); the distribution and abundance data are shown in Table 7.

Papod (A) ***(Lókút)*****,** (grab samples 81, 82)
(coordinates: 47° 11´23´´ N / 17° 51´52´´ E)

These grab sampling points are about 2 km south of the village of Lókút, along the northern foot of the Papod, in the few metres high cliffs of the southern side of the Répás-árok, about 600 metres east of the locality Fenyveskút. Neptunian dykes penetrating the Hettangian Kardosrét Limestones and filled with Hierlatz-type limestones, were found and collected for brachiopods personally. Their age is probably Early Pliensbachian.

Papod (B) ***(Lókút)*****,** (grab sample 87)
(coordinates: 47° 11´02´´ N / 17° 52´22´´ E)

The location and the stratigraphic position of this grab sampling point (found and collected by the author) is very similar to the previous ones; it is located around 800 metres eastward along the Répás-árok. Its age is probably Late Pliensbachian.

Papod (C) ***(Lókút)*****,** (grab samples 84, 86)
(coordinates: 47° 11´00´´ N / 17° 52´34´´ E)

These grab sampling points are also along the northern foot of Papod, near the cliff Mohoskő. Here, in the western rocky wall of a southern tributary of the Répás-árok, I found and collected Hierlatz-type limestones with brachiopods as neptunian dyke infillings. The age is probably Early Pliensbachian.

The brachiopod data of the Papod localities is shown together in Table 8.

Mohoskő ***(Lókút / Gyulafirátót)***, (grab sample 85)
(coordinates: 47° 11´08´´ N / 17° 52´43´´ E)

Mohoskő (also called Szögle) is a northern prong of the Papod; it forms an almost vertical cliff on the southern side of the Répás-árok, approximately two kilometres east–south-east of the locality Fenyveskút. This locality was first found by LACZKÓ (1898); many brachiopod species were identified from here by LÓCZY (1898) but their list was never published. This

Table 7. Stratigraphic distribution and number of identified specimens from the Kericser section

Kericser	*Apringia piccininii*	*Apringia barnabasii*	*Apringia paolii*	*Apringia diptycha*	*Apringia deltoidea*	*Serratapringia fraudatrix*	*Megapringia stoppanii*	*Megapringia altesinuata*	*Megapringia ? atlaeformis*	*Prionorhynchia polyptycha*	*Prionorhynchia* aff. *greppini*	*Prionorhynchia ? hagaviensis*	*Prionorhynchia ? flabellum*	*Lokutella liasina*	*Lokutella palmaeformis*	*Lokutella kondai*	*Cirpa ? subcostellata*	*Calcirhynchia ? hungarica*	*Jakubirhynchia ?* cf. *fascicostata*	*Jakubirhynchia ?* aff. *laevicosta*	*Homoeorhynchia* cf. *acuta*	*Homoeorhyncia ? lubrica*	*Homoeorhynchia ? ptinoides*	*Pisirhynchia pisoides*
Bed No. 2																								
3																								
4																								
5						1			4					1										
6	1					1	3		2						1									
7	2		6	1			3	2	1					3							1			1
8			8				1	1						1										1
9		1	3																					1
10			2																					
11			4	1									1	1										
12			3		1			2						1						1				
13		2	8	1															1				2	1
14			9	2										7		5						1		
15			17	4										8		4			2	2				2
16		1	12	10										1	5	1								
17			4	1											5									
18	1		17	7											2	1				1				
19			13	7											3			1		2				13
20			8	9										1	25									
21			1	6											7							1		
22			3	2										1	6									
23			1	2										1	4									
24			2	8											3	1								
25			16	17	1									2	3							1		
26	2	1	14	13										1	1							1	1	
27	3		17	20											5									
28			10	4												1				1				
29			6	5																				
30			4	1																			2	
31			3	1							1													
32			5	4										1								2		
33			13	12											2			1						
34			5	4						1														
35				2													1							
36			2																					
scree	4		42	21								1		6	32	1			1	5				5
sum	13	5	258	165	2	2	7	5	7	1	1	1	1	36	104	14	1	2	4	12	1	6	5	24

Pisirhynchia retroplicata	*Fenyveskutella pseudouhligi*	*Fenyveskutella vighi*	*Kericserella inversaeformis*	*Nannirhynchia reynesi*	*Nannirhynchia gemmellaroi*	*Paronarhynchia* ? cf. *verrii*	*Gibbirhynchia* cf. *orsinii*	*Gibbirhynchia* ? cf. *urkutica*	*Liospiriferina gryphoidea*	*Liospiriferina alpina*	*Liospiriferina* cf. *brevirostris*	*Liospiriferina sicula*	*Liospiriferina apenninica*	*Liospiriferina* aff. *handeli*	*Liospiriferina* cf. *globosa*	*Cisnerospira darwini*	*Cisnerospira meneghiniana*	*Orthotoma apenninica*	*Orthotoma* aff. *apenninica*	*Lobothyris punctata*	*Hesperithyris* ? cf. *costata*	*Rhapidothyris beyrichi*	*Rhapidothyris delorenzoi*	*Rhapidothyris* cf. *ovimontana*	*Rhapidothyris lokutica*
		1		1																					
		2				1										1							1		
					21						1	2	2					25		1		5			
1		1			8				2			1				2		6				1			1
1												1													2
					1																				
					1					2		1													
2					1							5													
												3													
3					1		3			2						1									
4					3		3		2	1		1				1									
					2							1													
4			4		1		2					4					1								
1			1				1		7			6				1									
5												3													
3							5		2								2								
							2		2			1													
1					11				1			5				1									
1					1		1		2			3													
							1		4			1													
4	2				1		3		4			3									1				
1			2		2				8			3		2			2								
	1						3					2					2								
			1		1		4					3													
			1				4					6													
2							3					2													
									1			2													
												2					1								
								1																	
									1					1											
							3		1			4		1		1			3						
												1			1										
15	8	2	2	1	20		13		9	2		8			2	1								1	
48	11	6	11	2	75	1	51	1	46	7	1	74	2	4	3	9	8	31	3	1	1	6	1	1	3

Table 7. Stratigraphic distribution and number of identified specimens from the Kericser section. (Continuation)

Kericser	*Viallithyris gozzanensis*	*Eplenyithyris cerasulum*	*Securithyris adnethensis*	*Securithyris filosa*	*Securithyris paronai*	*Linguithyris aspasia*	*Papodina bittneri*	*Zeilleria mutabilis*	*Zeilleria alpina*	*Zeilleria bicolor*	*Zeilleria ? aquilina*	*Antiptychina ? rothpletzi*	*Aulacothyris ? cf. fuggeri*	*Bakonyithyris pedemontana*	*Bakonyithyris apenninica*	*Bakonyithyris avicula*	*Bakonyithyris meneghinii*	*Bakonyithyris ovimontana*	*Bakonyithyris* aff. *gastaldii*	*Securina hierlatzica*
Bed No. 2						5														
3																				
4						2														
5						3														
6		1				12														
7	2	1	2			75		3			2	2		2	1				4	
8	3		6			83		2					1	1	9			6		1
9	6					26								1						
10	1					8									1					
11						20	1				1			5	2					
12	1					22					1			6		2		1		
13			1			21	1	1						6	3			8		
14			1			16	1	1						1	3	1		6		
15	3	1	2			49		3						2	3			13		
16	4	2	1			40		1						3	11			12		
17	5		9	5		58					1	1			5	1				
18			4	9		90				1	1	1			3			2		
19		2				74		2			2			3	7	1		21		
20	12	20	18	9		60		4				2	1	2	5	4		1		
21	16	8	2	2		26		1	1			1				1				
22	15	1	3	2		47					2			1	4	1				
23	15	2	2			31			1		1			1	3	1				
24	13		4	4		32		1				1		3	3					
25	9		2	5		50		4				3		12	6	1				
26	1		6	11		31		1						9	2					
27			14	23		28				3	1		1	3				2		
28	4		60		2	12	1	1								1		1		
29	5		23		1	12	1				3	1								
30	3		13			6					3									
31	1	5	9			8												1		
32	8	7	12			11												2		
33	14	7	17			14				2		3		2	1			6		
34	3	2	10			2			1						1					
35	4					15								1						
36	1	5	3														1			
scree	30	29	95	10	1	195		3		1	4	5		10	25	3		20		
sum	179	93	319	80	4	1184	5	28	3	7	22	20	3	74	98	17	1	102	4	1

Table 8. Distribution and number of identified specimens from the Papod A, B and C localities

Papod		*Apringia paolii*	*Apringia diptycha*	*Megapringia ? atlaeformis*	*Lokutella palmaeformis*	*Pisirhynchia pisoides*	*Pisirhynchia retroplicata*	*Fenyveskutella vighi*	*Paronarhynchia estherae*	*Koninckodonta* cf. *waehneri*	*Liospiriferina alpina*	*Orthotoma apenninica*	*Linguithyris aspasia*	*Eplenyitothyris cerasulum*	*Papodina bittneri*	*Zeilleria mutabilis*	*Antiptychina ? rothpletzi*	*Aulacothyris ?* cf. *fuggeri*	*Aulacothyris ? ballinensis*	*Bakonyithyris pedemontana*	sum
Locality	Grab sample																				
A	81											4	5								9
	82	10								1		2	2				1				16
sum		10								1		6	7				1				25
B	87		4	2	2	2		2	9	5	2		3		4			1	1	1	38
sum			4	2	2	2		2	9	5	2		3		4			1	1	1	38
C	84									1			2	2		4					9
	86		2				1			7											10
sum			2				1			8			2	2		4					19
Papod sum		10	6	2	2	2	1	2	9	14	2	6	12	2	4	4	1	1	1	1	**82**

Table 9. Distribution and number of identified specimens from the Mohoskő locality

Mohoskő	*Apringia paolii*	*Apringia diptycha*	*Lokutella liasina*	*Pisirhynchia pisoides*	*Pisirhynchia retroplicata*	*Nannirhynchia gemmellaroi*	*Liospiriferina gryphoidea*	*Linguithyris aspasia*	*Bakonyithyris pedemontana*	*Bakonyithyris apenninica*	sum
upper level	3		1	5	3	1		25	1	1	40
lower 1 m	1	1			1		1	2	3		9
sum	4	1	1	5	4	1	1	27	4		**49**

10-15 m high cliff consists mainly of Pliensbachian Hierlatz Limestone. On the plateau, connected to the top of the cliff, the Geological Institute of Hungary excavated a trench exposing crinoidal limestones, but no detailed collection was made here. I took only some grab samples for brachiopods from the lower part of the cliff (Table 9).

Középhát ***(Lókút*** */ Gyulafirátót)*, (section XI)
(coordinates: 47° 11´ 35´´ N / 17° 53´ 12´´ E) (Fig. 19)

This artificial trench was excavated in the late 1960's on the low hill Középhát, between the ravines Répás-árok and Gyökeres-árok, about two and a half kilometres south-east of the village Lókút (but belonging to the district of the village Gyulafirátót). Brief descriptions of its geology and stratigraphy were given by Konda (1970) and Géczy (1976). Neither the underlying, nor the cover of the Pliensbachian is exposed. The dominant lithology of the more than 5 m thick Pliensbachian sequence is pink, nodular, cherty, spiculitic, fine-grained crinoidal limestone, representing the

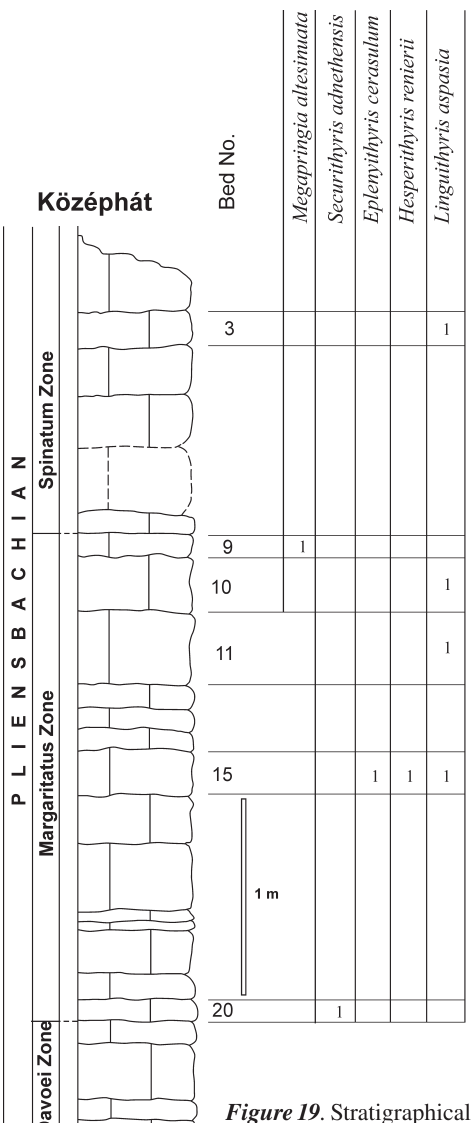


Figure 19. Stratigraphical column of the Középhát section with the distribution and number of identified brachiopod specimens

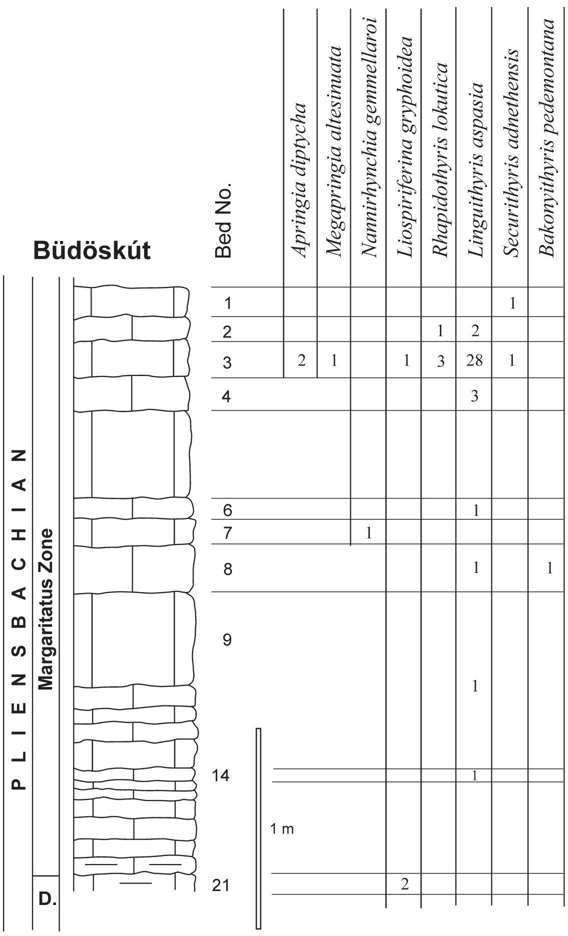


Figure 20. Stratigraphical column of the Büdösöskút section with the distribution and number of identified brachiopod specimens

Isztimér Formation. The ammonoids, collected from the 36 beds were identified by GÉCZY (1971a, 1976), then revised in GÉCZY & MEISTER (1998), and three Pliensbachian Zones (Davoei, Margaritatus, Spinatum Zones) were proved. The brachiopod fauna is scarce and moderately diverse.

Büdöskút ***(Lókút / Gyulafirátót)***, (section X)
(coordinates: 47° 11´ 12´´ N / 17° 54´ 04´´ E) (Fig. 20)

An artificial trench was excavated by the Geological Institute of Hungary in the late 1960's near a small farm called Büdöskútpuszta, on the northern side of the Gyökeres-árok, about three kilometres east–south-east of the village of Lókút (but administratively belonging to the village of Gyulafirátót). Brief descriptions of its geology and stratigraphy were given by KOVÁCS (1942), KONDA (1970) and GÉCZY (1976). In many respects, this section is very similar to the previous one (Középhát). The under- and the overlying of the Pliensbachian was not exposed. The prevalent lithology is pink or grey, partly nodular, cherty, spiculitic, crinoidal limestone which belongs to the Isztimér Formation. The ammonoids were collected here from 25 beds and were identified by GÉCZY (1971a, 1976), and revised by GÉCZY & MEISTER (1998), who proved the presence of the Upper Pliensbachian Margaritatus Zone. The brachiopod fauna is not very abundant but diverse.

Lókút, Lókúti-domb, (section IV)
(coordinates: 47° 12´ 01´´ N / 17° 53´ 19´´ E) (Fig. 21)

This is the most important key section of the Lower Jurassic in the Bakony, because it exposes an almost continuous sequence of beds from the Hettangian Kardosrét Limestone to the Upper Toarcian siliceous limestones of the Eplény Formation. The section lies 1.5 km east of the village of Lókút and it is the most impressive result of the ambitious excavation project of the Geological Institute of Hungary. Starting from a small abandoned quarry at the foot of the Lókúti-domb, a more than one hundred metre long trench was excavated, running up along the hillside to the top. The first stratigraphical description of the Lower Jurassic formations was given by KOVÁCS (1936); further brief geological descriptions can be found in KONDA (1970) and FÜLÖP (1971). The Sinemurian sequence is unusually thick (about 80 m), it comprises well bedded, massive Pisznice Limestone Formation followed by cherty and crinoidal limestones of the Isztimér Formation. The lowermost member of the Pliensbachian develops continuously from the Sinemurian; it is a 1.5 m thick red limestone with cherty layers. In this part, the trench was widened from its average width of 2 m to at least 5 m in order to facilitate bed-by-bed collecting of fossils (Fig. 22). Upward, the chert layers and nodules vanish gradually and the nex unit is a 1.6 m thick, red, nodular ammonitic limestone. This

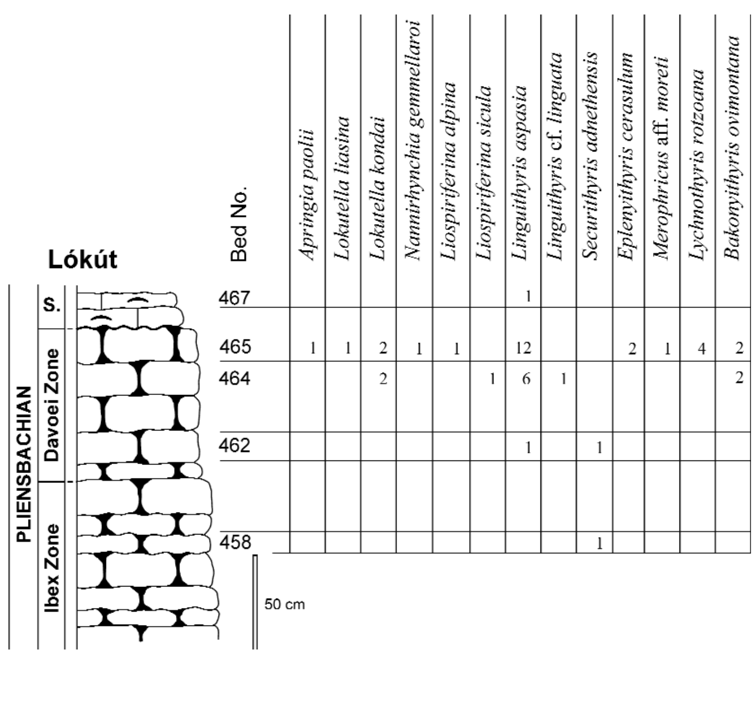


Figure 21. Stratigraphical column of the Pliensbachian part of the Lókút section with the distribution and number of identified brachiopod specimens. S. = Spinatum Zone

typical "Rosso Ammonitico" represents the Tűzkövesárok Formation. Above a sharp lithological change, it is overlain by a yellowish-greyish, platy crinoidal, spiculitic limestone. This well-bedded sequence of 4.5 m in thickness may be regarded as the typical Isztimér Formation. The top surface of the Pliensbachian is capped by a hardground, which is overlain by soft, brown manganiferous clay of the Úrkút Manganese Ore Formation, which in turn is overlain by platy, siliceous *Bositra*-limestones of the Eplény Formation of Toarcian age.

The more than 7 metres thick Pliensbachian sequence was collected bed-by-bed for ammonoids. The fauna of the 38 beds was identified by Géczy (1971a, 1972a 1976), and four Pliensbachian Zones (Jamesoni, Ibex, Davoei, and Spinatum Zones) were proved. The Margaritatus Zone seems to be missing at the omission surface between the red nodular limestone and the cherty crinoidal limestones. The brachiopod fauna, collected mainly from the Davoei and Spinatum Zones, is not abundant but very diverse. Fig. 21 shows only the brachiopod-rich part of the section.

Figure 22. Red nodular limestone layers (Tűzkövesárok Formation) in the Pliensbachian part of the Lókút section

Kávás-hegy ***(Lókút / Gyulafirátót)***, (section A)
(coordinates: 47° 11´ 55´´ N / 17° 53´ 49´´ E) (Fig. 23)

Following the pioneering geological activity of Kovács (1934, 1942), the Lower Jurassic beds of the Kávás-hegy (an 530 m high hill 3–4 km east of the village of Lókút but administratively belonging to the village of Gyulafirátót) were excavated by the Geological Institute of Hungary in the early 1960's, supervised by J. Konda. Several trenches were made here around the top of the hill, which exposed parts of the Pliensbachian sequence (Konda 1970). One of the most important of these is the section labelled "A". The almost 3 m thick sequence comprises slightly siliceous, red, nodular ammonitic limestones intercalated with crinoidal layers, and represents the transition between the Tűzkövesárok and Isztimér Formations. The ammonoids, collected from Beds 1–18 of this section, suggested the Pliensbachian Davoei Zone (Géczy 1971a, 1976, 1982). The brachiopod fauna consists of Spiriferinida and Terebratulida, rhynchonellids have not been found.

It is to be mentioned here, that an important brachiopod fauna collected from the section named **Kávás-hegy I,** was also in the scope of my studies in the last decades. In his earlier works Géczy (1971a, 1976) assigned the layers of this section to the Jamesoni Zone of the lowermost Pliensbachian. At that time the brachiopod fauna collected from this section was regarded as the most representative fauna of the Jamesoni Zone, and it served, at least partly, as the basis of the *Cuneirhynchia palmata* brachiopod zone in the works by Vörös (1983, 1984c) dealing with the stratigraphical distribution of the Pliensbachian brachiopods of the Bakony. Recently, however, in the course of the revision by Géczy & Meister (2007) it turned out that the ammonoids of the section Kávás-hegy I. point to the uppermost Sinemurian. Therefore, the rather rich brachiopod fauna of the section

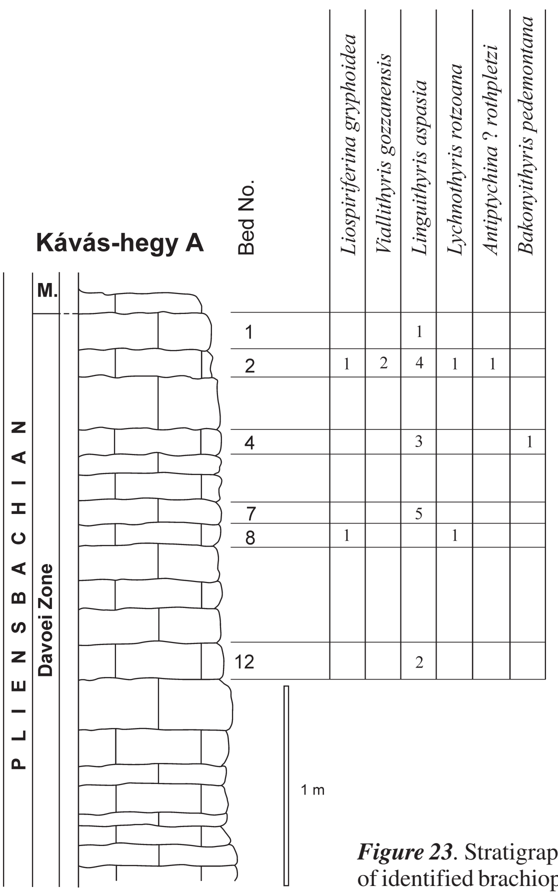


Figure 23. Stratigraphical column of the Kávás-hegy A section with the distribution and number of identified brachiopod specimens. M. = Margaritatus Zone

Kávás-hegy I is outside of the scope of the present monograph, and the former *Cuneirhynchia palmata* brachiopod zone needs reconsideration. As a result, the revised register of the whole Pliensbachian brachiopod fauna of the Bakony requires the exclusion of four species, and the record of the brachiopod fauna of the Jamesoni Zone of the Bakony now appears very scarce.

Eplény, Manganese-ore mine (grab sample)
(approximate coordinates: 47° 12´31´´N / 17° 54´36´´E)

The fossiliferous localities were found in the underground workings of the manganese-ore mine at Eplény, in the late 1950's. Extracting the Lower Toarcian sedimentary manganese ore, the shafts and galleries of the mine exposed also the underlying Kardosrét Limestone cut by a few decimetre-thick neptunian dykes of red micritic limestones with mass occurrence of fossils (brachiopods, bivalves, gastropods, ammonoids) coated by manganese-oxide (Konda 1970, Noszky 1972). The majority of the fossils were collected by I. Szabó, a smaller proportion by M. Szabó-Drubina and J. Noszky. After the shut-down of the mining, in the early 1970's, I had no possibility to visit the locality. On the basis of a few ammonoids, the infilling of the neptunian dyke can be assigned to the Margaritatus Zone (B. Géczy, pers. comm.). The brachiopod fauna, dominated by very large specimens of *Securithyris adnethensis* (Suess 1855), is very abundant (680 specimens) but not very diverse (Table 10).

Table 10. Number of identified specimens from the Eplény locality

Eplény Mn-ore mine	*Apringia paolii*	*Megapringia stoppanii*	*Megapringia altesinuata*	*Megapringia ? atlaeformis*	*Fenyveskutella vighi*	*Nannirhynchia reynesi*	*Nannirhynchia gemmellaroi*	*Amphiclinodonta liasina*	*Koninckodonta fuggeri*	*Koninckodonta eberhardi*	*Cisnerospira darwini*	*Liospiriferina alpina*	*Viallithyris gozzanensis*	*Linguithyris aspasia*	*Securithyris adnethensis*	*Eplenyithyris cerasulum*	*Zeilleria bicolor*	*Bakonyithyris ovimontana*	sum
sum	2	1	2	2	10	1	6	1	91	3	1	1	15	6	386	136	1	4	669

Kőris-hegy (A) ***(Bakonybél)***, (grab samples 1, 3)
(coordinates: 47° 17´07´´N / 17° 45´10´´E)

These grab sampling points (what I found and collected) are at about 4 km north of the village of Bakonybél, on the eastern slope of the Kőris-hegy (a 709 m high hill, the highest in the Bakony), in small road-cuts along the road leading to the top of the hill. Here the Pliensbachian reddish yellow brachiopodal-crinoidal limestone is juxtaposed against the dark red, manganiferous Bajocian limestones, but the small exposures do not allow a reliable reconstruction of the local geological setting. Ammonoids were not found in the Pliensbachian limestone, but the composition of its brachiopod fauna closely matches that of the Fenyveskút locality, thus, by analogy, the Kőris-hegy 1 and 3 localities are regarded as representing the Upper Pliensbachian, and probably the Margaritatus Zone.

Figure 24. Kőris-hegy B locality, 5 grab sampling point. Road-cut exposing steeply dipping Lower Pliensbachian crinoidal and spiculitic limestone layers of the Isztimér Formation

Kőris-hegy (B) ***(Bakonybél /*** *Bakonyszűcs)*, (grab samples 4, 5)
(coordinates: 47° 17´29´´N / 17° 45´07´´E)

These grab sampling points (found and collected by myself) are at about 5 km north of the village of Bakonybél, on the southern slope of the Kőris-hegy, in road-cuts along the road leading to the top of the hill. At point 5, the road-cut reaches a size of a small quarry (with a 10 metres high wall) and exposes a rather steeply (50°) southward dipping sequence (Fig. 24). The lowermost member is a 2 m thick, yellow, spiculitic limestone. It is overlain by a 0.5 m thick red, cherty limestone, then a massive, pink, fine-

Table 11. Distribution and number of identified specimens from the Kőris-hegy A and B localities

Kőris-hegy	*Serratapringia fraudatrix*	*Serratapringia ? suetii*	*Megapringia ? atlaeformis*	*Lokutella liasina*	*Lokutella palmaeformis*	*Lokutella kondai*	*Homoeorhynchia ? lubrica*	*Cuneirhynchia* cf. *rastuensis*	*Pisirhynchia pisoides*	*Nannirhynchia reynesi*	*Nannirhynchia gemmellaroi*	*Paronarhynchia bulga*	*Gibbirhynchia ? orsinii*	*Dispiriferina* cf. *segregata*	*Liospiriferina gryphoidea*	*Liospiriferina* cf. *obovata*	*Viallithyris gozzanensis*	*Securithyris adnethensis*	*Linguithyris aspasia*	*Buckmanithyris cornicolana*	*Bakonyithyris. pedemontana*	sum
Locality A																						
Grab sample 1		1	1	1	1		4								1			1	4		1	15
3	1	2								2		1				1			3	1		11
sum	1	3	1	1	1		4			2		1			1	1		1	7	1	1	**26**
Locality B																						
Grab sample 4						1													2			3
5					1	32	4	1	3				2	2	3		1	4	1		1	55
sum					1	33	4	1	3				2	2	3		1	4	3		1	**58**

grained crinoidal limestone of 1.5 m thickness. With gradual transition, a 1 m thick, pink, coarsely crinoidal-brachiopodal limestone occurs at the top of the exposed sequence. This latter lithology was found also at the grab sampling point 4. These layers represent the Isztimér Formation. Besides the dominant brachiopods, ammonoids and gastropods have also been found. The ammonoids indicate the Lower Pliensbachian Davoei Zone (B. GÉCZY, pers. comm.).

The brachiopod data of the Kőris-hegy localities are shown together in Table 11.

Som-hegy *(Bakonybél)*, (grab sample)
(coordinates: 47° 15´ 12´´ N / 17° 46´ 39´´ E)

Artificial outcrops were excavated by the Geological Institute of Hungary in the middle 1960's on the top of the Som-hegy, a 649 m high hill about 3 km east of the village of Bakonybél. The trenches exposed massive oolitic-oncoidal Kardosrét Limestone of Hettangian age unconformably overlain by Bajocian red limestone with ferromanganese crusts and nodules in the form of neptunian dykes and condensed sequences. A few neptunian dykes also contain older, Lower Jurassic sediments as documented by a single brachiopod specimen, *Orthotoma apenninica* (CANAVARI), found by J. SZABÓ.

Borzavár, Páskom (grab sample)
(coordinates: 47° 17´ 09´´ N / 17° 50´ 00´´ E)

The northern slope of the Páskom (a 490 m high hill 1 km south of the village of Borzavár) is cut by ravines which expose the cherty limestones (Isztimér Formation) of the Lower Jurassic sequence. I have found only a single specimen of *Gibbirhynchia curviceps* (QUENSTEDT) in the scree.

Bocskor-hegy *(Zirc)*, (section)
(coordinates: 47° 16´ 52´´ N / 17° 50´ 26´´ E) (Fig. 25)

The section was excavated by the Geological Institute of Hungary in the early 1970's in the western slope of the Bocskor-hegy, a 485 m

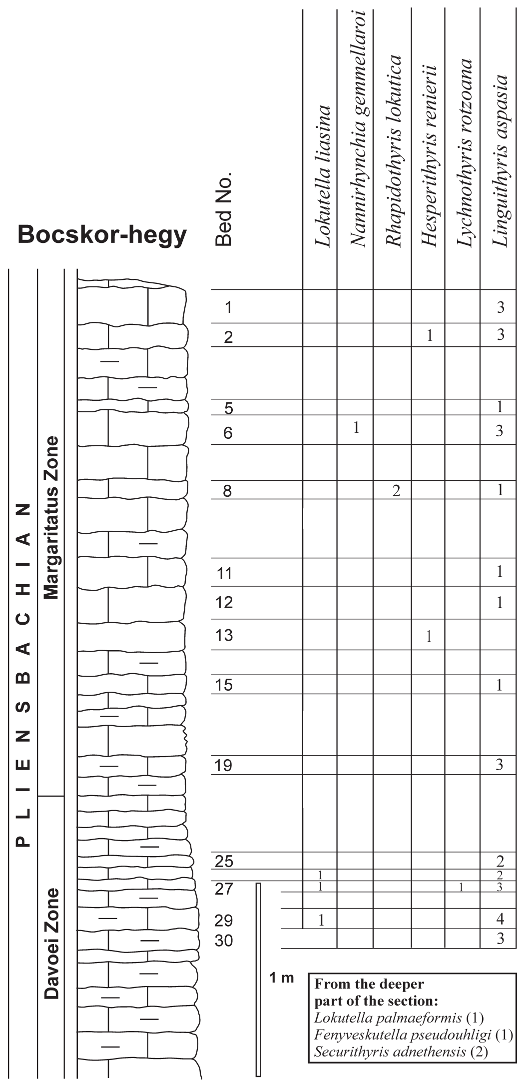


Figure 25. Stratigraphical column of the Bocskor-hegy section with the distribution and number of identified brachiopod specimens

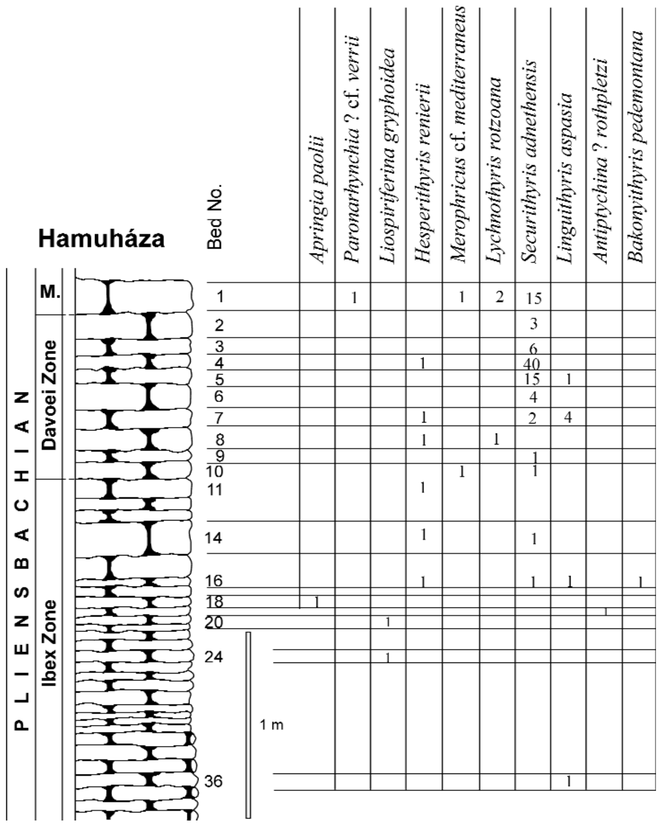


Figure 26. Stratigraphical column of the Hamuháza section with the distribution and number of identified brachiopod specimens. M. = Margaritatus Zone

high hill, not far from the road leading from the town of Zirc to Borzavár. A small cliff was connected to an artificial trench, and a bed-by-bed collection of fossils have been done from 55 layers. A brief introduction to the geology of the area can be found in KOVÁCS (1942), the section was described by GÉCZY (1976). The exposed part of the Pliensbachian sequence is more than 7 m thick and consists of greyish or pink, flaser-bedded, siliceous, spiculitic, cherty limestone (Isztimér Formation). The under- and the overlying of the Pliensbachian was not exposed. The ammonoids were identified by GÉCZY (1976, 1982), and partly revised by GÉCZY & MEISTER (1998). Four successive Pliensbachian Zones (Jamesoni, Ibex, Davoei and Margaritatus Zones) were proved. The brachiopod fauna is moderately abundant and diverse.

Hamuháza ***(Tés / Isztimér)***, (section)
(coordinates: 47° 16´ 49´´ N / 18° 04´ 42´´ E) (Fig. 26)

The section, excavated by the Geological Institute of Hungary in the early 1970's, lies at about 5 km north-east of the village of Tés (but administratively belongs to the village of Isztimér), at the northern margin of the Tés plateau. A brief geological description of the area can be found in KOVÁCS (1931); the stratigraphy of the section is given by B. GÉCZY (in DOMMERGUES et al. 1983 and in GÉCZY & MEISTER 1998). The section exposed the Pliensbachian red nodular, ammonitic limestone (Tűzkövesárok Formation) in more than 3 m of thickness; the under- and overlying sequence is not exposed. Ammonoids were collected here from 39 beds and were identified by DOMMERGUES et al. (1983), and revised by GÉCZY & MEISTER (1998) and GÉCZY & MEISTER (2007), indicating the presence of four Pliensbachian Zones (Jamesoni, Ibex, Davoei and Margaritatus Zones). The brachiopod fauna is relatively abundant (118 specimens) and dominated by *Securithyris adnethensis* (SUESS).

Bakonycsernye, ***(Isztimér)*****,** Tűzköves-árok (section)
(coordinates: 47° 17´ 14´´ N / 18° 06´ 25´´ E)

This is perhaps the most famous, classical locality of the Jurassic of Bakony, about 4 km south of the village of Bakonycsernye (but administratively belonging to the village of Isztimér). A deep ravine, running to the north-east from the northern margin of the Tés plateau, exposes here the Lower to Middle Jurassic sequence of red limestone. First mentioned by RÓMER (1860), the geology of the locality was described by PRINZ (1904) in his ammonoid monograph. A modern stratigraphical description can be found in GÉCZY (1961, 1966, 1976). Exposures of a small abandoned quarry were extended by artificial trenches by the Geological Institute of Hungary in the 1950's and 1960's, for revealing the Pliensbachian to Toarcian part of the sequence. The oldest exposed strata are the grey, spiculitic, cherty limestones of the Isztimér Formation. The nearly 9 m thick Pliensbachian sequence consists of red, partly nodular ammonitic beds of "Rosso Ammonitico" type (this is the type locality of the Tűzkövesárok Limestone Formation). Its top surface is a hardground, overlain, above a hiatus, by Lower Toarcian (Falciferum Zone) red clays with limestone nodules. The ammonoids, were identified by GÉCZY (1966, 1967a, 1976), then later revised by GÉCZY & MEISTER (1998) and GÉCZY & MEISTER (2007), who proved the presence of five ammonoid Zones (Jamesoni, Ibex, Davoei, Margaritatus and Spinatum Zones). The brachiopod fauna is very scarce (Table 12).

Table 12. Stratigraphic distribution and number of identified specimens from the Bakonycsernye (Tűzköves-árok) section

Bakonycsernye	*Lychnothyris rotzoana*	*Securithyris adnethensis*	*Antiptychina ? rothpletzi*	sum
Bed No. 47		1		1
49	1	1		2
68		1		1
90		1		1
92		1		1
101		1		1
111			1	1
sum	1	6	1	**8**

Úrkút, Manganese-ore mine (grab sample),
(coordinates: 47° 04´ 51´´ N / 17° 37´ 38´´ E)

Úrkút has been a famous locality of Sinemurian brachiopods since the pioneering descriptions by BÖCKH (1874). On the other hand, Pliensbachian brachiopods were unknown from Úrkút until 2008, when P. GULYÁS collected a specimen of *Lychnothyris rotzoana* (SCHAUROTH) and 2 specimens of *Securithyris adnethensis* (Suess) from the scree on the vaste dump of the underground mine of Úrkút. The embedding rock of the brachiopods is a red, somewhat clayey, micritic limestone of so called "Rosso Ammonitico" type. The Jurassic of the mining area represents the basinal, "continuous" facies, where this lithology appear first in the Pliensbachian (POLGÁRI et al. 2004). In the overlying of the Lower Toarcian manganese ore, this "Rosso Ammonitico" returns, but this ammonitic limestone has more greenish colour (GÉCZY 1967b). A local expert on the geology of the mining area also had the opinion that the brachiopod bearing pieces derived most probably from the Pliensbachian (Z. SZABÓ pers. comm.).

Summary of occurrences of brachiopods at the localities

The following Table 13 summarizes the occurrences and specimen number data of Pliensbachian brachiopod species at the studied localities of the Bakony Mountains.

Table 13. Distribution and number of identified specimens of the Pliensbachian brachiopod species at the studied localities of the Bakony Mountains

	Városlőd	Szentgál Fg-I, II, IV.	Szentgál T-I.	Szentgál T-II.	Szentgál T-III.	Kisnyerges	Közöskút	Fenyveskút	Kericser	Papod A	Papod B	Papod C	Mohoskő	Középhát	Büdöskút	Lókút	Kávás-hegy A	Eplény	Kőris-hegy A	Kőris-hegy B	Som-hegy	Borzavár	Bocskor-hegy	Hamuháza	Bakonycsernye	sum
Rhynchonellida																										
Apringia piccininii								10	13																	23
Apringia barnabasi									5																	5
Apringia paolii		1				1	19	23	258	10			4			1		2						1		320
Apringia diptycha			1					29	165		4	2	1		2											204
Apringia deltoidea									2																	2
Serratapringia fraudatrix								7	2										1							10
Serratapringia ? cf. *suetii*								2											3							5
Megapringia stoppanii								58	7									1								66
Megapringia altesinuata	1							179	5					1	1			2								189
Megapringia ? *atlaeformis*								6	7		2							2	1							18
Prionorhynchia polyptycha									1																	1
Prionorhynchia aff. *greppini*									1																	1
Prionorhynchia ? *hagaviensis*								5	1																	6
Prionorhynchia ? *flabellum*								2	1																	3
Prionorhynchia ? *catharinae*								1																		1
Lokutella liasina	1	1	3					32	36				1			1			1				5			81
Lokutella palmaeformis									104		2								1	1			1			109
Lokutella kondai									14							4				33						51
Cirpa ? *subcostellata*									1																	1
Cirpa ? cf. *subfurcillata*								1																		1
Calcirhynchia ? *hungarica*								2	2																	4
Jakubirhynchia ? cf. *fascicostata*									4																	4
Jakubirhynchia ? aff. *laevicosta*									12																	12
Homoeorhynchia cf. *acuta*									1																	1
Homoeorhynchia ? *lubrica*									6										4	4						14
Homoeorhynchia ? *ptinoides*								1	5																	6
Cuneirhynchia cf. *rastuensis*																				1						1
Pisirhynchia pisoides									24		2		5							3						34
Pisirhynchia retroplicata									48			1	4													53
Fenyveskutella pseudouhligi		1	1						11														1			14
Fenyveskutella vighi	1							125	6		2							10								144

Table 13. Distribution and number of identified specimens of the Pliensbachian brachiopod species at the studied localities of the Bakony Mountains (Continuation)

	Városlőd	Szentgál Fg-I, II, IV.	Szentgál T-I.	Szentgál T-II.	Szentgál T-III.	Kisnyerges	Közöskút	Fenyveskút	Kericser	Papod A	Papod B	Papod C	Mohoskő	Középhát	Büdöskút	Lókút	Kávás-hegy A	Eplény	Kőris-hegy A	Kőris-hegy B	Som-hegy	Borzavár	Bocskor-hegy	Hamuháza	Bakonycsernye	sum
Rhynchonellida																										
Fenyveskutella theresiae								1																		1
Fenyveskutella aff. *vighi*								1																		1
Kericserella inversaeformis									11																	11
Nannirhynchia reynesi								5	2									1	2							10
Nannirhynchia gemmellaroi			4					4	75				1		1			6					2			93
Nannirhynchia sinuata								3																		3
Paronarhynchia bulga								19											1							20
Paronarhynchia estherae	4							28			9															41
Paronarhynchia ? cf. *verrii*								1	1															1		3
Gibbirhynchia cf. *curviceps*																						1				1
Gibbirhynchia ? *orsinii*									51											2						53
Gibbirhynchia ? cf. *urkutica*									1																	1
Athyridida																										
Amphiclinodonta liasina																		1								1
Koninckodonta cf. *waehneri*								2		1	5	8														16
Koninckodonta fuggeri						2		29										91								122
Koninckodonta eberhardi																		3								3
Spiriferinida																										
Dispiriferina cf. segregata																				2						2
Liospiriferina alpina								1	7		2					1		1								12
Liospiriferina obtusa								1																		1
Liospiriferina cf. brevirostris									1																	1
Liospiriferina sicula							1	9	74							1										85
Liospiriferina gryphoidea									46				1		3		2		1	3				2		58
Liospiriferina apenninica									2																	2
Liospiriferina aff. handeli									4																	4
Liospiriferina cf. semicircularis								1																		1
Liospiriferina cf. globosa									3																	3
Liospiriferina cf. obovata																			1							1
Cisnerospira darwini								9	9									1								19
Cisnerospira meneghiniana	5							2	8																	15
Terebratulida																										
Orthotoma apenninica									31	6											1					38
Orthotoma aff. apenninica									3																	3
Lychnothyris rotzoana	1															4	2						1	3	1	12
Merophricus aff. moreti																1										1
Hesperithyris renierii		2	3											1									2	6		14
Merophricus cf. mediterraneus																								2		2
Hesperithyris ? cf. costata									1																	1
Lobothyris punctata									1																	1
Rhapidothyris cf. ovimontana									1																	1
Rhapidothyris delorenzoi									1																	1
Rhapidothyris beyrichi									6																	6
Rhapidothyris lokutica	1								3						4								2			10
Viallithyris gozzanensis			1					10	179								2	15		1						208
Eplenyithyris cerasulum	2							17	93			2		1		2		136								253
Securithyris adnethensis		10	11		4			48	319					1	3	2		386	1	4			2	89	6	886
Securithyris filosa								1	80																	81
Securithyris paronai									4																	4

Table 13. Distribution and number of identified specimens of the Pliensbachian brachiopod species at the studied localities of the Bakony Mountains (Continuation)

	Városlőd	Szentgál Fg-I, II, IV.	Szentgál T-I.	Szentgál T-II.	Szentgál T-III.	Kisnyerges	Közöskút	Fenyveskút	Kericser	Papod A	Papod B	Papod C	Mohoskő	Középhát	Büdöskút	Lókút	Kávás-hegy A	Eplény	Kőris-hegy A	Kőris-hegy B	Som-hegy	Borzavár	Bocskor-hegy	Hamuháza	Bakonycsernye	sum
Terebratulida																										
Linguithyris aspasia	3	21	33	39	9	66	81	33	1184	7	3	2	27	4	39	24	15	6	7	3			46	7		1659
Linguithyris cf. *linguata*																1										1
Buckmanithyris cornicolana								3											1							4
Papodina bittneri								22	5		4															31
Zeilleria mutabilis								16	28			4														48
Zeilleria alpina									3																	3
Zeilleria bicolor								3	7									1								11
Zeilleria ? *aquilina*									22																	22
Antiptychina ? *rothpletzi*									20	1							1							1	1	24
Aulacothyris ? cf. *fuggeri*									3		1															4
Aulacothyris ? *ballinensis*								13			1															14
Bakonyithyris pedemontana				1				15	74		1		4		1		1		1	1				1		100
Bakonyithyris apenninica				1		1	1	7	98				1													109
Bakonyithyris avicula						2			17																	19
Bakonyithyris meneghinii								1	1							1										3
Bakonyithyris ovimontana								48	102							4		4								158
Bakonyithyris ? aff. *gastaldii*									4																	4
Securina hierlatzica									1																	1

Brachiopod fauna

The Pliensbachian rocks of the Bakony Mountains provided 5705 brachiopod specimens, identified on species level, moreover, the number of the indeterminable brachiopod fragments exceeds one thousand. As a result of the detailed taxonomical work, the fauna consists of 95 species belonging to 38 genera. A remarkable feature of the taxonomic composition of the fauna is the complete absence of the "inarticulates" (Lingulida, Craniida), whereas all orders of the "articulates", i. e.

Table 14. List of the brachiopod species from the Pliensbachian of the Bakony Mountains with the indication of the respective number of specimens and the stratigraphic distribution

Species	Number of specimens	Jamesoni Zone	Ibex Zone	Davoei Zone	Margaritatus Zone	Spinatum Zone
Rhynchonellida						
Apringia piccininii **(Zittel, 1869)**	**23**		■■■■■	■■■■■	■■■■■	
Apringia barnabasi **n. sp.**	**5**		■■■■■	■■■■■	■■■■■	
Apringia paolii **(Canavari, 1880)**	**320**	■■■■■	■■■■■	■■■■■	■■■■■	
Apringia diptycha **(Böse, 1898)**	**204**		■■■■■	■■■■■	■■■■■	
Apringia deltoidea **(Canavari, 1880)**	**2**		■■■■■	■■■■■		
Serratapringia fraudatrix **(Böse, 1898)**	**10**				■■■■	■■■■
Serratapringia **? cf.** ***suetii*** **(Haas, 1884)**	**5**				■■■	
Megapringia stoppanii **(Parona, 1880)**	**66**				■■■■	■■■■
Megapringia altesinuata **(Böse, 1898)**	**189**				■■■	
Megapringia **?** ***atlaeformis*** **(Böse, 1898)**	**18**				■■■■	■■■■

Table 14. List of the brachiopod species from the Pliensbachian of the Bakony Mountains with the indication of the respective number of specimens and the stratigraphic distribution (Continuation)

Species	Number of specimens	Jamesoni Zone	Ibex Zone	Davoei Zone	Margaritatus Zone	Spinatum Zone
Rhynchonellida						
Jakubirhynchia ? cf. *fascicostata* (Uhlig, 1880)	4			■■■		
Jakubirhynchia ? aff. *laevicosta* (Geyer, 1889)	12		■■■	■■■		
Prionorhynchia polyptycha (Oppel, 1861)	1		■■■			
Prionorhynchia aff. *greppini* (Oppel, 1861)	1		■■■			
Prionorhynchia ? *hagaviensis* (Böse, 1898)	6				■■■	
Prionorhynchia ? *flabellum* (Gemmellaro, 1874)	3			■■■	■■■	
Prionorhynchia ? *catharinae* n. sp.	1				■■■	
Lokutella liasina (Principi, 1910)	81		■■■	■■■	■■■	
Lokutella palmaeformis (Haas, 1912)	109		■■■	■■■	■■■	
Lokutella kondai Vörös, 1983	51		■■■	■■■		
Cirpa ? *subcostellata* (Gemmellaro, 1878)	1		■■■			
Cirpa ? cf. *subfurcillata* (Böse, 1898)	1				■■■	
Calcirhynchia ? *hungarica* (Böckh, 1874)	4		■■■	■■■		
Homoeorhynchia cf. *acuta* (Sowerby, 1816)	1				■■■	
Homoeorhynchia ? *lubrica* (Uhlig, 1880)	14		■■■	■■■		
Homoeorhynchia ? *ptinoides* (Di Stefano, 1891)	6		■■■	■■■		
Cuneirhynchia cf. *rastuensis* Benigni, 1978	1			■■■		
Pisirhynchia pisoides (Zittel, 1869)	34			■■■	■■■	
Pisirhynchia retroplicata (Zittel, 1869)	53		■■■	■■■	■■■	
Fenyveskutella vighi n. sp.	144				■■■	■■■
Fenyveskutella pseudouhligi n. sp.	14	■■■	■■■			
Fenyveskutella theresiae n. sp.	1				■■■	
Fenyveskutella aff. *vighi* n. sp.	1				■■■	
Kericserella inversaeformis (Schlosser, 1900)	11		■■■	■■■		
Nannirhynchia reynesi (Gemmellaro, 1874)	10				■■■	■■■
Nannirhynchia gemmellaroi (Parona, 1880)	93		■■■	■■■	■■■	
Nannirhynchia sinuata (Haas, 1912)	3				■■■	
Paronarhynchia bulga (Parona, 1893)	20				■■■	
Paronarhynchia estherae n. sp.	41				■■■	
Paronarhynchia ? cf. *verrii* (Parona, 1883)	3				■■■	■■■
Gibbirhynchia cf. *curviceps* (Quenstedt, 1858)	1	?	?	?		
Gibbirhynchia ? *orsinii* (Gemmellaro, 1874)	53		■■■	■■■		
Gibbirhynchia ? cf. *urkutica* (Böckh, 1874)	1		■■■			
Athyridida						
Amphiclinodonta liasina Bittner, 1888	1				■■■	
Koninckodonta cf. *waehneri* (Bittner, 1894)	16	?	?	?	■■■	
Koninckodonta fuggeri Bittner, 1894	122	?	?	?	■■■	
Koninckodonta eberhardi Bittner, 1888	3				■■■	
Spiriferinida						
Dispiriferina cf. *segregata* (Di Stefano, 1887)	2			■■■		
Liospiriferina alpina (Oppel, 1861)	12			■■■	■■■	
Liospiriferina cf. *brevirostris* (Oppel, 1861)	1				■■■	
Liospiriferina obtusa (Oppel, 1861)	1				■■■	
Liospiriferina sicula (Gemmellaro, 1874)	85		■■■	■■■	■■■	
Liospiriferina gryphoidea (Uhlig, 1880)	58	■■■	■■■	■■■	■■■	
Liospiriferina apenninica (Canavari, 1880)	2				■■■	
Liospiriferina aff. *handeli* (Di Stefano, 1887)	4		■■■			
Liospiriferina cf. *semicircularis* (Böse, 1898)	1				■■■	

Table 14. List of the brachiopod species from the Pliensbachian of the Bakony Mountains with the indication of the respective number of specimens and the stratigraphic distribution (Continuation)

Species	Number of specimens	Jamesoni Zone	Ibex Zone	Davoei Zone	Margaritatus Zone	Spinatum Zone
Spiriferinida						
Liospiriferina cf. *globosa* (Böse, 1898)	3		■■■			
Liospiriferina cf. *obovata* (Principi, 1910)	1				■■■	
Cisnerospira darwini (Gemmellaro, 1878)	19		■■■	■■■	■■■	
Cisnerospira meneghiniana (Canavari, 1880)	15		■■■	■■■	■■■	
Terebratulida						
Orthotoma apenninica (Canavari, 1883)	38				■■■	
Orthotoma aff. *apenninica* (Canavari, 1883)	3		■■■			
Lychnothyris rotzoana (Schauroth, 1865)	12			■■■	■■■	
Merophricus cf. *mediterraneus* (Canavari, 1883)	2			■■■	■■■	
Merophricus aff. *moreti* (Dubar, 1942)	1			■■■		
Hesperithyris renierii (Catullo, 1827)	14	■■■	■■■	■■■	■■■	
Hesperithyris ? cf. *costata* (Dubar, 1942)	1		■■■			
Lobothyris punctata (Sowerby, 1812)	1				■■■	
Rhapidothyris cf. *ovimontana* (Böse, 1898)	1		?	?		
Rhapidothyris delorenzoi (Böse, 1900)	1					■■■
Rhapidothyris beyrichi (Oppel, 1861)	6				■■■	
Rhapidothyris ? *lokutica* n. sp.	10				■■■	
Viallithyris gozzanensis (Parona, 1880)	208		■■■	■■■	■■■	
Eplenyithyris cerasulum (Zittel, 1869)	253		■■■	■■■	■■■	
Securithyris adnethensis (Suess, 1855)	886	■■■	■■■	■■■	■■■	
Securithyris filosa (Canavari, 1880)	81		■■■	■■■	■■■	
Securithyris paronai (Canavari, 1880)	4		■■■			
Linguithyris aspasia (Zittel, 1869)	1659	■■■	■■■	■■■	■■■	■■■
Linguithyris cf. *linguata* (Böckh, 1874)	1			■■■		
Buckmanithyris cornicolana (Canavari, 1881)	4				■■■	
Papodina bittneri (Geyer, 1889)	31		■■■	■■■	■■■	
Zeilleria mutabilis (Oppel, 1861)	48		■■■	■■■	■■■	
Zeilleria alpina (Geyer, 1889)	3		■■■			
Zeilleria bicolor (Böse, 1898)	11		■■■	■■■	■■■	
Zeilleria ? *aquilina* (Franceschi, 1921)	22		■■■	■■■	■■■	
Antiptychina ? *rothpletzi* (Di Stefano, 1891)	24		■■■	■■■	■■■	
Aulacothyris ? cf. *fuggeri* (Böse, 1898)	4		■■■	■■■	■■■	
Aulacothyris ? *ballinensis* (Haas, 1912)	14				■■■	
Bakonyithyris pedemontana (Parona, 1893)	100		■■■	■■■	■■■	
Bakonyithyris apenninica (Zittel, 1869)	109		■■■	■■■	■■■	
Bakonyithyris avicula (Uhlig, 1880)	19		■■■	■■■		
Bakonyithyris meneghinii (Parona, 1880)	3		■■■	■■■	■■■	
Bakonyithyris ovimontana (Böse, 1898)	158		■■■	■■■	■■■	
Bakonyithyris ? aff. *gastaldii* (Parona, 1880)	4				■■■	
Securina hierlatzica (Oppel, 1861)	1				■■■	

the Rhynchonelliformea, which existed in the Jurassic, are profusely represented, with the exception of the Thecideida. To the present knowledge, this fauna is one of the most diverse among the Pliensbachian brachiopod faunas of the Mediterranean faunal province and probably of the world. This is certainly due to the exceptional, detailed and voluminous collecting work.

As it was written in the Introduction, and stated in the title, this monograph is devoted to the description of brachiopods from the Pliensbachian from the Bakony Mountains. Nevertheless, exceptionally it was necessary to go beyond these limits.

In some cases uppermost Sinemurian specimens were used for serial sectioning, because these seemed more suitable than the Pliensbachian representatives of the same species. In one case a specimen found in the Vértes Mountains (neighbouring to the Bakony) was used for illustration, because it was much better preserved than the Bakony specimens. These circumstances will be indicated in the respective figure captions and plate explanations.

Five of the genera and seven of the species are described here as new taxa. Further seven species are considered to be new, but in the lack of sufficient material, they are described under open nomenclature prefixed by "aff.". The species are listed in Table 14, with the indication of the specimen number data and stratigraphic distribution.

Diverse aspects of the Pliensbachian brachiopod fauna of the Bakony Mountains were evaluated and published in the last decades (taxonomy: VÖRÖS 1970a, 1978, 1983a; palaeoecology, stratigraphy, palaeobiogeography: VÖRÖS 1970b, 1973, 1974, 1977, 1980, 1983b, 1986, 1987, 1988, 1993a, 1994, 2001; adaptation, extinctions and diversity changes: VÖRÖS 1993b, 1995, 2002, 2005, VÖRÖS & DULAI 2007).

Systematic palaeontology

Methods

Most of the brachiopod specimens were removed from the limestone matrix by hammering still in the course of the field work. In many other cases, the rock slabs, collected in the field, were disintegrated in the laboratory by using hammers and chisels; pincers were exceptionally useful. Some brachiopods were further prepared by electric vibration tools, or pneumatic needles. Due to the foliaceous or fibrous parting of the brachiopod shells, the outermost shell layer regularly remained attached in the matrix. The finest details of the surface ornamentation of the shells and the particulars of the beak region could be seen mostly in cases when the outer surface of the specimen was naturally coated by some kind of mineralization (Fe-Mn coating) what served as a detachment seam. Very rarely, silicified shells were dissolved from the limestone matrix by diluted acetic, or hydrochloric acids.

Because of the hard matrix, the internal morphology was revealed regularly by serial sectioning. Since the sectioned specimen was, at least partly, destroyed during the sectioning, in the first step of this technique, a cast for permanent documentation of the external features of the specimen was prepared. A silicon rubber mould was made by using Szilorka H–1 mass and H–10 catalyst. The elastic mould was filled with synthetic resin or (more frequently) with plaster. Afterwards, in most cases, the brachiopod specimen was heated and leaved to cool slowly. As a result of this, the internal shelly elements became whitened and the contrast between the skeleton and the matrix became accentuated. The burning was disastrous in some cases: the specimens filled with sparry calcite disintegrated and fell into pieces. Another drawback of the heating was that inside the whitened skeletal elements the boundary between the primary and secondary shell material became blurred, therefore the tiny features of some skeletal parts (inner hinge plates, crural bases) were masked by the callotest. Heating was not necessary when the matrix was markedly red, micritic limestone, making good difference to the shell material, but even then, the contrast was not so excellent than in many other cases of my practice, where the limestone matrix was more clayey or marly.

Then, in the process of serial grinding, the brachiopod was embedded, with a definite orientation, into plaster. As for the orientation, the suggestion by Ager (1956) was followed, i. e. the posterior part of the lateral commissure and the plane of symmetry of the specimen was kept vertical. The block of plaster (with the oriented brachiopod in it) was mounted on a steel plate (carrying platform) of the Cutrock-Croft parallel grinding instrument. This device keeps the orientation and grinds in very narrow intervals (down to 0.01 mm). In the practice, usually 0.1 mm intervals were used. The brachiopods were sectioned (ground) from the tip of the beak to the distal end of the brachidium. Depending on the size of the specimen, this means 50 to 250 intervals i. e. phases of ginding. In each phase, the actual cross section was examined; if some significant change appeared, the cross section was drawn and/or recorded by making cellulose acetate peels. Drawings of the transverse sections were made by binocular microscope supplied with a prism and a horizontal drawing tube, on sheets of paper. In the figures, the distances of the particular sections are given in millimetres, as measured from the tip of the ventral umbo (beak). In order to make easier the comparative studies of other Mesozoic brachiopod workers, the “traditional” orientation of the cross sections (i. e. the ventral valve up) is used in the present work, in contrast to the reverse orientation introduced in the “revised Treatise” (Savage et al. 2002).

Some specimens were heated for a longer time and higher temperature around their umbonal region for revealing the muscle scars. Due to the heating, the shell flaked away and the impressions of the adductor muscle scars became visible on the surface of the matrix of the internal mould.

The identification of the brachiopods was made by the classical method of comparing their morphology with the use of descriptions and illustrations in old and recent monographs and papers, as many as it was available. Additionally, between 1975 and 2000, I visited more than a dozen European palaeontological collections in order to make comparative studies on the holotypes and topotypical specimens of the important monographs. These are: Geological Museum, Geological

Institute of Hungary, Budapest; Geologische Bundesanstalt, Wien; Bayerische Staatssammlung, München; Paläontologisches Institut und Museum, Universität Zürich; Università di Torino; Università di Milano; Università di Padova; Università di Pisa; Università di Roma; Università di Napoli; Università di Palermo; Università di Catania; Natural History Museum, London.

In the systematic descriptions, the classification of the revised "Treatise" (SAVAGE et al. 2002, MACKINNON 2002, CARTER & JOHNSON 2006, LEE et al. 2006) is followed, except a few genera erected more recently, where the opinion of the respective authors was taken into consideration. In the descriptions of the external and internal morphology, the terms suggested in the "Treatise" (MOORE 1965), revised (WILLIAMS et al. 1997) and partly corrected (WILLIAMS 2000) in the "new Treatise" are used.

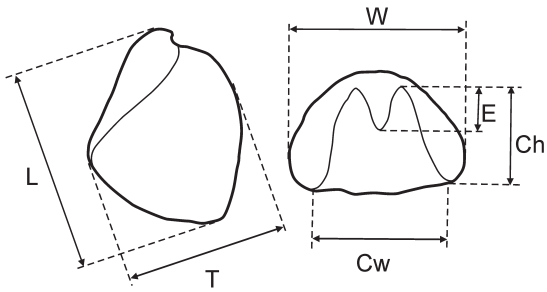


***Figure 27**.* The lines of measurements. L = length, W = width, T = thickness, Ch = height of the deflection in the anterior commissure, Cw = width of the deflection in the anterior commissure, E = depth of the sulcus in the plica

The overwhelming majority of the material is deposited in the collection of the Department of Geology and Palaeontology of the Hungarian Natural History Museum (HNHM), Budapest. The figured specimens are under the inventory numbers prefixed by "M". A few other figured specimens are kept in the collections of the Geological Institute of Hungary under the inventory numbers prefixed by „J".

The principal dimensions of the appropriate (more or less complete) specimens have been measured. The measurements (L = length, W = width, T = thickness, Ch = height of the deflection in the anterior commissure, Cw = width of the deflection in the anterior commissure, E = depth of the sulcus in the plica, see also in Fig. 27) are given in millimetres. Morphometrical analysis by simple scatter diagrams has been made only in reasonable cases, i. e. when it seemed to be useful in approval of homogeneity or separation of species.

Systematic descriptions

Phylum Brachiopoda DUMÉRIL, 1806
Subphylum Rhynchonelliformea WILLIAMS, CARLSON, BRUNTON, HOLMER & POPOV, 1996
Class Rhynchonellata WILLIAMS, CARLSON, BRUNTON, HOLMER & POPOV, 1996
Order Rhynchonellida KUHN, 1949
Superfamily Pugnacoidea RZHONSNITSKAIA, 1956
Family Basiliolidae COOPER, 1959
Subfamily Basiliolinae COOPER, 1959

Genus *Apringia* DE GREGORIO, 1886

The genus *Apringia* (as a subgenus of *Rhynchonella*) was described from the Toarcian to Aalenian sedimentary complex of the San Vigilio Oolite of the Southern Alps by DE GREGORIO (1886, p. 22) on the basis of numerous specimens divided into seven species and several nominal variants. The main distinctive difference of *Apringia* from "*Rhynchonella*" was the terebratulid-like appearance, i. e. the absence of ribbing. Some of DE GREGORIO's species are unisulcate (*R. mapra, R. ginga*) or rectimarginate (*R. fissicosta*) and may not belong to this definitely uniplicate group. *Apringia* was given a genus rank by AGER (1965) in the "old Treatise" (mistakenly placed into the Norellidae) and *A. giuppa* (DE GREGORIO, 1886) was designated as type species. This species is an average form of *Apringia*, with wide, uniformly arched uniplication and weak anterior ribbing in the fold. AGER et al. (1972), by its apparent external similarity to *Homoeorhynchia*, transferred *Apringia* to the Rhynchonellidae. Subsequently ROUSSELLE (1975), on the basis of internal morphology of specimens from the Toarcian of Morocco, showed that *Apringia* should belong to the family Pugnacidae, and this was endorsed by the "revised Treatise" (SAVAGE et al. 2002).

In the meantime, numerous possible representatives of *Apringia* were indicated and/or described from the Early Jurassic (VIGH 1943, VÖRÖS 1983b, 1994, 1997, DULAI 2003, SIBLÍK 2003a) and the Middle Jurassic (BENIGNI et al. 1982, VÖRÖS 1993, 2001b, ALMÉRAS & ELMI 1998, WIERZBOWSKI et al. 1999) widening the stratigraphical range of the genus from the Toarcian–Aalenian to a Sinemurian–Bathonian interval. At the same time, the morphological variety was also broadened, from completely smooth, globose and sharply uniplicate forms to variously ribbed, less biconvex species of very different adult size. This is obviously a too big cluster of species for a single genus and now *Apringia* is considered to be needed to split to more, new genera.

As for the Middle Jurassic, the most widespread species, tentatively attributed to the genus *Apringia* by several authors, "*R.*" *atla* OPPEL, 1863, may perhaps be moved from Basiliolinae to another subfamily. At least the form *A.* (?) *atla* (OPPEL, 1863), described by ALMÉRAS & ELMI (1998, p. 10) was referred to the subfamily Lacunosellinae on the basis of the falciform crura by ANDRADE (2006). Also, another *Apringia*-like new genus *Mondegia*, including ribbed morphotypes, was ranked into Lacunosellinae (ANDRADE 2006, p. 59).

On the other hand, the early and middle Liassic species known to me and previously attributed to the genus *Apringia* (VÖRÖS 1983b, 1994, 1997) all have hamiform (= prefalciform) crura and may remain in the Basiliolinae. An important, shared feature of them is the cone-like beak, without beak ridges and planareas, but, considering the very wide variations in the other characters of external morphology, they exceed the limits of a single genus. Therefore, in the present work, two new generic names are introduced for the large, antidichotomously ribbed and the anteriorly serrated forms, respectively. The generic name *Apringia* is here maintained for the usually strongly uniplicate (or "biplicate"), smooth or faintly ribbed species.

The genus *Apringia*, in this narrower sense, consists of the following lower and middle Liassic nominal species:

A. piccininii (ZITTEL, 1869, p. 125, pl. XIV, fig.7.)
A. aptyga (CANAVARI, 1880, p. 350, pl. III, fig. 7)
A. deltoidea (CANAVARI, 1880, p. 350, pl. IV, fig. 1)
A. paolii (CANAVARI, 1880, p. 69, pl. I, fig. 1)
A. diptycha (BÖSE, 1898, p. 203, pl. XIV, fig. 22; pl. XV, fig. 5)
A. misga (DE GREGORIO, 1930, p. 36, pl. VIII, fig. 17)
A. sghemba (DE GREGORIO, 1930, p. 36, pl. VII, figs. 16, 17; pl. VIII, fig. 18)
A. cerilla (DE GREGORIO, 1930, p. 34, pl. VIII, figs. 19, 20)
A. catapisa (DE GREGORIO, 1930, p. 38, pl. VIII, fig. 21)
A. busina (DE GREGORIO, 1930, p. 38, pl. VIII, figs. 23, 24)
A. striata (NUTSUBIDZE, 1949, p. 47, pl. I, fig. 7; pl. II, fig. 8)
A. barnabasi n. sp.

The six species described by DE GREGORIO (1930), some of which may be taken as synonyms, were attributed to *Rhynchonella* by their author, although their external similarity to *Apringia* is quite obvious. DE GREGORIO (1930, p. 36) emphasized that he was undecided if they were terebratulids or rhynchonellids (and this hesitation is expressed in the fact that some of his species were described as "*Terebratula*" in the text but were attributed to "*Rhynchonella*" in the explanation of plates). Exactly this aspect forced DE GREGORIO (1886) to create his *Apringia* ("J'ai propose ce sous-genre pour les térébratules qui se rapprochent trés-étroitement des rhynconelles…" l. c., p. 22) and it is interesting that forty years later he did not apply his own principle in the generic attribution.

Apringia piccininii (ZITTEL, 1869)
Plate I: 1–5; Figure 28.

* 1869 *Terebratula Piccininii*. Zitt. – ZITTEL, Central-Appenninen, p. 125, pl. XIV, fig. 7.
v 1874 *Terebratula Piccininii*, Zitt. – GEMMELLARO, Zona con Terebratula Aspasia, p. 64, pl. XI, fig. 4.
v 1880 *Rhynchonella aptyga*, nov. form. – CANAVARI, Suavicino, p. 69.
v 1880 *Rhynchonella aptyga* Canav. – CANAVARI, Strati a Terebratula Aspasia, p. 350, pl. III, fig. 7.
1943 *Rhynchonella giuppa* de Greg. – VIGH, Gerecse, p. 310, pl. III, fig. 31.
1943 *Rhynchonella giuppa* de Greg. var. chica de Greg. – VIGH, Gerecse, p. 310, pl. III, fig. 32.
? 1949 *Rhynchonella striata* nov. sp. – NUTSUBIDZE, Dzirula Massif, p. 47, pl. I, fig. 7, pl. II, fig. 8.
v 1983 *Apringia piccininii* (Zittel, 1869) – VÖRÖS, Stratigraphic distribution, p. 34.
v 1983 *Apringia aptyga* (Canavari, 1880) – VÖRÖS, Stratigraphic distribution, p. 34.
v 2007 *Apringia piccininii* (Zittel, 1869) – VÖRÖS & DULAI, Transdanubian Range, p. 55, pl. II, fig. 1.

Material: 23 double valves of mostly good state of preservation; some of them a bit fragmentary.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser/6	15.8	17.2	9.8	8.7
Kericser/7	20.7	22.0	12.0	9.6
	13.0	13.3	7.8	5.5
Kericser/18	13.1	13.5	8.1	5.4
Kericser/26	14.3	14.6	9.0	4.8

	12.5	11.8	7.1	4.6
Kericser/27	12.5	11.6	7.0	4.3
	11.8	12.2	6.4	3.4
Kericser II/k	12.3	11.8	7.3	5.0
	11.2	11.0	6.8	4.4
Kericser I/f	11.4	10.2	6.7	4.2
Kericser (scree)	10.8	8.6	6.0	3.3
Fenyveskút 5/a	17.7	17.2	10.7	7.5
	14.0	13.4	8.4	5.3
Fenyveskút 5/c	14.7	15.5	8.5	4.4
	12.7	12.6	7.6	4.2
	10.6	10.5	6.3	2.4
	10.6	10.7	6.1	2.7
Fenyveskút É	13.5	14.1	8.9	6.1
Fenyveskút D	14.0	15.2	9.0	7.0

Description:

External characters: This is a medium sized *Apringia* in average, though the size distribution covers a wide range. The outline is oval to subpentagonal. The lateral margins are straight to gently concave and diverge with an apical angle from 90° to 120°, increasing with the size of the specimens. The maximum width is attained at mid-length. The valves are almost equally convex; the maximum convexity lies near the middle of the length. The beak is suberect, slender, highly conical and pointed. The pedicle opening and the delthyrium is mostly covered by matrix but they must be tiny and very narrow. There are no beak ridges at all, neither planareas developed. The lateral parts are gently convex and the lateral commissures form a little elevated crest. In lateral view, the lateral commissures are nearly straight and run diagonally in ventral direction, where they pass gradually to the anterior commissure, forming a continuous curve. The anterior commissure is rather highly uniplicate showing an unbroken arch; its relative width somewhat increases during ontogeny. The valves are completely smooth; faint growth lines occur irregularly.

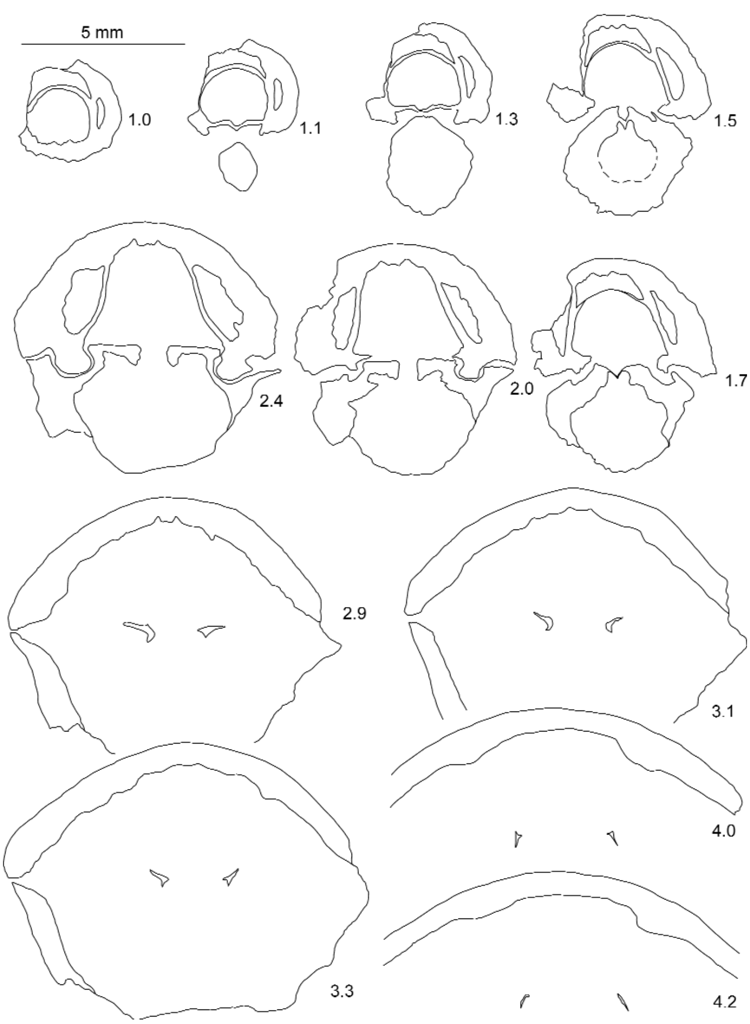


Figure 28. *Apringia piccininii* (Zittel, 1869). Twelwe transverse serial sections through the posterior part of a specimen from Kericser, Bed 7, Pliensbachian, Margaritatus Zone. M 2007.263.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 20.7 mm

Internal characters (Fig. 28): *Ventral valve*: The delthyrial cavity is subquadrate trapezium-like in cross-section, with ventral grooves connected with the muscle scars. The umbonal cavities are rounded triangular, but are largely filled with secondary shell material. The pedicle collar is well developed and rather long. The dental plates are convergent ventrally. The hinge teeth are massive, wide and almost smooth; denticula are present. The thin deltidial plates form a symphytium; the line of fusion forms a dorsally elevated crest. *Dorsal valve*: Cardinal process is not seen. The septalium is narrow and poorly developed. Median septum is absent. The outer socket ridges are massive and almost flat; accessory sockets are not seen. The inner socket ridges and the base of the hinge plates are strong, though this is partly due to thickening by secondary shell material. The hinge plates rise from the upper end of the inner socket ridges. They are horizontal, flat; thicken medially and terminate abruptly with a vertical plane. The crural bases emerge dorsally and give rise to crura of hamiform type which gently curve toward the ventral valve.

Remarks:

This smooth and usually small brachiopod was first described as a terebratulid, but the small and pointed beak, the fibrous structure of the shell and the internal morphology clearly show that it belongs to the order Rhynchonellida, and it is a typical representative of the genus *Apringia*. Previously, I also regarded "*Rhynchonella*" *aptyga* (CANAVARI, 1880) as a separate species, but the inspection of the type material at the collection in Pisa showed, that the two nominal species share the main morphological features and differ only in size. (N. B.: on the original label, CANAVARI wrote the name of the species as *aptycha*, instead of *aptyga*, clearly referring to the unbroken curve of the uniplication.) The size distribution of the Bakony specimens shows continuous range, connecting the two marginal morphotypes.

A. paolii differs from *A. piccininii* in its wider and mostly angular uniplication and its weak but regular ribbing. A remarkable, smooth Pliensbachian species, "*Rhynchonella*" *stachei* BÖSE, 1898 (BÖSE 1898, p. 192, pl. XIV, figs. 5–8, but particularly fig. 6) shows similar shape and arching of the anterior commissure, but the study of the original specimens in the München collection (Bayerische Staatssammlung) revealed that it has very marked beak ridges (not shown in the figures by BÖSE, l. c.), therefore it may not belong to *Apringia*. *A. piccininii* has close similarity to other smooth species of *Apringia*, e. g. *A. giuppa* (DE GREGORIO, 1886) (DE GREGORIO 1886, p. 23, pl. 14, fig. 7) and especially its variant *chica* (ibid., fig. 8) which is probably conspecific with *A. alontina* (DI STEFANO, 1884) (DI STEFANO 1884, p. 11, pl. 1, figs. 10–14) but these latter are Middle Jurassic representatives of the genus (Aalenian and Bathonian, respectively).

A rather similar *Apringia* was recorded from Timor by KRUMBECK (1923, p. 55, pl. CLXXIII, fig. 16) as "*Rhynchonella mefaensis* sp. nov.". It differs from *A. piccininii* by having three faint marginal folds in its uniplication.

Some specimens were figured (but not described) by VIGH (1943) as "*Rhynchonella giuppa*" and "var. *chica*" from the Gerecse (Hungary) from the Teke-hegy. Recent fieldwork has shown that the locality is a neptunian dyke of Hierlatz Limestone, penetrating Upper Triassic Dachstein Limestone. The dyke consists of two generations of infilling, of Sinemurian and Pliensbachian ages, respectively; Middle Jurassic did not occur. Therefore, VIGH's specimens may not belong to *A. giuppa*, but (judged from the illustrations by VIGH, l. c.) they are good representatives of *A. piccininii*.

"*Rhynchonella*" *striata* NUTSUBIDZE, 1949 (l. c.) probably belongs to *A. piccininii*; capillate ornamentation (mentioned and figured by NUTSUBIDZE (l. c.)) can be observed on some larger specimens of *A. piccininii* as well.

FAURÉ et al. (2007, p. 480, fig. 4A) described a brachiopod as *Apringia aptyga* (CANAVARI, 1880), which species is synonymized with *A. piccininii* here. The specimen, illustrated by FAURÉ et al. (l. c.), however clearly shows a parasulcate anterior commissure, in contrast to the uniplicate commissure of the members of *Apringia*, therefore it belongs very probably to the genus *Nannirhynchia*, perhaps as a large variant of *N. gemmellaroi* (PARONA, 1880).

Distribution:

Sinemurian (?) to Pliensbachian of Sicily and the Central Apennines (Italy), the Dzirula Massif (Caucasus, Georgia) and of the Gerecse Mts (Hungary). The Bakony specimens came from the Ibex to Spinatum Zones (Tables 13, 14).

Apringia barnabasi n. sp.
Plate I: 6, 7.

v 1898 *Rhynchonella Paolii* Canavari. – BÖSE, Brachiopodenfauna der östlichen Nordalpen, p. 191 (*partim*), pl. XIV, fig. 3 (*non* figs. 1, 2, 4).
v 1983 *Apringia paolii* (Canavari, 1880) – VÖRÖS, Stratigraphic distribution, p. 34 (*partim*).

Holotype: Hungarian Natural History Museum (Budapest), inventory number: M 2007.121.1.
Locus typicus: Lókút, Kericser section, Bed No. 26.
Stratum typicum: Crinoidal-brachiopodal Hierlatz Limestone, Pliensbachian, Ibex Zone.
Paratype: Hungarian Natural History Museum (Budapest), inventory number: M 2007.122.1.
Derivatio nominis: After the forename of Prof. Barnabás Géczy, as a tribute to his work on the Bakony Jurassic.
Diagnosis: Small sized *Apringia* with oval outline and drop-like shape. Beak suberect, pointed. No planareas. Lateral commissures straight, anterior commissure uniplicate. Plica low and wide, trapezium-like. Shell surface smooth.
Material: 5 rather well-preserved double valves filled with sparry calcite.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser/9	8.8	7.8	4.7	2.1
Kericser/13	10.2	9.8	5.6	1.8
	10.0	10.0	6.1	2.6
Kericser/16	12.5	11.7	7.5	3.0
Kericser/26	11.3	9.7	6.2	1.7

Description:

External characters: This is a small sized *Apringia*, with oval outline. The lateral margins are gently convex, and diverge with an apical angle of 90–100°. The maximum width lies at the anterior one-third of the length. The ventral valve is significantly more convex than the dorsal valve; the latter is somewhat flattened posteriorly. The above features together, provide a drop-like shape to the specimens. The pointed beak is suberect, nearly straight, slender and high; the beak ridges are very poorly defined. The details of the delthyrial region can not be observed. There are no planareas. The lateral parts are gently convex and the lateral commissures form a little elevated crest. The lateral commissures are nearly straight, gently diverges to ventral direction; at the anterolateral part, they sharply curve into the anterior commissure. The uniplication of the anterior commissure is trapezium-like: wide and rather low, with sharp lateral limits. The shell surface is totally smooth, except a few weak growth lines.

Internal characters: These were not studied owing to the lack of suitable material (all specimens are filled with sparry calcite).

Remarks:

The specimen figured by Böse (l. c., pl. XIV, fig. 3) as a smooth variant of "*Rhynchonella paolii*" probably represents this new species. Even Böse (l. c.) compared this smooth variant to the very similar form "*T. piccininii* Zittel", but, probably mislead by the prevalent opinion of those times that this latter was a terebratulid, he remained at the attribution of his smooth variant to "*R. paolii*". The study of Böse's type material in the Bayerische Staatssammlung (München) has shown that this specimen stands closer to *Apringia piccininii* than to *A. paolii*, and bears the characters of *A. barnabasi*.

A. barnabasi differs from *A. paolii* in its more elongate oval outline, the less convex dorsal valve with nearly flat umbonal region, and the absence of ribbing. The drop-shaped outline (maximum width at the anterior third), the less convex dorsal valve, and the low and trapezium-like uniplication of the anterior commissure separate *A. barnabasi* from *A. piccininii*.

Distribution:

Pliensbachian of the Northern Calcareous Alps and the Bakony Mts, where the specimens came from the Ibex to Margaritatus Zones (Tables 13, 14).

Apringia paolii (Canavari, 1880)

Plate I: 8–14; Plate II: 1-7; Figures 29, 30.

* 1880 *Rhynchonella Paolii*, nov. form. – Canavari, Suavicino, p. 69, pl. I, fig. 1.
1880 *Rhynchonella variabilis* Schl. sp. var. – Canavari, Strati a Terebratula Aspasia, p. 357 (*partim*), pl. IV, fig. 11 (*non* fig. 12).
? 1880 *Rhynchonella* n. f? – Canavari, Strati a Terebratula Aspasia, p. 357, pl. IV, fig. 13.
v 1889 *Rhynchonella Paoli* Canav. – Geyer, Hierlatz, p. 67, pl. VII, figs. 22, 23.
1893 *Rhynchonella laevicosta* Stur. m. s. – Böse, Hindelang, p. 644, pl. XV, fig. 1.
? 1895 *Rhynchonella Paolii* Can. – Fucini, Monte Pisano, p. 183, pl. VII, fig. 6.
1898 *Rhynchonella Paolii* Canavari. – Böse, Brachiopodenfauna der östlichen Nordalpen, p. 191, pl. XIV, figs. 1–4.
non 1932 *Rhynchonella* (*Rhactorhynchia* ?) *Paolii* sp. n. – Stefanini, Giuralias della Somalia, p. 112, pl. V, fig. 8.
v 1939 *Rhynchonella Paolii* Can. – Tricomi, Cozzo di Cugno, p. 5.
1943 *Rhynchonella paoli* Can. – Vigh, Gerecse, p. 345, pl. III, figs. 12–14.
v 1961 *Rh. paoli* Can. – Vigh, Esquisse géol. Gerecse, p. 576.
v 1983 *Apringia paolii* (Canavari, 1880) – Vörös, Stratigraphic distribution, p. 34.
1993 "*Rhynchonella*" aff. *paolii* Canavari, 1880 – Siblík, Steinplatte, p. 970, pl. 2, fig. 9.
2003 *Apringia paolii* (Canavari, 1880) – Dulai, Hettangian and Early Sinemurian, p. 8, pl. I, figs. 9–11.
2003 *Apringia paolii* (Canavari, 1880) – Siblík, Adnet, p. 74, text-fig. 1, text-fig. 3, 1a–d.
2003 *Apringia paolii* (Canavari, 1880) – Vörös et al., Schafberg, p. 78, pl. VIII, figs. 1–6.
2007 *Apringia paolii* (Canavari, 1880) – Vörös & Dulai, Transdanubian Range, p. 55, pl. II, fig. 2.
? 2008 *Apringia* ? *paolii* (Canavari, 1880) – Baeza-Carratalá, Patrimonio J. de Cisneros, p. 237, pl. XI, figs. 4–6.

Material: 249 specimens of variable state of preservation; most of them are medium or well preserved double valves. Disarticulated valves and incomplete specimens take less than ten percent of the material.

Localities	*Measurements (mm)*				*Localities*	*Measurements (mm)*			
	L	*W*	*T*	*Ch*		*L*	*W*	*T*	*Ch*
Kericser/7	13.9	15.2	9.8	5.4		11.8	10.7	6.4	2.8
	13.5	13.1	8.4	4.0		10.0	10.6	5.2	1.9
	12.4	12.3	7.5	4.0	Kericser/8	14.1	16.7	8.7	3.9

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
	13.5	14.0	8.4	6.1
	13.8	13.2	8.7	5.7
	11.6	9.9	7.3	3.0
	10.5	11.2	5.9	2.6
Kericser/9	12.5	12.4	6.9	3.7
Kericser/10	11.2	11.0	7.2	5.8
Kericser/11	21.2	17.8	12.0	9.0
	15.9	15.7	10.8	7.0
	13.5	14.2	8.6	5.2
Kericser/12	15.7	16.0	10.0	5.0
	10.5	12.7	6.2	1.6
Kericser/13	13.8	15.7	9.0	5.2
	13.9	14.0	8.5	3.8
	12.0	13.9	7.2	4.0
	13.2	11.6	6.0	2.5
Kericser/14	16.1	18.0	9.9	6.5
	14.0	15.5	9.1	5.0
	12.7	11.5	5.7	1.3
	10.7	11.5	6.5	2.5
Kericser/15	12.0	13.4	8.0	4.8
	12.4	13.2	7.1	3.8
	11.8	12.4	6.7	4.0
	12.0	11.1	8.0	4.7
	11.2	12.2	7.5	4.7
	11.0	11.4	7.0	3.8
	10.8	11.4	5.4	2.8
	10.2	10.7	6.8	3.0
	10.1	11.8	6.0	3.0
	8.9	10.1	4.6	1.4
	8.5	7.7	4.5	1.8
Kericser/16	15.5	17.4	9.6	5.2
	14.8	16.8	9.0	4.8
	16.4	14.0	9.8	4.5
	14.2	13.0	8.9	5.4
	13.0	13.6	7.3	4.7
	13.2	13.6	8.0	4.7
	13.5	12.1	7.5	5.6
	12.7	13.0	5.9	2.4
	10.6	9.5	6.7	3.5
	9.5	10.0	5.7	3.2
Kericser/18	15.3	15.7	8.8	6.2
	14.6	15.8	8.2	4.8
	14.0	14.3	8.3	3.7
	14.5	14.2	8.4	4.3
	13.5	14.1	8.1	5.0
	12.5	13.1	7.5	4.6
	12.4	12.4	6.8	3.6
	12.0	12.0	5.9	2.2
	11.5	12.2	6.2	3.0
	11.0	12.0	6.0	2.7
	9.9	9.4	5.4	1.9
Kericser/19	14.5	16.0	8.0	3.8
	13.5	13.6	8.8	5.8
	13.8	12.7	9.0	5.0
	12.0	12.0	7.4	4.4

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
	10.9	11.0	6.0	3.8
	9.0	8.8	5.0	2.2
	6.6	6.0	2.7	0.7
Kericser/20	14.0	15.6	9.0	6.5
	13.8	13.6	8.5	4.0
	11.8	13.0	7.2	4.2
	10.8	10.3	5.7	2.9
Kericser/21	14.2	15.5	8.8	5.5
Kericser/22	16.0	15.2	9.4	6.2
	13.0	14.6	7.9	4.5
Kericser/24	13.0	13.6	8.0	4.8
	8.9	9.8	4.5	1.4
Kericser/25	17.2	18.3	10.8	5.9
	16.6	19.5	11.8	5.0
	14.8	15.8	9.8	5.3
	13.7	15.0	9.4	4.5
	14.2	15.5	9.0	5.5
	13.9	15.0	8.9	5.2
	14.1	14.4	9.0	4.4
	13.6	15.6	8.2	6.0
	13.5	14.3	8.2	5.6
	12.8	13.3	7.6	4.3
	11.8	11.5	6.8	2.9
	10.7	10.4	5.1	2.1
Kericser/26	15.8	19.0	10.7	6.8
	14.1	15.8	8.7	4.8
	14.0	15.0	8.5	3.0
	13.0	15.0	7.5	3.4
	10.7	10.6	6.0	2.2
Kericser/27	16.4	17.0	9.4	4.7
	15.3	17.4	10.0	5.6
	15.5	15.8	8.8	5.2
	14.4	13.5	7.4	4.7
	13.1	13.8	8.1	4.3
	12.2	14.4	7.7	5.3
	11.5	10.9	6.8	5.0
	11.7	11.1	7.2	5.0
	10.8	11.0	6.0	4.2
	10.9	11.3	6.0	3.4
Kericser/28	13.5	13.2	8.1	4.3
	12.0	12.7	6.6	3.6
	12.0	11.3	7.3	5.9
	11.0	10.5	7.7	4.4
	11.0	11.3	6.5	3.4
	6.7	7.0	2.8	?
Kericser/29	15.0	14.8	8.6	2.5
	13.0	14.2	8.1	4.7
	14.0	13.6	9.1	6.5
	13.0	13.2	7.8	4.1
	11.9	12.1	7.2	3.8
Kericser/30	14.4	14.6	9.2	5.9
	13.1	13.8	9.2	5.3
	13.1	13.6	8.2	4.6
	12.5	11.7	6.8	2.7
Kericser/31	12.5	13.6	6.2	2.6

Localities	Measurements (mm)				Localities	Measurements (mm)			
	L	W	T	Ch		L	W	T	Ch
Kericser/32	15.6	16.3	8.1	3.3	Kericser II/f	9.2	9.1	5.5	2.2
	12.9	13.2	6.7	3.7	Kericser (scree)	14.5	14.9	8.6	7.2
Kericser/33	15.8	15.9	8.6	5.4		14.5	14.4	8.6	5.7
	15.0	15.1	8.8	5.1		13.3	14.0	8.3	4.1
	14.1	16.0	9.4	4.6		12.3	13.0	6.5	3.6
	13.0	12.0	7.4	3.7		12.1	12.8	7.2	5.9
	11.7	11.4	5.7	3.0	Fenyveskút 5/c	16.2	18.0	10.5	7.0
	8.5	9.9	5.1	3.0		14.8	15.5	9.3	6.2
Kericser/34	13.9	14.7	8.4	4.8		15.0	15.1	9.3	6.6
	13.9	13.9	8.3	4.9		14.4	15.1	8.8	3.3
	13.0	11.9	8.9	4.0		15.0	14.4	9.5	7.2
Kericser/36	17.6	18.5	11.1	7.0		14.0	14.0	9.5	6.2
Kericser I/a	15.6	16.0	8.5	5.0		11.5	12.4	5.4	1.8
Kericser I/f	16.7	17.5	10.3	8.2	Fenyveskút 7	6.7	6.3	2.8	0.6
	14.0	15.5	8.2	3.0	Fenyveskút (scree)	16.8	16.1	9.7	9.4
	12.4	12.0	7.5	5.3		14.8	14.6	8.8	7.0
	11.8	12.5	7.4	3.8		14.0	14.4	8.5	6.8
	11.1	11.6	7.1	3.7		12.4	14.0	8.4	3.8
	11.4	11.6	6.6	4.4	Papod 82	12.5	14.6	8.0	5.5
	11.3	12.1	5.2	2.4		12.0	14.1	6.6	4.1
	10.2	10.3	6.7	3.6		11.7	13.0	7.5	5.1
	10.2	10.9	5.3	2.0	Mohoskő (1 m)	15.1	13.6	9.2	5.2
	8.8	8.6	4.1	1.5	Mohoskő f.	10.0	11.4	4.8	1.5
Kericser II/a	13.3	13.7	9.4	4.7	Közöskút/21	13.7	13.6	8.2	6.3
	11.0	11.5	6.5	3.0		15.5	17.8	9.3	6.8
	10.1	10.4	5.0	2.3		13.2	14.3	7.7	5.1
	8.7	8.9	4.3	1.5		12.3	12.8	8.0	5.8
Kericser II/k	17.5	18.6	11.0	8.9		12.1	12.7	8.0	5.0
	13.4	14.9	7.6	4.0		12.7	12.1	6.8	4.3
	13.0	15.6	8.4	4.2		12.5	12.9	7.7	4.6
	13.1	13.9	7.8	5.7		12.3	12.5	6.9	3.7
	13.0	13.0	8.5	7.6		11.7	11.9	6.7	5.2
	12.8	13.0	7.0	4.9		11.6	11.7	7.5	4.0
	12.0	13.1	8.0	4.2		11.0	11.7	6.4	4.3
	11.4	11.0	7.5	3.7		9.7	9.8	6.4	3.0
	11.3	10.9	5.5	2.4		9.8	9.7	5.3	2.9
	9.2	8.0	3.7	0.5					

Description:

External characters: This is a medium to large sized *Apringia* with rounded subpentagonal outline (tending to oval in juvenile specimens). Typically, the anterior parts of the lateral margin (the shortest sides of the pentagon) are gently concave. The lateral margins of the adult specimens are nearly straight and diverge with an apical angle from 95° to 110°. The maximum width lies around the middle of the length. The valves are usually almost equally convex; in some cases the dorsal valve is slightly more convex than the ventral valve. The maximum convexity is attained near the middle of the length. The beak is suberect, characteristically cone-shaped and pointed. The pedicle opening is covered by matrix; the delthyrium is rarely seen, it has a form of an equilateral triangle. The beak ridges are insignificant, very rounded; planareas are not developed. The lateral surface of the double valves are gently convex; the lateral commissures form a little elevated crest. In lateral view, the lateral commissures are nearly straight, or a little arched dorsally, and run diagonally in ventral direction, where they join the anterior commissure with a rather sharp angle. The anterior commissure is uniplicate. The shape of the uniplication is variable from a simple, rather high arch to a rather low and wide, trapezium-like curve. The width of the arched type of uniplication a little exceeds the half of the total width of the specimen, whereas the trapezoidal type of uniplication may attain the four-fifth of the total width. The valves are ornamented with faint ribs and thin, irregularly spaced growth lines. The ribbing is variable. Typically, on the majority of the specimens, the thread like ribbing runs through the surface starting from the umbo and increasing in strength anteriorly. Their number seems to be constant during growth, it may attain 40 and about one-third of them lies in the fold (uniplication). In rare, less typical cases, the ribbing is much coarser and the number of costae in the fold is around five. Even in these more strongly costate specimens, the ribs are blunt, and the amplitude of the multiplication of the anterior commissure remains low. Very rarely, the costulation starts at mid-length and the umbonal region is almost smooth.

Internal characters (Figs. 29, 30): *Ventral valve*: The delthyrial cavity is subquadrate trapezium-like in cross-section; the umbonal cavities are rounded triangular. Pedicle collar was not recorded. The dental plates are convergent ventrally. The hinge teeth are massive, wide and almost smooth; denticula were not recorded. Deltidial plates were not recorded, probably due to the poor preservation of the two sectioned specimens. *Dorsal valve*: Cardinal process is not recorded. The septalium is narrow and poorly seen. Median septum is absent. The outer socket ridges are massive. The inner socket ridges and the base of the hinge plates are thin. The hinge plates raise from the upper end of the inner socket ridges. They are horizontal and flat. The posterior part of their medial termination is bifurcate in cross section The crural bases emerge dorsally and give rise to crura of hamiform (or subfalciform) type.

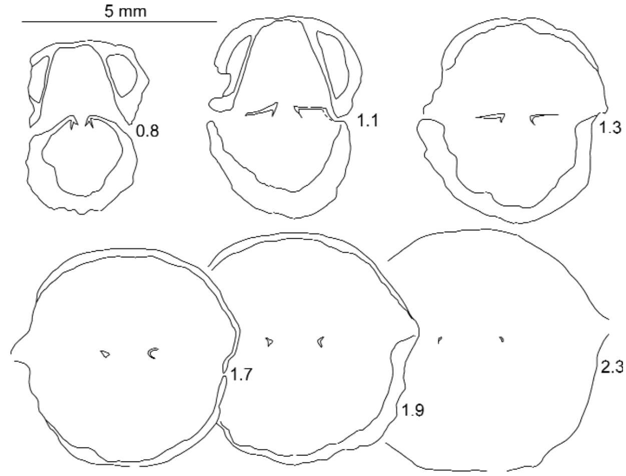


Figure 29. *Apringia paolii* (CANAVARI, 1880). Six transverse serial sections through the posterior part of a specimen from Közöskút, Bed 21, Pliensbachian, Ibex Zone. M 2007.264.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 16.0 mm

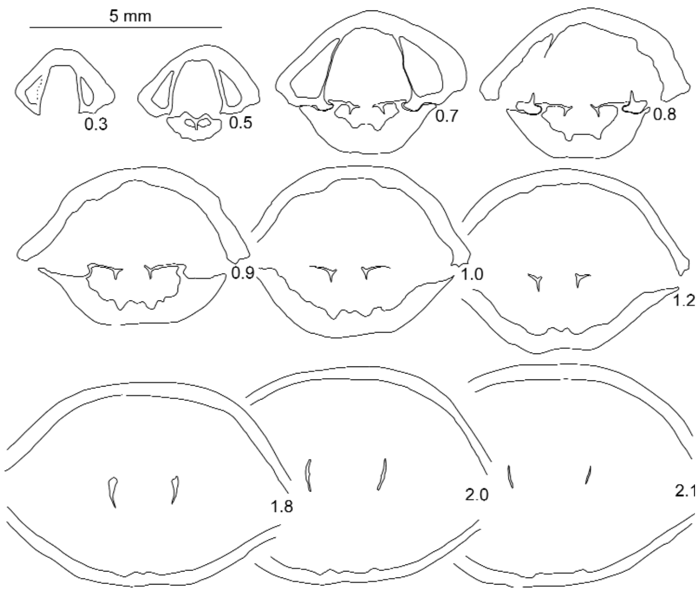


Figure 30. *Apringia paolii* (CANAVARI, 1880). Ten transverse serial sections through the posterior part of a specimen from Kávás-hegy I, Bed 84, Late Sinemurian. M 2007.265.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 11.7 mm

Remarks:

This is perhaps the most typical, average species of the genus *Apringia* in the Pliensbachian. In CANAVARI's original description *A. paolii* was illustrated by a specimen with very faint ribs disappearing posteriorly (CANAVARI 1880a). Remarkably, in another work published in the same year, CANAVARI (1880b) introduced two forms, seemingly very similar to *paolii*, under the name "*Rhynchonella variabilis* Schl. sp. var.", and figured them as var. *laevis* and var. *plicata* (pl. IV, figs. 11 and 12, respectively). Subsequent authors (e. g. GEYER, l. c., BÖSE, l. c.), in the possession of larger material, illustrated a wider variation of the ornamentation of *A. paolii*, from almost smooth specimens to moderately coarsely ribbed ones. GEYER (l. c.) and FUCINI (l. c.) even synonymized both specimens figured by CANAVARI (1880b) as "*R. variabilis* Schl. sp. var." with *A. paolii*. On the other hand, BÖSE (l. c., p. 191) regarded only CANAVARI's var. *laevis* as belonging to *A. paolii*, whereas var. *plicata* was considered to be a representative of BÖSE's new species "*Rhynchonella fraudatrix*" (BÖSE, l. c., p. 190). This opinion is accepted here.

The specimen figured as "*Rhynchonella* n. f?" by CANAVARI (1880b) was not encountered in the Museum of the Pisa University, but on the basis of the figures it may represent the strongly ribbed variant of *A. paolii*.

The not very well illustrated species "*R*." *laevicosta* of GEYER (1889, p. 67, pl. VII, figs. 22, 23) has strong similarity to *A. paolii*, as it was stressed also by GEYER. Later authors seem to often confuse the two, and in many cases the attribution can not be proved or rejected only on the basis of the published figures. Perhaps the only exception is the record by BÖSE (l. c.) which portrays a very typical *A. paolii* under the name *laevicosta*.

The illustrations by later authors (see list of synonymy) endorsed the concept of the variable character of ornamentation in *A. paolii*. The records by TRICOMI (1939) and VIGH (1961) have been confirmed in the collections of the Palermo University and the Geological Institute of Hungary (inventory number J. 448), respectively. The specimen figured by SIBLÍK (l. c.) shows a somewhat irregular ribbing. BAEZA-CARRATALÁ (2008) portrayed three specimens questionably ascribed to *A. paolii*, however, the character of the ribbing of these seems to be too regular and strong, and they may stand closer to the genus *Jakubirhynchia* TOMAŠOVÝCH, 2006.

The specimens figured in the present monograph fit well into the range of variation of the ornamentation (from nearly smooth to moderately ribbed), the only exception is the specimen figured in Pl. II, fig. 1. On this almost completely smooth specimen, the faint ribs appear only on the flanks and not in the fold, as it is usual with *A. paolii*. This deviation was not considered to be enough to introduce a new taxon, because the other features of the mentioned specimen are shared with *A. paolii*.

The species name *paolii* was introduced by Stefanini (l. c.) for a morphologically different brachiopod from the Middle Jurassic of Somalia, in a trinomen "*Rhynchonella* (*Rhactorhynchia* ?) *paolii*". It was a secondary junior homonym of *Rhynchonella paolii* Canavari,1880, but, since *Rhactorhynchia* has been raised to generic rank, Stefanini's species name is not to be rejected (ICZN, Article 57.4).

A. piccininii and *A. barnabasi* stand close to the almost smooth representatives of *A. paolii*, but their general shapes are different, being more slender and drop-shaped, in contrast to the robust, subpentagonal form of *A. paolii*.

Distribution:

Sinemurian (?) to Pliensbachian of Sicily, the Central and Northern Apennines (Italy), the Northern Calcareous Alps (Austria), the Betic Cordilleras (Spain) and Gerecse and Bakony Mts (Hungary). The Pliensbachian specimens of the Bakony came from numerous localities from the Ibex to Spinatum Zones (Tables 13, 14).

Apringia diptycha (Böse, 1898)
Plate II: 8–14; Figure 31.

v 1874 *Rhynchonella Mariottii*, Zitt. – Gemmellaro, Zona con Terebratula Aspasia, p. 84.
v 1880 *Rhynchonella Mariottii* Zitt. – Canavari, Strati a Terebratula Aspasia, p. 352 (partim), pl. IV, fig. 2 (non fig. 3).
v ? 1895 *Rhynchonella juliana* Neri. – Fucini, Monte Pisano, p. 188, pl. VI, fig.19.
v * 1898 *Rhynchonella diptycha* nov. sp. – Böse, Brachiopodenfauna der östlichen Nordalpen, p. 203, pl. XIV, fig. 22, pl. XV, fig. 5.
1910 *Rhynchonella Mariottii* Zittel. – Principi, Castel del Monte, p. 83, pl. III, fig. 12.
v 1911 *Rhynchonella diptycha,* Böse. – De Toni, Vedana, p. 19, pl. I, fig. 4.
? 1930 *Terebratula cerilla* De Greg. – De Gregorio, M. San Giuliano, p. 34, pl. VIII, figs. 19, 20.
1930 *Terebratula misga* De Greg. – De Gregorio, M. San Giuliano, p. 36, pl. VIII, fig. 17.
1930 *Terebratula sghemba* De Greg. – De Gregorio, M. San Giuliano, p. 36, pl. VII, figs. 16, 17, pl. VIII, fig. 18.
1930 *Rhynchonella busina* De Greg. – De Gregorio, M. San Giuliano, p. 38, pl. VIII, figs. 23, 24.
v 1961 *Rh. diptycha* Böse – Vigh, Esquisse géol. Gerecse, p. 577.
v 1983 *Apringia mariottii* (Zittel, 1869) – Vörös, Stratigraphic distribution, p. 34.
v 1994 *Apringia mariottii* – Vörös, Umbrian Liassic brachiopods, p. 361.
v 1997 *Apringia mariottii* (Zittel) – Vörös, Jurassic brachiopods of Hungary, p. 15, Appendix: fig. 14.
v 2003 *Apringia* cf. *diptycha* (Böse, 1898) – Vörös et al., Schafberg, p. 78, pl. VIII, figs. 10–12.
v 2007 *Apringia diptycha* (Böse, 1898) – Vörös & Dulai, Transdanubian Range, p. 55, pl. II, fig. 3.

Material: 172 mostly well preserved specimens. Disarticulated valves and incomplete specimens take less than five percent of the material.

Localities	*Measurements (mm)*				
	L	*W*	*T*	*Ch*	*E* (*episulcus*)
Kericser/7	12.5	12.1	8.0	5.6	1.3
Kericser/13	13.0	13.7	8.6	8.4	2.0
Kericser/14	12.7	12.7	8.5	8.3	1.7
	9.9	10.6	5.9	5.1	1.8
Kericser/15	13.5	14.6	8.2	7.1	1.0
	11.7	13.0	8.5	5.6	2.3
	10.4	11.0	6.5	4.0	?
	10.5	10.0	7.0	6.3	0.7
Kericser/16	12.2	13.0	8.3	8.0	?
	13.0	13.7	9.2	8.4	3.0
	12.2	13.4	8.4	7.4	2.6
	11.7	12.3	7.8	6.8	?
	11.3	12.2	7.1	4.1	1.0
	11.9	12.2	7.7	5.0	?
	11.5	11.6	7.5	6.4	2.0
	11.1	10.9	7.3	6.4	1.9
	10.6	11.2	6.2	4.5	?
	9.8	11.7	6.1	3.7	0.8
Kericser/17	13.4	13.7	8.3	6.5	2.1
Kericser/18	15.0	16.2	9.4	8.4	2.9
	12.6	13.0	7.9	5.7	?
	10.6	10.8	7.1	6.0	2.2
Kericser/19	13.4	13.9	9.0	7.9	3.5
	13.8	14.8	8.4	6.5	1.3
	12.8	12.5	7.7	6.1	1.3
	11.9	12.5	8.2	6.4	0.7
Kericser/20	12.5	11.7	8.4	9.2	3.7
	12.3	11.8	8.2	8.4	3.1
	11.3	11.5	7.2	7.3	1.4
	11.8	10.9	8.0	8.1	2.9
	11.1	12.3	7.0	5.4	1.4
	9.7	10.4	6.6	5.6	1.7

Localities	*Measurements (mm)*				
	L	*W*	*T*	*Ch*	*E* *(episulcus)*
Kericser/21	12.3	12.8	7.5	6.6	1.0
	11.3	12.5	7.2	6.3	2.9
	11.6	11.1	8.0	7.3	2.4
	11.0	11.0	7.7	7.2	2.6
	11.2	10.9	6.7	6.5	2.4
Kericser/22	12.7	12.4	7.5	7.1	2.6
	12.0	11.8	9.0	7.5	2.8
	10.5	10.8	7.5	7.2	1.6
	10.6	10.3	5.7	3.6	1.0
	9.4	8.8	5.3	3.8	0.9
Kericser/23	11.7	11.0	7.6	7.0	1.5
	11.7	11.7	7.0	6.0	1.0
Kericser/24	13.5	13.9	8.9	6.8	1.5
	13.0	13.8	8.5	7.7	3.3
	12.2	12.2	7.8	6.8	1.6
	10.5	10.8	6.4	5.8	2.0
	9.8	11.0	6.5	6.2	1.9
	8.8	8.9	5.2	2.6	0.3
Kericser/25	13.6	12.9	9.2	9.3	1.5
	13.0	12.6	8.5	6.9	2.8
	12.8	12.1	8.0	7.4	2.7
	12.1	12.5	8.3	8.2	3.2
	12.0	10.9	8.0	8.1	3.2
	12.1	11.9	8.7	6.0	1.9
	11.6	12.2	8.4	8.0	2.1
	12.2	11.4	8.2	8.2	2.3
	11.5	12.0	7.0	5.1	2.1
	12.1	11.5	7.6	5.9	2.0
	11.7	11.3	7.9	6.9	2.0
	10.2	9.8	7.1	6.7	1.5
Kericser/26	14.3	12.9	9.2	8.1	2.6
	12.5	14.0	8.0	7.1	2.2
	12.4	13.4	9.3	8.4	3.4
	12.6	12.7	7.7	6.6	1.1
	12.5	12.5	7.4	7.3	2.6
	12.2	12.6	8.9	8.3	0.6
	12.7	12.2	8.1	6.4	1.9
	12.5	12.4	8.3	7.0	2.2
	10.9	10.9	7.2	5.6	1.7
	10.8	10.2	7.5	6.9	?
Kericser/27	13.3	14.2	9.1	9.9	3.1
	13.0	13.6	9.0	8.0	0.4
	11.8	13.0	8.7	6.9	2.4
	13.7	12.3	8.1	7.8	2.0
	12.8	13.1	8.1	9.0	4.1
	12.9	12.8	9.1	9.2	3.7
	12.2	13.3	8.3	7.2	2.0
	11.4	12.0	7.8	7.6	2.3
	12.4	11.6	8.6	7.6	1.6
	11.8	12.2	7.7	6.8	2.6
	11.8	11.8	7.6	7.2	1.5
	11.4	11.0	7.5	6.3	?
	10.8	10.6	7.5	6.6	2.2
	10.0	10.5	6.4	5.5	1.6

Localities	*Measurements (mm)*				
	L	*W*	*T*	*Ch*	*E* *(episulcus)*
Kericser/28	12.5	12.4	8.8	7.9	1.0
	12.0	10.7	7.9	6.4	1.8
	10.7	11.3	6.5	4.0	0.7
Kericser/29	12.3	12.9	8.0	7.0	?
	11.7	11.8	7.1	6.2	1.6
	11.2	11.7	8.1	8.5	4.1
	10.9	12.0	7.7	7.5	2.5
Kericser/30	10.9	11.0	7.2	6.8	1.9
Kericser/31	12.7	11.8	8.2	7.8	3.1
Kericser/32	13.5	13.5	9.2	7.5	4.0
Kericser/33	12.8	12.2	8.8	8.0	3.8
	11.5	12.2	8.3	7.6	4.1
	11.9	12.0	7.6	5.3	1.3
	11.0	11.4	7.7	6.1	1.9
	11.4	10.8	7.5	5.5	1.0
	10.8	10.1	7.1	6.2	1.7
Kericser/34	11.7	10.8	8.0	8.1	1.4
	9.8	10.0	7.1	6.2	1.8
	10.3	9.7	7.0	6.5	3.5
Kericser/35	12.4	13.2	8.5	7.5	?
	11.5	12.8	7.5	7.7	2.4
Kericser I/f	13.2	12.7	8.0	7.6	?
	12.0	11.7	8.2	7.3	2.4
	11.3	11.0	7.5	6.8	2.4
Kericser II/a	13.8	14.0	8.3	6.3	2.0
	14.0	13.0	6.6	4.8	1.7
	12.0	13.1	7.8	5.4	1.0
	12.0	11.8	7.9	7.0	3.6
Kericser II/k	11.8	12.6	8.5	7.5	2.7
	12.2	12.6	8.1	8.0	3.0
	12.5	11.4	8.4	7.2	2.2
	10.7	11.4	7.4	7.0	2.7
	10.9	10.8	7.5	6.9	1.8
	9.1	9.7	5.2	2.9	0.2
Kericser II/f	13.8	14.6	8.2	8.3	2.4
Kericser (scree)	13.9	12.4	8.1	7.3	2.0
	10.6	11.2	6.3	4.8	1.2
	10.9	11.2	6.8	5.2	?
	10.7	10.0	6.4	3.4	?
Papod 86	10.4	10.3	6.3	5.4	2.5
Papod 87	14.0	15.9	9.4	9.8	5.6
	11.7	11.5	7.1	6.7	2.1
Fenyveskút 5/c	14.4	13.7	9.0	7.5	2.5
	13.7	13.4	9.8	8.4	2.6
	12.9	12.7	9.6	8.7	1.0
	12.2	12.3	8.1	8.0	0.7
	10.6	10.8	7.4	5.2	?
Fenyveskút É	11.2	11.0	7.3	6.5	1.3
Fenyveskút (scree)	13.3	13.5	9.8	9.8	4.4
	13.6	13.2	9.7	9.8	2.6
	12.0	13.5	8.1	7.5	2.1
	12.7	12.5	8.3	8.8	?
	11.4	12.9	7.7	5.7	?
	11.0	12.2	8.1	8.1	3.9

Description:

External characters: This is a medium sized *Apringia* with characteristically subpentagonal outline. The lateral margins are usually gently concave and diverge with an apical angle of around 105°. The maximum width is attained at mid-length. The valves are almost equally convex; the maximum convexity lies near the posterior one third of the length. The lateral parts of the valves regularly form a wing-like extension which appears as a protrusion in lateral view. The cone-shaped beak is suberect, slender, and highly pointed. The pedicle opening and the delthyrium are mostly covered by matrix but the latter, if seen, has a form of a low equilateral triangle. There are no beak ridges at all, neither planareas developed. The lateral parts are gently convex and the lateral commissures form a little elevated crest. In lateral view, the lateral commissures are nearly straight, or a little arched dorsally, and run diagonally in ventral direction, where they join the anterior commissure with a rather sharp bend. In rare cases, the anterior part of the lateral commissure is gently sinuous. The anterior commissure is highly plicate (typically sulciplicate). In some specimens, the degree of sulciplication is very low (Pl. II, 12) or a simple, sharp uniplication appears (Pl. II, 8). Even more rarely, a third, asymmetric plica may develop (Pl. II. 13). The surface of the shells are smooth, except the gentle anterior folds connected to the plicae of the commissure. Ribs are not seen; even the specimen with the sinuous lateral commissure (Pl. II, 14) is smooth.

Internal characters (Fig. 31): *Ventral valve*: The delthyrial cavity is subquadrate in cross-section, with a ventral groove connected with the muscle scars. Pedicle collar was not recorded. The umbonal cavities are rounded triangular, but are largely filled with secondary shell material. The dental plates are subparallel. The hinge teeth are massive and wide; denticula are seen. Symphytium is present. *Dorsal valve*: Cardinal process is not seen. Median septum is absent. Instead a septalium, fused hinge plates appear. The outer socket ridges are well developed. The inner socket ridges and the base of the hinge plates are thin. The hinge plates raise from the upper end of the inner socket ridges; they are horizontal, gently convex ventrally. The crural bases emerge dorsally and give rise to crura of hamiform type.

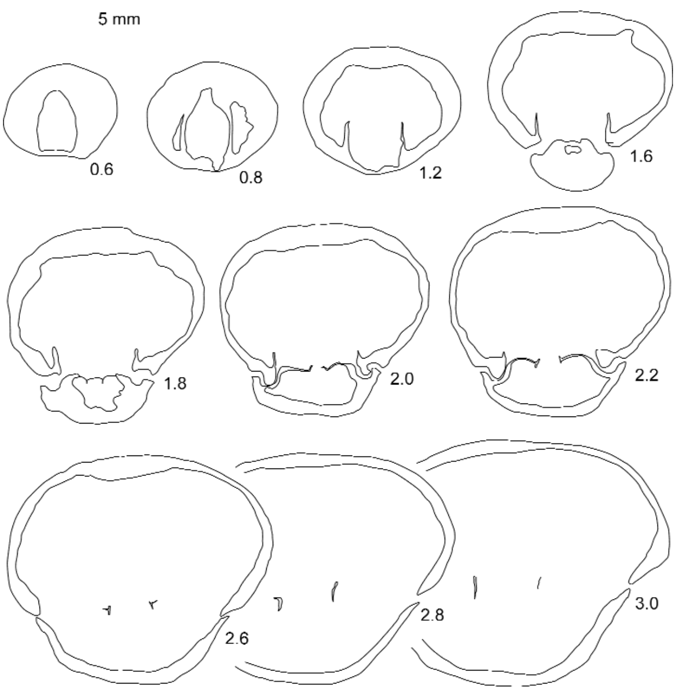


Figure 31. *Apringia diptycha* (BÖSE, 1898). Ten transverse serial sections through the posterior part of a specimen from Kericser, Bed 33, Pliensbachian, Ibex Zone. M 2007.266.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 13.3 mm

Remarks:

A. diptycha has been very frequently confused with the similarly sulciplicate (biplicate in former usage) *A.* ? *mariottii* (ZITTEL, 1869), which, however, has definite ribbing on its flanks, therefore its attribution to *Apringia* (in strict sense) is doubtful. I have also been mislead for a long time by this apparent similarity (VÖRÖS 1983b, 1994, 1997) worsen by the low quality of the original figures by BÖSE (l. c.), and has wrongly used the name *mariottii* for all "biplicate" *Apringia*. Finally, the examination of BÖSE's type material in the Bayerische Staatssammlung (München) has proved that the completely smooth *A. diptycha* has to be taken as a true, independent species. The records of "*mariottii*" by GEMMELLARO (l. c.) and CANAVARI (l. c.) have been checked in the respective collections at Palermo and Pisa, and turned to belong to *A. diptycha*. The original specimens of VIGH (1961, l. c.) have been inspected in the collection of the Geological Institute of Hungary (inventory number J. 218); they are mostly biplicates, but there is one specimen with three and some others with one deflection.

The specimen figured by FUCINI (l. c.) as "*Rhynchonella juliana* NERI" was seen in the Museum of the Pisa University; it strongly resembles *A. diptycha* but it is a somewhat aberrant individual therefore its specific identity is not convincing.

Some of DE GREGORIO's nominal species (*T. misga, T. sghemba, R. busina*), despite the low quality of the original figures, may be ranked into *A. diptycha*, whereas "*T. cerilla*" may represent the variant of the same species with a single fold in the anterior commissure.

A. diptycha has an apparent similarity to some "biplicate" Toarcian species of *Soaresirhynchia*, e. g. *S. bouchardii* (DAVIDSON, 1852) (previously referred to *Stolmorhynchia*, see in AGER 1962, pl. XI, figs.7–9) and *S. flamandi* (DUBAR, 1931) (see in ALMÉRAS et al. 2007, p. 63, pl. 3, figs. 10–16). The generic difference in their internal morphology and the time gap in their stratigraphic distribution however suggest that this is a case of a heterochronous homoeomorphy.

Distribution:

Sinemurian (?) to Pliensbachian of Sicily, the Central and Northern Apennines and the Southern Alps (Italy), the Northern Calcareous Alps (Austria). The Pliensbachian specimens of the Bakony came from many localities, from the Jamesoni(?) or Ibex to the Margaritatus Zones (Tables 13, 14).

Apringia deltoidea (CANAVARI, 1880)
Plate III: 3, 4.

* 1880 *Rhynchonella deltoidea* Mgh. ms. – CANAVARI, Strati a Terebratula Aspasia, p. 350, pl. IV, fig. 1.
v 1983 *Apringia deltoidea* (Canavari, 1880) – VÖRÖS, Stratigraphic distribution, p. 34.
v 2007 *Apringia deltoidea* (Canavari, 1880) – VÖRÖS & DULAI, Transdanubian Range, p. 55.

Material: Two nearly complete, rather well preserved specimens.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser/12	22.5	16.2	6.9	4.3
Kericser/25	10.4	12.0	5.4	3.6

Description:

External characters: Small to medium sized *Apringia* with subpentagonal to subtrigonal outline. The lateral margins are straight to gently convex and diverge with an apical angle of about 110°. The maximum width is attained at mid-length. The dorsal valve is a little more convex than the ventral one; the maximum convexity lies in the posterior one third of the length. The lateral parts of the valves tend to form a flat wing-like extension which emerges ventrally in lateral view. The beak is nearly straight to suberect, conical and pointed. The pedicle opening is tiny; the delthyrium is narrow. There are no beak ridges or planareas. The lateral commissures run on a little elevated crest. In lateral view, the lateral commissures are nearly straight, or a little arched ventrally, and run diagonally in ventral direction, where they join the anterior commissure with a gentle curve. The anterior commissure is uniplicate. The plica forms a very low and gentle arch and bears two or three minor folds. The surface of the shells are smooth, except the gentle anterior folds connected to the plicae of the commissure.

Internal characters: These were not studied by serial sectioning because of the paucity of the material. The partly broken beak of the larger specimen shows the trace of a dental plate converging ventrally.

Remarks:

This rare species was described by CANAVARI (l. c.) on the basis of a small specimen with low and gently folded uniplication,. The observation of the specimen in the Museum of the Pisa University confirmed the validity of CANAVARI's figures.

A. deltoidea, is the less convex species of the genus *Apringia*; this character separates it very clearly from the most closely comparable *A. diptycha* (BÖSE, 1898).

Distribution:

Pliensbachian of the Central Apennines (Italy). The Pliensbachian specimens of the Bakony came from Kericser, from the Ibex and Davoei Zones (Tables 13, 14).

Genus *Serrataprinqia* n. gen.

Type species: Serrataprinqia fraudatrix (BÖSE, 1898)

Diagnosis: Medium to large sized rhynchonellids with subpentagonal outline; mostly straight lateral margins diverge with 110°; biconvex, maximum convexity at mid-length. Beak suberect to erect; no beak ridges, no planareas. Lateral parts gently convex, with crest along lateral commissures. Anterior commissure highly uniplicate, serrated, trapezoidal to arched. Strong costae, constant in number (4 to 5 in the fold), increasing in strength. Delthyrial cavity subquadrate, trapezoidal, massive hinge teeth, denticula present. No median septum; hinge plates slender, horizontal, flat. Crural bases emerge dorsally; crura hamiform.

Derivatio nominis: After the serrated anterior margin (serra <latin> = saw)

Nominal species:

S. fraudatrix (BÖSE, 1898, p. 190, pl. XIII, figs. 36, 37.)
? *S. mariottii* (ZITTEL, 1869, p. 129, pl. XIV, fig. 17)
? *S. suetii* (HAAS, 1884, p. 9, pl. II, fig. 9.)
? *S. tella* (DE GREGORIO, 1930, p. 38, pl. VIII, figs.16, 22)

Discussion: Serrataprigia belongs definitely to the subfamily Basiliolinae on the basis of its general shape and internal features (absence of the median septum, slender, horizontal hinge plates, hamiform crura), and is obviously closely allied to *Apringia*. The deeply serrated anterior commissure is the most diagnostic difference distinguishing *Serrataprigia* from *Apringia*.

Strong anterior ribbing appears also on the Toarcian–Aalenian *Almorhynchia* OVCHARENKO, 1983, attributed to Basiliolinae in the revised Treatise (SAVAGE et al. 2002, p. 1199). Taking into account the short description given in the Treatise (l. c.), *Almorhynchia* differs from *Serrataprigia* (beyond the disjunct stratigraphic range) in having a low, feebly defined fold, which is high and well-marked in *Serrataprigia*, and the well-developed pedicle collar and septal pillar which are absent in *Serrataprigia* .

The regularly serrated anterior commissure is the most important feature separating *Serrataprigia* from *Megapringia* (n. gen., introduced in the present work) which has a quite different ornamentation.

S. ? *mariottii* (ZITTEL, 1869) has definite ribbing not only in its fold and sulcus but on its flanks which seems to exclude it from *Apringia*, but is not enough to ascribe it definitely to *Serrataprigia*. The same holds partly true for *S.* ? *tella* (DE GREGORIO, 1930) where the low quality of the figures poses a further difficulty to the objective decision.

From the above point of view, it is worth mentioning the possible relationship of the species *S.* ? *mariottii* (ZITTEL, 1869) to *Saubachia* SIBLÍK, 1999, described from the Hettangian of the Northern Calcareous Alps. At first glance this genus is similar to *Apringia*, especially its "biplicate" specimens, figured by SIBLÍK (1999, pl. 2, figs. 3 and 5). They are smooth posteriorly and their lateral commissures show zigzag deflections, just as *S.* ? *mariottii*. On the basis of its internal morphology, *Saubachia* belongs to the family Wellerellidae. Serial sectioning of *Serrataprigia* ? *mariottii* would be needed to reveal its possible attribution to *Saubachia*.

Distribution: Pliensbachian of the Northern Calcareous Alps (Austria), Bakony (Hungary) and probably of Sicily, Central Apennines and the Southern Alps (Italy).

Serrataprigia fraudatrix (BÖSE, 1898)
Plate III: 1, 2; Figure 32.

? 1880 *Rhynchonella variabilis* Schl. sp. var. – CANAVARI, Strati a Terebratula Aspasia, p. 357 (partim), pl. IV, fig. 12 (non fig. 11).
v * 1898 *Rhynchonella fraudatrix* nov. sp. – BÖSE, Brachiopodenfauna der östlichen Nordalpen, p. 190, pl. XIII, figs. 36, 37.
v 1983 *Apringia fraudatrix* (Böse, 1898) – VÖRÖS, Stratigraphic distribution, p. 34.
v 2007 *Apringia fraudatrix* (Böse, 1898) – VÖRÖS & DULAI, Transdanubian Range, p. 55, pl. II, fig. 8.

Material: Ten specimens of variable state of preservation.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser/5	15.5	16.1	10.6	8.0
Kericser/6	13.4	14.0	?	8.5
Fenyveskút 5/c	11.8	13.5	8.4	6.6
	11.5	12.6	?	6.2
Fenyveskút É	17.5	16.6	12.8	12.7
	12.6	13.6	8.8	7.7
	12.5	13.6	9.0	7.7
Kőris-hegy A/3	14.5	13.8	11.0	11.2

Description:

External characters: This is a medium sized *Serrataprigia* with rounded subpentagonal outline. The lateral margins are usually gently concave and diverge with an apical angle from 105° to 120°. The maximum width is attained at around the posterior one-third of the length. The maximum convexity lies near the mid-length. The cone-shaped beak is suberect to erect. The dorsal valve is uniformly and strongly convex. The ventral valve is somewhat resupinate: convex in lateral view, but concave in anterior view. This is due to a deep ventral sulcus, starting from the posterior one fifth of the valve. Here the ventral umbo emerges rather abruptly from the surrounding concave region. The pedicle opening is mostly covered by matrix; the delthyrium has a form of a low equilateral triangle. There are neither beak ridges, nor planareas. The posterior segment of the lateral parts are depressed but toward the lateral corners they become gently convex and the lateral commissures run on a little elevated crest throughout. In lateral view, the lateral commissures are sigmoidal; arched dorsally in the posterior segment, and pass gradually to the anterior commissure with a continuous curve. In accordance with the ribbing, the anterior part of the lateral commissure is gently sinuous. The anterior commissure is highly uniplicate, serrated and forms an unbroken arch. The amplitude of the sharp zigzag deflections increases toward the centre of the fold. The anterior part is slightly distorted in some specimens (e. g.: Pl. III, 2), i. e. the top (centre) of the fold is displaced from the plane of symmetry. The posterior surface of the shells is smooth; ribs appear at around the mid-length. The ribbing remains weak on the lateral flanks but in the central fold and sulcus the costae become very strong toward the anterior margin. The number of costae remains constant (4–5) in the fold, where the ribbing shows a characteristic fan-shaped pattern.

Internal characters (Fig. 32): *Ventral valve*: The delthyrial cavity is subquadrate trapezium-like in cross-section; with ventral grooves connected with the muscle scars. The umbonal cavities are rounded triangular. The pedicle collar is well developed. The dental plates are convergent ventrally. The hinge teeth are massive, wide, crenulation is not visible; denticula are present. The deltidial plates were not recorded. *Dorsal valve*: Cardinal process and septalium were not recorded. Median septum is absent. The outer socket ridges are massive; accessory sockets are not seen. The inner socket ridges and the base of the hinge plates are slender. The horizontal and flat hinge plates raise from the upper end of the inner socket ridges. The crural bases start to evolve rather posteriorly; they emerge dorsally and give rise to crura of hamiform (or subfalciform) type.

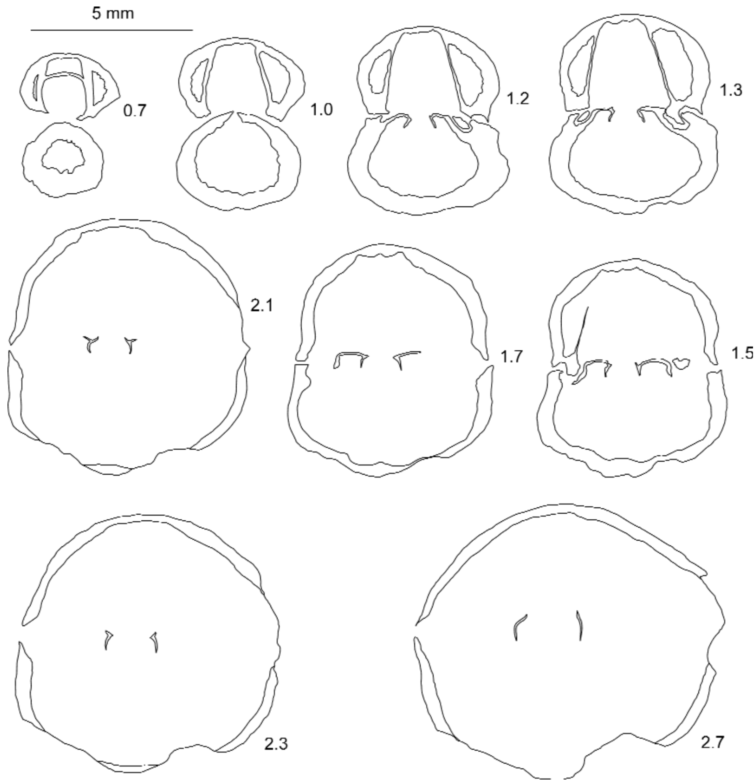


Figure 32. *Serrataprimgia fraudatrix* (Böse, 1898). Nine transverse serial sections through the posterior part of a specimen from Kericser, Bed 5, Pliensbachian, Spinatum Zone. M 2007.267.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 15.5 mm

Remarks:

This is the type species of the genus *Serrataprimgia* introduced in the present work and shows the strongly serrated anterior commissure, the most diagnostic feature which separates the new genus from *Apringia*.

Canavari (1880b) described two rhynchonellids under the name "*Rhynchonella variabilis* Schl. sp. var.", and figured them as var. *laevis* and var. *plicata* (pl. IV, figs 11 and 12, respectively). Subsequently, Böse (l. c., p. 191) regarded Canavari's var. *laevis* as belonging to *A. paolii*, whereas var. *plicata* was considered to be a representative of Böse's new species "*Rhynchonella fraudatrix*" (Böse, l. c., p. 190). Böse's figured types have been examined in the Bayerische Staatssammlung (München) and the specific identity of the Bakony specimens with *S. fraudatrix* was approved. In my previous works this species was kept still in the genus *Apringia*.

Distribution:

Pliensbachian of the Northern Calcareous Alps (Austria), the Bakony Mts (Hungary) and probably of the Central Apennines (Italy). The Pliensbachian specimens of the Bakony came from three localities, from the Margaritatus and Spinatum Zones (Tables 13, 14).

Serrataprimgia ? cf. *suetii* (Haas, 1884)
Plate VI: 5–7; Figure 33.

*1884 *Rhynchonella Suetii* Haas. – Haas, Südtyrol und Venetien, p. 9, pl. II, fig. 9.
1983 *Apringia* ? cf. *suetii* (Haas, 1884) – Vörös, Stratigraphic distribution, p. 34.
2007 *Apringia* ? cf. *suetii* (Haas, 1884) – Vörös & Dulai, Transdanubian Range, p. 55, pl. II, fig. 7.

Material: Six specimens; three disarticulated shells and three partly incomplete double valves.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Fenyveskút 5/c	21.1	22.7	14.9	12.5
Fenyveskút (scree)	19.9	19.0	12.6	10.5

Description:

External characters: This is a large *Serratapringia* with subpentagonal outline. The lateral margins are straight and diverge with an apical angle of about 110°. The maximum width is attained at around the middle of the length. The two valves are nearly equally convex; the maximum convexity lies at the mid-length. The beak is mostly broken but seems to be suberect. There are no beak ridges, planareas did not develop. The lateral parts are gently convex and the lateral commissures form a little elevated crest. In lateral view, the lateral commissures are nearly straight, or a little arched dorsally, and run diagonally in ventral direction, where they join the anterior commissure with a rather sharp bend. In large specimens, the anterior part of the lateral commissure shows zigzag deflections. The anterior commissure is markedly uniplicate, and intensely but uniformly serrated. The shape of the uniplication is high trapezoidal; the horizontal segment is almost straight or tends to be arched dorsally. Both valves are costate throughout, including the umbonal parts. The ribs became significantly stronger toward the anterior margin, while their number remains more or less constant; intercalating ribs are seen only occasionally. The number of ribs is 6 to 11 on the dorsal valve, from which 4–5 fall to the central fold. Irregularly spaced growth lines occur.

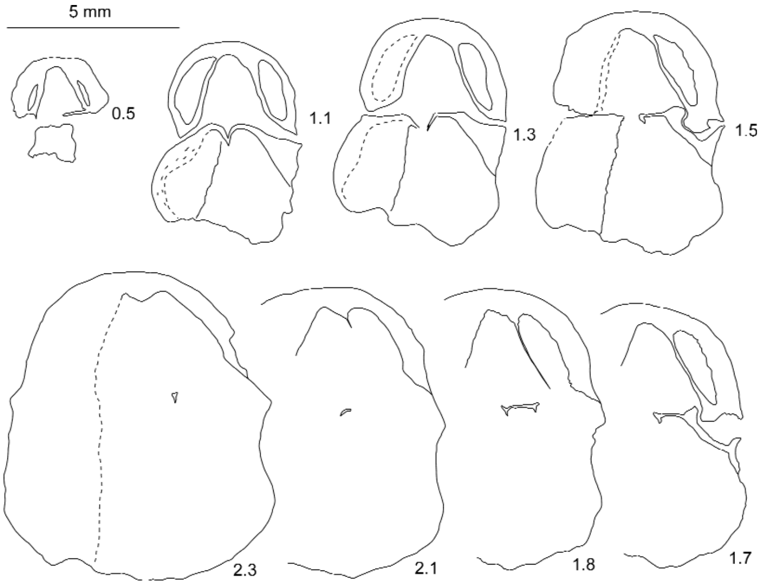


Figure 33. *Serratapringia suetii* (Haas, 1884). Eight transverse serial sections through the posterior part of a specimen from Fenyveskút, scree, Pliensbachian, Margaritatus Zone. M 2007.273.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 19.8 mm. The left side of the specimen was filled with sparry calcite therefore the skeletal structure was blurred

Internal characters (Fig. 33): *Ventral valve*: The delthyrial cavity is subquadrate, narrow trapezium-like in cross-section. The umbonal cavities are rounded triangular, but are partly filled with secondary shell material. The dental plates are convergent ventrally. The hinge teeth are massive, wide and almost smooth; denticula are present. Pedicle collar and deltidial plates have not been recorded. *Dorsal valve*: The septalium is narrow and poorly developed. Median septum is absent. The outer socket ridges are high; accessory sockets are not seen. The inner socket ridges are strong. The slender hinge plates are horizontal and flat, and raise from the middle of the inner socket ridges. The crural bases start to evolve rather posteriorly and emerge dorsally. The crura are incomplete (poorly preserved) but seem to be of hamiform type.

Remarks:

This is a rarely cited species; in the specific identification I had to rely on the documentation given by Haas (l. c.). However, the similarity of the Bakony specimens (especially Pl. VI, 7) to that figured by Haas (l. c.) is convincing.

By its size *S. suetii* seems to approach the genus *Megapringia* (n. gen, introduced herein), but the character of the ribbing speaks in favour of its attribution to *Serratapringia*. In my previous works this species was kept still in the genus *Apringia*.

Distribution:

Pliensbachian of the Southern Alps (Italy) and the Bakony Mts (Hungary). The Pliensbachian specimens of the Bakony came from two localities, from the Margaritatus(?) Zone (Tables 13, 14).

Genus *Megapringia* n. gen.

Type species: Megapringia stoppanii (Parona, 1880).

Diagnosis: Large to very large sized rhynchonellids with subpentagonal outline; mostly straight lateral margins diverge with apical angle of around 100°; biconvex, maximum convexity at mid-length. Beak suberect to erect; blunt beak ridges, ill-defined planareas. Lateral parts gently concave, with crest along lateral commissures. Anterior commissure uniplicate, trapezoidal to asymmetric. Antidichotomous ribbing, numerous (5–14) posterior ribs; 0 to 5 zigzags on the anterior commissure. Delthyrial cavity subquadrate, trapezoidal. No median septum; septalium deep, well-developed. Hinge plates thin, horizontal, flat. Crural bases emerge dorsally; crura hamiform.

Derivatio nominis: After the large size (mega- <greek> = large).

Nominal species:

M. stoppanii (PARONA, 1880, p. 201, pl. II, fig. 6)
M. undata (PARONA, 1880, p. 200, pl. II, fig. 5)
M. altesinuata (BÖSE, 1898, p. 204, pl. XV, figs. 6, 7)
? *M. margaritati* (BÖSE, 1898, p. 201, pl. XIV, fig. 21, pl. XV, fig. 1)
? *M. atlaeformis* (BÖSE, 1898, p. 202, pl. XV, figs. 2–4)

Discussion: Megapringia is a typical representative of the subfamily Basiliolinae on the basis of its general shape and internal features (absence of the median septum, thin, horizontal hinge plates, hamiform crura), and is closely allied to *Apringia*. The above listed species were ranked into *Apringia* in my previous works. The significantly larger size and the characteristic antidichotomous ribbing are the most diagnostic differences distinguishing *Megapringia* from *Apringia.* Representatives of *Serratapringia* n. gen. may also reach rather large sizes but their regular ribbing clearly distinguishes them from *Megapringia*.

M. atlaeformis (BÖSE, 1898) is perhaps the largest Lower Jurassic species of the "*Apringia*-clan" therefore it was tentatively placed here into *Megapringia*, though the absence of the diagnostic antidichotomous ornamentation makes this attribution questionable. The position of *M.* ? *margaritati* (BÖSE, 1898), a possible juvenile of *M. atlaeformis*, is also doubtful, for the same reason.

Distribution: Pliensbachian of the the Southern Alps (Italy), Northern Calcareous Alps (Austria) and the Bakony (Hungary).

Megapringia stoppanii (PARONA, 1880)
Plate III: 5–8; Plate IV: 1–4; Figures 34, 35.

1880 *Rhynchonella undata* n. sp. – PARONA, Gozzano, p. 200, pl. II, fig. 5.
* 1880 *Rhynchonella Stoppanii* n. sp. – PARONA, Gozzano, p. 201, pl. II, fig. 6.
1893 *Rhynchonella Stoppani,* Par. – PARONA, Revisione Gozzano, p. 28, pl. II, fig. 12.
1898 *Rhynchonella Stoppanii* Parona. – BÖSE, Brachiopodenfauna der östlichen Nordalpen, p. 201, pl. XIV, figs. 18, 19.
1967 *Prionorhynchia undata* (Par.) – SACCHI VIALLI & CANTALUPPI, Nuovi fossili di Gozzano, p. 80, pl. XI, figs. 9, 10.
v 1983 *Apringia* ? *stoppanii* (Parona, 1880) – VÖRÖS, Stratigraphic distribution, p. 34.
v 1997 *Apringia* ? *stoppanii* (Parona) – VÖRÖS, Jurassic brachiopods of Hungary, p. 15, Appendix: fig. 15.
v 2007 *Apringia* ? *stoppanii* (Parona, 1880) – VÖRÖS & DULAI, Transdanubian Range, p. 55, pl. II, fig. 4.

Material: 66 specimens of variable state of preservation; mostly double valves, one third of them incomplete.

Localities	*Measurements (mm)*				
	L	*W*	*T*	*Ch*	*Cw*
Kericser/6	24.7	26.8	14.6	7.5	23.1
	24.0	24.7	14.5	7.7	20.5
Fenyveskút p2	28.2	32.7	16.2	8.5	28.3
	24.0	23.4	15.8	8.6	20.8
	22.4	22.0	13.4	5.5	19.3
	19.5	21.5	10.4	3.2	19.0
	16.8	15.3	10.9	4.5	13.0
Fenyveskút 5/c	19.0	18.2	10.7	6.0	17.0
	17.5	19.7	9.5	6.3	17.0
	14.7	13.5	7.7	4.0	11.6
	13.2	13.4	7.1	3.0	12.0
	11.3	11.0	7.0	1.7	9.4
	9.6	10.3	5.6	2.1	9.4
Fenyveskút 5/a	12.0	11.8	7.1	4.8	9.7
	11.0	10.4	5.6	1.5	7.8
Fenyveskút (scree)	15.1	18.0	8.3	3.0	15.0
	12.7	12.3	6.8	3.5	10.3
	23.9	23.3	15.7	8.0	21.5
	24.1	24.6	14.4	5.5	22.8
	22.1	24.0	12.0	6.0	22.9
	19.6	19.5	12.3	7.3	16.5
	18.0	20.4	10.5	7.0	19.0
	17.5	21.1	10.4	6.6	18.8
	18.1	19.2	10.4	7.0	16.6
	18.5	18.8	9.2	2.0	15.5
	15.1	17.6	9.9	2.0	15.0
	10.4	9.0	5.0	1.2	7.6

Description:

External characters: This is a very large *Megapringia*, with variable subpentagonal outline. The outline may be elongated to laterally expanded or even "axiniform" and tends to be oval in juvenile specimens. The lateral margins of the adult specimens are straight or gently concave and diverge with an apical angle from 75° to 105°. The maximum width lies near the anterior one-third of the length, rarely at around the middle of the length. The valves are usually almost equally convex. The maximum convexity is attained near the middle of the length, though the maximum convexity lies anteriorly in the dorsal valve, whereas the ventral valve is more convex posteriorly. The beak is suberect to erect, pointed, but low, depressed.

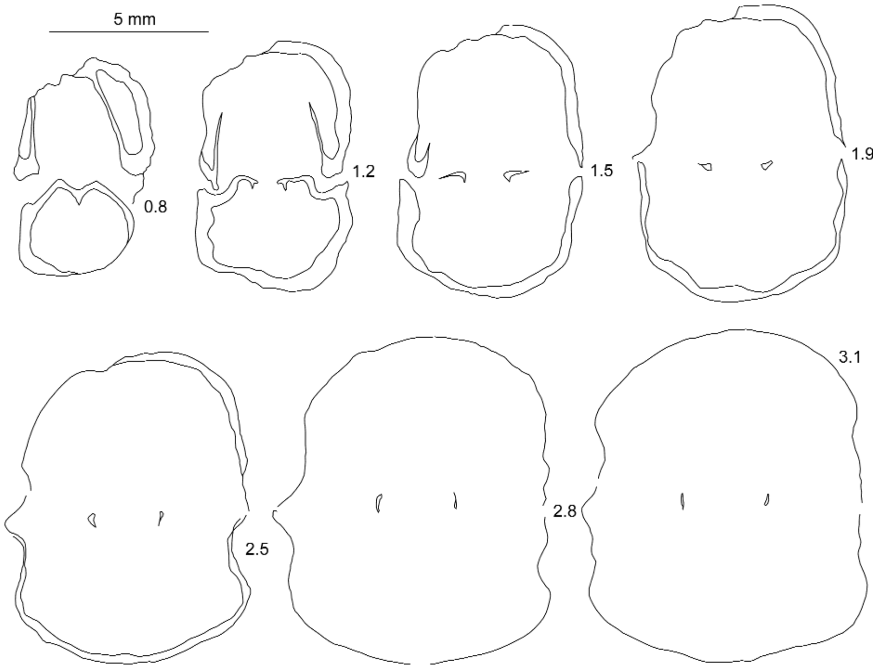


Figure 34. *Megapringia stoppanii* (PARONA, 1880). Seven transverse serial sections through the posterior part of a specimen from Fenyveskút, p2, Pliensbachian, Margaritatus Zone. M 2007.269.1. Distance from posterior end of shell is given in mm. Original length of the specimen is over 20 mm

The pedicle opening is mostly covered by matrix, but minute; the delthyrium is rarely seen, it is very small and has a form of a high equilateral triangle. There are blunt beak ridges in both valves delimiting ill-defined planarea-like surfaces. These lateral areas of the double valves are generally flat, rarely a little concave; the lateral commissures usually form a little elevated crest. In lateral view, the lateral commissures are nearly straight, or very slightly sigmoidal, and run diagonally in ventral direction, where they join the anterior commissure with a continuous bend. The anterior commissure is uniplicate. Typically, the uniplication has a rather low and wide, trapezium-like shape, with gently sinuous horizontal segment (Plate IV, 2 and 4). In other cases the plica may be higher and asymmetric, with oblique horizontal part, which may be less sinuous or even straight. The valves are ornamented with peculiar, antidichotomous system of ribs. Numerous (8 to 14) blunt ribs start at the umbones; their number increases by bifurcation, and, beyond the mid-legth, may reach 18. Near the anterior margin the ribs disappear and a comarginal smooth belt develops. The anterior commissure may be smooth or gently sinuous (in typical cases: Pl. IV, 2 and 4); the number of sinuous deflections (0 to 5) usually does not correlate with the strength or number of the posterior ribbing. There is a considerable variability in the strength and character of the posterior ribbing, the width of the smooth belt and the development of the anterior commissure. There are almost smooth forms with rather high and asymmetrical anterior commissure (Pl. III, 5, 7; Pl. IV, 1) and entirely ribbed specimens with straight anterior commissure (Pl. III, 8).

Internal characters (Figs. 34, 35): *Ventral valve*: The delthyrial cavity is ventrally rounded subquadrate trapezium-like in cross-section. The umbonal cavities are rounded triangular. Pedicle collar and deltidial plates were not observed. The dental plates are convergent ventrally. The hinge teeth are narrow, slender; denticula are present. *Dorsal valve*: Cardinal process is not seen. The septalium is deep, well developed. Median septum is absent. The outer socket ridges are narrow; accessory sockets are not seen. The inner socket ridges and the base of the hinge plates are strong posteriorly. The hinge plates raise from the upper end of the inner socket ridges. They are horizontal, flat; thicken medially; the posterior part of their medial termination tends to be bifurcate in cross section. The crural bases emerge dorsally and give rise to crura of hamiform type.

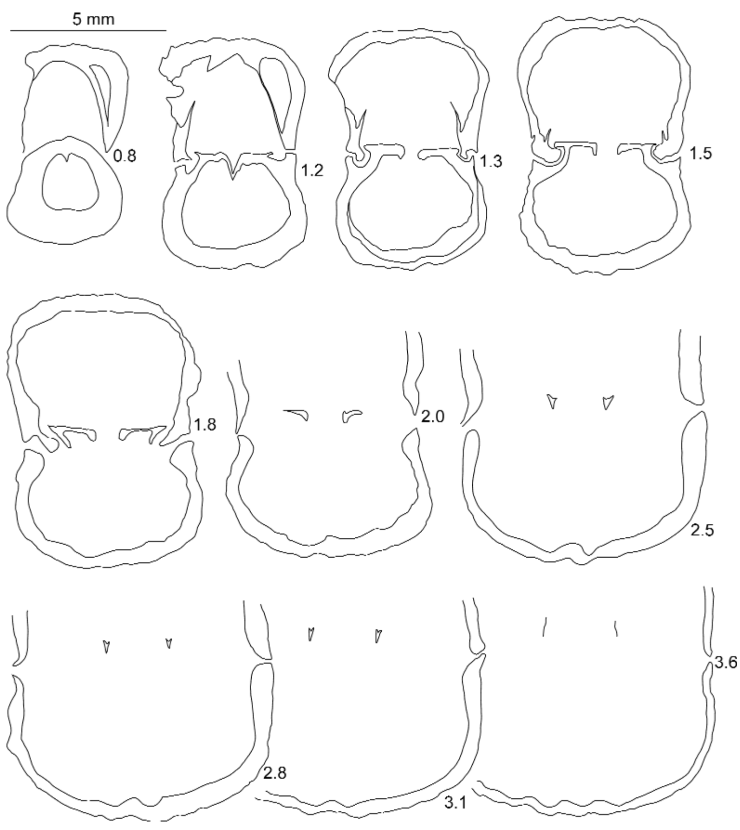


Figure 35. *Megapringia stoppanii* (PARONA, 1880). Ten transverse serial sections through the posterior part of a specimen from Kericser, Bed 6, Pliensbachian, Spinatum Zone. M 2007.268.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 24.3 mm

Remarks:

Parona (1880) described and figured two closely related forms as "*R. undata*" and "*R. stoppanii*" whose similarity was stressed even by himself. Later, in the revision of the Gozzano fauna (Parona 1893), after studying a more plentiful material, he united the two forms under the name *stoppanii*. By application of the rule of page priority, the name *undata* would be applicable (described on p. 200, while *stoppanii* on p. 201, in Parona 1880), but in the present case it is obvious to use of the principle of the first reviser, who was Parona (1893). Therefore, the renewed use of the name *undata* by Sacchi Vialli & Cantaluppi (1967) is not justified.

The great variability of this species, mentioned and documented by Parona (1893) and Böse (1898), was observed in the Bakony material as well, and is demonstrated in the present work. The more expanded variant with low and wide, gently sinuous unplication is regarded as typical, whereas the more elongated and convex morphotypes with higher and frequently asymmetrical uniplication seem to approach to *Megapringia altesinuata* (Böse, 1898). The main difference is that the unplication of the latter species is higher and show sharp zigzag deflections of high amplitude.

Megapringia margaritati (Böse, 1898) is rather similar to *M. stoppanii* in general shape, but does not have planareas and lacks the characteristic ribbing and, in this respect, stands closer to *M. atlaeformis* (Böse, 1898).

Observations on the type specimens of "*Rhynchonella subundata*" Rothpletz, 1886 in the Bayerische Staatssammlung (München) suggest that this species is not closely related to *M. stoppanii*.

Distribution:

Pliensbachian of the Southern Alps (Italy), the Northern Calcareous Alps (Austria). The Pliensbachian specimens of the Bakony came from the Margaritatus and Spinatum Zones (Tables 13, 14).

Megapringia altesinuata (Böse, 1898)

Plate IV: 5–8; Plate V: 1–8; Plate VI: 1–3; Figures 36, 37.

v * 1898 *Rhynchonella altesinuata* nov. sp. – Böse, Brachiopodenfauna der östlichen Nordalpen, p. 204, pl. XV, figs. 6, 7.
v 1983 *Apringia* ? *altesinuata* (Böse, 1898) – Vörös, Stratigraphic distribution, p. 34.
v 1997 *Apringia* ? *altesinuata* (Böse) – Vörös, Jurassic brachiopods of Hungary, p. 15, Appendix: fig. 15.
v 2003 *Apringia* cf. *altesinuata* (Böse, 1898) – Vörös et al., Schafberg, p. 78, pl. VIII, figs. 7–9.
v 2007 *Apringia* ? *altesinuata* (Böse, 1898) – Vörös & Dulai, Transdanubian Range, p. 55, pl. II, figs. 5, 6.

Material: 189 specimens; mostly double valves of variable state of preservation.

Localities	*Measurements (mm)*					*Localities*	*Measurements (mm)*				
	L	*W*	*T*	*Ch*	*Cw*		*L*	*W*	*T*	*Ch*	*Cw*
Kericser/7	21.5	19.5	12.8	8.4	17.4		19.0	20.5	12.2	10.3	17.0
Kericser/8	17.9	16.9	10.0	7.1	15.2		19.0	19.8	12.8	11.8	18.6
	15.7	19.5	10.6	6.5	?		19.0	20.1	12.1	8.5	17.3
	15.0	14.8	9.0	5.0	12.2		18.5	21.1	12.0	8.2	19.0
Eplény	20.7	21.0	13.8	9.5	18.0		20.4	19.3	13.0	11.2	16.9
Fenyveskút p1	20.2	20.4	11.5	9.0	19.6		20.5	18.0	13.7	7.0	16.8
	21.0	21.6	15.6	13.3	20.4		18.3	19.2	11.8	9.7	16.0
	20.4	21.0	13.3	10.7	17.3		18.5	19.3	11.8	7.3	18.0
	18.4	19.8	12.5	6.0	17.3		19.0	20.0	12.5	6.8	17.5
	18.0	18.9	12.0	8.3	17.6		17.0	21.1	11.2	5.6	18.7
Fenyveskút 5/a	17.0	21.1	12.5	11.0	19.5		19.2	19.4	12.2	8.0	17.0
	18.7	18.2	10.4	6.4	15.3		18.3	18.0	13.6	7.3	17.0
	17.2	16.9	9.5	7.3	14.5		18.5	19.0	11.7	8.2	15.5
	16.7	17.8	11.0	9.0	15.5		19.8	18.4	11.3	8.5	16.0
Fenyveskút 5/c (I.)	20.9	22.8	12.9	11.8	19.2		18.0	19.0	11.7	6.8	16.0
	21.6	21.1	12.5	6.4	17.0		19.4	19.0	12.8	7.6	16.7
	19.5	22.5	11.5	10.0	18.6		18.5	18.6	10.3	5.0	17.9
	21.7	22.6	12.8	9.8	19.3		20.0	19.2	11.7	6.3	17.0
	22.0	23.1	16.3	10.3	20.8		18.2	17.8	11.8	7.2	16.4
	19.9	19.0	13.0	8.4	17.9		17.9	18.0	12.0	7.3	16.5
	20.2	19.2	14.6	12.3	16.8		17.8	17.5	11.0	8.2	14.0
	18.6	20.4	12.0	3.2	19.0	Fenyveskút 5/c (II.)	17.2	17.4	10.6	8.3	14.9
	19.5	19.7	12.7	8.0	18.4		17.6	16.4	10.1	6.0	14.0

Localities	*Measurements (mm)*				
	L	*W*	*T*	*Ch*	*Cw*
Fenyveskút 5/c (II.)	17.0	19.4	11.6	7.2	17.9
	17.0	18.4	12.3	9.6	16.6
	17.0	18.3	12.4	8.6	14.6
	17.0	18.2	11.8	7.6	16.3
	16.8	16.7	11.2	5.3	15.9
	18.2	16.7	12.0	7.6	15.6
	16.0	17.1	10.2	7.0	15.3
	16.3	18.2	10.1	7.4	16.0
	16.4	15.8	10.8	8.0	14.6
	17.3	16.7	9.7	7.9	15.0
	16.7	18.0	9.6	7.4	17.7
	17.0	16.6	10.3	7.5	14.6
	15.7	15.3	9.6	5.8	14.0
	14.2	15.6	8.6	2.3	14.0
	14.7	14.3	9.1	3.7	12.0
	14.0	14.6	6.9	2.0	12.0
	13.8	13.0	9.6	8.3	11.6
	13.9	13.5	8.4	4.9	13.0
	12.8	14.0	6.3	3.6	11.0
	12.4	12.2	7.5	4.7	11.2
	13.1	13.1	6.9	2.5	11.0
	12.7	10.7	6.6	1.5	8.4
Fenyveskút (scree)	20.0	19.5	12.6	11.7	16.8

Localities	*Measurements (mm)*				
	L	*W*	*T*	*Ch*	*Cw*
Fenyveskút (scree)	21.6	24.3	12.8	12.4	22.2
	23.1	24.0	16.9	13.4	22.1
	23.6	22.0	14.4	11.0	20.3
	21.0	20.0	12.6	9.4	18.8
	18.6	20.0	17.0	11.4	19.5
	19.0	22.2	13.4	10.7	20.6
	21.0	20.5	13.3	11.0	18.0
	20.0	18.0	12.9	10.3	16.7
	18.5	19.5	12.4	8.1	18.8
	18.5	18.6	13.7	13.0	17.5
	19.4	18.2	14.1	11.7	11.0
	20.0	18.7	14.3	7.8	15.8
	18.7	18.8	11.6	6.6	17.1
	18.0	18.7	13.5	8.6	17.9
	17.3	17.0	10.1	7.3	15.6
	17.8	19.6	13.2	7.2	16.5
	16.6	18.6	11.0	8.7	17.0
	17.0	17.2	11.0	9.4	15.0
	17.2	16.5	11.3	9.0	15.4
	16.9	15.5	11.8	8.3	13.3
	13.8	14.5	9.5	5.6	13.5
	15.0	13.6	8.4	4.6	10.8
	14.3	10.8	8.0	6.5	10.0

Description:

External characters: Large *Megapringia*, with very variable subpentagonal outline. The lateral margins are nearly straight or gently concave and diverge with an apical angle from 80° to 110°. The maximum width lies usually around the middle of the length, sometimes near the posterior one-third, or rarely in the anterior one-third of the length. The valves are usually almost equally convex. The maximum convexity is attained near the middle of the length; this point is shifted a little posteriorly in more convex specimens. The beak is usually erect, pointed, and elevated. The pedicle opening is mostly covered by matrix, but seems to be small; the delthyrium is barely seen, it seems to form a narrow equilateral triangle. The lateral areas of the double valves are generally flat, rarely a little concave; in some specimens blunt beak ridges develop in both valves delimiting ill-defined planarea-like surfaces. In most cases the lateral commissures form a little elevated crest. In lateral view, the lateral commissures are nearly straight, or very slightly sigmoidal, and run diagonally in ventral direction, where they join the anterior commissure with a slight bend. The anterior commissure is usually highly and variably uniplicate. Typically, the high uniplication has a few sharp and asymmetric, flame-shaped zigzag deflections (Pl. IV, 6 and 8; Pl. VI, 3); sometimes the asymmetric deflections are rounded (Pl. IV, 7, Pl. V, 4). In many cases the deflections are more numerous and regular, symmetric (Pl. V, 6; Pl. VI, 1 and 2), or may be

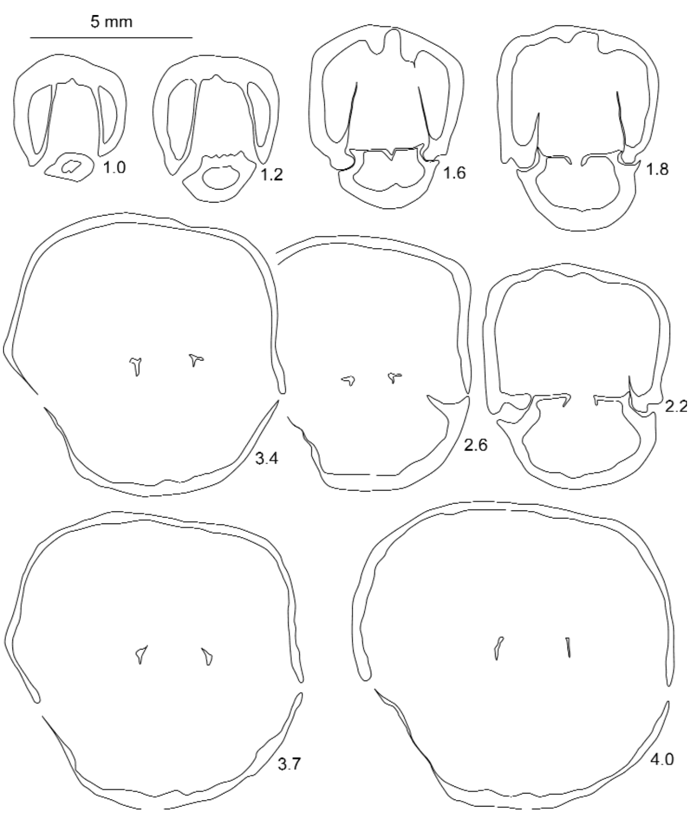


Figure 36. *Megapringia altesinuata* (Böse, 1898). Nine transverse serial sections through the posterior part of a specimen from Fenyveskút, p1, Pliensbachian, Margaritatus Zone. M 2007.270.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 20.2 mm

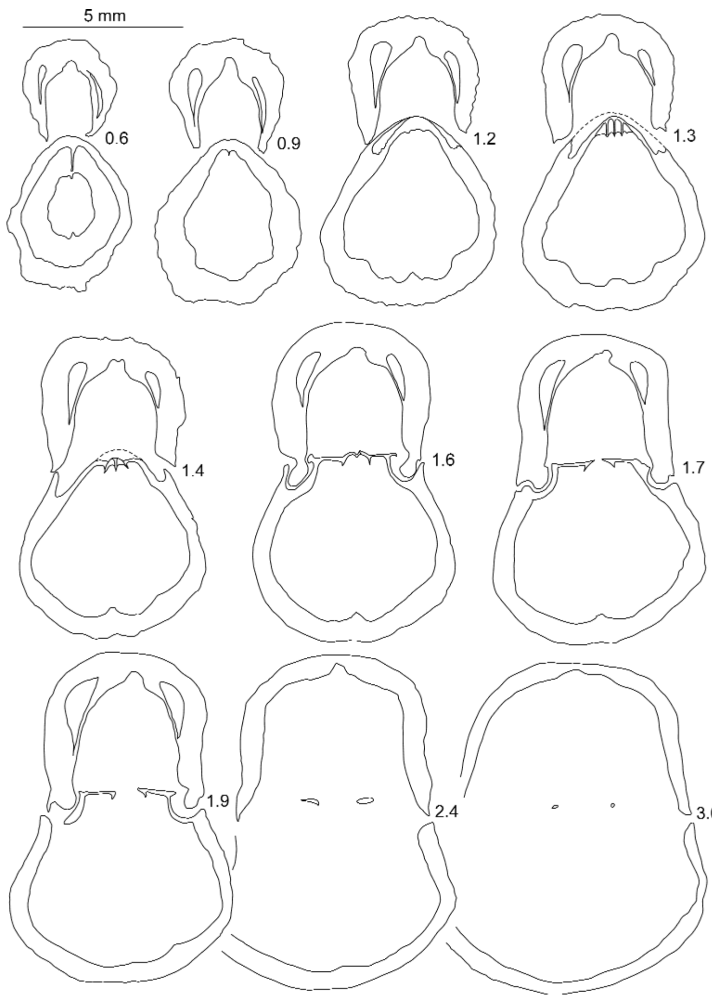


Figure 37. *Megapringia altesinuata* (BÖSE, 1898). Ten transverse serial sections through the posterior part of a specimen from Büdöskút, Bed 3, Pliensbachian, Margaritatus Zone. M 2007.271.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 16.2 mm

blunt (Pl. IV, 5). Rarely the plica may be low and evenly arched. The valves are sometimes smooth, but typically they are ornamented with antidichotomous system of ribs. Numerous (5 to 9) blunt ribs start at the umbones; their number increases by rare bifurcations, and may reach 11. Beyond the mid-legth, or at the anterior margin as latest, the ribs disappear and a smooth belt develops. The shape and the number of the zigzag deflections of the anterior commissure (0 to 4) does not correlate with the strength or number of the posterior ribbing.

Internal characters (Figs. 36, 37): *Ventral valve*: The delthyrial cavity is subquadrate trapezium-like in cross-section, with ventral grooves connected with the muscle scars. The umbonal cavities are rounded triangular, but are largely filled with secondary shell material. Pedicle collar was not recorded. The dental plates are gently convergent ventrally. The hinge teeth are massive and wide; denticula are present. Deltidial plates were not observed. *Dorsal valve*: Cardinal process is not seen. The septalium is shallow, V-shaped and in one case (Fig. 37) it shows a curious structure connecting the posterior part of the hinge plates. Median septum is absent. The outer socket ridges are low and sharp; accessory sockets are not seen. The inner socket ridges and the base of the hinge plates are thin. The hinge plates rise from the upper end of the inner socket ridges. The hinge plates are horizontal and flat. The crural bases emerge dorsolaterally and give rise to crura of hamiform type.

Remarks:

BÖSE (l. c.) when describing "*R. altesinuata*", clearly stated that the lateral part of this form can not be termed as typical planarea ("Lateralfeld") because the demarcating ridges are blunt and the lateral commissure forms a crest; these features make diagnostic difference from such forms as "*Rhynchonella glycinna*" GEMMELLARO, 1874 (which subsequently were placed into *Prionorhynchia*). At the same time, BÖSE (l. c.) did not mention the apparent similarity of *M. altesinuata* to *M. stoppanii* (PARONA, 1880), though the two species apparently share the features of the "planareas" and the type of ribbing. The study of BÖSE's figured specimens in the Bayerische Staatssammlung (München) led to the conclusion that these two species may be maintained as different. *M. altesinuata* is more convex, its anterior commissure has much higher uniplication, and shows (sometimes strongly asymmetrical) sharp zigzag deflections of high amplitude.

Distribution:

Pliensbachian of the Northern Calcareous Alps (Austria). The Pliensbachian specimens of the Bakony came from the Margaritatus Zone (Tables 13, 14).

Megapringia ? *atlaeformis* (BÖSE, 1898)
Plate VI: 4; Figure 38.

v * 1898 *Rhynchonella atlaeformis* nov. sp. – BÖSE, Brachiopodenfauna der östlichen Nordalpen, p. 202, pl. XV, figs. 2–4.
v ? 1898 *Rhynchonella margaritati* nov. sp. – BÖSE, Brachiopodenfauna der östlichen Nordalpen, p. 201, pl. XIV, fig. 21; pl. XV, fig. 1.
v 1983 *Apringia* ? *atlaeformis* (Böse, 1898) – VÖRÖS, Stratigraphic distribution, p. 34.
v 2007 *Apringia* ? *atlaeformis* (Böse, 1898) – VÖRÖS & DULAI, Transdanubian Range, p. 55.
? 2008 *Apringia atlaeformis* (Böse, 1897) – BAEZA-CARRATALÁ, Patrimonio J. de Cisneros, p. 232, pl. XI, fig. 7; pl. XII, figs. 3–8.

Material: 18 specimens of poor preservation; mostly fragmentary disarticulated shells; double valves are rare (3).

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Fenyveskút p2	23.0	26.0	17.5	?
	21.8	?	13.6	?
Fenyveskút 5/c	21.0	19.0	12.5	11.0
Fenyveskút (scree)	16.0	18.6	9.4	6.0

Description:

External characters: This is a large-sized *Megapringia* with very rounded subpentagonal outline, wider than long. The lateral margins are straight or gently convex and diverge with an apical angle from 85° to 105°. The maximum width lies near the middle of the length. The valves are almost equally convex. The maximum convexity is attained near the middle of the length. The beak is poorly preserved but seems to be erect. The dorsal valve is uniformly and strongly convex. The ventral valve is a little resupinate: convex in lateral view, but concave in anterior view. This is due to a shallow ventral sulcus starting from the posterior one third of the valve. The pedicle opening and the delthyrium can not be seen due to incomplete preservation. There are neither beak ridges, nor planareas. The lateral parts are gently convex and the lateral commissures run on a little elevated crest. In lateral view, the lateral commissures are sigmoidal; arched dorsally in the posterior segment, and pass gradually to the anterior commissure with a continuous curve. The anterior commissure is highly uniplicate and usually asymmetrical. The very high uniplication forms a single arch, without significant secondary deflections. The arch is usually rounded or may be pointed but its peak is regularly shifted laterally, left or right. The shells are smooth, except weak radial striae and irregularly spaced growth lines.

Internal characters (Fig. 38): *Ventral valve*: The delthyrial cavity is high subquadrate, trapezium-like in cross-section, with ventral groove connected with the muscle scars. The umbonal cavities are rounded triangular, but are largely filled with secondary shell material. Pedicle collar and deltidial plates were not observed. The dental plates are convergent ventrally. The hinge teeth are massive, wide and almost smooth; denticula are present. *Dorsal valve*: Cardinal process is not seen. The small notothyrial cavity is drop-shaped; the dorsally adjoined septum-like structure can be interpreted as fused inner hinge plates which give rise to a true septalium. Dorsal median septum is absent. The outer socket ridges are well developed. The inner socket ridges and the base of the hinge plates are thin. The hinge plates rise from the upper end of the inner socket ridges and are horizontal. The crural bases emerge dorsally and give rise to crura of hamiform type.

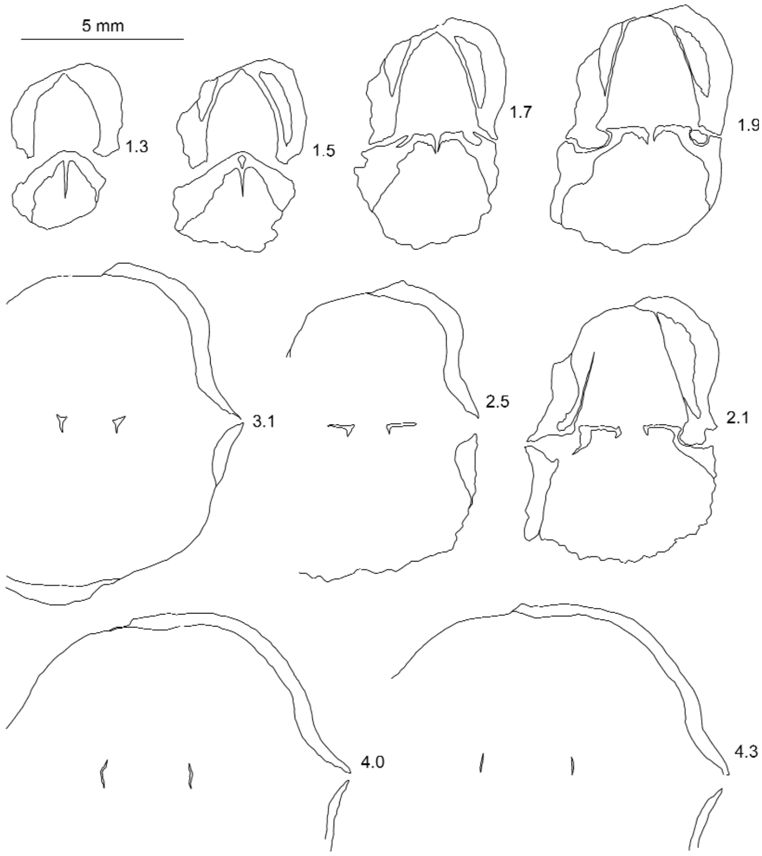


Figure 38. *Megapringia* ? *atlaeformis* (Böse, 1898). Nine transverse serial sections through the posterior part of a specimen from Fenyveskút, p2, Pliensbachian, Margaritatus Zone. M 2007.272.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 21.5 mm

Remarks:

Observations on the type specimens of "*Rhynchonella atlaeformis*" in the Bayerische Staatssammlung (München) convinced me that this species was rightly described by Böse (l. c.) as different from the other related forms of the Schafberg fauna, and that the respective Pliensbachian specimens from the Bakony belong to *atlaeformis*. At the same time, Böse's "*R. margaritati*" stands very closely to *M. atlaeformis*.

Böse (l. c.) when giving this species name, expressed the apparent similarity of this form to the very widespread Middle Jurassic species "*Rhynchonella*" *atla* Oppel, 1863 (frequently cited as *Apringia* ? *atla* in the near past, e. g.: Benigni et al. 1982, Vörös 1993, 2001b, Alméras & Elmi 1998). It is, in fact, extremely difficult to make difference between these two heterochronous homoeomorphs, without knowing their stratigraphic provenance. For example, in the Fenyveskút locality (in the Bakony), *Megapringia atlaeformis* occurred in the Pliensbachian part of the megabreccia and *A.* ? *atla* was frequently collected from the Bajocian rocks of the same group of exposures. In similar settings of the Alpine–Mediterranean area, where the Jurassic sediments are very condensed, or the Liassic is dissected by Middle Jurassic neptunian dykes, a mixed association of brachiopods collected by fossil hunters, may be expected. One of these cases was recognized, or at least suggested by HAAS (1884, p. 12), when he described "*Rhynchonella atla* OPPEL" in his monograph dealing with Liassic brachiopods from South Tyrol, with the remark that Middle Jurassic rock may also occur at his Liassic locality. An analogous situation may be supposed for the occurrence in the Betic Cordilleras, where, in the course of the revision of the old collection of the Middle Liassic brachiopods of JIMÉNEZ DE CISNEROS (1935), BAEZA-CARRATALÁ (l. c.) found large, smooth, uniplicate *Apringia*s. In the firm belief that they came from the Lower Jurassic, BAEZA-CARRATALÁ (l. c.), after consulting with me, when I supported his opinion, used the name *A. atlaeformis* for those brachiopods. Recently, however, new data from the Betic localities have suggested that, among others, these fossils might have derived from Middle Jurassic rocks of the same group of outcrops. Therefore BAEZA-CARRATALÁ's record is cited in the above synonymy with query.

Distribution:

Pliensbachian of the Northern Calcareous Alps (Austria) and perhaps the Betic Cordilleras (Spain). The Pliensbachian specimens of the Bakony Mts came from the Margaritatus and Spinatum Zones (Tables 13, 14).

Subfamily Pamirorhynchiinae, OVCHARENKO, 1983

Genus *Jakubirhynchia* TOMAŠOVÝCH, 2006

This genus, recently erected and meticulously described by TOMAŠOVÝCH (2006), embraces "ordinary looking" multicostate rhynchonellids, such as the type species *Jakubirhynchia latifrons* (GEYER, 1889), formerly ranked into the genus *Cirpa* or *Calcirhynchia* by several authors. The latter genera belong to the family Wellerellidae and possess dorsal median septum and hamiform crura. On the other hand, *Jakubirhynchia* differs by having septalium (often sessile) and subfalciform crura and lacks dorsal median septum. Partly on the basis of these features, *Jakubirhynchia* was placed to the family Pugnacidae (subfamily Pamirorhynchiinae) by TOMAŠOVÝCH (2006). This act of splitting seems to be justified and also practical, because in the last time too many Alpine Liassic brachiopod species have been attributed to the genus *Calcirhynchia* by some authors (e. g. SIBLÍK 2002, DULAI 2003, VÖRÖS & DULAI 2007), often only by external morphology. Some of these multicostate species may have a better place in *Jakubirhynchia* (see also the discussion in TOMAŠOVÝCH (2006, p. 223).

Jakubirhynchia ? cf. *fascicostata* (UHLIG, 1880)
Plate VIII: 12, 13.

v * 1880 *Rhynchonella fascicostata* n. f. – UHLIG, Sospirolo, p. 42, pl. V, figs. 1–3.
v 1900 *Rhynchonella fascicostata* Uhlig. – BÖSE & SCHLOSSER, Südtirol, p. 195, pl. XVIII, fig. 15.
v 1907 *Rhynchonella fascicostata,* Uhl. – DAL PIAZ, Tranze di Sospirolo, p. 39, pl. II, fig. 13.
? 1910 *Rhynchonella fascicostata* Uhlig. – PRINCIPI, Castel del Monte, p. 81, pl. III, fig. 10.
v 1911 *Rhynchonella fascicostata,* Uhl. – DE TONI, Vedana (Belluno), p. 18.
1912 *Rhynchonella* cf. *fascicostata* Uhlig. – HAAS, Ballino, p. 248, pl. XIX, fig. 22.
1943 *Rhynchonella fascicostata* Uhl. – VIGH, Gerecse, p. 344, fig. 12, pl. III, fig. 10.
v 1976 *"Rhynchonella" fascicostata* Uhl. 1880 – VIGH in FÜLÖP, Liassic Brach. Tata, p. 33.
1978 *Calcirhynchia fascicostata* (Uhlig, 1879) – BENIGNI, Ra Stua e Fanes, p. 137, pl. 13, fig. 4.
v 1983 *Calcirhynchia* ? cf. *fascicostata* (Uhlig, 1880) – VÖRÖS, Stratigraphic distribution, p. 34.
v 2003 *Calcirhynchia fascicostata* (Uhlig, 1879) – DULAI, Dunántúli-középhegység, p. 23, pl. III, figs. 7–9.
v 2003 *Calcirhynchia fascicostata* (Uhlig, 1879) – VÖRÖS et al., Schafberg, p. 71.
v 2007 *Calcirhynchia fascicostata* (Uhlig, 1879) – VÖRÖS & DULAI, Transdanubian Range, p. 54, pl. I, fig. 16.
2008 *Calcirhynchia fascicostata* (Uhlig, 1879) – BAEZA-CARRATALÁ, Patrimonio J. de Cisneros, p. 189, pl. V, figs. 6–8.

Material: Four rather well preserved double valves.

Localities	*Measurements (mm)*		
	L	*W*	*T*
Kericser/13	9.0	9.9	4.1
Kericser/15	9.5	10.1	3.9
	8.4	8.0	3.6
Kericser (scree)	6.0	7.1	3.1

Description:

External characters: Small sized *Jakubirhynchia*, with transversely elongated subcircular outline. The lateral margins are straight or gently convex and diverge with an apical angle of about 100°. The maximum width is attained at mid-length. The valves are very weakly convex; the maximum convexity lies near the middle of the length. The beak is nearly straight to suberect, slender and pointed. The pedicle opening and the delthyrium is mostly covered by matrix. The beak ridges are insignificant, rounded; planareas are not developed. The lateral surface of the double valves are sharp; the valves join by an acute angle at the lateral commissures. In lateral view, the lateral commissures are nearly straight, or a little arched dorsally. The anterior commissure uniplicate; the plica is wide and very low. Fold or true sulcus are not developed, though there is a short and slight longitudinal depression near the umbo of the dorsal valve. The valves are ornamented with faint ribs and a few thin, irregularly spaced growth lines. The dichotomous ribs start at the umbones; their number increases, even posteriorly, by bifurcation, or trifurcation. The number of ribs is 6–8 near the umbones and 16–22 at the anterior margin, where about 10 ribs fall into the plica. The ribs are typically gathered into bundles; they are low but marked; in cross section the ribs are rounded while the interstices are sometimes more incised.

Internal characters: These were not studied owing to the lack of suitable material (all specimens are filled with sparry calcite).

Remarks:

This small and rather flat brachiopod is very easy to identify and separate from other rhynchonellids on the basis of its ornamentation: it is entirely and finely ribbed; the mostly bifurcate ribs appear as if gathered in bundles. Many of the numerous occurrences in the Alpine–Mediterranean region were confirmed by personal studies of the original figured specimens in the collections of Padova, München and Budapest, thus the identification of the specimens from the Pliensbachian of the Bakony is endorsed.

By recent authors (starting from Benigni 1978, including my works), this species was attributed to the genus *Calcirhynchia*, mostly without any supporting study or documentation on the internal morphology. Now it seems that *Calcirhynchia* was regarded as a collective genus embracing a series of species which did not fit to other multicostate rhynchonellid genera of standard shape, as for example *Cirpa*, or *Salgirella*. The recently introduced genus *Jakubirhynchia* seems to be an appropriate host for the species *fascicostata*. Its external features (gentle convexity and uniplication, high, nearly straight to suberect beak, multicostate ornamentation) are in support of this, though the present material did not allow to obtain internal morphological evidence.

Distribution:

Sinemurian to Pliensbachian of the Central Apennines and the Southern Alps (Italy), the Gerecse and the Bakony Mts (Hungary). The Pliensbachian specimens of the Bakony came from one section from the Davoei Zone (Tables 13, 14).

Jakubirhynchia ? aff. *laevicosta* (Geyer, 1889)
Plate IX: 1–4.

v 1997 *Calcirhynchia* ? *laevicosta* (Stur in Geyer) – Vörös, Jurassic brachiopods of Hungary, p. 13.
v 2007 *Calcirhynchia* ? *laevicosta* (Geyer, 1889) – Vörös & Dulai, Transdanubian Range, p. 54, pl. I, fig. 15.

Material: 12, partly fragmentary double valves.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser/12	10.7	11.8	6.4	3.0
Kericser/15	12.6	14.0	6.9	3.4
Kericser/18	11.0	11.5	6.3	4.1
Kericser/19	14.1	15.7	9.0	6.3
	12.9	14.5	7.8	2.8
Kericser I/f	14.2	17.2	10.0	5.7
	11.2	13.0	6.8	4.5
	11.2	11.6	7.6	5.6
	10.1	10.9	5.6	2.6

Description:

External characters: Medium sized *Jakubirhynchia* with subpentagonal to transversely oval outline. The lateral margins are nearly straight and diverge with an apical angle of around 100°. The maximum width lies around the middle of the length. The valves are moderately convex; usually the ventral valve is slightly more convex than the dorsal valve. The maximum convexity is attained near the middle of the length, though this point is usually a little shifted anteriorly in the ventral valve. The beak is suberect, slender and pointed. The pedicle opening and the delthyrium is mostly covered by matrix. The beak ridges are insignificant, rounded; planareas are not developed. The lateral surface of the double valves are convex; the valves join by a blunt angle and the lateral commissures form a crest. In lateral view, the lateral commissures are nearly straight, and run diagonally to ventral direction. The anterior commissure is moderately uniplicate. The uniplication is trapezium-like and usually rather narrow; its width rarely exceeds the half of the total width of the specimen. The valves are ornamented with faint, dichotomous ribs and a few thin, irregularly spaced growth lines. The ribs start at the umbones; their number increases, usually by bifurcation in the posterior region. The number of ribs is 10–12 near the umbones and 18–26 at the anterior margin, where 5 to 10 ribs fall into the plica. In one specimen (Pl. IX, 3) slight antidichotomy can be seen close to the anterior margin. The ribs are low but marked; in cross section the ribs and the interstices are equally rounded.

Internal characters: These were not studied owing to the lack of suitable material (all specimens are filled with sparry calcite).

Remarks:

The species here described shows many similarities to "*Rhynchonella*" *laevicosta* Geyer, 1889, and was previously regarded as conspecific with that also by me (Vörös 1997, Vörös & Dulai 2007). Geyer's figured specimens seem to be lost, at least they are indicated as missing in the inventory book before World War II. However, on the basis of the figures given by Geyer (1889, pl. VI, figs. 20, 21) two important features separates the Bakony species from *laevicosta*: (1) its dorsal valve is less convex than the ventral one (Geyer 1989, p. 67 reported the contrary for *laevicosta*), and (2) its ribbing is remarkably dichotomous (this character is not recorded on Geyer's *laevicosta*). Therefore, in spite of the apparent similarity, here this species is not attributed to *laevicosta*, only the affinity is indicated.

"*Rhynchonella*" *ramosa* Rothpletz, 1886 has rather flattened dorsal valve and dichotomous ribbing, and looks similar to the species here described, but the poor quality of the documentation (Rothpletz 1886, pl. XII, figs. 29, 30, 32) does not allow to make a sure identification. Likewise, "*R.*" *matyasovszkyi*, as described by Böckh (1874, p. 143, pl. IV, fig. 4), possesses a dorsal valve less convex than the ventral, and shows somewhat similar ornamentation, but, again, the figures are not informative enough, and Böckh's original specimens seem to be lost.

The present species stands close to *Jakubirhynchia* ? *fascicostata* (Uhlig, 1880) but deviates from that by its subpentagonal outline, higher and well-defined uniplication and by its slightly different ornamentation, namely its dichotomous ribs are not grouped into bundles. Nevertheless, the overall similarity to *J.* ? *fascicostata* permits to attribute this species also to *Jakubirhynchia*, although with query, because it is not supported by internal morphological evidence.

It is worth mentioning that the species "*R.*" *matyasovszkyi* Böckh, "*R.*" *fascicostata* Uhlig and "*R.*" *ramosa* Rothpletz were grouped together by Rothpletz (1886, p. 90) into his "Ramosa-Sippe" characterized by low convexity and plica, high and pointed beak, and dense, dichotomous ribbing. Thus, the above three species form a closely related group and the species, presently described as *Jakubirhynchia* ? aff. *laevicosta* seems to belong there. If in the future a better knowledge on the morphology of *matyasovszky* or *ramosa* may be obtained, the presently described species would be included one of them.

Distribution:

The Pliensbachian specimens of the Bakony Mts came from one section, from the Ibex and Davoei Zones (Tables 13, 14).

Superfamily Rhynchotetradoidea Licharew, 1956
Family Prionorhynchiidae Mance□ido & Owen, 2002

Genus *Prionorhynchia* Buckman, 1918

Prionorhynchia polyptycha (Oppel, 1861)
Plate VIII: 3.

* 1861 *Rhynchonella polyptycha* Opp. – Oppel, Brachiopoden des unteren Lias, p. 544, pl. XII, fig. 4.
v ? 1874 *Rhynchonella polypthycha,* Opp. [sic] – Gemmellaro, Zona con Terebratula Aspasia, p. 79.
v 1889 *Rhynchonella polyptycha* Opp. – Geyer, Hierlatz, p. 51, pl. VI, figs. 15–17.
1911 *Rhynchonella Greppini* Opp. m. f. *polyptycha* Opp. – Hahn, Achensee, p. 577, pl. XXI, fig. 1.
? 1920 *Rhynchonella polyptycha* Oppel – Dareste de la Chavanne, Guelma, p. 17, pl. I, fig. 4.
? 1964 *Rhynchonella* cf. *polyptycha* Opp. – Sacchi Vialli, Revisione Saltrio V., p. 12, pl. II, fig. 6.
v 1983 *Prionorhynchia polyptycha* (Oppel, 1861) – Vörös, Stratigraphic distribution, p. 34.
? 1987 *Prionorhynchia* (?) *polyptycha* (Oppel) – Alméras & Elmi, Peuplements de brachiopodes Lias ardéchois, p. 34, pl. 1, fig. 13.

v 1992 *Prionorhynchia polyptycha* (Oppel, 1861) – DULAI, Lókút Hill, p. 48, text-figs. 7, 8, pl. I, fig. 5.
v 2003 *Prionorhynchia polyptycha* (Oppel, 1861) – VÖRÖS et al., Schafberg, p. 70, pl. VI, figs. 10–12.
v 2003 *Prionorhynchia polyptycha* (Oppel, 1861) – DULAI, Dunántúli-középhegység, p. 14, pl. V, figs. 1–3.
v 2007 *Prionorhynchia polyptycha* (Oppel, 1861) – VÖRÖS & DULAI, Transdanubian Range, p. 54, pl. I, fig. 8.
2008 *Prionorhynchia polyptycha* (Oppel, 1861) – BAEZA-CARRATALÁ, Patrimonio J. de Cisneros, p. 134, pl. II, fig. 4.

Material: A single, partly worn, double valve.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser/34	14.8	17.5	9.4	4.4

Description:

External characters: This is a small sized *Prionorhynchia* with subpentagonal outline. The lateral margins are straight and diverge with an apical angle of 95°. The maximum width lies around the middle of the length. The valves are almost equally convex; the dorsal valve is slightly more convex posteriorly than the ventral valve. The maximum convexity is attained near the posterior third of the length. The beak is incomplete but seems to be erect and depressed. Pedicle opening and delthyrium are not preserved. There are sharp beak ridges in both valves, delimiting very pronounced, deep planareas. In lateral view, the lateral commissures are deflected. In their posterior one fifth they are strongly arched dorsally, then they became straight and run longitudinally, in the ventral one third of the planareas, where they slightly incline ventrally. The first deflection, connecting the lateral and the anterior commissures, is directed dorsally. The anterior commissure is gently arched, nearly straight and strongly serrated. The zigzag deflections of the anterior commissure are very sharp; their amplitude equals to their wave-length. The valves are multicostate; the ribs start at the umbones and increase in strength to the anterior margin. The number of ribs is 12 near the umbo and 18 at the anterior margin; bifurcations occur in the posterior third of the valves. In cross section the ribs and their interstices are equally sharp.

Internal characters: These were not studied because of the paucity of the material (single specimen).

Remarks:

This is a widespread Sinemurian species of the Alpine region; its attribution to the genus *Prionorhynchia* is very obvious and widely accepted (see review in ALMÉRAS et al. 1993).

Prionorhynchia polyptycha is excellently illustrated by OPPEL (l. c.), GEYER (l. c.) and DULAI (1992, 2003). I had the opportunity to study personally most of the above figured specimens (except OPPEL's), and the Bakony specimen here described corresponds very well to them.

Some of the records listed in the synonymy are regarded as uncertain. GEMMELLARO's (l. c.) specimen, checked in the collection of the Palermo University, possesses ill-defined and rather shallow planareas. DARESTE DE LA CHAVANNE (l. c.) figured a to much fragmentary specimen. SACCHI VIALLI (l. c.) illustrated a single, isolated valve with flabelliform ribbing; its attribution to *P. polyptycha* is not probable. ALMÉRAS & ELMI (l. c.) recorded a well-preserved specimen but its uniplication is narrow and arched instead of being wide and straight.

Distribution:

Sinemurian to Pliensbachian (?) of the Northern Calcareous Alps (Austria) and the Gerecse and the Bakony Mts (Hungary). The records from the Southern Alps and Sicily (Italy), Ard□che (France), Betic Cordilleras (Spain) and Guelma (Algeria) are queried. The Pliensbachian specimen of the Bakony came from the Kericser section from the Ibex Zone (with mixed faunal elements from the Sinemurian) (Tables 13, 14).

Prionorhynchia aff. *greppini* (OPPEL, 1861)
Plate VIII: 4.

1889 *Rhynchonella Greppini* Opp. – GEYER, Hierlatz, p. 48 (partim), pl. VI, fig. 6, (non figs. 1–5, 7–10).
1889 *Rhynchonella palmata* Opp. (Uhlig). – GEYER, Hierlatz, p. 48 (partim), pl. VI, fig. 12, (non figs. 11, 13, 14).
v 2007 *Prionorhynchia* aff. *greppini* (Oppel, 1861) – VÖRÖS & DULAI, Transdanubian Range, p. 55.

Material: A single, a bit fragmentary specimen.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser/31	11.9	13.1	7.5	2.1

Description:

External characters: This is a medium sized *Prionorhynchia* with subtrigonal outline. The lateral margins are straight, a little concave, and diverge with an apical angle of 80°. The maximum width lies at the anterior third of the length.

The valves are almost equally convex; the dorsal valve is slightly more convex than the ventral valve. The maximum convexity is attained near the middle of the length. The beak is broken but seems to be erect and slightly depressed. Pedicle opening and delthyrium are not seen. There are sharp beak ridges in both valves, delimiting very pronounced, deep and rather elongate planareas. In lateral view, the lateral commissures are peculiarly deflected. In their posterior one third they are strongly arched dorsally, then they became straight and run longitudinally, in the middle of the planareas, slightly inclining ventrally. The first deflection, connecting the lateral and the anterior commissures, is directed dorsally. Consequently, the anterior commissure is principally uniplicate but its amplitude is very low and looks nearly straight. The zigzag deflections of the anterior commissure are marked but not very sharp. The valves are multicostate; the ribs are very weak at the umbones and increase in strength to the anterior margin. The number of ribs (8–9) remains constant through the valves; bifurcations or intercalations were not observed. In cross section the ribs (and their corresponding interstices) are V-shaped with blunt crests.

Internal characters: These were not studied because of the paucity of the material (single specimen).

Remarks:

The here described form is similar to *Lokutella palmaeformis* (HAAS, 1912) in general constitution and ribbing, but differs in the character of the lateral commissure and in the basically uniplicate anterior commissure, and these latter features bring it to the genus *Prionorhynchia*. Repeated visits in the collections of the Geologische Bundesanstalt (Vienna) and studies on GEYER's originals have convinced me that GEYER (l. c.) assembled several different forms under the names "*R.*" *palmata* and "*R.*" *greppini*", respectively. In both cases, most of the specimens corresponds to OPPEL's original concept, but there are exceptions. The specimen (figured by GEYER l. c., pl. VI, fig. 6) is a triangular *Prionorhynchia*, but not so much fan-shaped as the usual *greppini*, and its ribbing corresponds to the presently described form. The other specimen (on pl. VI, fig. 12, in GEYER, l. c.) does not fit to the group of *Cuneirhynchia palmata* (OPPEL, 1861), because its lateral commissure runs in the middle of the planarea, and not along the ventral beak ridge, as it is usual in the representatives of *Cuneirhynchia*; and again, its outline is regular triangular, not so expanded as of the typical *palmata*.

Distribution:

Sinemurian to Pliensbachian of the Northern Calcareous Alps (Austria) and the Bakony Mts (Hungary). The specimen of the Bakony came from the Kericser section from the Ibex Zone (with mixed faunal elements from the Sinemurian) (Tables 13, 14).

Prionorhynchia ? hagaviensis (BÖSE, 1898)
Plate VIII: 7, 8; Figure 39.

v * 1898 *Rhynchonella Hagaviensis* nov. sp. – BÖSE, Brachiopodenfauna der östlichen Nordalpen, p. 206, pl. XV, figs. 10–13.
non 1914 *Rhynchonella Hagaviensis* Böse. – KULCSÁR, Mittellias. Gerecse, p. 166, pl. I, fig.1.
? 1943 *Rhynchonella hagaviensis* Böse. – VIGH, Gerecse, p. 347, pl. III, figs. 19–22.
? 1953 *Rhync*[h]*onella uhi* Haas – ROSSI RONCHETTI & BRENA, Lias del Monte Albenza, p. 132, pl. XI, fig. 1.
? 1957 *Rhynchonella uhi* Haas – CUZZI, Hettang. di Monte Ubiale, p. 178, pl. IV, fig. 6.
? 1959 *Rhynchonella hagaviensis* Böse – POINTINGHER, Prealpi Carniche, p. 85, pl. II, fig. 1.
? 1986 *Cuneirhynchia dalmasi* (Dumortier) – ALMÉRAS & ELMI, Peuplements de brachiopodes Lias ard□chois, p. 36 (partim), pl. 3, fig. 7a–d (non fig. 8a–d).
? 2003 *Pisirhynchia* ex gr. *retroplicata* (Zittel, 1869) – SIBLÍK, Adnet, p. 74, text-fig. 3: 2a–c.
v 2003 *Prionorhynchia ? hagaviensis* (Böse, 1898) – VÖRÖS et al., Schafberg, p. 78, pl. VIII, figs. 13, 14.
v 2007 *Prionorhynchia ? hagaviensis* (Böse, 1898) – VÖRÖS & DULAI, Transdanubian Range, p. 55.

Material: Six specimens; 5 rather well preserved double valves and 1 incomplete single valve.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser II/k	12.8	13.0	7.7	1.4
Fenyveskút p1	13.9	13.6	8.3	1.6
Fenyveskút (scree)	16.8	18.6	10.9	4.6

Description:

External characters: Small to medium sized *Prionorhynchia*, with rounded subtrigonal to subpentagonal outline. The lateral margins are straight, or a little convex, and diverge with an apical angle of 80° to 90°. The maximum width lies at the anterior quarter of the length. The valves are almost equally convex; the maximum convexity is attained near the middle of the length. The beak is broken but seems to be erect and rather depressed. Pedicle opening and delthyrium are not visible. There are blunt beak ridges in both valves, delimiting flat and rather elongate planareas. In the biggest specimen (Pl. VIII, 8), the planareas are a little concave. The lateral commissures form a little elevated crest. In lateral view, the lateral commissures are straight and run in the middle of the planareas, then slightly incline ventrally. The first deflection, connecting the lateral and the anterior commissures, is directed dorsally. The anterior commissure is nearly straight but tends to be uniplicate in the large specimens. The amplitude of the zigzag deflections of the anterior commissure are variable: usually low in the smaller and high in the larger specimens. The valves are multicostate; the blunt ribs are weak at the umbones and increase in strength toward the anterior margin. The number of ribs (7–9) remains constant through the valves; bifurcations or intercalations were not observed.

Internal characters (Fig. 39): *Ventral valve*: The delthyrial cavity is high subpentagonal in cross-section, with ventral groove connected with the muscle scars. The umbonal cavities are rounded triangular. Pedicle collar and deltidial plates were not observed. The dental plates are subparallel but, in anterior direction, they tend to be convergent ventrally. The hinge teeth are rather massive and wide; denticula are present. *Dorsal valve*: Cardinal process is not seen. The small notothyrial cavity is diamond-shaped; the dorsally adjoined septum-like structure can be interpreted as fused inner hinge plates which give rise to a true, deep septalium. Dorsal median septum is weakly developed. The outer socket ridges are well developed. The inner socket ridges and the base of the hinge plates are thin. The hinge plates rise from the medial part of the inner socket ridges and are subhorizontal. The crural bases emerge dorsally and give rise to crura of raduliform type, slightly divergent, then convergent anteriorly.

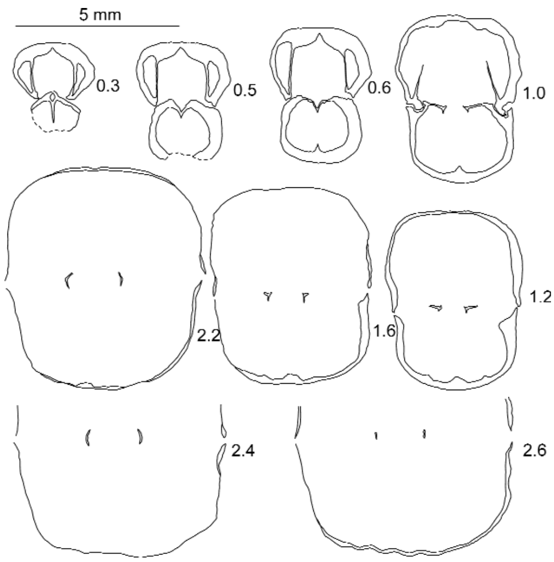


Figure 39. *Prionorhynchia* ? *hagaviensis* (Böse, 1898). Nine transverse serial sections through the posterior part of a specimen from Fenyveskút, scree, Pliensbachian, Margaritatus Zone. M 2007.274.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 13.3 mm

Remarks:

This species shares some important morphological features of the genera *Prionorhynchia* and *Lokutella*. Its straight lateral commissures running in the middle of the planareas bring it closer to *Prionorhynchia* but the generic attribution is tentative.

Böse's (l. c.) figures are not very informative; this may be the explanation of the misinterpretation of this species by some authors. The figures by Kulcsár (l. c.) and, at least partly, by Vigh (l. c.) portray *Lokutella liasina* (Principi, 1910). On the other hand, the specimens figured under different species names (*uhi, dalmasi,* aff. *retroplicata*) by Rossi Ronchetti & Brena (l. c.), Cuzzi (l. c.), Alméras & Elmi (l. c.) and Siblík (l. c.), respectively, belong very probably to *P.* ? *hagaviensis*. At a first glance, *Lokutella liasina* looks similar to *P.* ? *hagaviensis* but its quite different lateral parts (deeper planareas, sharp dorsal beak ridges, diagonal lateral commissures) make clear distinction between them.

From among other species, probably belonging to *Prionorhynchia*, *P.* ? *flabellum* (Gemmellaro, 1874) stands the closest to *P.* ? *hagaviensis* but its outline is more fan-shaped and its planareas are less pronounced.

P. ? *securiformis* (Hofmann, 1884), which also belong to this group, was synonymized with *hagaviensis* by Vigh (1943). This species was established by Hofmann (1884, p. 329) who did not give a full description but only a very short comparison expressing that "*R.*" *securiformis* stands between "*R.*" *palmata* Oppel and "*R.*" *flabellum* Gemmellaro but smaller then those. This fulfils the requirements of availability claimed by the ICZN for species names introduced before 1930, consequently "*R.*" *securiformis* Hofmann, 1884 is a valid species. I have found Hofmann's originals in the collections of the Geological Institute of Hungary where they are kept under the informal identity number "161". They probably belong to the genus *Prionorhynchia* and they are more similar to *P.* ? *flabellum* than to *P.* ? *hagaviensis*.

Distribution:

Pliensbachian of the Northern Calcareous Alps (Austria) and the Bakony Mts (Hungary). The records from Ardèche (France) and from the Lower Liassic of the Southern Alps (Italy), and the Gerecse (Hungary) are queried. The Pliensbachian specimens of the Bakony came from two localities, from the Ibex or Davoei and the Margaritatus Zones (Tables 13, 14).

Prionorhynchia ? *flabellum* (Gemmellaro, 1874)
Plate VIII: 5.

v * 1874 *Rhynchonella flabellum,* Menegh. – Gemmellaro, Zona con Terebratula Aspasia, p. 83 (partim), pl. XI, figs. 25–27, (non fig. 14).

v 1880 *Rhynchonella flabellum* Mgh. – Canavari, Strati a Terebratula Aspasia, p. 354 (partim), pl. IV, figs. 4–6, (non fig. 7).

1880 *Rhynchonella flabellum* Menegh. – Parona, Gozzano, p. 202, pl. II, figs. 7, 8.

non 1885 *Rhynchonella flabellum,* Mgh. – PARONA, Saltrio e Arzo, p. 241, pl. I, fig. 13; pl. II, figs. 1, 2.
1893 *Rhynchonella flabellum,* Mngh. – PARONA, Revisione Gozzano, p. 36, pl. II, figs. 9, 10.
v 1895 *Rhynchonella flabellum* Mgh. Var. *pisana* Neri. – FUCINI, Monte Pisano, p. 162, pl. VI, fig. 18.
non 1900 *Rhynchonella flabellum* Menegh. – BÖSE & SCHLOSSER, Südtirol, p. 195, pl. XVIII, fig. 13.
v 1907 *Rhynchonella flabellum,* Mgh. – DAL PIAZ, Tranze di Sospirolo, p. 26, pl. II, fig. 9.
non 1909 Rhynchonella cf. flabellum Mgh. – TRAUTH, Grestener Schichten, p. 65, pl. II, fig. 2.
? 1920 *Rhynchonella flabellum* Meneghini – DARESTE DE LA CHAVANNE, Guelma, p. 24, pl. I, fig. 8.
? 1923 *Rhynchonella flabellum* Menegh. (non Geyer). – JIMÉNEZ DE CISNEROS, Rincón de Egea, p. 27, pl. V, fig. 15.
v 1961 *Rh. flabellum* Mgh. – VIGH, Esquisse géol. Gerecse, p. 577.
1967 *Prionorhynchia flabellum* (Mgh.) – SACCHI VIALLI & CANTALUPPI, Nuovi fossili di Gozzano, p, 80, pl. XI, figs. 5, 6.
? 1968 *Prionorhynchia quinqueplicata* (Zieten, 1832) – SIBLÍK, Rhynchonellinae a Cirpinae Slovenského Domeru, p. 33 (partim), pl. IV, fig. 1. (non pl. II, fig. 1 and pl. IV, fig. 3)
1978 *Prionorhynchia flabellum* (Gemmellaro, 1874) – BENIGNI, Ra Stua e Fanes, p. 144, pl. 14, fig. 3.
v 1983 *Prionorhynchia ? flabellum* (Gemmellaro, 1874) – VÖRÖS, Stratigraphic distribution, p. 34.
v non 2003 *Prionorhynchia flabellum* (Meneghini in Gemmellaro, 1874) – VÖRÖS et al., Schafberg, p. 70, pl. VI, figs. 1–3.
2005 *Prionorhynchia* cf. *flabellum* (Meneghini in Gemmellaro 1874) – SULSER & FURRER, Lias von Arzo, p. 19, fig. 12a.
v non 2007 *Prionorhynchia ? flabellum* (Gemmellaro, 1874) – VÖRÖS & DULAI, Transdanubian Range, p. 54, pl. I, fig. 9.
v 2007 *Prionorhynchia ? flabellum* (Gemmellaro, 1874) – VÖRÖS & DULAI, Transdanubian Range, p. 55, pl. II, fig. 9.
2008 *Prionorhynchia flabellum* (Meneghini in Gemmellaro, 1874) – BAEZA-CARRATALÁ, Patrimonio J. de Cisneros, p. 107, pl II, figs. 5, 6; pl. III, figs. 4, 5.

Material: Three specimens, one well-preserved and another fragmentary double valves and a single valve.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser/11	16.7	19.4	10.1	4.0

Description:

External characters: Medium sized *Prionorhynchia*, with laterally expanded subtrigonal, flabelliform outline. The lateral margins are straight, and diverge with an apical angle of 95°. The maximum width lies at the anterior third of the length. The valves are almost equally convex; the maximum convexity is attained near the middle of the length. The beak is rather depressed, its peak is broken but seems to be suberect. Pedicle opening and delthyrium are not visible. The beak ridges are very weak in both valves, therefore the flat and elongate planareas are poorly defined. The lateral commissures are straight, run in the middle of the planareas, slightly incline ventrally, and form a little elevated crest. The anterior commissure is uniplicate; slightly but definitely arched and shows a series of gentle and somewhat irregular zigzag deflections. The valves are multicostate; the weak and blunt ribs start near the umbones, slightly increase in strength toward the anterior margin but remain characteristically subrounded in cross section. The number of ribs increases by a few intercalations from 10 at the umbonal part to 12 near the anterior margin. The outspread pattern of the ribbing enhances the flabelliform impression given by the specimens in dorsal or ventral views. Signs of antidichotomy appear near the anterior margin.

Internal characters: These were not studied because of the paucity of the material.

Remarks:

This is a very frequently cited species, but, due to the too wide interpretation of its variation range, not all records correspond to the basic form described and illustrated by GEMMELLARO (l. c.). I have studied GEMMELLARO's original specimens, and those figured by CANAVARI (l. c.) in the collections of the Palermo University and the Pisa University, respectively. In both series of originals, the specimens with indistinct planareas, expanded anterior margins and weak, outspread ribbing create consistent group, whereas the smaller, elongate forms with narrow anterior margin may easily be distinguished from the typical *P. ? flabellum*.

Some authors (e. g. PARONA 1885, BÖSE & SCHLOSSER 1900, TRAUTH 1909) illustrated under the name "*Rhynchonella flabellum*" more convex and coarsely ribbed forms with less flabelliform outline; these are excluded from the present list of synonymy.

The other deviation from the typical *P. ? flabellum* concerned the interpretation of the lateral part, i. e. the depth and delimitation of the planareas. In typical *P. ? flabellum* the planareas are flat and the beak ridges are rounded, ill-defined. On the other hand, JIMÉNEZ DE CISNEROS (l. c.) figured a specimen with rather deep planareas, which is not a typical *P. ? flabellum*. The specimens figured by VÖRÖS et al. (2003) and VÖRÖS & DULAI (2007) from the Schafberg and the Sinemurian of the Bakony, respectively, are also revised here and excluded from *P. ? flabellum*, because they possess rather deep planareas and sharp beak ridges.

The record by VIGH (1961) has been confirmed in the collection of the Geological Institute of Hungary (inventory number J. 219); this is a typical *flabellum* but the specimen is slightly aberrant, with asymmetric, low but sharp uniplication.

The specimen figured by SIBLÍK (l. c.) as juvenile of *P. quinqueplicata* (ZIETEN, 1832) looks like a typical *P. ? flabellum* from every point of view.

Baeza-Carratalá (l. c.) gave a profuse illustration of his *P.* ? *flabellum*. These specimens belong to *flabellum* and one of them (Baeza-Carratalá l. c., pl. II, fig. 6) fits perfectly the restricted species concept outlined here.

P. ? *flabellum* is the archetype of a group of non-typical *Prionorhynchia* with weak ribbing and flat planareas, also including *P.* ? *triquetra* (Gemmellaro, 1874), *P.* ? *securiformis* (Hofmann, 1884), *P.* ? *apennina* (Fucini, 1893), *P.* ? *hagaviensis* (Böse, 1898), and the new species described here as the next item.

The original, partly figured specimens of *P.* ? *triquetra* were checked in the collections of the Palermo University. They are very small, and the character of their planareas and ribbing are strongly similar to *P.* ? *flabellum*, but their marked globosity suggests that they represent an independent, small sized species and not the juveniles of *P.* ? *flabellum.*

P. ? *securiformis* (Hofmann, 1884), which is probably the senior synonym of *P.* ? *apennina* (Fucini, 1893) has more numerous ribs, somewhat better defined beak ridges and is smaller than *P.* ? *flabellum*. *P.* ? *securiformis* was established by Hofmann (1884, p. 329) who did not give a full description but only a very short comparison expressing that "*R.*" *securiformis* stands between "*R.*" *palmata* Oppel and "*R.*" *flabellum* Gemmellaro but smaller then those. This fulfils the requirements of availability claimed by the ICZN for species names introduced before 1930, consequently *P.* ? *securiformis* (Hofmann, 1884) is a valid species. I have found Hofmann's originals in the collections of the Geological Institute of Hungary where they are kept under the informal identity number "161".

P. ? *hagaviensis* stands close to *P.* ? *flabellum* but its outline is less fan-shaped and its planareas are a little more pronounced.

Distribution:

Pliensbachian of Sicily, the Central and Northern Apennines and the Southern Alps (Italy), the Betic Cordilleras (Spain), and the Bakony and Gerecse Mts (Hungary). The records from Algeria and from the West Carpathians (Slovakia) are queried. The Pliensbachian specimens of the Bakony came from two localities, from the Davoei and the Margaritatus Zones (Tables 13, 14).

Prionorhynchia ? *catharinae* n. sp.
Plate VIII: 6.

v 2007 *Prionorhynchia* ? aff. *flabellum* (Gemmellaro, 1874) – Vörös & Dulai, Transdanubian Range, p. 55.

Holotype: Hungarian Natural History Museum (Budapest), inventory number: M 2007.192.1.

Locus typicus: Lókút, Fenyveskút, grab sample D.

Stratum typicum: Red brachiopod limestone, Upper Pliensbachian.

Derivatio nominis: A favourite feminine forename in latinized form.

Diagnosis: Small *Prionorhynchia* with elongated subtrigonal outline. Beak suberect, pointed. No true planareas. Lateral commissures straight, anterior commissure nearly rectimarginate, zigzag deflections gentle. Opposite longitudinal flattenings medially. 4 to 8, flat, rounded ribs. Persistent medial ribs, supplementary lateral riblets.

Material: A single, rather well preserved double valve.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Fenyveskút (scree)	14.3	12.4	7.5	1.0

Description:

External characters: Small sized *Prionorhynchia*, with rounded and elongated subtrigonal outline. The lateral margins are convex and form a broken arch. They diverge with an apical angle of 95° near the umbo but only of 55° more anteriorly. The maximum width lies at about the anterior quarter of the length. The valves are almost equally convex; the maximum convexity is attained near the middle of the length. The beak is suberect, small but distinct, pointed. The pedicle opening and the delthyrium are covered with matrix. There are no discrete beak ridges but only blunt edges in both valves, therefore, true planareas are not developed; the elongated lateral parts are flattened but gently convex ("pseudo-planareas"). The lateral commissures are straight and run in the middle of the lateral parts. The anterior commissure shows a series of gentle zigzag deflections which develop gradually from the straight lateral commissures. The first deflection, connecting the lateral and the anterior commissures, is directed dorsally. The anterior commissure is nearly straight but shows a very gently and widely arched sinus. Both valves bear very shallow longitudinal medial depression, however these opposite flattenings do not reach the condition of a sulcus. The lateral parts are smooth. The ornamentation of the central segment of the valves consists of very flat and rounded ribs. Their number increases from about 4 (in the umbonal region) to more than 8 anteriorly. In the medial part the ribs are stronger and their number remains constant from the umbones to the anterior margin; the weaker supplementary riblets are added laterally.

Internal characters: These were not studied because of the paucity of the material (single specimen).

Remarks:

This new species, as a non-typical *Prionorhynchia,* probably belongs to the group of *P.* ? *flabellum,* and stands the closest to the latter species. The markedly elongated subtrigonal outline, the slight, longitudinal medial depressions, the peculiar pattern of ribbing and the smooth but gently convex lateral parts (the "pseudo-planareas") clearly distinguish *P.* ? *catharinae* from *P.* ? *flabellum,* and justify the introduction of a new species, even though it is based on a single specimen.

The small specimens figured as *P.* ? *flabellum* by GEMMELLARO (1874, pl. XI, fig. 14), and by CANAVARI (1880, pl. IV, fig. 7), here excluded from that species (see the list of synonymy of *P.* ? *flabellum*, above), show elongated subtrigonal outline and partly similar ribbing as *P.* ? *catharinae*. However, the study of the original specimens in the collections of the Palermo and the Pisa Universities, respectively, revealed that they possess markedly defined and depressed planareas, what makes a diagnostic difference from *P.* ? *catharinae.*

Distribution:

Pliensbachian of the Bakony Mts, where the specimen was found in the Margaritatus Zone (Tables 13, 14).

Genus *Lokutella* VÖRÖS, 1983

The morphological diagnosis and the content (i. e. the species included) of *Lokutella* did not change since its original definition (VÖRÖS 1983a). Its systematic position was modified in the revised "Treatise" (SAVAGE et al. 2002) from the family Wellerellidae LICHAREW, 1956 to the family Prionorhynchiidae MANCE□IDO & OWEN, 2002, what is followed here.

Lokutella liasina (PRINCIPI, 1910)
Plate VII: 1–5; Figures 40, 41.

* 1910 *Rhynchonella liasina* nov. sp. – PRINCIPI, Castel del Monte, p. 81, pl. III, fig. 7.
1914 *Rhynchonella Hagaviensis* Böse. – KULCSÁR, Mittellias. Gerecse, p. 166, pl. I, fig.1.
1943 *Rhynchonella retrocurvata* n. sp. – VIGH, Gerecse, p. 347, pl. III, figs. 23, 24.
? v 1961 *Rhynchonella hagaviensis* Böse nov. var. – VIGH, Esquisse géol. Gerecse, p. 576.
v 1961 *Rh. hagaviensis* Böse – VIGH, Esquisse géol. Gerecse, p. 577.
v 1983 *Lokutella liasina* (Principi, 1910) – VÖRÖS, Stratigraphic distribution, p. 34.
v 2007 *Lokutella liasina* (Principi, 1910) – VÖRÖS & DULAI, Transdanubian Range, p. 55, pl. II, fig. 11.

Material: 81 specimens; mostly moderately preserved double valves and several single valves.

Localities	*Measurements (mm)*				*Localities*	*Measurements (mm)*			
	L	*W*	*T*	*Ch*		*L*	*W*	*T*	*Ch*
Fenyveskút 5/a	8.8	7.8	4.3	0.2		12.6	12.7	7.7	2.5
Fenyveskút 5/c	12.6	11.8	5.9	0.2		12.0	12.1	7.4	2.5
	12.5	11.6	6.8	1.3		11.0	10.3	7.5	1.4
	12.2	11.3	7.0	1.0	Kericser/5	8.8	8.2	3.6	0.4
	12.4	11.7	7.0	1.3	Kericser/7	10.5	9.9	6.3	1.0
	11.8	13.3	6.0	0.8	Kericser/8	8.6	8.8	4.7	0.5
	11.2	11.6	7.2	1.8	Kericser/11	6.5	7.2	3.4	0.5
	12.0	10.5	7.6	?	Kericser/12	10.2	10.6	5.7	0.9
	10.6	11.1	5.6	1.5	Kericser/14	14.1	15.8	7.3	0.8
	11.2	10.1	6.6	2.5	Kericser/15	12.0	12.9	6.2	0.6
	11.0	12.0	7.5	2.6		9.8	10.6	5.2	0.5
	10.5	10.8	7.0	2.2		10.7	10.0	5.5	0.6
	10.3	10.8	6.0	2.0		8.3	8.4	4.7	0.6
	10.0	10.2	6.1	1.5		8.2	7.8	4.4	0.4
	10.8	10.0	6.2	0.2		7.3	7.7	3.9	0.2
	10.5	9.7	6.2	1.2		7.3	7.0	3.7	0.3
	9.5	10.2	6.1	1.6	Kericser/20	10.5	10.6	5.7	0.8
Fenyveskút É	12.8	14.0	7.8	0.8	Kericser/23	7.8	8.3	4.2	0.5
	13.3	13.8	8.4	2.4	Kericser/25	9.7	8.5	5.6	0.9

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
	13.5	14.1	7.3	1.2
	12.5	11.2	6.4	0.9
	10.4	9.1	5.3	0.6
	9.0	9.3	5.0	0.5
	8.0	7.5	4.1	0.4
Kericser/26	10.3	10.0	5.5	0.8
Kericser/32	12.3	11.8	6.5	0.8

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser II/a	8.7	9.4	5.3	0.4
	8.3	8.4	4.4	0.5
Kericser II/k	9.9	10.4	5.4	0.2
Kericser (scree)	9.0	8.7	5.0	0.5
Szentgál T-I/8	8.1	7.9	4.3	?
Szentgál T-I/12	11.1	11.6	6.0	0.7
Szentgál Fg-I	9.8	9.7	5.9	0.6

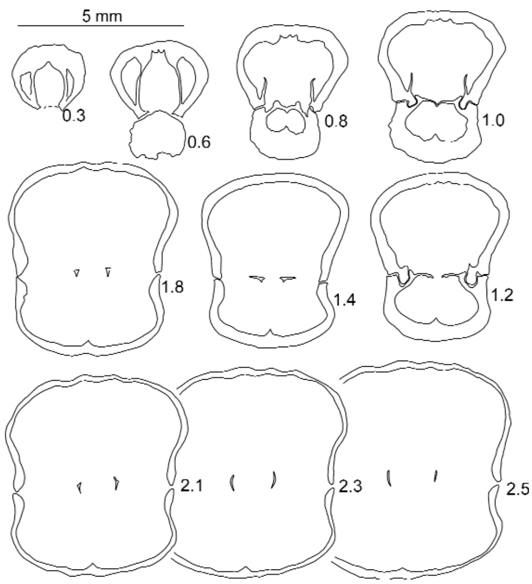


Figure 40. *Lokutella liasina* (PRINCIPI, 1910). Ten transverse serial sections through the posterior part of a specimen from Fenyveskút, 5/c, Pliensbachian, Margaritatus Zone. M 2007.278.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 11.1 mm

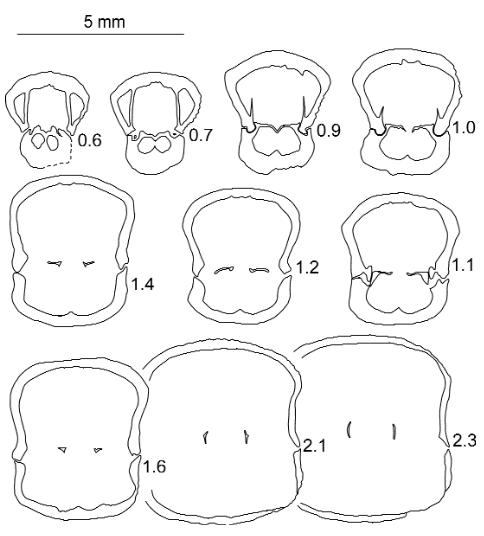


Figure 41. *Lokutella liasina* (PRINCIPI, 1910). Ten transverse serial sections through the posterior part of a specimen from Fenyveskút, 5/c, Pliensbachian, Margaritatus Zone. M 2007.279.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 11.0 mm

Description:

External characters: Small to medium sized *Lokutella*, with rounded subtrigonal outline. The lateral margins are straight, or a little concave, and diverge with an apical angle of 65° to 85°. The maximum width lies at about the anterior third of the length. The valves are usually almost equally convex, but in many cases the posterior half of the dorsal valve tends to be strongly inflated. The maximum convexity is attained near the posterior third of the length. The beak is erect and rather depressed. The pedicle opening and the delthyrium are not visible. There are definite beak ridges in the umbonal region; the dorsal beak ridges are rather sharp throughout, whereas on the ventral valve they become blunt anteriorly. The planareas are elongated and moderately convave; they are sharply delimited on the dorsal valve, while on the anterior half of the ventral valve their limits are indistinct. In lateral view, the posterior part of the lateral commissures are straight, diagonal and run dorsally, across the dorsal third of the planarea. At about the middle of the length they join the dorsal beak ridge, then abruptly turn ventrally and follow the crest of the beak ridges. Thus, the first deflection, connecting the lateral and the anterior commissures, is directed ventrally. This considerable ventral shift of the whole anterior commissure gives the impression of a wide and deep sinus. Otherwise, the anterior commissure is rectimarginate or gently sulcate and shows very low and rounded deflections. The ornamentation of the valves consists of 5 to 7, very flat and rounded ribs. The ribs start near the umbones, their width increases toward the anterior margin but they remain low and characteristically subrounded in cross section.

Internal characters (Figs. 40, 41): *Ventral valve*: The delthyrial cavity is high subquadrate in cross-section, with ventral grooves connected with the muscle scars. The umbonal cavities are rounded triangular. Pedicle collar and deltidial plates were not recorded. The dental plates are subparallel and, in one specimen (Fig. 40) they are thickened ventrally with secondary shell material. The hinge teeth are narrow but massive; denticula are present. *Dorsal valve*: Cardinal process is not seen. The fused inner hinge plates give rise to a marked but shallow septalium. The dorsal median septum is low but long, persists almost through the entire length of the crura. The outer socket ridges are well developed. The inner socket ridges and the base of the hinge plates are rather thin. The hinge plates rise from the medial part of the inner socket ridges and are subhorizontal. The crural bases emerge dorsally and give rise to crura of raduliform type, distally with crescentic cross-section.

Remarks:

The original specimens of *L. liasina* were not available in the collection of the Perugia University, however, the figures published by PRINCIPI (l. c.) are rather informative and show very well the most important, diagnostic features of this species, i. e. the peculiar shape of the lateral commissure, the gently sulcate anterior margin and the style of the ribbing. On this basis, the identification of the Bakony specimens is confirmed.

The specimen figured by KULCSÁR (l. c.) as *P*. ? *hagaviensis* is, in fact, a very typical *L. liasina*. The new species "*R*." *retrocurvata*, erected by VIGH (l. c.) seems to belong also to *L. liasina*. VIGH's records of *P*. ? *hagaviensis* from the Gerecse (Hungary) were checked in the collections of the Geological Institute of Hungary (inventory numbers J. 222 and J. 484) and they turned to be rather typical representatives of *L. liasina*.

L. liasina differs from the other species of *Lokutella* by its smaller size, much weaker ribbing, usually gently sulcate anterior commissure, and the peculiar shape of its lateral commissure.

Distribution:

Sinemurian (?) and Pliensbachian of the Central Apennines (Italy) and the Bakony and Gerecse Mts (Hungary). The Pliensbachian specimens of the Bakony came from several localities, from the Ibex to the Spinatum Zones (Tables 13, 14).

Lokutella palmaeformis (HAAS, 1912)
Plate VII: 6–13; Figures 42–45.

v 1891 *Rhynchonella palmata,* Opp. – DI STEFANO, M. San Giuliano, p. 195, pl. II, fig. 7.
v 1900 *Rhynchonella palmata* Opp. – BÖSE & SCHLOSSER, Südtirol, p. 194, pl. XVIII, figs. 10, 11.
1910 *Rhynchonella palmata* Oppel. – PRINCIPI, Castel del Monte, p. 77, pl. III, fig. 2.
* 1912 *Rhynchonella palmaeformis* nov. nom. – HAAS, Ballino, p. 232, pl. XIX, figs. 2–4.
non 1936 *Rhynchonella palmaeformis* (Liss. in sched.) nov. sp. – ARCELIN & ROCHÉ, Monsard, p. 71, pl. III, figs. 8, 9.
1978 *Prionorhynchia palmaeformis* (Haas, 1912) – BENIGNI, Ra Stua e Fanes, p. 146, pl. 15, fig. 1.
v 1983 *Lokutella palmaeformis* (Haas) – VÖRÖS, Some new genera, p. 7, figs. 1, 2.
v 1983 *Lokutella palmaeformis* (Haas, 1912) – VÖRÖS, Stratigraphic distribution, p. 34.
v 1997 *Lokutella palmaeformis* (Haas) – VÖRÖS, Jurassic brachiopods of Hungary, p. 15, Appendix: fig. 15.
2001 *Lokutella palmaeformis* (Haas, 1912) – POZZA & BAGAGLIA, Koninckella fauna, p. 28, pl. I, fig. 6.
v 2007 *Lokutella palmaeformis* (Haas, 1912) – VÖRÖS & DULAI, Transdanubian Range, p. 55, pl. II, fig. 10.

Material: 109 specimens; mostly double valves of variable state of preservation and a few single valves.

Localities	*Measurements (mm)*				*Localities*	*Measurements (mm)*			
	L	*W*	*T*	*Ch*		*L*	*W*	*T*	*Ch*
Kericser/6	12.5	13.1	6.5	1.5	Kericser/22	12.8	15.4	7.3	1.8
Kericser/16	15.1	18.5	8.8	4.4		14.4	16.4	8.3	2.2
	14.2	17.1	7.4	1.5		12.8	14.6	7.3	1.2
	13.8	14.8	7.0	1.0	Kericser/23	11.0	11.4	6.3	0.7
Kericser/17	13.4	13.9	7.9	1.6	Kericser/25	12.5	14.1	6.5	2.2
	13.1	13.1	7.3	1.6		12.0	11.7	7.1	2.0
	13.0	14.0	7.0	1.1	Kericser/27	12.9	15.4	6.8	2.0
Kericser/18	12.4	14.2	6.8	1.3		9.7	11.0	6.2	1.8
	11.8	13.6	6.9	0.9	Kericser I/a	10.6	12.0	6.0	0.4
Kericser/19	11.9	13.4	7.5	1.7	Kericser II./a	13.2	14.2	7.8	2.9
	13.3	13.2	7.5	2.4	Kericser II/k	14.5	14.8	8.7	3.8
Kericser/20	14.0	13.7	7.2	1.4		13.5	13.2	8.4	2.2
	13.7	13.8	7.2	1.5		9.6	10.2	5.3	0.5
	15.0	17.1	9.5	2.5		17.9	19.0	9.8	4.1
	12.9	15.0	7.0	1.4		16.5	19.1	10.0	4.0
	15.5	16.3	8.6	2.0		15.8	19.1	9.1	1.9
	15.0	16.7	7.9	1.9		16.2	18.3	8.8	2.9
	14.7	15.2	?	1.9		15.5	17.0	8.7	2.6
	13.2	13.6	8.0	2.5		14.7	16.3	8.5	2.3
	13.5	13.9	8.0	1.6		14.0	15.5	8.2	2.7
	13.1	13.0	7.4	2.2		13.6	16.2	8.6	4.2
	12.1	12.6	6.6	1.0		13.8	16.2	7.8	1.1
	12.0	13.0	6.9	1.3		13.3	14.7	7.6	1.3
Kericser/21	13.5	14.0	7.1	1.9		12.6	13.8	6.6	1.2
	12.9	13.9	6.9	2.4		12.6	13.7	6.8	1.1
	14.6	15.7	8.3	2.3		12.5	14.2	7.5	2.6

Localities	*Measurements (mm)*				*Localities*	*Measurements (mm)*			
	L	*W*	*T*	*Ch*		*L*	*W*	*T*	*Ch*
	11.8	13.9	6.7	1.0		12.0	12.8	6.6	1.6
Kericser (scree)	14.0	16.9	7.7	2.0	Koris-hegy B/5(f)	17.8	19.7	9.1	6.9
	13.3	15.2	7.3	2.3	Bocskorhegy (scree)	16.7	18.2	9.0	3.7
	13.9	14.0	7.5	3.1					

Description:

External characters: Medium to large sized *Lokutella*, with laterally expanded subtrigonal, flabelliform outline. The lateral margins are straight or gently concave, and diverge with an apical angle of 85° to 90°. The maximum width lies at the anterior third of the length. The valves are almost equally convex; the maximum convexity is attained near the middle of the length. In some cases the dorsal valve is more inflated posteriorly. The beak is erect to suberect and rather depressed. The pedicle opening and the delthyrium are not visible, broken or covered with matrix. There are well-defined beak ridges in both valves; the dorsal beak ridges remain sharp throughout, whereas on the ventral valve they become a little less defined anteriorly. The planareas are elongated and deeply concave; they are sharply delimited on the dorsal valve, while near the anterior margin of the ventral valve their limits are less distinct in some cases. The lateral extremities of the flabelliform outline are formed by the protrusions of the dorsal beak ridges which project over the ventral beak ridges. In lateral view, the lateral commissures are peculiarly deflected. In their posterior one third they are gently arched dorsally, then they became straight and run longitudinally, in the middle of the planareas; at about the middle of the length they curve dorsally and join the dorsal beak ridge, then abruptly turn ventrally and follow the crest of the dorsal beak ridges. The first deflection, connecting the lateral and the anterior commissures, is directed ventrally. This ventral shift of the whole anterior commissure gives the impression of a wide and deep sinus. The anterior commissure itself is rectimarginate or very gently sulcate and shows sharp zigzag deflections which may reach considerable amplitude (Pl. VII, 10, 11). The valves are multicostate throughout; the 6 to 12 ribs of variable strength and sharpness start at the umbones. Their strength increases anteriorly, but their number remains almost constant; intercalations or bifurcations are rare (Pl. VII, 12).

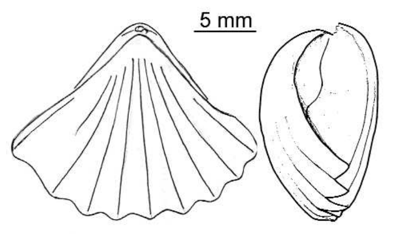


Figure 42. *Lokutella palmaeformis* (Haas, 1912) in dorsal and lateral views. Drawings of a specimen from Kericser, scree from the upper part of the section, Pliensbachian, Davoei or Margaritatus(?) Zone. M 2007.179.1.

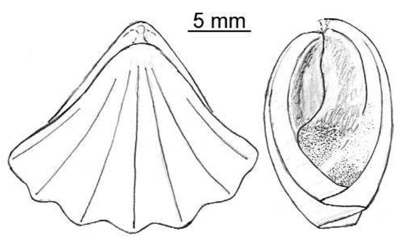


Figure 43. *Lokutella palmaeformis* (Haas, 1912) in dorsal and lateral views. Drawings of a specimen from Kericser, scree from the upper part of the section, Pliensbachian, Davoei or Margaritatus(?) Zone. M 2007.183.1.

Internal characters (Figs. 44, 45): *Ventral valve*: The delthyrial cavity is high subquadrate in cross-section, with ventral groove connected with the muscle scars. The umbonal cavities are rounded triangular. Pedicle collar was not recorded. Thin and disjunct deltidial plates were observed in one section. The dental plates are subparallel but, in the somewhat tilted specimen (Fig. 45) they appear as divergent ventrally. The hinge teeth are slender and gently crenulated; denticula are not seen. *Dorsal valve*: Instead of cardinal process a shallow trough (attachment scar ?) develops in the dorsal umbo. The fused inner hinge plates form a marked but shallow septalium, connected to the median septum. The dorsal median septum is low but long, persists almost through the entire length of the crura. The outer socket ridges are well developed, sharp. The inner socket ridges and the base of the hinge plates are thickened with secondary shell material. The hinge plates rise from the medial part of the inner socket ridges and are gently inclined dorsally. The crural bases emerge dorsally and give rise to crura of raduliform type, distally with crescentic cross-section.

Remarks:

L. palmaeformis was selected as the type species of *Lokutella* Vörös, 1983 and it is an average representative of that genus (Vörös 1983a, p. 7). Probably due to its flabelliform, palm-shaped outline, this form was identified by some earlier authors with "*Rhynchonella palmata*" Oppel, 1861, although this latter species is more triangular and its lateral commissure runs along the ventral beak ridge. The original specimens of the early records by Di Stefano (l. c.) and Böse & Schlosser (l. c.) were checked in the collections of the Palermo University and the Bayerische Staatssammlung (München), respectively, and they turned to be typical representatives of *L. palmaeformis*.

The species name *palmaeformis* was introduced by Arcelin & Roché (l. c.) for a morphologically different brachiopod from the Middle Jurassic of France, in a binomen "*Rhynchonella palmaeformis*". It is a secondary junior homonym of *Rhynchonella palmaeformis* Haas, 1912, and has to be rejected.

L. palmaeformis differs from *L. liasina* (Principi, 1910) by its much stronger ribbing, significantly more expanded, flabelliform outline, and very deep planareas. *L. kondai* Vörös, 1983 is close to *L. palmaeformis*, but its anterior ribbing is much stronger and it has a smooth area posteriorly.

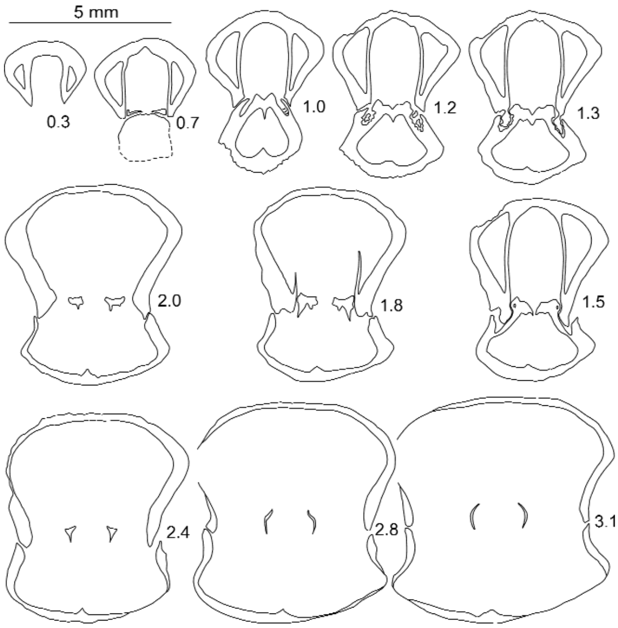


Figure 44. *Lokutella palmaeformis* (Haas, 1912). Eleven transverse serial sections through the posterior part of a specimen from Kericser, scree from the upper part of the section, Pliensbachian, Davoei or Margaritatus(?) Zone. J. 9185. Distance from posterior end of shell is given in mm. Original length of the specimen is 12.7 mm. Redrawn after Vörös (1983, fig. 2)

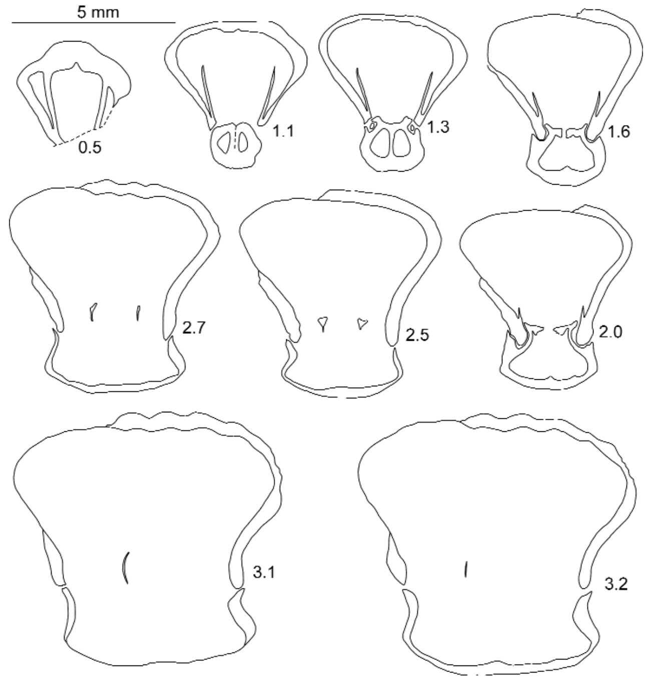


Figure 45. *Lokutella palmaeformis* (Haas, 1912). Nine transverse serial sections through the posterior part of a specimen from Kericser, Bed 18, Pliensbachian, Davoei Zone. J. 9184. Distance from posterior end of shell is given in mm. Original length of the specimen is 12.4 mm. One of the crura was broken away. Redrawn after Vörös (1983, fig. 1)

Another, related form was described as "*Rhynchonella cuneiformis*" by Canavari (1884, p. 103, pl. XI, fig. 1); this is the senior homonym of "*Rhynchonella cuneiformis*" Mansuy, 1912, a quite different form of Late Triassic age. Canavari's original specimen was inspected in the collection of the Pisa University and it surely belongs to the genus *Lokutella*. It bears much similarity to *L. palmaeformis*, especially to one of the Bakony specimens with irregularly bifurcate anterior ribbing, figured here on Pl. VII, Fig. 12. However, the lateral commissure of *L. cuneiformis* runs along the dorsal beak ridge, what is considered to be a diagnostic difference from *L. palmaeformis*.

Distribution:

Pliensbachian of Sicily, the Central Apennines and the Southern Alps (Italy) and the Bakony Mts (Hungary). The Pliensbachian specimens of the Bakony came from several localities, from the Ibex to the Spinatum Zones (Tables 13, 14).

Lokutella kondai Vörös, 1983

Plate VII: 14–15; Plate VIII: 1, 2; Figure 46.

v * 1983 *Lokutella kondai* sp. n. – Vörös, Some new genera, p. 8, fig. 3.

v 1983 *Lokutella kondai* Vörös, 1983 – Vörös, Stratigraphic distribution, p. 34.

v 2007 *Lokutella kondai* Vörös, 1983 – Vörös & Dulai, Transdanubian Range, p. 55.

Material: 51 specimens mostly of poor preservation; a dozen of rather well preserved double valves

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser/14	15.2	16.8	9.2	4.8
Kericser/15	14.0	15.8	8.8	4.0
Kericser/18	13.8	?	8.9	4.6
Kericser/28	12.3	?	7.5	3.3
Kericser II/k	12.5	13.8	6.6	1.3
Koris-hegy B/5	15.5	17.6	8.0	5.7
	17.0	18.8	9.7	7.7
	14.3	17.5	8.7	7.2
	14.2	15.5	8.8	7.5

Emended description:

External characters: Medium sized *Lokutella*, with laterally expanded subtrigonal, flabelliform outline. The lateral margins are straight or gently concave, and diverge with an apical angle of 80° to 90°. The maximum width lies at about the half of the length. The valves are almost equally convex; the maximum convexity is attained near the middle of the length. The beak is erect and rather depressed. The pedicle opening and the delthyrium are not visible, broken or covered with matrix. There are marked beak ridges in both valves; the dorsal beak ridges remain sharp throughout, whereas on the ventral valve they are less distinct and become rounded or flat-topped anteriorly. The planareas are elongated and very deep; they are sharply delimited on the dorsal valve, while near the anterior margin of the ventral valve their limits are usually less defined. In lateral view, the lateral commissures are deflected. In their posterior one third they are arched dorsally, then they became straight and run longitudinally, in the middle of the planareas; at about the middle of the length they curve dorsally and join the dorsal beak ridge, then abruptly turn ventrally and follow the crest of the dorsal beak ridges. The first deflection, connecting the lateral and the anterior commissures, is directed ventrally. The anterior commissure is rectimarginate but shows extremely high and sharp zigzag deflections; their amplitude increases medially and may reach the thickness of the double valve (Pl. VII, 14). The valves are multiplicate; 5 to 7 ribs (or plicae) start at about the middle of the length and become very coarse anteriorly whereas the umbonal part is smooth. The number of ribs usually remains constant; in an extreme case, intercalation/bifurcation appears near the anterior margin (Pl. VIII, 2).

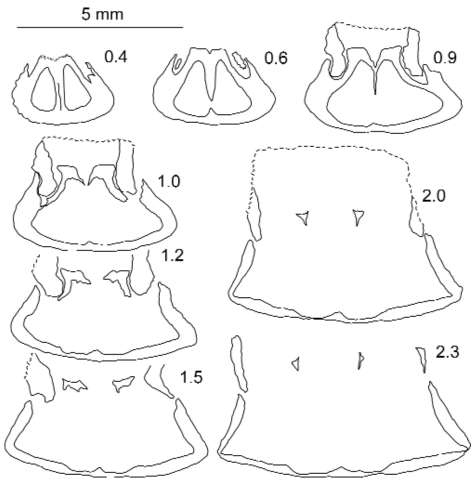


Figure 46. *Lokutella kondai* VÖRÖS, 1983. Eight transverse serial sections through the posterior part of a specimen from Lókút, Bed 464, Pliensbachian, Davoei Zone. M 2007.275.1. Distance from posterior end of shell is given in mm. Original length of the specimen is over 13 mm. The umbonal part of the ventral valve was broken

Internal characters: Owing to the paucity of suitable material (most specimens are filled with sparry calcite) only one specimen was sectioned. Its ventral umbo was broken away, therefore the internal features of the ventral valve are unknown, except that the hinge teeth are strong and crenulated. *Dorsal valve* (Fig. 46): There is a deep and long septalium, formed by the steeply inclined inner hinge plates and connected to a strong, stout median septum. The dorsal part of the median septum is low, but long. The outer socket ridges are well developed. The inner socket ridges and the base of the hinge plates are thickened with secondary shell material. The hinge plates rise from the medial part of the inner socket ridges and are gently inclined dorsally. The crural bases emerge dorsally and give rise to crura of raduliform type, tending to be crescentic in cross-section.

Remarks:

When originally describing this species as new, I tentatively included to its synonymy the record by BÖSE & SCHLOSSER (1900, p. 194, pl. XVIII, fig. 10). They figured a specimen as "*Rhynchonella palmata* OPP." with strong ribs but smooth posterior area, otherwise quite similar to *L. kondai*, but also to *L. palmaeformis* (HAAS, 1912). Later, in 1984, I had the opportunity to study the originals of BÖSE & SCHLOSSER in the Bayerische Staatssammlung (München), and the smooth posterior area of the above specimen turned to be produced by secondary abrasion. Therefore in the present work, it is attributed to *L. palmaeformis*.

L. kondai differs from other species of the genus *Lokutella* by its smooth posterior region and its extremely coarse anterior ribbing (or multiplication).

Distribution:

The Pliensbachian specimens of the Bakony Mts came from three localities, from the Ibex and Davoei Zones (Tables 13, 14).

Superfamily Wellerelloidea LICHAREW, 1956
Family Wellerellidae LICHAREW, 1956
Subfamily Cirpinae AGER, 1965

Genus *Cirpa* DE GREGORIO, 1930

Cirpa ? *subcostellata* (GEMMELLARO, 1878)
Plate VIII: 9.

v * 1878 *Rhynchonella subcostellata,* Gemm. – GEMMELLARO, Casale e Bellampo, p. 422, pl. XXXI, figs. 75–78.
v 1879 *Rhynchonella* n. f. – UHLIG, Sospirolo, p. 41, pl. V, fig. 8.
v ? 1895 *Rhynchonella latissima* n. sp. – FUCINI, Monte Pisano, p.180, pl. VII, fig. 5.

non 1898 *Rhynchonella subcostellata* Gemmellaro. – Böse, Brachiopodenfauna der östlichen Nordalpen, p. 193, pl. XIV, fig. 9.
v 1907 *Rhynchonella Canevae* n. f. – Dal Piaz, Tranze di Sospirolo, p. 38, pl. II, fig. 14.
? 1912 *Rhynchonella subcostellata* Gemmellaro. – Haas, Ballino, p. 246, pl. XIX, fig. 20.
v 1983 *Cirpa* ? *subcostellata* (Gemmellaro, 1878) – Vörös, Stratigraphic distribution, p. 34.
v ? 2003 *Cirpa subcostellata* (Gemmellaro, 1878) – Vörös et al., Schafberg, p. 71, pl. VI, figs. 13–15.
? 2003 *Cirpa subcostellata* (Gemmellaro, 1878) – Dulai, Hettangian and Early Sinemurian, p. 21, pl. III, figs. 1–3.
? 2003 *Cirpa subcostellata* (Gemmellaro) – Elmi et al., Grands bivalves en Algérie occidentale, p. 701, fig. 4/5.
v ? 2007 *Cirpa subcostellata* (Gemmellaro, 1878) – Vörös & Dulai, Transdanubian Range, p. 54, pl. I, fig. 12.
v 2007 *Cirpa* ? *subcostellata* (Gemmellaro, 1878) – Vörös & Dulai, Transdanubian Range, p. 55.
? 2007 *Cirpa subcostellata* (Gemmellaro, 1878) – Alméras et al., Algérie occidentale, p. 45, pl. 2, figs. 8–10.

Material: A single, partly fragmentary double valve.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser/35	12.4	17.8	7.8	6.0

Description:

External characters: This is a medium sized *Cirpa*, with laterally expanded subpentagonal, flabelliform outline. The lateral margins are straight, and diverge with an apical angle of 95°. The maximum width lies at about the middle of the length. The valves are moderately convex; the ventral valve is more convex than the dorsal valve which is characteristically flattened posteriorly. After a posterior biconvex stage, a marked sulcus develops in the ventral valve which results in a dorsally oriented uniplication in the anterior part. Consequently, the maximum thickness of the double valve is attained anteriorly. The beak is erect, massive. Its point is broken, therefore the pedicle opening is not seen. The medial part of the delthyrium is covered with matrix, but the lateral sides form a wide and low triangle. The ventral beak ridges are rounded but distinct, and delimit a low but wide, markedly flat interarea or palintrope. There are no beak ridges on the dorsal valve; planareas are not developed. In lateral view the lateral commissures are nearly straight, they are slightly arched ventrally. The anterior commissure is uniplicate and shows a series of moderately sharp zigzag deflections. The uniplication is markedly trapezoidal and occupies the central one third of the anterior commissure. The valves are multicostate throughout; 12 strong but rounded ribs start at the umbones, four of which fall to the medial fold. They become somewhat sharper anteriorly, but their number remains constant; intercalations or bifurcations are not seen. In the lateral sectors of the valves the ribs follow a flabelliform pattern, i. e. they are more and more arched laterally.

Internal characters: These were not studied because of the paucity of the material (single specimen).

Remarks:

Gemmellaro's original specimens of *C.* ? *subcostellata* were studied in the collection of the Palermo University and they showed the diagnostic features (strongly convex ventral and relatively flat dorsal valve, characteristic beak, flabelliform ribbing) of this species, better than the figures of Gemmellaro (l. c.). The same distinctive features were observed on the original specimens of "*Rhynchonella* n. f." (Uhlig, l. c.) and "*R. canevae* n. f." (Dal Piaz, l. c.) kept in the collection of the Padova University, therefore the latter species is regarded here as a junior synonym of *C.* ? *subcostellata*. The specimen of "*R. latissima* n. sp.", figured by Fucini (l. c.), was checked in the collection of the Pisa University, it may also be attributed to *C.* ? *subcostellata* although it is markedly larger.

The specimens figured by Böse (l. c.) and Haas (l. c.) probably do not belong to *C.* ? *subcostellata* because they are too convex and do not show the flabelliform ribbing. The recent records from the Sinemurian by Vörös et al. (l. c.), Dulai (l. c.), and Vörös & Dulai (l. c.) may represent *C.* ? *subcostellata* but they are far from being typical representatives of that species. The same holds true for the *C. subcostellata* from the Sinemurian and Lower Pliensbachian of western Algeria (Elmi et al. l. c., Alméras et al. l. c.); perhaps only one of those specimens (pl. 2, fig. 9) may correspond to the present interpretation of *C.* ? *subcostellata*.

Without knowledge on the internal features, the attribution of this species to the genus *Cirpa* is tentative, and is based on the general constitution, the shape of the beak and the anterior region. At the same time, the presence of the interarea and the absence of the planareas, as well as the low convexity speak against the attribution to *Cirpa* and imply that *C.* ? *subcostellata* may represent another, new genus. Introducing a new genus on the basis of a single specimen of a single species would not be recommended.

Distribution:

Sinemurian to Pliensbachian of Sicily, the Central Apennines and the Southern Alps (Italy) and the Bakony Mts (Hungary). The records from the Northern Calcareous Alps (Austria) are doubtful. The Bakony specimen came from the Kericser section from the Ibex Zone (with mixed faunal elements from the Sinemurian) (Tables 13, 14).

Cirpa ? cf. *subfurcillata* (Böse, 1898)
Plate VIII: 10.

1878 *Rhynchonella* sp. – Gemmellaro, Casale e Bellampo, p. 424, pl. XXXI, figs. 61–63.
* 1898 *Rhynchonella subfurcillata* nov. sp. – Böse, Brachiopodenfauna der östlichen Nordalpen, p. 210, pl. XV, fig. 19.
v 2007 *Cirpa* ? cf. *subfurcillata* (Böse, 1898) – Vörös & Dulai, Transdanubian Range, p. 55.

Material: A single, rather well preserved double valve.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Fenyveskút (scree)	17.7	17.9	13.6	9.8

Description:
External characters: This is a large sized *Cirpa* with rounded subpentagonal outline. The lateral margins are gently convex and diverge with an apical angle of about 100°. The maximum width is attained at around the middle of the length. The two valves are nearly equally convex, though the dorsal valve is more inflated posteriorly; the maximum convexity lies in the anterior one-third of the double valve. The beak is rather high, erect. The pedicle opening and the delthyrium are covered with matrix, but seem to be tiny and narrow. The beak ridges are blunt; true planareas did not develop, but the lateral parts are gently concave. In lateral view the lateral commissures are slightly arched ventrally. The anterior commissure is uniplicate and shows a series of rather sharp, partly irregular zigzag deflections. The uniplication occupies the central one third of the anterior commissure and is markedly asymmetrical: it is shifted from the plane of symmetry toward the anatomical left side. The trapezoidal uniplication is also asymmetrical: its anatomical right flank is much higher than the left one. The amplitude of the zigzag deflections grows gradually on the lateral sectors and reach the maximum in the uniplication, where three deflections develop. The ornamentation consists of antidichotomous ribbing. The posterior surface of the shells is covered with numerous faint riblets; coarse ribs appear near the anterior margin. The ribbing remains weak on the lateral flanks but in the central fold and sulcus the costae become very strong. The number of coarse ribs is 3 to 4 in the fold. Due to irregularity in the longitudinal component of the growth, the anterior end is somewhat truncated and a flattened frontal part developed.
Internal characters: These were not studied because of the paucity of the material (single specimen).

Remarks:
The here described specimen is highly similar to that figured by Böse (l. c.) as "*R. subfurcillata*" in general constitution and antidichotomous pattern of ribbing. Böse's specimen does not show asymmetry in the anterior margin, therefore the identification of the Bakony specimen bears some doubt. On the other hand, the interesting specimen, figured by Gemmellaro (l. c.), checked in the collection of the Palermo University, fits perfectly to the specimen here described, even in the position and shape of the irregularities of the anterior region.
All the above mentioned specimens show several characteristic features of the genus *Cirpa*, therefore the Bakony specimen is placed tentatively to this genus, despite the lack of information on the internal morphology.

Distribution:
Sinemurian to Pliensbachian of Sicily (Italy), the Northern Calcareous Alps (Austria) and the Bakony Mts (Hungary). The Bakony specimen came from the Fenyveskút locality from the Margaritatus Zone (Tables 13, 14).

Genus *Calcirhynchia* Buckman, 1918

Calcirhynchia ? *hungarica* (Böckh, 1874)
Plate VIII: 11.

* 1874 *Rhynchonella Hungarica* n. sp. – Böckh, Südlichen Theiles des Bakony, p. 160, pl. IV, figs. 5, 6.
1884 *Rhynchonella Hungarica* Böckh. 1874. – Haas, Südtyrol und Venetien, p. 8, pl. II, fig. 12.
v 1887 *Rhynchonella plicatissima* Quenst. sp. – Di Stefano, Lias inferiore di Taormina, p. 61, Pl. II, figs. 30–35.
v 1961 *Rh. plicatissima* Qu. – Vigh, Esquisse géol. Gerecse, p. 577.
v 1976 *"Rhynchonella" plicatissima* Qu. 1852 – Vigh in Fülöp, Liassic Brach. Tata, p. 33.
v 1983 *Calcirhynchia ? plicatissima* (Quenstedt, 1852) – Vörös, Stratigraphic distribution, p. 34.
v 2003 *Calcirhynchia plicatissima* (Quenstedt, 1852) – Vörös et al., Schafberg, p. 71, pl. VI, figs. 24–26.
v 2003 *Calcirhynchia plicatissima* (Quenstedt, 1852) – Dulai, Hettangian and Early Sinemurian, p. 25, pl. III, figs. 13-18; pl. IV, figs. 1–7.
v 2007 *Calcirhynchia plicatissima* (Quenstedt, 1852) – Vörös & Dulai, Transdanubian Range, p. 54, pl. I, fig. 14.

Material: 4 specimens; a fragmentary and 3 rather well preserved double valves.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser/33	12.5	13.1	9.4	4.8
Fenyveskút (scree)	8.0	8.5	4.2	1.1
	7.2	9.4	4.5	1.3

Description:

External characters: This is a medium sized *Calcirhynchia* with very rounded subpentagonal outline. The lateral margins are straight, or a little convex, and diverge with an apical angle of about 90°. The maximum width lies at the anterior third of the length. The valves are almost equally convex; the maximum convexity is attained near the middle of the length. A weak dorsal fold develops anteriorly. The beak is massive, slightly incurved. Pedicle opening and delthyrium are not visible. There are no beak ridges or planareas. The lateral sides are flat, or a little concave near the umbo. In lateral view, the posterior segment of the lateral commissures are gently arched dorsally then run diagonally in ventral direction, and gradually become serrated. The anterior commissure is widely uniplicate and shows sharp zigzag deflections. The top of the trapezoidal uniplication is nearly straight. The valves are multicostate throughout; the ribs appear at the umbones and increase in strength and sharpness toward the anterior margin. The number of major ribs (10 altogether, 6 of which fall to the fold) remains constant through the valves; bifurcations or intercalations were not observed. The lateral parts are not smooth but covered with 4 to 5 riblets.

Internal characters: These were not studied because of the paucity of the material (few specimens filled with sparry calcite).

Remarks:

In the description of "*R.*" *hungarica*, BÖCKH (l. c.) recognized its similarity to "*R.*" *plicatissima* QUENSTEDT, 1852, but listed some differences between the two species. HAAS (1884, l. c.), although with some reservation, still maintained "*R.*" *hungarica* as independent species. However, later HAAS (1885, p. 38), ROTHPLETZ (1886, p. 139) and GEYER (1889, p. 57) unanimously concluded that the differences between *hungarica* and *plicatissima* were within the morphological range of a variable species, i. e. they took *hungarica* as a junior synonym of *plicatissima*. The statement of ROTHPLETZ (1886, p. 139): " Boe[c]kh hat eine sehr gute Beschreibung der Art [*plicatissima*] unter dem Namen *hungarica* gegeben…" well expresses this concept, but at the same time it involves the fact, that QUENSTEDT's original description was not fully informative.

Nevertheless, from this time on, *hungarica* was synonymized with *plicatissima* by a plenty of authors, and the senior synonym became one of the most frequently cited Early Jurassic brachiopod species of wide range of variation (see a long list of synonymy in DULAI 2003). Only VIGH (1943, p. 339) mentioned again the name *hungarica* (under the heading *R. plicatissima*) and remarked that his specimens fit perfectly BÖCKH's *hungarica* and were very similar to GEYER's figures of *plicatissima* but were quite different from QUENSTEDT's figures of *plicatissima* in shape and ribbing. But, despite of this observation, he (VIGH 1961, 1976, l. c.) and also the subsequent Hungarian authors (VÖRÖS 1983b, VÖRÖS et al. 2003, DULAI 2003, l. c.) consequently used the species name *plicatissima* for this wide ranging taxon, so frequent in the Lower Jurassic of Hungary, and the name *hungarica* seemed to be abandoned.

A new turn in this matter was brought about by the debate on the generic position of "*R.*" *plicatissima*. AGER (1962, p. 86) tentatively suggested *Calcirhynchia* as host genus, then SUČIĆ-PROTIĆ (1969, p. 55) proposed her new genus *Mediterranirhynchia* to include *plicatissima*, but the previous view became prevalent (VÖRÖS 1983b, DULAI 1992, SIBLÍK 1993, BÖHM et al. 1999, SULSER 1999, VÖRÖS et al. 2003).

Recently, TOMAŠOVÝCH (2006) analyzed very thoroughly the question of Lower Liassic multicostate rhynchonellids and concluded that many earlier records of "*Calcirhynchia plicatissima*" in fact belong to his new genus *Jakubirhynchia*. But, even more importantly, he stated that QUENSTEDT's original specimens of "*R. plicatissima*", he studied in the Tübingen collection, "do have marked planareas" (TOMAŠOVÝCH, 2006, p. 223) what definitely exclude them from the genus *Calcirhynchia* and probably transfer them to *Prionorhynchia*.

QUENSTEDT (1867, 1871) did not figure lateral views of his specimens of *plicatissima*. In my mind, this might be the cause of the inherited misinterpretation of the species e. g. by ROTHPLETZ (1886) and GEYER (1889). The original specimens figured by these latter authors I checked in the collections of München and Wien, respectively, and I found several specimens with planareas in both collections. On the other hand, the Hungarian specimens of "*plicatissima*", what I studied personally, do not have planareas, but show fine riblets on their flat or gently convex lateral parts and definitely may not belong to *Prionorhynchia*. Consequently, the species name *plicatissima* should not be applied to them any more, but instead, the use of BÖCKH's species name *hungarica* has to be restored.

The generic attribution of these forms is still questionable, because the information on their internal morphology is rather scanty. DULAI (1992, 2003) published serial sections of his "*Calcirhynchia plicatissima*", now regarded as representative of *C. hungarica*, which exclude the attribution to *Mediterranirhynchia* (possessing massive median septum) and seem to stand closer to *Calcirhynchia* than to *Jakubirhynchia*. At least DULAI's sections demonstrate the fused hinge plates and the lack of median septum, but do not show the deep, sessile septalium, characteristic of *Jakubirhynchia*. The restricted material from the Pliensbachian of the Bakony did not give more information on the internal features, therefore, the species *hungarica* is placed here tentatively to *Calcirhynchia*.

The above conclusion and the rehabilitation of Böckh's *hungarica* would require the revision of many previous records of *plicatissima* in the Alpine and Mediterranean brachiopod faunas. In the above synonymy I listed only those items, what I was able to study personally, and I was convinced that they do not have planareas, and represent the true *C. hungarica* (BÖCKH, 1874).

Distribution:

Sinemurian to Pliensbachian of Sicily and the Southern Alps (Italy), the Northern Calcareous Alps (Austria) and the Gerecse and Bakony Mts (Hungary). The Pliensbachian specimens of the Bakony came from two localities from the Ibex to the Margaritatus Zones (Tables 13, 14).

Superfamily Rhynchonelloidea D'ORBIGNY, 1847
Family Rhynchonellidae D'ORBIGNY, 1847
Subfamily Rhynchonellinae D'ORBIGNY, 1847

Genus *Homoeorhynchia* BUCKMAN, 1918

Homoeorhynchia cf. *acuta* (J. SOWERBY, 1816)
Plate IX: 5.

* 1816 *Terebratula acuta.* – J. SOWERBY, Mineral Conchology, p. 115, pl. CL, figs. 1, 2.
1867 *T. acuta* – QUENSTEDT, Handbuch der Petrefactenkunde II, p. 540, pl. 46, fig. 15.
1871 *Terebratula acuta* – QUENSTEDT, Petrefactenkunde II, p. 64, pl. 37, figs. 150–153.
1882 *Rhynchonella acuta* Sow. sp. – HAAS & PETRI, Elsass-Lothringen, pl. III, fig. 23.
1885 *Rhynchonella acuta,* Sow. sp., 1818. – HAAS, Alpes Vaudoises I, p. 44, pl. II, fig. 24; pl. III, fig. 56.
v 1918 *[Rhynchonella] acuta* Sow. sp. – VADÁSZ, Posidonomya alpina-Schichten in Anatolien, p. 217.
1918 *H[omoeorhynchia]. acuta,* J. Sowerby sp. – BUCKMAN, Namyau Beds, p. 36, pl. XVIII, fig. 13; pl. XIX, fig. 30.
1956 *Homoeorhynchia acuta* (J. Sowerby) – AGER, British Liassic Rhynchonellidae, p. 29, text-figs. 17–19, pl. III, figs. 1–4.
1959 *Homoeorhynchia acuta* (J. Sowerby) – AGER, Turkey, p. 1019, text-fig. 1, pl. 128, fig.1.
? 1967 *Homoeorhynchia acuta* (Sow), – PREDA, Brachiopod. jur. Roşia, p. 49, pl. II, figs 4–7.
1968 *Homoeorhynchia acuta* (Sowerby, 1816) – SIBLÍK, Rhynchonellinae a Cirpinae Slovensk. Domeru, p. 21 (partim), pl. I, fig. 2, text-figs 3, 4.
1979 *Homoeorhynchia acuta* (J. Sowerby) – ALMÉRAS, Étude morphologique, p. 207, figs. 16–19, pl. 2, figs. 9–12.
v 1983 *Homoeorhynchia acuta* (Sowerby, 1816) – VÖRÖS, Stratigraphic distribution, p. 34.
1987 *Homoeorhynchia acuta* (Sowerby, 1818) – ALMÉRAS & ELMI, Lias ardechois, p. 48, pl. 2, figs. 9–12.
? 1989 *Homoeorhynchia acuta* (J. Sowerby, 1816) – TCHOUMATCHENCO, Kotel, p. 15, pl. I, figs. 7–8, text-fig. 10.
v 2007 *Homoeorhynchia acuta* (Sowerby, 1816) – VÖRÖS & DULAI, Transdanubian Range, p. 54.

Material: A single, moderately preserved double valve.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser/7	17.0	18.7	10.6	13.8

Description:

External characters: This is a medium sized *Homoeorhynchia* with a little asymmetric, rounded subquadrate to subpentagonal outline. The lateral margins are nearly straight and diverge with an apical angle of about 110°. The maximum width lies at mid-length. The maximum thickness is attained anteriorly; the outline in lateral view is rather "cynocephalous". The lateral parts of the valves tend to form flat wing-like extensions which emerge ventrally in lateral view. The dorsal valve is strongly convex. The ventral valve is resupinate: convex in lateral view, but concave in anterior view. This is due to a deep ventral sulcus, starting from the posterior one fifth of the valve. Here the ventral umbo emerges rather abruptly from the surrounding concave region. The cone-shaped beak is erect. The pedicle opening and the delthyrium are mostly covered by matrix. The beak ridges are moderately developed. The lateral parts are gently concave; the lateral commissures form a faint, elevated ridge. In lateral view the lateral commissures are gently sinuous: in their posterior part they are strongly arched dorsally, then they run diagonally to the anterolateral extremities. Anteriorly they show weak zigzag deflections. The anterior commissure is highly and sharply uniplicate. The central peak of the plica is as high as the thickness of the specimen. There is an asymmetric, lower peak in the anatomical left side of the plica. The valves are smooth posteriorly; the blunt ribs appear around mid-length and become sharp at the anterior margin. On the lateral flanks, a pair of opposing ribs appears near the umbones and gives the impression of long beak ridges.

Internal characters: These were not studied because of the paucity of the material (single specimen).

Remarks:

This is a very widespread, well-known and frequently cited brachiopod species of the European Early Jurassic, therefore the above list of synonymy is far from being complete. *H. acuta* is a distinctive species of the NW European faunal province (AGER 1967, 1983). Although it was recorded outside of western Europe, e. g. in Turkey, Bulgaria and Slovakia (AGER 1983), its occurrence in a true Mediterranean fauna, as that of the Bakony, is an absolute rarity.

H. acuta differs from other species of *Homoeorhynchia* first of all by its single, very marked dorsal fold and uniplication. This seems to throw some doubt on the identification of the Bakony specimen with an extra fold. However, the characters of the beak, the beak ridges and the whole constitution of the specimen from the Bakony strongly supports its attribution to *H. acuta*. It is also important to bear in mind, that *H. acuta* specimens with asymmetric, secondary fold were often recorded in true NW European faunas (e. g. HAAS 1885, pl. III, fig. 56, with unusually low, asymmetric fold; AGER 1956, pl. III, fig. 3, with obliquely developed secondary fold) and especially in the "marginal" populations (AGER 1983) such as in Turkey (AGER 1959, text-fig. 1, specimens with faint lateral costae). These marginal occurrences of *H. acuta* with extra folding were regarded by AGER (1983) as examples of allopatric speciation within the genus *Homoeorhynchia*. He concluded that the sites of allopatric speciation might be the deeper water, in southern [i. e. Tethyan] areas. In this concept, the single, aberrantly folded specimen from the Bakony may represent an "attempt" of *Homoeorhynchia* "to return to the more conservative multicostate form" (AGER 1983, p. 563).

Distribution:

Pliensbachian of western Europe (Great Britain, France, Germany, Switzerland), the West Carpathians (Slovakia), Bakony (Hungary), Apuseni Mts (Romania), Balkan Mts (Bulgaria), North Anatolia (Turkey). The Bakony specimen came from Kericser from the Margaritatus Zone (Tables 13, 14).

Homoeorhynchia ? *lubrica* (UHLIG, 1880)
Plate IX: 7; Figure 47.

v * 1880 *Rhynchonella lubrica* n. f. – UHLIG, Sospirolo, p. 39, pl. V, figs 5-7.
v 1907 *Rhynchonella lubrica,* Uhl. – DAL PIAZ, Tranze di Sospirolo, p. 33, pl. II, fig. 10.
1 912 *Rhynchonella* nov. spec. indet. ex affin. *Rh. Albertii* Oppel – HAAS, Ballino, p. 241, pl. XIX, fig. 16.
? 1943 Rh. lubrica Uhl. – VIGH, Gerecse, p. 49, fig. 13c, pl. III, fig. 11.
? 1956 *Rhynchonella alberti* Oppel – SELLI, Fossili Mesoz. Isonzo, p. 10, pl. I, fig. 6.
v 1983 *Homoeorhynchia* ? *lubrica* (Uhlig, 1880) – VÖRÖS, Stratigraphic distribution, p. 34.
v 2007 *Homoeorhynchia* ? *lubrica* (Uhlig, 1879) – VÖRÖS & DULAI, Transdanubian Range, p. 55.
? 2008 *Cuneirhynchia lubrica* (Uhlig) – RADULOVIĆ, Livari, Montenegro, p. 184, fig. 2 A–L.

Material: 14 specimens, 5 of them moderately well preserved double valves.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser/14	11.6	12.9	7.1	4.6
Kericser/25	9.2	10.8	5.6	3.6
Kericser/26	12.7	13.8	7.3	6.2
Kericser/32	12.1	12.6	8.1	6.0
	10.0	10.5	6.6	4.8

Description:

External characters: This is a small sized *Homoeorhynchia* with a gently subrounded subpentagonal outline. The lateral margins are nearly straight and diverge with an apical angle of about 90°. The maximum width can be measured at the middle of the length. The outline in lateral view is rhomboid-like. The dorsal valve is very convex posteriorly. The lateral parts of the valves form flat wing-like extensions. The ventral valve is somewhat resupinate: convex in lateral view, but gently concave in anterior view. This is due to a ventral sulcus, starting from the posterior one third of the valve and corresponding to a fold in the dorsal valve. The lateral parts of the double valve appear as wing-like extensions. The beak is cone-shaped, rather high and suberect. The pedicle opening and the delthyrium are not well seen. There are definite beak ridges in both valves. The lateral surfaces are gently concave but do not form true planareas. A part of the lateral commissure form an elevated ridge. In lateral view the lateral commissures are gently sinuous: in their posterior part they are strongly arched dorsally, then they run diagonally to the anterolateral extremities, where they show weak deflections. The anterior commissure is uniplicate and forms a rather low, unbroken arch. It is serrated, usually with 4 to 5 zigzag deflections which increase in strength medially. In some specimens, the whole anterior part is developed somewhat asymmetrically: the centre of the fold and uniplication is a little shifted to the anatomical left. The umbonal area of the shells is smooth; ribs appear at around the posterior one-third of the length. The ribbing is weak on the lateral flanks but in the central fold and sulcus the costae become very strong towards the anterior margin. The number of costae remains constant (4–5) in the fold, where the ribbing shows a fan-shaped pattern.

Internal characters (Fig. 47): *Ventral valve*: The delthyrial cavity is high subquadrate in cross-section. The umbonal cavities are rounded triangular. Pedicle collar and deltidial plates were not observed. The dental plates are subparallel and strong. The hinge teeth are rather elongated and crenulated; denticula are present. *Dorsal valve*: Cardinal process is not seen. The notothyrial cavity is open dorsally and lanceolate in cross-section. The dorsally adjoined double lamellae can be interpreted as posteriorly reinforced crural bases. Dorsal median septum is absent. The outer socket ridges are well developed. The inner socket ridges are high, oblique and poorly demarcated from the outer hinge plates. The outer hinge plates are directed slightly ventrally, whereas the crural bases emerge dorsally. Crura were not preserved.

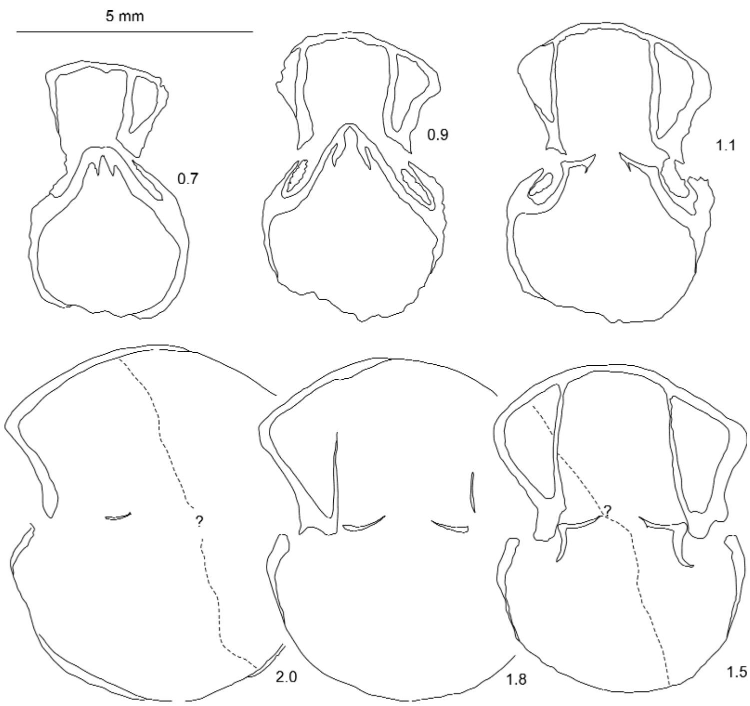


Figure 47. *Homoeorhynchia* ? *lubrica* (Uhlig, 1879). Six transverse serial sections through the posterior part of a specimen from Kávás-hegy I, Bed 84, Late Sinemurian. M 2007.276.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 11.5 mm. The internal features were partly blurred by a calcite vein; crura were not seen

Remarks:

The original specimens of "*R*." *lubrica*, figured by Uhlig (l. c.) and Dal Piaz (l. c.) have been studied in the collection of the Padova University, and this way the identification of the Bakony specimens is confirmed. Vigh's (l. c.) record from the Gerecse (Hungary) is questionable, because the original specimens were not found in the collection of the Geological Institute of Hungary and the figures themselves are not informative enough.

The specimen figured by Haas (l. c.) as "ex affin. *albertii*" shows many diagnostic characters of *lubrica*, including the slight asymmetry of the fold, and clearly differs from "*R*." *albertii* Oppel, 1861 which has much sharper and stronger ribs and a robust constitution.

Recently, Radulović (l. c.) figured three specimens of "*lubrica*" attributed to the genus *Cuneirhynchia*. Only one of them (l. c., fig. 2A–D) has some similarity to the true *H.* ? *lubrica*, but the generic attribution of the specimens to *Cuneirhynchia* makes Radulović's species identification very questionable.

H. ? *lubrica* is closely allied to *H.* ? *ptinoides* (Di Stefano, 1891) but the latter differs by its more elongated outline, more inflated dorsal valve, more projected anterior part (forming a linguiform extension) and by its fewer and stronger ribs.

The generic position of this species is very ambiguous. Some of its important internal features, e. g. the lack of septalium and median septum, speak against its attribution to the genus *Homoeorhynchia*, instead, would rather support its inclusion to the family Basiliolidae. However, the internal morphology of the species *lubrica* is very poorly known, as yet, therefore I relied mostly upon its external features, which strongly differ from that of the Basiliolidae. On the other hand, the characters of the beak and the resupinate shape with wing-like lateral parts bring this species closer to *Homoeorhynchia*, therefore here I used this tentative attribution.

Distribution:

Sinemurian(?) to Pliensbachian of the Southern Alps (Italy) and the Gerecse and Bakony Mts (Hungary). The Pliensbachian specimens of the Bakony came from two localities from the Ibex and the Davoei Zones (Tables 13, 14).

Homoeorhynchia ? *ptinoides* (DI STEFANO, 1891)
Plate IX: 6; Figure 48.

v * 1891 *Rhynchonella ptinoides* Di-Stef. – DI STEFANO, M. San Giuliano, p. 206, pl. II, fig. 13; pl. III, fig. 1.
v 1911 *Rhynchonella ptinoides,* Di Stef. – DE TONI, Vedana, p. 13, pl. I, fig. 3.
v 1983 *Homoeorhynchia* ? *ptinoides* (Di Stefano, 1891) – VÖRÖS, Stratigraphic distribution, p. 34.

Material: 5 specimens of various state of preservation.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser/13	11.7	11.2	7.8	7.5
Kericser/26	14.0	10.6	9.3	8.8
Kericser/30	12.3	11.5	8.9	9.5
	12.5	11.0	8.5	7.7

Description:

External characters: This is a small sized *Homoeorhynchia* with a rounded subpentagonal outline. The lateral margins are gently convex and diverge with an apical angle of about 100°. The maximum width is located at the posterior third of the length. The maximum convexity is attained also in the posterior one third. The dorsal valve is very much inflated posteriorly, still the outline is somewhat "cynocephalous" in lateral view. The lateral parts of the valves form narrow, wing-like extensions, while the central fold creates a linguiform extension. The ventral valve is strongly resupinate: convex in lateral view, but definitely concave in anterior view. A rather deep sulcus starts near the umbo of the ventral valve and widens anteriorly, where it corresponds to a less well defined fold in the dorsal valve. The beak is cone-shaped, elevated and suberect. The pedicle opening and the delthyrium are poorly preserved. There are blunt beak ridges in both valves. The lateral surfaces are gently concave but do not form true planareas. In lateral view the lateral commissures are almost straight, except in their posterior part, where they are strongly arched dorsally. They run diagonally to the anterolateral extremities, where they tend to show weak deflections. The anterior commissure is highly uniplicate; the steep-sided plica is strongly serrated. There are usually 3 zigzag deflections in the central portion, while the lateral sides of the uniplication remain unbroken. Occasionally, the whole anterior part is developed somewhat asymmetrically: the centre of the fold and uniplication is a little shifted laterally. The posterior part of the shells is smooth; ribs appear at about the middle of the length. The lateral flanks are only weakly ribbed, while in the central fold and sulcus the costae become very strong and sharp towards the anterior margin. The number of costae remains constant (usually 3) in the fold.

Internal characters (Fig. 48): *Ventral valve*: The delthyrial cavity is highly elliptical subquadrate in cross-section. The umbonal cavities are elongated triangular. Pedicle collar was not recorded. The deltidial plates are massive, thick and not fused. The dental plates are strong and slightly divergent ventrally. The hinge teeth are rather massive; denticula seem to be present. *Dorsal valve*: Cardinal process is not seen. There is a weak and shallow septalium. Dorsal median septum was not recorded (N. B. the postero-dorsal part of the specimen was broken). The outer socket ridges are poorly seen. The inner socket ridges are high, oblique and poorly demarcated from the outer hinge plates. The outer hinge plates are arched ventrally. The crural bases emerge dorsally and give rise to crura of raduliform(?) type.

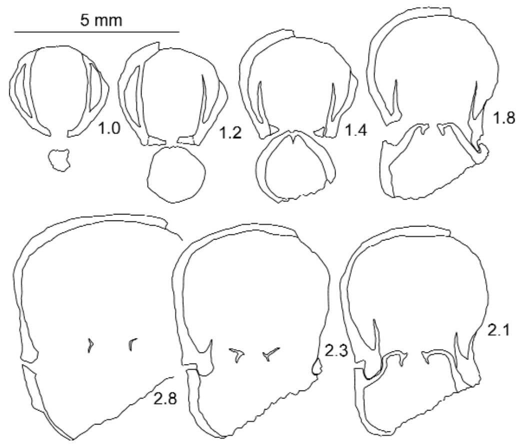


Figure 48. *Homoeorhynchia* ? *ptinoides* (DI STEFANO, 1891). Seven transverse serial sections through the posterior part of a specimen from Kávás-hegy I, Bed 83, Late Sinemurian. M 2007.277.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 11.5 mm. The distal part of the crura were not preserved

Remarks:

This is a rare but well recognizable species. The original specimens, figured by DI STEFANO (l. c.) and DE TONI (l. c.) have been studied in the collections of the Palermo and the Padova Universities, respectively, and this way the identification of the Bakony specimens is confirmed.

H. ? *ptinoides* is closely allied to *H.* ? *lubrica* (UHLIG, 1880) but differs from that by its more elongated outline, more inflated dorsal valve, more projected anterior part (forming a linguiform extension) and by its fewer and stronger ribs. There are other species of *Homoeorhynchia* with three or more zigzag deflections in their anterior fold, e. g. *H. capitulata* (TATE, 1876), *H. meridionalis* (EUDES-DESLONGCHAMPS, 1863) and *H. maninensis* (SIBLÍK, 1967), but their linguiform extension is protracted dorsally (giving their cynocephaluos appearance), whereas the linguiform extension is stretched more in anterior direction at *H.* ? *ptinoides*.

The position of *H.* ? *ptinoides* at the genus *Homoeorhynchia* is somewhat uncertain. Most of its external morphological features suggests this attribution, and even the presence of the septalium may be taken as a supporting fact, but the apparent lack of the dorsal median septum speaks against this decision. After all, I tentatively suggest *Homoeorhynchia* as the most probable host genus for *ptinoides*.

Distribution:
Pliensbachian of Sicily and the Southern Alps (Italy) and the Bakony Mts (Hungary). The Pliensbachian specimens of the Bakony came from the Kericser section, from the Ibex and the Davoei Zones (Tables 13, 14).

Subfamily Piarorhynchiinae Shi & Grant, 1993

Genus *Cuneirhynchia* Buckman, 1918

Cuneirhynchia cf. *rastuensis* Benigni, 1978
Plate IX: 8.

v 1900 *Rhynchonella Dalmasi* Dum. – Böse & Schlosser, Südtirol, p. 195 (partim), pl. XVIII, fig. 17 (non fig. 16).
? 1930 *Rhynchonella Dalmasi* Dum. var. itaca – De Gregorio, M. San Giuliano, p. 39, pl. 9, fig. 21.
* 1978 *Cuneirhynchia rastuensis* sp. n. – Benigni, Ra Stua e Fanes, p. 153, fig. 13, pl. 16, figs. 1–4.
v 1983 *Cuneirhynchia* cf. *rastuensis* Benigni, 1978 – Vörös, Stratigraphic distribution, p. 34.
v 2007 *Cuneirhynchia* cf. *rastuensis* Benigni, 1978 – Vörös & Dulai, Transdanubian Range, p. 55.
2008 *Cuneirhynchia rastuensis* (Benigni, 1978) – Baeza-Carratalá, Patrimonio J. de Cisneros, p. 95, pl. I, figs. 6–9.

Material: A single, incomplete ventral valve.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kőris-hegy B/5	~11.0	~15.0	?	~2.0

Description:
External characters: The only specimen is a fragmentary single (ventral) valve, therefore its description is only partial. This is a medium sized *Cuneirhynchia*, with subrounded triangular, flabelliform outline. The lateral margins are widely divergent. The maximum width is attained at the anterior third of the length. The ventral valve is rather flat. Characters of the beak and the lateral parts are not seen. The anterior portion of the ventral beak ridge is sharp. The anterior commissure is nearly straight, gently uniplicate and shows a series of definite but rounded zigzag deflections. Most of the surface of the ventral valve is entirely smooth; multiplication, in the form of 7 coarse ribs, develops only very close to the anterior margin.
Internal characters: These were not studied (single valve).

Remarks:
This very characteristic species, introduced as new by Benigni (l. c.), was recorded earlier under the name "*R.*" *dalmasi* by Böse & Schlosser (l. c.) and De Gregorio (l. c.). However, *C. rastuensis* clearly differs from any other species of *Cuneirhynchia* by the broad and entirely smooth surface of its valves and by the abruptly appearing, very coarse anterior multiplication. On the basis of these diagnostic features, the identification of the Bakony specimen seems to be correct, in spite of its incomplete preservation.

Distribution:
Pliensbachian of Sicily and the Southern Alps (Italy) and the Bakony Mts (Hungary). The Pliensbachian specimen of the Bakony came from the Kőris-hegy (B) locality, from the Davoei Zone (Tables 13, 14).

Superfamily Norelloidea Ager, 1959
Family Norellidae Ager, 1959
Subfamily Norellinae Ager, 1959

Genus *Pisirhynchia* Buckman, 1918

Pisirhynchia pisoides (Zittel, 1869)
Plate IX: 9-12.

v * 1869 *Rhynchonella pisoides.* Zitt. – Zittel, Central-Appenninen, p. 129, pl. XIV, figs. 15, 16.
non 1910 *Rhynchonella pisoides* Zittel. – Principi, Castel del Monte, p. 84, pl. III, figs. 13, 14.

1981 *Pisirhynchia pisoides* (Zittel), 1869 – Giovannoni, Revisione critica, p. 205, pl. 2, figs. 1–3.
v 1983 *Pisirhynchia pisoides* (Zittel, 1869) – Vörös, Stratigraphic distribution, p. 34.
v 2002 *Pisirhynchia [pisoides* von Zittel, 1869] – Mance□ido et al., Norelloidea, p. 1309, fig. 889-1.
v 2007 *Pisirhynchia pisoides* (Zittel, 1869) – Vörös & Dulai, Transdanubian Range, p. 55, pl. II, fig. 12.

Material: 34, partly fragmentary double valves.

Localities	*Measurements (mm)*				*Localities*	*Measurements (mm)*			
	L	*W*	*T*	*Ch*		*L*	*W*	*T*	*Ch*
Kericser/7	7.0	8.3	4.9	3.2		5.4	5.9	2.7	1.6
Kericser/8	9.0	9.5	5.8	4.2		4.8	5.3	2.5	1.4
Kericser/9	5.8	5.7	2.9	1.6	Kericser II/k	6.8	7.0	4.0	2.9
Kericser/13	7.6	9.2	5.1	2.7		6.9	6.7	4.2	2.7
Kericser/15	7.2	8.0	3.7	3.1		7.0	6.4	4.0	2.5
	6.0	5.8	3.0	1.7		6.4	5.5	3.5	2.0
Kericser/19	7.2	7.2	4.1	3.3		5.8	5.5	2.9	1.6
	7.0	6.6	4.5	4.1	Mohoskő 85/f	7.8	8.0	4.5	3.6
	7.0	7.1	4.1	3.3		6.8	7.5	4.4	2.7
	6.9	6.9	3.9	3.2		6.8	7.0	3.5	2.2
	6.9	7.2	3.8	3.0		6.5	6.5	3.7	2.7
	6.5	7.2	3.6	3.0		5.6	6.0	2.8	1.7
	6.3	6.6	3.4	2.3	Papod 87	7.6	7.5	4.3	2.3
	7.2	6.2	3.8	3.1		6.6	7.0	3.8	2.0
	6.7	6.2	3.6	2.9	Fenyveskút 5/c	7.0	8.1	5.1	3.3
	6.0	6.2	2.9	1.6	Kőris-hegy B/5	7.8	8.5	3.8	2.7
	5.6	5.7	3.0	2.4					

Description:

External characters: This is a small sized *Pisirhynchia* with rounded subtrigonal to subpentagonal outline. The lateral margins are usually gently convex and diverge with an apical angle from 90° to 100°. The maximum width is attained in the anterior third of the length. The maximum convexity lies near the middle of the length. The valves are almost equally convex though the dorsal valve is more inflated posteriorly. The beak is suberect, very tiny and pointed; frequently broken away. Due to the fragmentary state of preservation, the pedicle opening and the delthyrium are not seen. There are no beak ridges at all, neither planareas developed. The lateral parts are gently convex and the lateral commissures form a little elevated crest. In lateral view, the lateral commissures are gently arched ventrally and run diagonally in dorsal direction, where they pass gradually to the anterior commissure, forming a continuous curve. The anterior commissure is deeply unisulcate; the sinus usually forms an unbroken U-shaped curve, rarely a slight median plica develops. There is no incipient posterior sulcation; the dorsal sulcus develops only anteriorly. In many cases, the linguiform extension is gently projected anteroventrally. The valves are almost completely smooth; incipient ribs may appear in the sulcus.

Internal characters: These were not studied by serial sectioning, owing to the lack of suitable material (all specimens are filled with sparry calcite). In some cases, in the broken ventral umbones the slightly divergent dental plates can be seen.

Remarks:

P. pisoides is the type species of *Pisirhynchia* and portrays the most characteristic features of the genus: the dorsal sulcus, the absence of ornamentation, the small size and the almost globular shape, where the generic name came from (*pisum* <latin> = *pea*). In fact, this is the only totally smooth species of *Pisirhynchia*, and this makes it different from the other, variously ribbed species, as *P. retroplicata* (Zittel, 1869). The also ribbed *P. inversa* (Oppel, 1861) and *P. meneghinii* (Zittel, 1869) differ further on by the presence of an incipient posterior sulcation.

The specimens figured by Principi (l. c.), as far as it can be decided on the basis of the not really informative figures, are probably not *Pisirhynchia*, but seem to belong to the genus *Nannirhynchia* (supposing that Principi's figs. 13c and 14d were inserted in inverted position).

In the Pliensbachian brachiopod fauna of the Bakony (and probably in some other faunas of the Mediterranean Province), the small, smooth, globular, sulcate shape reappears as characters of isochronous homoeomorphy in some unrelated brachiopods, e. g. in juveniles of some species of *Bakonyithyris* and of *Linguithyris aspasia* (Zittel, 1869). This deceptive co-occurrence of homoeomorphs, sometimes in the same sample, may confuse the student and lead to order-level misidentification.

Distribution:

Pliensbachian of the Central Apennines (Italy) and the Bakony (Hungary). The Pliensbachian specimens of the Bakony came from several localities, from the Davoei and Margaritatus Zones (Tables 13, 14).

Pisirhynchia retroplicata (Zittel, 1869)
Plate IX: 13–22.

v * 1869 *Rhynchonella retroplicata.* Zitt. – Zittel, Central-Appenninen, p. 128, pl. XIV, figs. 13, 14.
v 1880 *Rhynchonella retroplicata* Zitt. – Canavari, Strati a Terebratula Aspasia, p. 353.
1881 *Rhynchonella retroplicata* Zitt. – Canavari, Alcuni nuovi Brachiopodi, p. 184, pl. IX, fig. 14.
1900 *Rhynchonella retroplicata* Zitt. – Böse & Schlosser, Südtirol, p. 198, pl. XVII, fig. 25.
? 1910 *Rhynchonella Vinassai* nov. sp. – Principi, Castel del Monte, p. 80, pl. III, fig. 9.
? 1912 *Rhynchonella inversa* Oppel emend Geyer. – Haas, Ballino, p. 253, pl. XIX, fig. 25.
v 1961 *Rh. inversa* Opp. – Vigh, Esquisse géol. Gerecse, p. 577.
v 1983 *Pisirhynchia retroplicata* (Zittel, 1869) – Vörös, Stratigraphic distribution, p. 34.
v 1997 *Pisirhynchia retroplicata* (Zittel) – Vörös, Jurassic brachiopods of Hungary, p. 15, Appendix: fig. 10.
non 2003 *Pisirhynchia* ex gr. *retroplicata* (Zittel, 1869) – Siblík, Adnet, p. 74, text-fig. 3: 2a–c.
v 2007 *Pisirhynchia retroplicata* (Zittel, 1869) – Vörös & Dulai, Transdanubian Range, p. 55, pl. II, fig. 13, 14.

Material: 53, partly fragmentary double valves.

Localities	*Measurements (mm)*				*Localities*	*Measurements (mm)*			
	L	*W*	*T*	*Ch*		*L*	*W*	*T*	*Ch*
Kericser/8	10.7	11.2	7.1	4.1		9.7	10.4	6.2	4.3
Kericser/9	7.9	9.0	5.6	3.2		8.9	10.0	5.7	5.4
Kericser/12	8.3	9.2	5.5	4.5		7.4	7.3	4.4	3.0
	10.6	11.0	7.3	4.5	Kericser/26	8.1	8.5	5.7	4.2
Kericser/14	9.5	10.1	6.7	4.3	Kericser/30	8.5	9.4	5.9	5.4
	9.0	10.0	6.0	4.4		8.0	8.8	5.9	4.1
	8.7	9.0	6.2	4.7	Kericser II/a	8.9	9.0	5.7	3.5
Kericser/15	8.8	9.5	6.0	4.8		9.2	9.2	5.7	3.7
	8.6	8.6	5.4	2.0		7.8	7.6	5.0	3.6
	8.5	9.3	5.5	4.3		7.0	6.6	4.0	2.0
	7.7	8.4	5.4	3.8	Kericser II/k	9.2	9.5	7.0	5.1
Kericser/17	8.2	9.8	5.5	4.5		8.1	8.5	5.0	3.8
	7.9	8.9	5.5	3.1		8.0	9.0	5.4	4.3
	8.5	8.6	?	?		8.4	8.0	5.4	3.8
	8.0	8.3	5.2	3.2		8.5	8.4	5.1	3.8
Kericser/18	7.6	8.9	6.4	5.8		7.8	7.6	4.7	3.8
Kericser/19	10.7	10.3	7.1	4.2		7.6	7.1	4.5	4.2
	10.2	?	6.5	3.5		8.8	9.2	5.7	4.6
	9.8	10.0	6.4	3.0	Kericser (scree)	7.8	8.9	4.7	3.0
	8.0	8.5	5.6	4.3		8.9	8.4	5.2	3.7
	6.5	7.4	3.7	2.8		7.5	8.5	6.1	4.4
Kericser/20	10.5	11.2	7.8	4.8	Papod 86	7.5	8.6	5.3	4.3
	10.0	10.5	6.3	2.6	Mohoskő 85	9.4	10.0	?	5.0
Kericser/22	7.6	7.7	5.0	3.0		7.0	7.5	4.2	3.2
Kericser/23	7.8	8.8	5.7	3.2		6.5	6.7	?	2.8
Kericser/25	8.5	9.6	6.4	5.1		9.6	11.8	6.5	5.5

Description:

External characters: This is a large sized species for the genus *Pisirhynchia.* The outline is rounded subtrigonal to subpentagonal; usually wider than long. The lateral margins are usually gently convex and diverge with an apical angle from 90° to 110°. The position of the line of the maximum width varies from mid-length to the anterior third of the length. The maximum convexity lies usually near the middle of the length, or somewhat posteriorly. The valves are almost equally convex; in many cases the dorsal valve is more inflated posteriorly. The beak is suberect to erect, very tiny and pointed, but frequently broken away. The pedicle opening is not seen because the beak is often fragmentary, or the respective part is covered by matrix. The delthyrium is very rarely and poorly seen; it is low and narrow. The beak ridges are weakly developed or absent; there are no planareas. The lateral parts are gently convex and the lateral commissures usually form a little elevated crest. In lateral view, the lateral commissures are nearly straight and run diagonally in dorsal direction; in most cases they are gently serrated anteriorly. The anterior commissure is unisulcate; the sinus is usually trapezoidal and bears 2 to 4, somewhat rounded zigzag deflections. There is no incipient sulcation posteriorly; the dorsal sulcus develops only anteriorly. The linguiform extension is usually a little projected anteroventrally. The valves are ornamented with numerous rounded ribs. The posterior area is smooth, the ribs appear at or beyond mid-length and become stronger anteriorly. Their number varies from 5 to 14 (from which 1 to 5 ribs fall to the sulcus) and remains constant, except in some specimens (e. g. Pl. IX, 14 and 15) where antidichotomous pattern of ribbing appear near the anterior margin.

Internal characters: These are poorly known. Two specimens were sectioned, but both were filled with sparry calcite therefore the details of the internal morphology were blurred. Subparallel dental plates were recorded in both specimens. No information on the cardinalia. In one specimen crescentic cross sections of crura were recorded which may correspond to the arcuiform type.

Remarks:

P. retroplicata is the largest among the ribbed species of the genus *Pisirhynchia*. It differs from the others first of all by the absence of incipient (posterior) sulcation. Furthermore, *P. inversa* (OPPEL, 1861) differs from *P. retroplicata* by its stronger and more regular ribbing and by its wider subpentagonal outline, due to its wider posterior (cardinal) margin which somewhat protrudes laterally on both sides. These kind of corners are missing at *P. retroplicata*. The very small *P. meneghinii* (ZITTEL, 1869) is much less convex than *P. retroplicata*; its outline is more elongated and drop-shaped and its ribs appear only near the anterior margin.

The specimens figured by PRINCIPI (l. c.), as a new species (*vinassai*), probably represent *P. retroplicata*. The records of *P. inversa* by HAAS (l. c.) and VIGH (l. c.) (which latter was checked in the collection of the Geological Institute of Hungary under the inventory number J. 225) are here attributed to *P. retroplicata* on the basis of the priciples outlined above.

SIBLÍK's (l. c.) specimen figured as *P*. ex gr. *retroplicata* definitely does not belong to this species, because it is flabelliform, with weak planareas, it is not sulcate, but rectimarginate-multiplicate. It may represent *Prionorhynchia hagaviensis* (BÖSE, 1898).

Distribution:

Pliensbachian of the Central Apennines and the Southern Alps (Italy) and the Gerecse and Bakony (Hungary). The Pliensbachian specimens of the Bakony came from three localities, from the Ibex to Margaritatus Zones (Tables 13, 14).

Genus *Fenyveskutella* n. gen.

Type species: Fenyveskutella vighi n. sp.

Diagnosis: Small to medium-sized rhynchonellids with subpentagonal to oval outline; mostly arched lateral margins diverge with apical angle of around 100°; biconvex, maximum convexity at about mid-length. Beak suberect to slightly incurved; beak ridges ill-defined; no planareas. Lateral parts gently concave, with crest along lateral commissures. Anterior commissure unisulcate, trapezoidal to U-shaped. Shells smooth to finely costate; few, coarse anterior plicae in some species. Subparallel dental plates; pedicle collar may be present. No median septum; septalium ill-developed. Hinge plates thin, subhorizontal. Crural bases emerge dorsally; crura subfalciform or modified arcuiform(?).

Derivatio nominis: After the name of the locality Fenyveskút (near Lókút, in the Bakony Mts, Hungary).

Species:

F. vighi n. sp.
F. pseudouhligi n. sp.
F. theresiae n. sp.
F. aff. *vighi* n. sp.

Discussion: Fenyveskutella has many similarities to *Pisirhynchia*, both externally and internally, therefore it is placed to the subfamily Norellinae, according to the interpretation of the "new Treatise" (MANCEÑIDO et al. 2002). There is a deceptive external homoeomorphy between *Fenyveskutella* and some representatives of the genus *Septocrurella*. The latter belongs to the Erymnariidae by its diagnostic crural plates and includes mainly Middle and Late Jurassic species, e. g. *S. supinifrons* (ROTHPLETZ, 1886) and *S. microcephala* (PARONA, 1896) from the Alpine Middle Jurassic. A very similar form, *S. uhligi* (HAAS, 1884), was described from the Early Jurassic by HAAS (1884) from the Southern Alps and recently by BAEZA-CARRATALÁ (2008) from Spain, from the classical collection of JIMÉNEZ DE CISNEROS (1923). Previously (VÖRÖS 1983b), I also tried to relate my Bakony specimens (now attributed to *Fenyveskutella*) with *S. uhligi*, until their completely different internal morphology has been revealed. [Here I want to mention my reservations on the occurrence of *Septocrurella* in the Early Jurassic. In my experience on serial sectioning of Early Jurassic rhynchonellids, I have never found double crural plates. On the other hand, there are indications that the Early Jurassic brachiopod fauna of HAAS (1884, pp. xi and 12) and of JIMÉNEZ DE CISNEROS (BAEZA-CARRATALÁ, pers. comm.) may contain Middle Jurassic brachiopods, e. g. *Apringia atla* (OPPEL, 1863), due to collecting bias. I have the opinion that the specimens of *S. uhligi* might be derived also from Middle Jurassic rocks to the Early Jurassic brachiopod assemblages of the above authors.]

Distribution: Sinemurian(?) and Pliensbachian of the Gerecse and Bakony (Hungary).

Fenyveskutella vighi n. sp.
Plate X, 1–7; Figures 49, 50.

v 1983 *Septocrurella* n. sp., aff. *uhligi* (Haas, 1884) B – VÖRÖS, Stratigraphic distribution, p. 34.
v 1997 *Pisirhynchia* n.sp., aff. *uhligi* (Haas) B – VÖRÖS, Jurassic brachiopods of Hungary, p. 15, Appendix: fig. 11.
v 2007 *Pisirhynchia* ? aff. *uhligi* (Haas, 1884) B – VÖRÖS & DULAI, Transdanubian Range, p. 55.

Holotype: Hungarian Natural History Museum (Budapest), inventory number: M 2007.221.1.
Locus typicus: Lókút, Fenyveskút, grab sample p1.
Stratum typicum: Red brachiopod limestone, Upper Pliensbachian.
Paratype: Hungarian Natural History Museum (Budapest), inventory number: M 2007.222.1.
Derivatio nominis: After the name of the late Gusztáv Vigh, a renowned Hungarian palaeontologist.
Diagnosis: Large, biconvex *Fenyveskutella* with rounded subpentagonal outline. Beak erect to slightly incurved, small, pointed. No planareas. Lateral commissures straight, anterior commissure unisulcate, tending to be plicosulcate to bisulcate. Sinus deep and wide, trapezium-like. Dorsal sulcus at the anterior part. Shell surface smooth or weakly costate.
Material: 144, partly fragmentary double valves.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser/6	13.7	15.1	9.4	5.5
	15.5	?	10.4	5.0
Kericser/8	10.1	9.9	6.6	3.8
Kericser II/a	8.7	8.4	5.2	3.0
Kericser II/k	9.7	11.1	6.2	2.8
Fenyveskút p1	14.1	15.1	9.9	5.0
	14.2	15.2	10.7	7.0
	14.4	14.0	10.0	6.1
	12.4	12.7	8.1	3.6
	12.0	12.8	8.0	3.5
	12.9	12.3	9.1	4.8
	13.3	?	8.5	4.2
	12.0	11.8	7.4	4.8
	11.4	11.8	7.6	3.0
Fenyveskút p2	12.4	14.3	8.5	4.6
	11.6	12.0	7.7	4.1
	11.1	11.1	7.5	4.5
	10.8	11.5	6.8	3.6
	10.3	11.4	7.2	3.8
	10.8	10.8	7.2	5.0
	10.9	10.8	7.3	3.3
	11.0	11.1	6.5	3.0
	10.9	9.4	7.0	4.0
	10.4	9.8	6.5	?
	9.8	10.1	4.4	1.5
	9.1	10.1	5.0	2.4
	9.0	8.8	5.4	2.8
Fenyveskút 5/a	10.8	11.1	7.8	4.3
	11.3	10.8	7.5	5.1
	10.4	10.9	7.4	4.3
	10.2	9.4	7.0	2.8
	10.2	9.4	6.3	3.0
	8.5	9.2	4.0	1.2
Fenyveskút 5/c	13.6	13.0	10.2	6.5
	13.8	15.4	9.6	5.0
	13.6	12.9	9.0	5.2
	13.2	12.7	8.9	5.1
	12.5	13.0	8.4	4.2
	12.8	12.1	8.2	4.3
	11.7	10.5	8.2	4.4

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
	12.4	13.8	8.0	3.7
	11.7	11.0	8.1	4.6
	12.4	11.4	7.9	4.3
	12.1	12.2	7.2	3.2
	11.4	11.0	7.9	4.0
	11.8	11.8	8.0	4.0
	11.4	11.4	7.6	4.1
	11.3	10.4	8.0	3.5
	10.8	10.1	5.4	1.8
	10.8	9.7	6.1	3.1
	10.4	9.3	5.6	2.5
Fenyveskút É	15.1	15.5	10.3	6.0
	12.9	12.8	9.3	7.5
	13.4	11.9	9.0	5.2
	12.7	11.6	8.0	3.7
	14.9	15.1	9.7	5.5
	14.0	13.4	8.6	4.0
	13.8	13.0	9.4	4.4
	12.3	13.8	8.9	4.1
	13.0	12.2	8.3	4.8
	13.6	13.1	8.5	4.0
	12.0	12.5	8.1	4.4
	12.1	11.4	8.1	2.3
	13.2	13.6	8.2	4.5
	12.0	11.2	7.6	3.7
	13.1	12.6	8.7	5.2
	12.2	11.9	6.9	4.0
	11.6	11.8	7.0	3.2
	11.9	12.0	8.8	3.8
	12.1	11.9	7.5	3.3
	11.6	10.8	7.2	2.2
	11.5	12.8	6.3	2.7
	11.3	10.8	7.6	2.7
	11.2	12.3	6.7	2.7
	11.1	10.3	7.6	4.6
	10.5	11.3	7.6	4.0
	10.6	9.6	6.5	4.0
	11.4	10.7	8.3	4.5
	11.1	10.0	6.4	3.7
	11.1	11.5	7.5	3.7

Localities	*Measurements (mm)*				*Localities*	*Measurements (mm)*			
	L	*W*	*T*	*Ch*		*L*	*W*	*T*	*Ch*
	11.1	9.5	6.8	2.5		11.2	11.3	7.3	3.7
	10.5	9.4	7.2	3.5	Fenyveskút Ny	8.2	8.7	4.7	1.7
	11.2	10.6	7.4	4.1	Eplény	13.5	13.6	9.0	5.2
	10.9	9.6	7.8	4.0		11.7	11.5	7.4	3.6
	10.5	9.5	6.9	2.8		11.4	11.0	6.6	4.4
	10.2	9.3	5.4	1.8		10.6	11.8	6.7	2.9
	9.6	9.0	7.1	2.2		10.8	10.4	7.6	3.0
Fenyveskút D	12.8	12.3	8.4	3.7	Városlőd/6	14.0	15.0	8.7	5.9

Description:

External characters: This is a large *Fenyveskutella* with rounded subpentagonal, almost oval, outline. The lateral margins are convex, therefore the apical angle can not be measured correctly but it seems to vary between 90° and 110°. The position of the line of the maximum width varies from mid-length to the anterior third of the length. The maximum convexity lies usually near the middle of the length. The valves are rather strongly and almost equally convex. The beak is erect to slightly incurved, depressed, very tiny and pointed. The pedicle opening and the delthyrium are not seen because the beak is often fragmentary, or the respective part is covered by matrix. Beak ridges are absent; there are no planareas. The lateral parts are gently convex and the lateral commissures usually form a little elevated crest. In lateral view, the lateral commissures are nearly straight and run diagonally in dorsal direction to the anterolateral extremities where they pass gradually to the anterior commissure. The anterior commissure is rather deeply unisulcate but very variable in shape. Typically it has single or double median plicae and these cases may be termed as plicosulcate (Pl. X, 1, 4) or bisulcate (Pl. X, 2, 5), respectively. In some cases there are no symmetrical differences in the amplitude of plicae, but the median portion of the anterior commissure shows uniform and weak deflections, two, three or four in number (Pl. X, 6). In other cases, the median portion of the trapezoidal anterior commissure is straight. There is no incipient sulcation posteriorly; the dorsal sulcus is very shallow and develops only anteriorly. The linguiform extension is short and not projected anteroventrally. The valves are typically smooth. The lateral flanks of some specimens are ornamented with weak and low, rounded ribs which disappear at the anterior margin. In the specimens with deflected anterior commissure, blunt ribs appear anteriorly in the medial portion of the shell.

Internal characters (Figs. 49, 50): *Ventral valve*: The delthyrial cavity is subquadrate trapezium-like in cross-section; with ventral grooves connected with the muscle scars. The umbonal cavities are rounded triangular. Traces of the pedicle collar are seen. The dental plates are subparallel, slightly convergent ventrally. The hinge teeth are narrow, slender and inwardly oriented; denticula are present. *Dorsal valve*: Cardinal process was not observed. The septalium is shallow, ill developed. Median septum is absent. The outer socket ridges are low and narrow; accessory sockets are also present. The inner socket ridges are high and lean well over the teeth. In their posterior part the hinge plates are dorsally tilted and form a consistent oblique plate with the inner socket ridges. More anteriorly they become subhorizontal and wider. The crural bases emerge dorsally and give rise to crura which seems to stand closer to the subfalciform than to the arcuiform type: they project more into the ventral than to the dorsal valve, but they are crescentic and even falcoid in cross section.

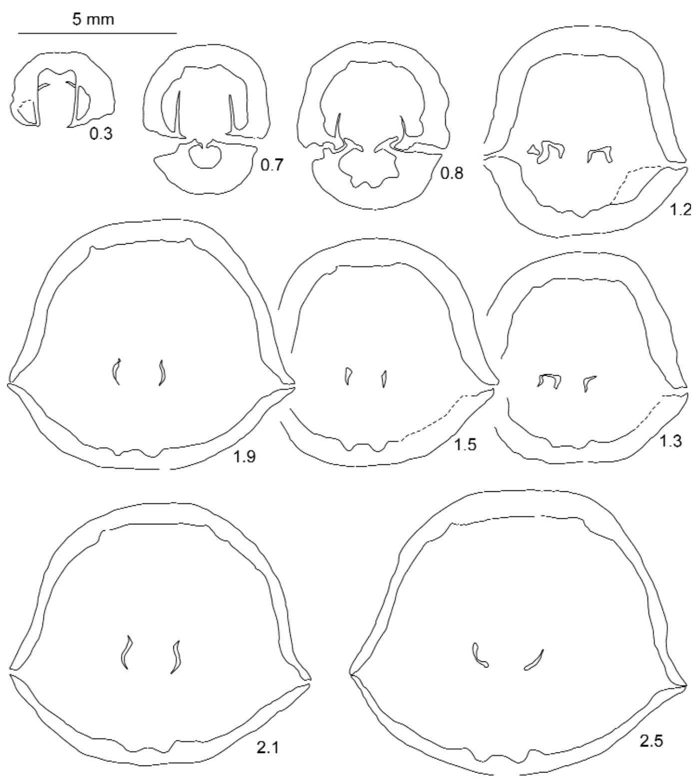


Figure 49. *Fenyveskutella vighi* n. sp. Nine transverse serial sections through the posterior part of a specimen from Fenyveskút, p1, Pliensbachian, Margaritatus Zone. M 2007.281.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 14.1 mm

Remarks:

This species is markedly similar to "*Rhynchonella uhligi*" HAAS, 1884, as described by HAAS (1884, p. 3, pl. II, figs. 1, 2, 4 and 6), in its general constitution, smoothness, and in the shape and variation of the anterior commissure. Almost exactly the same form was described by JIMÉNEZ DE CISNEROS (1923, p. 28, pl. IV, 9–11) under the name

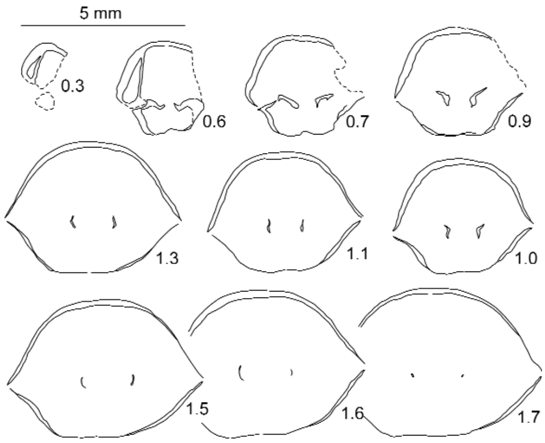


Figure 50. *Fenyveskutella vighi* n. sp. Ten transverse serial sections through the posterior part of a specimen from Fenyveskút, p2, Pliensbachian, Margaritatus Zone. M 2007.293.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 10.0 mm

"*Rhynchonella falloti*", which was revised and described by BAEZA-CARRATALÁ (2008, p. 258, pl. X, figs. 1–3) as *Septocrurella* ? *uhligi*. There is, however, an essential morphological difference: the above forms have incipient posterior sulcation i. e. a shallow but definite sulcus starting from the umbo of the dorsal valve, whereas the posterior part of *F. vighi* is uniformly convex.

Influenced by the apparent external similarity, initially I also attributed the large, sulcate brachiopod from the Pliensbachian of the Bakony to *Septocrurella uhligi* with question mark (VÖRÖS 1983b). Later on, serial sectioning of some specimens revealed that crural plates are absent from the dorsal valves of this form. Consequently, it may not belong to *Septocrurella* (neither to the species *uhligi*) but represents a new species *F. vighi*.

Some species of *Pisirhynchia*, e. g. *P. pisoides* (ZITTEL, 1869) and some variants of *P. retroplicata* (ZITTEL, 1869) have similarities to *F. vighi*, but the latter is significantly larger and its anterior commissure shows the typical complex features.

Other species of *Fenyveskutella* can be separated from *F. vighi* by the following criteria: *F. pseudouhligi* n. sp. is significantly less convex, completely smooth and its linguiform extension is projected ventrally; *F. theresiae* n. sp. is elongated oval, less convex, has suberect beak and weakly sulcate anterior commissure; *F.* aff. *vighi* has no ribbing and its dorsal valve is extremely inflated posteriorly.

Distribution:
Pliensbachian of the Bakony Mts, where the specimens came from the Margaritatus and Spinatum Zones (Tables 13, 14).

Fenyveskutella pseudouhligi n. sp.
Plate X: 8, 9.

v ? 1898 *Rhynchonella (Norella)* sp. nov. – BÖSE, Brachiopodenfauna der östlichen Nordalpen, p. 211, pl. XIV, fig. 20.
1943 *Rhynchonella uhligi* Haas. – VIGH, Gerecse, p. 348 (partim), pl. III, figs. 26, 27, 28, 30 (non fig. 29).
v 1983 *Septocrurella* ? *uhligi* (Haas, 1884) – VÖRÖS, Stratigraphic distribution, p. 34.
v 1983 *Septocrurella* n. sp., aff. *uhligi* (Haas, 1884) A – VÖRÖS, Stratigraphic distribution, p. 34.
v 2007 *Pisirhynchia* ? aff. *uhligi* (Haas, 1884) A – VÖRÖS & DULAI, Transdanubian Range, p. 55.

Holotype: Hungarian Natural History Museum (Budapest), inventory number: M 2007.229.1.
Locus typicus: Szentgál, Gombáspuszta (Fg.-I, basal layer).
Stratum typicum: Red, micritic, manganiferous limestone, Lower Pliensbachian.
Paratype: Hungarian Natural History Museum (Budapest), inventory number: M 2007.228.1.
Derivatio nominis: After the name of a closely similar brachiopod species.
Diagnosis: Small, biconvex *Fenyveskutella* with rounded subtrigonal outline. Beak erect to slightly incurved, small, pointed. No planareas. Lateral commissures straight, anterior commissure unisulcate. Dorsal sulcus at the anterior part. Linguiform extension projected anteroventrally. Shell surface smooth.
Material: 14 specimens; 13 partly fragmentary double valves and 1 dorsal valve.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Szentgál Fg-I.	11.5	12.5	5.8	4.5
Szentgál T/I./14	11.2	12.6	5.8	4.8
Kericser/25	7.0	7.2	3.2	2.6
	6.3	6.7	3.1	2.8
Kericser/27	6.6	7.5	3.2	3.1
Kericser/scree	7.5	7.7	3.4	3.0
	7.0	8.1	3.5	3.0
	6.7	8.1	3.2	?
	6.1	7.6	3.0	?
	6.3	6.8	3.2	?
	6.7	7.0	2.8	2.5
	6.4	6.8	2.8	2.5

Description:

External characters: This is a small *Fenyveskutella* with rounded subtrigonal outline. The lateral margins are gently convex and diverge with an apical angle of about 100°. The maximum width is attained between the middle and the anterior third of the length. The maximum convexity lies near the middle of the length. The ventral valve is moderately convex but the medial portion of its anterior margin is recoiled. The dorsal valve is resupinate: gently convex in lateral view, but concave in anterior view. This is due to a dorsal sulcus, starting in the middle of the valve. The beak is suberect to erect, tiny and pointed; rises well above the dorsal valve. Due to the fragmentary state of preservation or covering by matrix, the pedicle opening and the delthyrium are not seen. The beak ridges are weak or absent; there are no planareas. In lateral view, the lateral commissures are nearly straight and run diagonally in dorsal direction, where they pass gradually to the anterior commissure, forming a continuous curve. The anterior commissure is rather deeply unisulcate; the sinus forms an unbroken U-shaped curve. There is no posterior sulcation; the dorsal sulcus develops only very anteriorly. The linguiform extension is markedly projected anteroventrally. The valves are completely smooth with no traces of ribbing.

Internal characters: These are poorly known. One specimen was sectioned, but due to the sparry calcite infilling, the details of the internal morphology were blurred. Subparallel dental plates were recorded. Almost no information on the cardinalia. The inner hinge plates seem to be subhorizontal, a little dipping dorsally. The crural bases are given off dorsally. The crura are subparallel in cross section and may correspond to the arcuiform or hamiform type.

Remarks:

This species is somewhat similar to *Pisirhynchia pisoides* (Zittel, 1869) but its mean size is larger and it is much less convex, even in the case of its larger specimens.

The medial recoiling at the anterior rim of the ventral valve and the corresponding ventral projection of the linguiform extension, and the absence of any ribbing are the most important features which differentiate *F. pseudouhligi* from the other species of *Fenyveskutella*. By these criteria, some of the specimens described by Vigh (l. c.) as "*Rhynchonella uhligi* Haas" can be attributed to *F. pseudouhligi*, even though the originals were not found in the collection of the Geological Institute of Hungary. On the other hand, the same collection contains two specimens (under the inventory number J. 447) which were mentioned by Vigh (1961, p. 576) as "*Rh. uhligi* Haas". These very small specimens show definite posterior sulcation, therefore they may represent the smooth variant of the "true" "*R.*" *uhligi* Haas, 1884.

The specimen figured by Böse (l. c.) as "*Rhynchonella* (*Norella*) sp. nov." was investigated in the collection of the Bayerische Staatssammlung (München). Although its umbonal part is broken, this very small specimen seems to belong to *F. pseudouhligi*.

Distribution:

Pliensbachian of the Bakony Mts, where the specimens came from the Jamesoni and Margaritatus and Spinatum Zones (Tables 13, 14).

Fenyveskutella theresiae n. sp.
Plate X: 11.

v 1983 *Septocrurella* n. sp., aff. *uhligi* (Haas, 1884) C – Vörös, Stratigraphic distribution, p. 34.
v 2007 *Pisirhynchia* ? aff. *uhligi* (Haas, 1884) C – Vörös & Dulai, Transdanubian Range, p. 55.

Holotype: Hungarian Natural History Museum (Budapest), inventory number: M 2007.231.1.
Locus typicus: Lókút, Fenyveskút, grab sample É.
Stratum typicum: Red brachiopod limestone, Upper Pliensbachian.
Derivatio nominis: A favourite feminine forename in latinized form.
Diagnosis: Medium-sized *Fenyveskutella* with elongated oval outline. Beak suberect, pointed. No planareas. Lateral commissures straight, anterior commissure unisulcate. Sinus shallow and wide. Dorsal sulcus weak, confined to anterior part. Shell surface finely costate.
Material: A single, rather well preserved double valve.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Fenyveskút/scree	12.4	10.1	6.2	3.1

Description:

External characters: This is a medium-sized *Fenyveskutella* with elongated oval outline. The lateral margins are arched, therefore the apical angle can not be measured correctly but it is around 100°. The maximum width and the maximum convexity are attained at the middle of the length. The valves are moderately and almost equally convex. The beak is suberect, upright and pointed. The pedicle opening and the delthyrium are not seen because the respective part is covered by matrix. The beak ridges are blunt; there are no planareas. The lateral parts are convex and the lateral commissures form an elevated crest. In lateral view, the lateral commissures are nearly straight and run longitudinally to the anterolateral extremities where they pass gradually to the anterior commissure. The anterior commissure is widely but slightly unisulcate; the median portion of the trapezoidal anterior commissure bears three weak deflections. There is no incipient sulcation; the dorsal sulcus appears only anteriorly and is very weak. The valves are ornamented with very weak riblets; blunt ribs appear anteriorly in the medial portion of the shell, corresponding to the deflections of the anterior commissure.

Internal characters: These were not studied because of the paucity of the material (single specimen).

Remarks:

F. theresiae markedly differs from any other Early Jurassic brachiopods with sulcate anterior commissure, by its elongated oval outline, fine ribbing, and its barely developed dorsal sulcus. Some elongated variants of *F. vighi* n. sp. with regularly deflected anterior commissure are somewhat similar to *F. theresiae* but they are always more convex and have well-developed, deep sulcus. All these seem to justify the erection of this new species, in spite of the fact that so far it is represented by a single specimen.

Distribution:

Pliensbachian of the Bakony Mts, where the specimen came from the Margaritatus Zone (Tables 13, 14).

Fenyveskutella aff. *vighi* n. sp.

Plate X: 10.

v 2007 *Pisirhynchia* ? aff. *uhligi* (Haas, 1884) D – Vörös & Dulai, Transdanubian Range, p. 55.

Material: A single, partly incomplete double valve.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Fenyveskút/scree	13.9	12.5	9.1	6.7

Description:

External characters: This is a large *Fenyveskutella* with rounded subpentagonal outline. The lateral margins are gently convex, therefore the apical angle can not be measured correctly but it seems to be around 110°. The maximum width and convexity are attained at the middle of the length. The valves are rather strongly but not equally convex: the dorsal valve is much more inflated posteriorly. The point of the beak is broken away but it seems so that the beak was erect. Due to the incomplete preservation, the pedicle opening and the delthyrium are not seen. Beak ridges are absent; there are no planareas. The lateral parts are convex and the lateral commissures form a little elevated crest. In lateral view, the lateral commissures are gently arched ventrally and run diagonally in dorsal direction, where they join the anterior commissure with a continuous curve. The anterior commissure is deeply unisulcate; the sinus forms a U-shaped curve which is broken by a very slight, asymmetric deflection. There is no incipient posterior sulcation; the dorsal sulcus develops only anteriorly. The linguiform extension is rather strongly projected to anterior direction. The valves are completely smooth, except some growth lines.

Internal characters: These were not studied because of the paucity of the material (single specimen).

Remarks:

The here described form is similar to *Fenyveskutella vighi* n. sp. in general constitution and size, but differs in having enormously inflated dorsal valve, very wide and deep, unbroken sinus and in the absence of ribs. Especially by the first character, this form stands definitely outside of the range of the morphological variation of *F. vighi*. The close relationship is indicated with the use of the open nomenclature (*affinis*), because the creation of a new species did not seem to be justified on the basis of the single available specimen.

Distribution:

Pliensbachian of the Bakony Mts, where the specimen came from the Margaritatus Zone (Tables 13, 14).

Genus *Kericserella* Vörös, 1983

Since its description (Vörös 1983a), the diagnosis, the taxonomic composition (single species) and the distribution of *Kericserella* remained unchanged. Its systematic position, which was suggested in the original description, with some uncertainty, within the family Basiliolidae was modified in the "new Treatise" (Manceñido et al. 2002); now it is ranked (with query) into the subfamily Norellinae within the superfamily Norelloidea.

Kericserella inversaeformis (SCHLOSSER, 1900)
Plate X: 12–14; Figures 51–53.

v * 1900 *Rhynchonella inversaeformis* n. sp. – BÖSE & SCHLOSSER, Südtirol, p. 199, pl. XVII, figs. 27, 28.
? 1910 *Rhynchonella inversaeformis* Böse. – PRINCIPI, Castel del Monte, p. 86, pl. III, fig. 11.
1978 *Pisirhynchia inversaeformis* (Böse & Schlosser, 1900) – BENIGNI, Ra Stua e Fanes, p. 133, fig. 2, pl. 13, figs. 1, 2.
v 1983 *Kericserella inversaeformis* (Schlosser) – VÖRÖS, Some new genera, p. 10, fig. 4.
v 1983 *Kericserella inversaeformis* (Schlosser, 1900) – VÖRÖS, Stratigraphic distribution, p. 34.
v 2007 *Kericserella inversaeformis* (Schlosser, 1900) – VÖRÖS & DULAI, Transdanubian Range, p. 55.

Material: 11 moderately well-preserved double valves.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser/17	9.8	10.0	7.0	3.6
	10.1	12.0	7.1	3.0
	8.2	?	6.0	3.5
	9.6	11.3	6.5	3.2
Kericser/18	8.3	9.4	6.1	4.1
Kericser/26	8.0	9.1	5.5	3.9
	7.0	7.6	5.1	3.4
Kericser/28	7.0	7.6	5.5	3.5
Kericser/29	6.8	7.2	5.5	2.7
Kericser II./k	7.9	9.4	5.5	3.2

Description:

External characters: Small rhynchonellid with subtrigonal outline. The lateral margins are straight or gently convex, and diverge with an apical angle of around 90°. The maximum width lies between mid-length and the anterior third of the length. The valves are almost equally convex; the maximum convexity is attained in the posterior third of the length. In some cases the dorsal valve is more inflated posteriorly. The beak is erect to slightly incurved and rather massive. The pedicle opening and the delthyrium are not visible; mostly broken. There are well-defined beak ridges in both valves; the dorsal beak ridges are usually sharper, whereas the ventral ones are a little less defined. The planareas are elongated and flat, but are well delimited on both valves. In lateral view, the lateral commissures are almost straight, a little arched ventrally, and run in the middle of the planareas. The first deflection, connecting the lateral and the anterior commissures at the lateral extremities, is directed ventrally. The anterior commissure is widely but not very deeply unisulcate and shows 2 to 4, rather sharp zigzag deflections which may reach considerable amplitude. The valves are strongly costate, or multiplicate; the 4 to 8 ribs of variable strength and sharpness start close the umbones. Their strength increases anteriorly, but their number remains constant; intercalations or bifurcations do not occur.

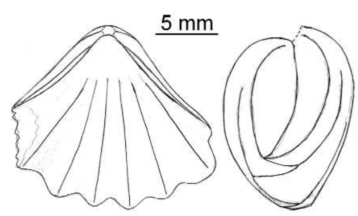


Figure 51. *Kericserella inversaeformis* (SCHLOSSER, 1900) in dorsal and lateral views. Drawings of a specimen from Kericser, Bed 17, Pliensbachian, Davoei Zone. M 2008.141.1.

Internal characters (Figs. 52, 53): *Ventral valve*: The delthyrial cavity is subquadrate in cross-section, with ventral grooves connected with the muscle scars. The umbonal cavities are narrow triangular. Pedicle collar and deltidial plates were not recorded in the Bakony material. The dental plates are subparallel. The hinge teeth are slender and inwardly oriented; denticula are present. *Dorsal valve*: A shallow trough and a narrow notothyrial cavity develops in the dorsal umbo. Septalium and dorsal median septum are absent. The inner socket ridges are high and lean well over the teeth. The outer hinge plates are very narrow or absent; the crural bases emerge almost directly from the inner socket ridges. The crural bases are subparallel, blade-like and dorsally oriented. The crura are falcoid and crescentic in cross section and may represent the subfalciform or a modified arcuiform type.

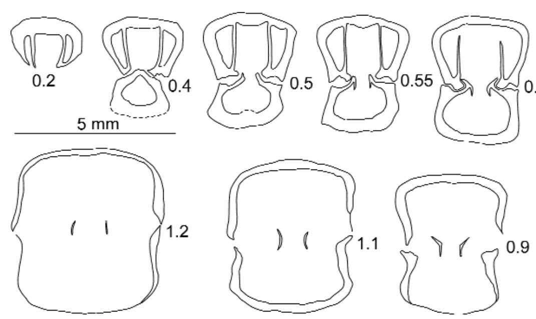


Figure 52. *Kericserella inversaeformis* (SCHLOSSER, 1900). Eight transverse serial sections through the posterior part of a specimen from Kericser, Bed 17, Pliensbachian, Davoei Zone. J. 9187. Distance from posterior end of shell is given in mm. Original length of the specimen is 9.6 mm. Redrawn after Vörös (1983, fig. 4)

Remarks:

K. inversaeformis is the type species of *Kericserella*, and the single species attributed to this genus, so far. It has some similarities to

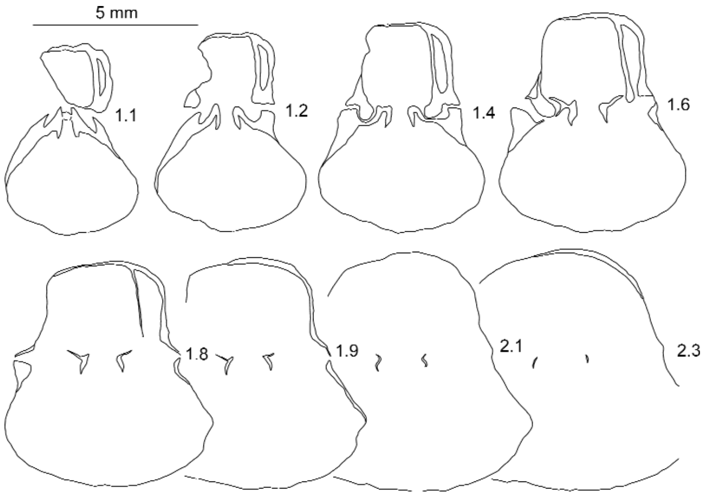


Figure 53. *Kericserella inversaeformis* (SCHLOSSER, 1900). Eight transverse serial sections through the posterior part of a specimen from Kericser, scree, probably Early Pliensbachian. M 2007.292.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 10.4 mm

marginal variants of *Pisirhynchia retroplicata* (ZITTEL, 1869) but the presence of the planareas and the much stronger ribbing make it clearly different. The general constitution and ribbing of some representatives of *Lokutella palmaeformis* (HAAS, 1912) shows resemblance to *K. inversaeformis*, but the well marked anterior sinus and the flat planarea with almost straight lateral commissure of the latter give clues to the separation of the two forms.

The record by PRINCIPI (l. c.) is queried, because the published figures are not informative enough, and the search for the original specimens in the collection of the Perugia University was not successful.

K. inversaeformis was described in the joint publication by BÖSE & SCHLOSSER (1900) but, after the death of E. BÖSE, the monograph was completed by M. SCHLOSSER, who clearly indicated in the introduction (l. c., p. 175) that the description of certain species (*inversaeformis*, among them) belonged to his responsibility. Therefore the authorship of this species is owed to M. SCHLOSSER.

Distribution:

Pliensbachian of the Central Apennines(?) and the Southern Alps (Italy) and the Bakony Mts (Hungary). The Pliensbachian specimens of the Bakony came from the Kericser section, from the Ibex and Davoei Zones (Tables 13, 14).

Subfamily Laevirhynchiinae DAGYS, 1974

Genus *Nannirhynchia* BUCKMAN, 1918

This genus was founded by BUCKMAN (1918) on a Middle Jurassic type species but also containing Toarcian forms. Later on, three Toarcian species were magnificently treated by ALMÉRAS et al. (1995), and recently the stratigraphical range of *Nannirhynchia pygmaea* (MORRIS, 1847) was extended even into the Pliensbachian (FAURÉ et al. 2007). In the present work, I portray three Late Pliensbachian species of *Nannirhynchia,* and further two, possibly attributed to this genus. After all, the range of *Nannirhynchia* is now extended from the Pliensbachian to the Bajocian, and the maximum species diversity appears in the Pliensbachian. The list of the nominal species of *Nannirhynchia*:

Bajocian:
- *N. subpygmaea* BUCKMAN, 1918
- *N. milvina* BUCKMAN, 1918

Toarcian:
- *N. pygmaea* (MORRIS, 1847)
- *N. delgadoi* ALMÉRAS, 1995
- *N. cotteri* ALMÉRAS, 1995

Pliensbachian:
- *N. pygmaea* (MORRIS, 1847)
- *N. reynesi* (GEMMELLARO, 1874)
- *N. pusilla* (GEMMELLARO, 1874)
- *N. gemmellaroi* (PARONA, 1880)
- *N. sinuata* (HAAS, 1912)
- ?*N. pillula* (SCHLOSSER, 1900)

As for the Pliensbachian species, the type specimens of *N. pusilla* were studied in the collection of the Palermo University, and very probably belongs here. It is not parasulcate but almost rectimarginate, and in this respect, is very similar to *N. pygmaea*; perhaps a junior synonym of that. I examined the types of *N.* ? *pillula* in the collection of the Bayerische Staatssammlung; they show flat planareas, therefore I would hesitate to include them to *Nannirhynchia*. Recently, however, BAEZA-CARRATALÁ (2008, p. 279) attributed this species to *Nannirhynchia* on the basis of internal morpology as well, therefore it is listed above with question mark.

It seems that *Nannirhynchia* appeared first in the Pliensbachian of the Mediterranean faunal province with diverse forms, then, after the Early Toarcian anoxic event and biotic crisis, migrated to the NW-European province, where it had a secondary peak of diversity in the Toarcian. It persisted until the Bajocian of England with diminutive forms, including the type species (*N. subpygmaea*). It represents the paracme stage of the genus, what may explain the observation by BUCKMAN (1918, p. 68) that the Liassic species "are much more advanced than the Vesulian [Bajocian] forms."

Nannirhynchia reynesi (GEMMELLARO, 1874)
Plate XI: 6, 7.

v * 1874 *Rhynchonella Reynesi,* Gemm. – GEMMELLARO, Zona con Terebratula Aspasia, p. 72, pl. X, fig. 23.
? 1900 *Rhynchonella Reynesi* Gemm. – BÖSE & SCHLOSSER, Südtirol, p. 196, pl. XVII, fig. 26.
v 1900 *Rhynchonella pusilla* Gemm. – BÖSE & SCHLOSSER, Südtirol, p. 197, pl. XVII, fig. 29.
1910 *Rhynchonella Reynesi* Gemm. – PRINCIPI, Castel del Monte, p. 87, pl. III, fig. 20.
1910 *Rhynchonella pusilla* Gemm. – PRINCIPI, Castel del Monte, p. 86, pl. III, figs. 16–17.
1978 *Piarorhynchia reynesi* (Gemmellaro, 1874) – BENIGNI, Ra Stua e Fanes, p. 155, pl. 13, figs. 6, 7.
v 1983 *Stolmorhynchia* ? *reynesi* (Gemmellaro, 1874) – VÖRÖS, Stratigraphic distribution, p. 34.
? 2001 *Nannirhynchia pigmoea* (Morris in Davidson) – POZZA & BAGAGLIA, Koninckella fauna, p. 28, pl. I, fig. 3.
? 2008 *Nannirhynchia* aff. *reynesi* (Gemmellaro, 1874) – BAEZA-CARRATALÁ, Patrimonio J. de Cisneros, p. 288, pl. XIII, figs. 8, 9.

Material: 10 specimens, 2 isolated and 8 double valves.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser/4	10.1	10.2	7.9	3.5
Kericser II/f	6.9	6.7	4.6	?
Fenyveskút 5/a	9.9	10.3	7.5	3.2
	6.9	7.2	4.0	1.4
Fenyveskút 5/c	8.6	9.5	6.4	3.6
	8.5	9.3	6.6	3.0
Kőris-hegy A/3	6.1	6.2	4.5	1.9

Description:

External characters: This is a medium-sized *Nannirhynchia* with subcircular outline. The lateral margins are convex, therefore the apical angle can not be measured correctly but it seems to be around 110°. The maximum width and the maximum convexity are attained near the middle of the length. The valves are very strongly and nearly equally convex. The beak is suberect to erect, very tiny and pointed. The pedicle opening is covered by matrix; the delthyrium is rarely seen, it has a form of a low equilateral triangle. Beak ridges are absent; there are no planareas. The lateral parts are strongly convex and the lateral commissures usually form a little elevated crest. In lateral view, the lateral commissures are nearly straight; a little arched in dorsal direction, then curve ventrally and pass to the anterior commissure. The anterior commissure is very markedly parasulcate; i. e. the incipient bilateral sulcation turns abruptly to a medial plica which rises over the plane of the lateral commissures. The medial part of the plica is rather wide and straight, and bears usually three rounded deflections. There is no true sulcus or linguiform extension: the double valves are almost uniformly globose. The valves are ornamented with weak and low, rounded ribs which start at the umbonal region or may appear at mid-length in weakly costate specimens. The number of ribs (4 to 7) remains constant but their strength and width increase towards the anterior margin.

Internal characters: These are poorly known. One specimen was sectioned, but due to technical difficulties during sectioning, the details of the internal morphology were only partly seen. Vague traces of a pedicle collar and subparallel dental plates were recorded. Almost no information on the cardinalia. The inner hinge plates seem to be narrow, a little dipping dorsally. The crura are subparallel in cross section and may correspond to the arcuiform or hamiform type.

Remarks:

The investigation of the type specimen of *N. reynesi* in the collection of the Palermo University revealed that the figure published by GEMMELLARO (l. c.) was somewhat misleading: it shows planareas which, in fact, are not present. Moreover, the type specimen is more globose and its beak is less incurved than it is seen on the figure. The parasulcate anterior commissure and the type of the ribbing is, however, rightly illustrated, and these are the most important features distinguishing *N. reynesi* from the closely related *N. pusilla* (GEMMELLARO, 1874) which has rectimarginate anterior commissure and much broader ribs (or folds). By these criteria, the records of *pusilla* by BÖSE & SCHLOSSER (l. c.) and PRINCIPI (l. c.) seem to belong to *N. reynesi*. Other Pliensbachian species of *Nannirhynchia* differ from *N. reynesi* in the following characters: *N. gemmellaroi* (PARONA, 1880) is less convex, almost smooth, without true ribbing, and has a linguiform extension projected anterodorsally; *N. sinuata* (HAAS, 1912) is even more convex, smooth, and has simple but strongly parasulcate anterior commissure.

Pozza & Bagaglia (l. c.) illustrated a specimen with secondary deflection in the parasulcate anterior commissure which, therefore, may not represent the *N. pygmaea* (Morris, 1847) with single plica, but seems rather close to *N. reynesi*.

The specimens figured by Baeza-Carratalá (l. c.) as *N.* aff. *reynesi* are in fact somewhat similar to that species but can only be regarded as closely related forms.

Some definitely ribbed specimens of the Toarcian *N. delgadoi* Alméras, 1995 (as figured by Alméras et al. 1995, pl. 1, fig. 10; pl. 2, figs. 5, 7) and *N. cotteri* Alméras, 1995 (as figured by Andrade (2006, fig. 54-4) show apparent similarity to *N. reynesi*. The short time gap between their stratigraphical ranges and the intervening Early Toarcian crisis may be considered to be a natural limit between these species as separate palaeobiological entities. If someone intended to lump them together, the species name *N. reynesi* would have the priority.

Distribution:

Pliensbachian of Sicily, the Central Apennines and the Southern Alps (Italy) and the Bakony Mts (Hungary). The Pliensbachian specimens of the Bakony came from several localities, from the Margaritatus and Spinatum Zones (Tables 13, 14).

Nannirhynchia gemmellaroi (Parona, 1880)
Plate XI: 8–13; Figure 54.

* 1880 *Terebratula Gemmellaroi* n. sp. – Parona, Gozzano, p. 195, pl. I, fig. 6.
v 1880 *Rhynchonella Mariottii* Zitt. – Canavari, Strati a Terebratula Aspasia, p. 352 (partim), pl. IV, fig. 3 (non fig. 2).
v 1883 *Rhynchonella triptera* n. f. – Canavari, Strati a Terebratula Aspasia III, p. 96, pl. XI, fig. 7.
1893 *Rhynchonella restituta,* n. sp. – Parona, Revisione Gozzano, p. 39.
? 1978 *Piarorhynchia* aff. *pusilla* (Gemmellaro, 1874) – Benigni, Ra Stua e Fanes, p. 157, pl. 13, fig. 8.
v 1983 *Stolmorhynchia gemmellaroi* (Parona, 1880) – Vörös, Stratigraphic distribution, p. 34.
? 2007 *Apringia aptyga* (Canavari, 1880) – Fauré et al., Jebel Zaghouan, p. 480, fig. 4-B.
v 2007 *Nannirhynchia gemmellaroi* (Parona, 1880) – Vörös & Dulai, Transdanubian Range, p. 55, pl. II, fig. 16.
? 2008 *Nannirhynchia* aff. *gemmellaroi* (Parona, 1880) – Baeza-Carratalá, Patrimonio J. de Cisneros, p. 285, pl. XIII, fig. 10.

Material: 93 specimens, mostly double valves of various state of preservation.

Localities	*Measurements (mm)*				*Localities*	*Measurements (mm)*			
	L	*W*	*T*	*Ch*		*L*	*W*	*T*	*Ch*
Kericser/7	8.4	9.3	6.0	3.6		7.1	7.0	5.2	2.4
	8.4	8.3	5.8	3.6		7.0	6.7	4.8	2.8
	8.0	7.6	5.5	3.7	Kericser/10	6.0	6.0	4.0	1.6
	8.0	8.6	5.2	3.5	Kericser/11	5.5	5.0	4.0	1.5
	8.3	8.6	5.5	4.7	Kericser/12	6.0	5.8	3.9	1.9
	7.8	8.0	5.3	3.8	Kericser/14	9.0	9.5	6.3	3.0
	7.8	7.6	5.4	3.2	Kericser/15	8.2	8.1	5.1	2.0
	8.1	7.8	5.6	3.2		5.8	5.8	4.1	1.5
	7.8	7.4	5.1	3.1		5.8	5.3	4.0	2.2
	8.0	7.6	5.4	3.8	Kericser/16	9.7	10.1	6.9	3.0
	7.3	7.3	5.1	3.5		9.3	9.1	6.2	3.8
	7.8	7.9	4.8	3.1	Kericser/17	6.0	6.0	3.3	1.5
	7.2	8.0	4.5	2.9	Kericser/22	6.4	6.2	3.6	2.0
	7.1	7.6	4.7	3.2		6.3	6.0	3.4	1.9
	7.6	8.0	4.8	3.0		5.5	5.2	3.1	1.5
	7.0	7.3	4.3	2.2		5.4	5.2	3.0	1.1
	7.0	7.0	4.7	2.1		5.6	5.2	3.1	1.3
	6.6	6.8	4.8	2.9		5.3	5.1	2.9	1.3
	6.6	6.9	4.6	2.6		5.1	5.2	2.8	1.5
	6.4	6.2	4.4	2.1		5.2	5.0	2.6	1.1
Kericser/8	9.9	10.2	6.8	2.8		4.9	4.9	2.5	1.0
	7.8	8.4	5.1	2.6	Kericser/23	5.8	5.9	3.4	2.1
	7.8	7.8	5.6	2.4	Kericser/25	6.3	6.2	3.9	2.3
	7.7	7.9	5.7	2.4	Kericser/26	5.6	5.3	4.3	2.0
	7.3	7.7	5.2	3.1		5.5	5.6	3.5	1.8
	7.5	6.7	5.4	2.1	Kericser/28	7.3	6.6	4.9	3.0

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser II/a	7.2	6.8	4.9	2.5
	6.2	5.7	3.5	2.0
	5.7	5.5	2.8	1.3
	5.7	5.4	3.1	1.4
	5.8	5.5	3.4	2.0
	5.5	5.2	3.2	1.8
	5.3	5.0	2.5	0.9
Kericser II/k	10.4	10.2	6.3	2.7
	10.1	9.2	7.2	3.1
	6.6	6.5	3.4	2.2
	5.7	5.6	3.3	1.1
	5.6	5.2	3.2	1.7
	5.2	4.8	3.2	2.0
Kericser II/f	6.6	6.4	4.2	2.0

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser (scree)	6.5	6.5	3.3	2.0
	6.1	6.1	3.2	1.6
	5.5	5.9	3.6	1.8
	5.5	5.4	3.4	1.7
	5.3	5.1	2.7	1.2
Fenyveskút É	10.6	10.3	6.8	3.5
	10.3	10.4	7.6	3.0
	10.2	10.2	7.0	3.0
Lókút/465	6.7	5.8	4.5	2.5
Eplény	9.4	9.3	6.9	4.0
	10.0	10.2	6.7	4.3
	10.1	10.5	6.7	3.4
	8.4	8.7	5.2	2.2

Description:

External characters: This is a small-sized *Nannirhynchia* with subcircular to subpentagonal outline. The lateral margins are convex, therefore the apical angle can not be measured correctly but it seems to vary between 100° and 110°. The maximum width is attained near the middle of the length. The maximum convexity can be measured near the posterior one-third of the length. The ventral valve is uniformly and strongly convex. The posterior part of the dorsal valve is strongly inflated, but the medial portion of its anterior margin is recoiled; this is due to a linguiform extension which is markedly projected anterodorsally. The beak is suberect, very tiny and pointed. The pedicle opening and the delthyrium are covered by matrix. The beak ridges are ill-defined; there are no planareas. The lateral parts are convex and the lateral commissures usually form a little elevated crest. In lateral view, the lateral commissures are nearly straight; a little arched in dorsal direction, then abruptly curve ventrally and pass to the anterior commissure. The anterior commissure is simply but markedly parasulcate; the sulcation turns to a medial plica which rises well over the plane of the lateral commissures. Typically, the medial part of the plica is uniformly arched. Rarely a slight median sinus appears, in these cases the anterior commissure may be termed as bisulcate. The ventral sulcus and dorsal fold develop very anteriorly and result in a dorsally projected linguiform extension. The valves are completely smooth.

Internal characters (Fig. 54): *Ventral valve*: The delthyrial cavity is subquadrate trapezium-like in cross-section, with ventral grooves connected with the muscle scars. The umbonal cavities are rounded triangular, but are largely filled with secondary shell material. The dental plates are convergent ventrally. The hinge teeth are poorly developed; denticula are not seen. Pedicle collar and deltidial plates were not recorded. *Dorsal valve*: Cardinal process is not seen. Septalium and median septum are absent. The outer socket ridges are weak; accessory sockets are not seen. The inner socket ridges are moderately high. The outer hinge plates are dorsally tilted and wide; they form a coherent oblique plate with the inner socket ridges. The crural bases are given off dorsally and give rise to crura of possibly arcuiform type.

Remarks:

This minute, smooth rhynchonellid was the source of some confusion. It was taken first as a terebratulid by Parona (1880, l. c.). Later, he (Parona, 1893, p. 195) introduced a new name (*restituta,* instead of *gemmellaroi*), in order to correct his "mistake", which was, in fact, not a mistake from the point of view of the zoological nomenclature. At that time, Parona (1893) believed that the binomen "*Rhynchonella gemmellaroi*" was preoccupied, and this was the reason for him to introduce the substitute name. I was not able to trace this binomen in the literature, but even if the homonymy existed once, the species name *gemmellaroi* (with Parona, 1880, as author) would become valid, because presently it is referred to *Nannirhynchia* (ICZN Article 59.2.).

Canavari (1880, l. c.) figured a small form as "*R. mariottii*" and later described a new species named "*R. triptera*" (Canavari, 1883, l. c.). I checked both specimens in the collection of the Pisa

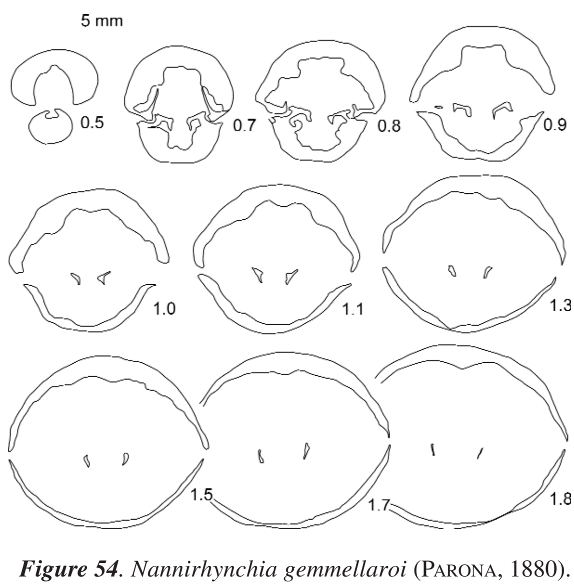


Figure 54. *Nannirhynchia gemmellaroi* (Parona, 1880). Ten transverse serial sections through the posterior part of a specimen from Eplény, Pliensbachian, Margaritatus(?) Zone. M 2007.285.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 9.4 mm

University and in my opinion they belong to *N. gemmellaroi*. In accordance with the reasoning in the previous paragraph, I kept this senior species name instead of *triptera* by Canavari.

The specimens figured by BENIGNI (l. c.) as *Piarorhynchia* aff. *pusilla*, and by BAEZA-CARRATALÁ (l. c.) as *Nannirhynchia* aff. *gemmellaroi,* respectively, are rather similar to *N. gemmellaroi*, though they do not show the characteristic, anterodorsal projection of the linguiform extension. On the other hand, this recoiled anterodorsal margin (besides the diagnostic parasulcate anterior commissure) is clearly seen on the specimen figured by FAURÉ et al. (l. c.) as "*Apringia aptyga*", therefore this specimen is regarded as a representative of *N. gemmellaroi*.

The generic position of this species was doubtful, from the beginning ("*Terebratula*") to the modern times (*Piarorhynchia*: BENIGNI 1978, *Stolmorhynchia*: VÖRÖS 1983b), until the appearance of the splendid monograph by ALMÉRAS et al. (1995) portraying the morphological diversity of the genus *Nannirhynchia*. On the basis of this, the generic attribution of the species *gemmellaroi* to *Nannirhynchia* seems to be well justified. As for the Toarcian species of *Nannirhynchia*, *N. gemmellaroi* is almost mistakenly similar to some smaller specimens of *N. delgadoi* (e. g. pl. 1, figs. 9 and 12 in ALMÉRAS et al. 1995). One of the specimens of *N. cotteri* ALMÉRAS, 1995, as figured by ANDRADE (2006, fig. 54-2), shows also apparent similarity to *N. gemmellaroi*.

Distribution:

Pliensbachian of the Central Apennines and the Southern Alps (Italy), the Bakony Mts (Hungary) and possibly of the eastern Atlas (Tunisia). The Pliensbachian specimens of the Bakony came from several localities, from the Ibex to the Margaritatus Zones (Tables 13, 14).

Nannirhynchia sinuata (HAAS, 1912)
Plate XI: 14.

1912 *Rhynchonella pusilla* Gemmellaro variet. *sinuata* nov. nom. – HAAS, Ballino, p. 252, pl. XIX, fig. 24.
v 2007 *Nannirhynchia sinuata* (HAAS, 1912) – VÖRÖS & DULAI, Transdanubian Range, p. 55.

Material: One double valve of rather good preservation.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Fenyveskút, scree	8.7	8.2	7.2	3.0

Description:

External characters: This is a small-sized *Nannirhynchia* with rounded subpentagonal outline. The lateral margins are slightly convex and diverge with an apical angle of about 90°. The maximum width is attained near the middle of the length. The maximum convexity can be measured closer to the posterior one-third of the length. Both valves are very strongly and nearly equally convex. The dorsal umbo is gibbose. The beak is slightly incurved, tiny and pointed. The pedicle opening and the delthyrium are covered by matrix. Beak ridges are absent; there are no planareas. The lateral parts are slightly convex; almost flat posteriorly, and the lateral commissures form a little elevated crest. In lateral view, the lateral commissures are nearly straight; a little arched in dorsal direction, then curve ventrally and pass to the anterior commissure. The anterior commissure is markedly parasulcate; the sulcation passes to a medial plica which rises well over the plane of the lateral commissures. The medial part of the plica is almost straight but shows a slight median sinus. The ventral sulcus and dorsal fold develop posteriorly. Both valves are a little flattened medially; consequently, in anterior view, the outline is not simply biconvex, but somewhat angular. The valves are completely smooth.

Internal characters: These were not studied because of the paucity of the material (single specimen).

Remarks:

HAAS (l. c.) rightly differentiated this form from *N. pusilla* (GEMMELLARO, 1874) on the basis of its stronger dorsal fold and its more convex ventral valve (what is best expressed by the gibbose character of its umbo). Here I add that *N. pusilla* has numerous, rather well-defined ribs, whereas *N. sinuata* is almost smooth. Almost the same characters differentiate *N. sinuata* from *N. reynesi* (GEMMELLARO, 1874). *N. gemmellaroi* (PARONA, 1880) is even more closely similar to *N. sinuata* in some morphological features, but it is significantly less convex and does not show the flat-topped medial fold, characteristic of *N. sinuata*.

BENIGNI (1978, p. 157) put *N. sinuata* in the synonymy of *N.* aff. *pusilla*. However, her figured specimen (l. c. pl. 13, fig. 8) is only moderately convex and has no angular outline in anterior view, and seems to stand closer to *N. gemmellaroi*.

Distribution:

Pliensbachian of the Southern Alps (Italy), and the Bakony Mts (Hungary). The Pliensbachian specimen of the Bakony came from Fenyveskút, from the Margaritatus Zone (Tables 13, 14).

Genus *Paronarhynchia* n. gen.

Type species: Paronarhynchia bulga (PARONA, 1893)

Diagnosis: Small to medium-sized rhynchonellids with subpentagonal to subcircular outline; mostly convex lateral margins diverge with apical angle of around 100°; biconvex, maximum convexity often shifted near the anterior margin. Marked anterior flattening delimited by comarginal ledge. Beak erect; beak ridges and planareas absent. Lateral parts convex, with crest along lateral commissures. Lateral commissure straight. Anterior commissure parasulcate, medial plica trapezoidal, with rounded deflections. Shells smooth or with few, coarse anterior ribs in some species. Delthyrial cavity subquadrate. Septalium and median septum absent. Hinge plates subhorizontal or dorsally dipping. Crural bases emerge dorsolaterally. Crura crescentic; modified arcuiform(?).

Derivatio nominis: After the name of Carlo Fabrizio PARONA, the outstanding Italian palaeontologist.

Species:

P. bulga (PARONA, 1893)
P. estherae n. sp.
? *P. zeina* (CANAVARI, 1880)
? *P. verrii* (PARONA, 1883)

Discussion: Paronarhynchia stands very close to *Nannirhynchia* therefore it is placed to the subfamily Laevirhynchiinae. The two genera share the almost smooth appearance, the tiny, pointed beak without beak ridges, and the parasulcate anterior commissure, moreover their internal morphology is also very similar. The most remarkable and diagnostic external feature of *Paronarhynchia* is the very peculiar anterior flattening delimited by a rather sharp ledge, and from this respect (especially portrayed by the type species), the new genus seems to stand alone among the Jurassic rhynchonellids. One may put forward the idea that this strange anterior flattening, caused by the abrupt cessation of longitudinal growth, is a pathological phenomenon, or at least is due to local ecological factors. However, *Paronarhynchia* is not an endemic genus in the Bakony, it was recorded in Gozzano (Italy), and it is highly improbable that this phenomenon occurred in so distant regions, synchronously in the Late Pliensbachian, never before and never again. Therefore *Paronarhynchia* is considered a real new taxon. *P. zeina* (CANAVARI, 1880) probably belongs to this genus but has significantly fewer and stronger ribs (or rather folds). The attribution of *P. verrii* (PARONA, 1883) is even more doubtful, because, though it shares many features of *Paronarhynchia*, it does not seem to show the diagnostic anterior flattening.

Distribution: Pliensbachian of the Central Apennines(?) and the Southern Alps (Italy), and the Bakony Mts (Hungary).

Paronarhynchia bulga (PARONA, 1893)
Plate X: 15–17; Figures 55, 56.

* 1893 *Rhynchonella bulga.* n. sp. – PARONA, Revisione Gozzano, p. 39, pl. I, fig. 25.
1967 *Stolmorhynchia bulga* (Par.) – SACCHI VIALLI & CANTALUPPI, Nuovi fossili di Gozzano, p. 82, fig. 10, pl. XII, figs. 7, 8.
v 1983 *Stolmorhynchia bulga* (Parona, 1893) – VÖRÖS, Stratigraphic distribution, p. 34.
v 2007 *Nannirhynchia* ? *bulga* (Parona, 1893) – VÖRÖS & DULAI, Transdanubian Range, p. 55, pl. II, fig. 15.

Material: 20 specimens; 7 double and 13 isolated valves.

Locality	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Fenyveskút É	12.0	11.7	8.9	2.3
	11.7	10.6	7.4	2.3
	11.6	11.4	8.8	2.8
	11.7	10.2	10.1	1.8
	11.6	10.7	9.5	2.6
	9.8	9.0	7.3	2.0

Description:

External characters: This is a medium-sized *Paronarhynchia* with subcircular outline. The lateral margins are convex, therefore the apical angle can not be measured correctly but it seems to vary between 90° and 110°. The maximum width is attained near the middle of the length. The maximum thickness of the double valve is shifted near to the anterior margin. The valves have very peculiar form. The ventral valve is moderately and uniformly convex to its distal extremity. The dorsal valve is inflated only near the umbo, then becomes almost flat to its distal extremity. At this most distal point, the surface of both valves curve abruptly, and a flattened frontal region develops (due to the cessation of longitudinal growth). In most cases, this anterior flattening tends to be a little concave and is always limited by a rather strong keel from the main part of the shell. This keel or ledge corresponds to a certain growth line, i. e. the line of commissure in the ontogenetic stage when the

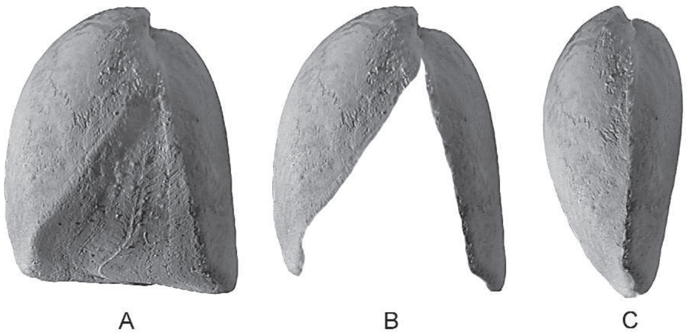


Figure 55. *Paronarhynchia bulga* (Parona, 1893), M 2007.234.1., Fenyveskút, É, Pliensbachian, Margaritatus Zone. A: lateral view, B: same specimen with the flattened frontal region removed, C: virtual reconstruction of the „closed" specimen, as if the growth stopped in the ontogenetic stage when the longitudinal vector abruptly ceased. Length of the specimen is 13.2 mm

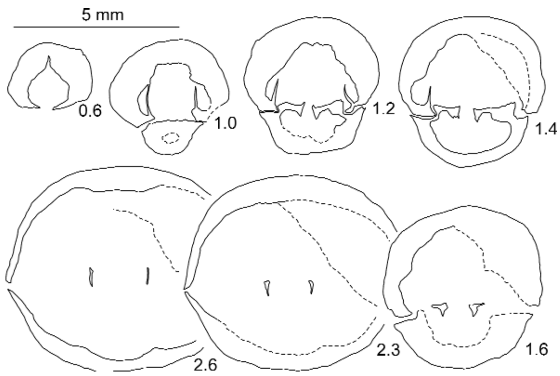


Figure 56. *Paronarhynchia bulga* (Parona, 1893). Seven transverse serial sections through the posterior part of a specimen from Fenyveskút, É, Pliensbachian, Margaritatus Zone. M 2007.287.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 11.5 mm

resultant vector of growth components abruptly changed and the growth deviated from the logarithmic spiral pattern. (For the sake of interest, I have tried to make a virtual reconstruction of this stage of ontogeny of the specimen M 2007.235.1., Figure 55.) The beak is erect, tiny and pointed. The pedicle opening and the delthyrium are covered by matrix. Beak ridges are absent. There are no true planareas, though the lateral parts of the anterior flattening give such impression, because the double valve has markedly rectangular appearance in anterior view. In lateral view, the lateral commissures are nearly straight, then curve ventrally and pass to the anterior commissure. In the final growth stage the anterior commissure is parasulcate; the bilateral sulcation turns abruptly to a medial plica which rises over the plane of the lateral commissures. The medial part of the plica is rather wide and nearly straight, and bears two or three weak deflections. In the intermediate stage, when the growth-rate changed (i. e. along the line of the keel), the anterior commissure is nearly rectimarginate, or shows a very low and wide uniplication. The valves are completely smooth, except the fine and irregularly spaced growth lines.

Internal characters (Fig. 56): *Ventral valve*: The delthyrial cavity is subquadrate trapezium-like in cross-section, with a deep ventral groove connected with the muscle scar. The umbonal cavities are rounded triangular, but are largely filled with secondary shell material. The dental plates are gently convergent ventrally. The hinge teeth are weak and narrow; denticula are not seen. Pedicle collar and deltidial plates were not recorded. *Dorsal valve*: Cardinal process is not seen. Septalium and median septum are absent. The outer socket ridges are low and weak; accessory sockets are not seen. The inner socket ridges are moderately high and partly thickened with secondary shell material. The outer hinge plates are subhorizontal, wide and also thickened. The crural bases emerge dorsolaterally and give rise to crura of possibly arcuiform type.

Remarks:

This very peculiar species, described by Parona (l. c.) from Gozzano (Piemonte, Italy) was revised and more profusely illustrated by Sacchi Vialli & Cantaluppi (l. c.) from the same locality. It is almost unmistakenly different from any other known brachiopod species of Early Jurassic age, and the attribution of the Bakony specimens to *P. bulga* is clearly justified. The only apparent divergence is seen on the figure by Parona (l. c.) which portrays weak ribbing on the anterior extremity of the dorsal valve. However, this feature was probably overrated, because in the subsequent revision, the figured specimens of Sacchi Vialli & Cantaluppi (l. c.) do not show ribbing. After all, *P. bulga* is considered an essentially unribbed form, and this is taken as one of the main differences which separate it from the other species of *Paronarhynchia*. The other, unique morphological feature of *P. bulga* is the extremely broad frontal flattening which usually tends to be even concave. This obviously means that the rate of the horizontal growth not only stopped but its vector changed more than 90°, and the outward growth turned to inward direction. In fact, an isolated dorsal valve may imitate the shape of a military officer's hat.

The generic position of this curious species was doubtful. By its small size and smooth appearance it was included to *Stolmorhynchia* (Sacchi Vialli & Cantaluppi 1967, Vörös 1983b), recently it was tentatively placed to *Nannirhynchia* (Vörös & Dulai 2007). Both the external and the internal features support its attribution to the family Norellidae, close to *Nannirhynchia*. However, its significantly larger size and its peculiar frontal flattening seem to justify to erect a new genus for *bulga* and its allies.

Distribution:

Pliensbachian of the Southern Alps (Italy) and the Bakony Mts (Hungary). The Pliensbachian specimens of the Bakony came from two localities, from the Margaritatus Zone (Tables 13, 14).

Paronarhynchia estherae n. sp.
Plate XI: 1–4; Figure 57.

v 1983 *Stolmorhynchia* n. sp., aff. bulga (Parona, 1893) – Vörös, Stratigraphic distribution, p. 34.
v 2007 *Nannirhynchia* ? aff. *bulga* (Parona, 1893) – Vörös & Dulai, Transdanubian Range, p. 55.

Holotype: Hungarian Natural History Museum (Budapest), inventory number: M 2007.237.1.
Locus typicus: Lókút, Fenyveskút, grab sample p2.
Stratum typicum: Red brachiopod limestone, Upper Pliensbachian.
Paratype: Hungarian Natural History Museum (Budapest), inventory number: M 2007.239.1.
Derivatio nominis: A favourite feminine forename in latinized form.
Diagnosis: Small, biconvex *Paronarhynchia* with rounded subpentagonal outline and flattened frontal region. Beak erect, tiny, pointed. No beak ridges and planareas. Lateral commissures straight, anterior commissure parasulcate, with rounded deflections. Dorsal fold and ventral sulcus at the anterior part. Weak linguiform extension projected anteroventrally. Rounded ribs (5–7) develop anteriorly.

Material: 41 specimens; nearly half of them moderately preserved double valves.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Fenyveskút p1	9.5	9.6	7.1	2.8
	9.6	9.6	6.0	2.8
	8.9	8.8	6.7	2.6
	8.7	8.6	4.8	1.4
Fenyveskút p2	10.4	11.3	7.6	5.3
	10.8	11.2	6.7	3.2
	10.0	9.8	6.1	3.0
	7.8	7.8	5.0	3.1
Fenyveskút D	9.1	8.7	6.5	3.1
Fenyveskút 5/c	9.9	10.2	6.9	4.0
Fenyveskút (scree)	10.1	11.0	7.0	3.0
	10.9	11.3	7.7	4.2
	10.3	10.9	7.2	3.0
	10.2	11.3	6.9	2.9
Papod 87	9.5	10.5	7.2	2.6
	9.7	9.5	6.6	3.2
	9.4	9.4	7.3	3.5
	9.8	9.7	6.5	3.0
	8.6	8.3	6.8	2.7

Description:
External characters: This is a small-sized *Paronarhynchia* with rounded subpentagonal outline. The lateral margins are gently convex, and diverge with an apical angle varying between 90° and 110°. The maximum width is attained near the anterior third of the length. The maximum thickness of the double valve lies around mid-length or may be shifted near to the anterior margin. The ventral valve is moderately and uniformly convex in most cases. The dorsal valve is less convex and inflated only near the umbo. Distally, the surface of both valves curve abruptly, and a more or less flattened frontal region develops. In most cases, this anterior flattening is limited by a blunt keel or ledge from the main part of the shell; this keel corresponds to a certain growth stage (growth line). The beak is erect, tiny and pointed, frequently broken away. The pedicle opening and the delthyrium, if remained, are covered by matrix. Beak ridges and planareas are absent. The lateral parts are slightly convex; the lateral commissures form a little elevated crest. In lateral view, the lateral commissures are nearly straight, then curve ventrally and pass to the anterior commissure. The anterior commissure is parasulcate; the bilateral sulcation turns abruptly to a medial plica which rises over the plane of the lateral commissures. The medial part of the plica is rather wide and nearly straight, and bears three to four, well-marked but rounded deflections. A ventral sulcus and a corresponding dorsal fold develop anteriorly and in most cases a weak, dorsally projected linguiform extension develops. The valves are ornamented with low but marked, rounded ribs which start at about the mid-length. The number of ribs is 5 to 7, from which 3 to 4 fall to the medial fold. The number of ribs remains constant but their strength and width increase towards the anterior margin, what, in this case, corresponds to the ledge limiting the flattened frontal region. On the anterior flattening the ribs fade out, but the number of deflections on the anterior commissure equals to the number of ribs.

Internal characters (Fig. 57): *Ventral valve*: The delthyrial cavity is rounded subquadrate in cross-section, with ventral grooves connected with the muscle scars. The umbonal cavities are rounded subtriangular. The dental plates are subparallel. The hinge teeth are massive and short; denticula are poorly developed. Pedicle collar and deltidial plates were not recorded. *Dorsal valve*: Cardinal process is not seen. Septalium and median septum are absent. The outer socket ridges are weak; accessory sockets are not seen. The inner socket ridges lean well over the teeth. The outer hinge plates are dorsally tilted and rather wide; they form an almost continuous oblique plate with the inner socket ridges. The crural bases emerge dorsolaterally and give rise to crura of partly crescentic in cross section and may represent a modified arcuiform type.

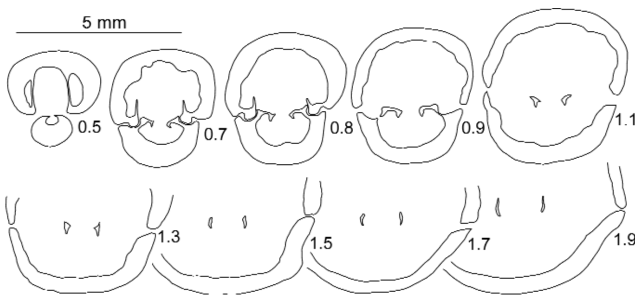


Figure 57. *Paronarhynchia estherae* n. sp. Nine transverse serial sections through the posterior part of a specimen from Fenyveskút, scree, Pliensbachian, Margaritatus Zone. M 2007.288.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 10.3 mm

Remarks:

P. estherae is very closely related to *P. bulga* (PARONA, 1893) from which it differs by the presence of definite anterior ribbing and by the narrower belt of the anterior flattening surface, which never becomes concave. In the development of its anterior region, *P. estherae* has also some similarity to *P. zeina* (CANAVARI, 1880), checked in the collection of the Pisa University, but this latter has significantly fewer and stronger ribs (or rather folds).

Previously, this species was tentatively placed to *Stolmorhynchia* (VÖRÖS 1983b), and to *Nannirhynchia* (VÖRÖS & DULAI 2007). Now it is regarded as a typical representative of the genus *Paronarhynchia*.

Distribution:

Pliensbachian of the Bakony Mts, where the specimens came from three localities, from the Margaritatus Zone (Tables 13, 14).

Paronarhynchia ? cf. *verrii* (PARONA, 1883)
Plate XI: 5.

1883 *Rhynchonella Verrii,* n. f. – PARONA, Appennino centrale, p. 664, pl. IV, figs. 9–11.
v 1983 *Pseudogibbirhynchia* ? cf. *verrii* (Parona, 1883) – VÖRÖS, Stratigraphic distribution, p. 34.

Material: Three fragmentary specimens.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser/6	16.4	15.9	11.3	3.5

Description:

External characters: This is a large-sized *Paronarhynchia* with oval, drop-shaped outline. The lateral margins are convex; their posterior segments diverge with an apical angle of about 100°. The maximum width is attained in the anterior one-third of the length. The maximum thickness of the double valve can be measured near the posterior one-third of the length. The valves are very strongly and nearly equally convex; the posterior part of the dorsal valve is more inflated than the rest. The beak is broken off but it seems that it was rather depressed. Beak ridges are absent; there are no planareas. The lateral parts are strongly convex and the lateral commissures usually form a markedly elevated crest. In lateral view, the lateral commissures are nearly straight; at the anterolateral extremities they curve ventrally and pass to the anterior commissure. The anterior part is largely broken, but it is well seen that the anterior commissure is parasulcate. Between the ventrally oriented, weak lateral sinuses, the medial plica is rather low, but wide and straight. This part is badly incomplete, therefore it can not be decided if this horizontal segment had some low, rounded deflections. The valves are ornamented with weak and low, rounded ribs which start at the umbonal region. The number of ribs (12, from which 6 fall to the medial plica) remains constant but their strength and width increase towards the anterior margin, where they seem to fade out.

Internal characters: These were not studied because of the paucity of the material (single specimen).

Remarks:

This is a rather poorly known species. PARONA (l. c.) illustrated his original description by three specimens, which, however, seem to differ from each other, at least according to the respective figures. PARONA's figures on pl. IV, 9 and 11 portray regularly ribbed specimens, with rectimarginate anterior commissure, showing marked zigzag deflections; these specimens may belong to the genus *Prionorhynchia*. On the other hand, the third specimen (PARONA 1883, pl. IV, fig. 10) clearly shows a parasulcate anterior commissure, where the ribs fade out. I regarded this specimen as the typical representative of the species *verrii*, because it corresponds to the description given by PARONA (l. c.), clearly stating that the anterior commissure is not straight but parasulcate ("Linea commessurale … sui lati della fronte si inflette più o meno fortemente verso la valva perforata per risalire di nuovo verso la brachiale…"). Since PARONA's original description, apparently nobody recorded this species. This fact, and the incomplete preservation of the Bakony specimen make reasonable the tentative identification.

The generic position of this species is also very doubtful. Looking at the parasulcate anterior commissure, the genera *Nannirhynchia* and *Paronarhynchia* may be taken into account. The significantly large size and moderate globosity speak strongly against the attribution to *Nannirhynchia*. Therefore I tentatively placed *verrii* to *Paronarhynchia*, despite that my specimen does not seem to show the anterior flattening.

Distribution:

Pliensbachian of the Central Apennines (Italy), and the Bakony Mts (Hungary). The Pliensbachian specimen of the Bakony came from Kericser, from the Spinatum Zone (Tables 13, 14).

Superfamily Hemithyridoidea RZHONSNITSKAIA, 1956
Family Tetrarhynchiidae AGER, 1959
Subfamily Gibbirhynchiinae MANCEÑIDO & OWEN, 2002

Genus *Gibbirhynchia* BUCKMAN, 1918

Gibbirhynchia cf. *curviceps* (QUENSTEDT, 1858)
Plate XI: 16.

* 1858 *Terebratula curviceps* – QUENSTEDT, Der Jura, p. 138, pl. 17, figs. 13–15.
v 1887 *Rhynchonella curviceps* Quenst. sp. – DI STEFANO, Lias inferiore di Taormina, p. 59, Pl. II, figs. 25–29.
v 1891 *Rhynchonella curviceps* Quenst. sp. – DI STEFANO, M. San Giuliano, p. 184, pl. II, fig.2.
v 1907 *Rhynchonella curviceps,* Quenst. – DAL PIAZ, Tranze di Sospirolo, p. 23, pl. II, fig. 1.
? 1910 *Rhynchonella curviceps* Quenst. – VINASSA DE REGNY, Prealpi dell'Arzino, p. 190, pl. VII, fig. 19.
v 1924 *Rhynchonella curviceps* Quenst. sp. – MAUGERI-PATANÉ, S. Teresa in Riva, p. 28, pl. I, fig. 3.
1934 *Rhynchonella curviceps* Quenst. – MOISSEIEV, Jur. Brach. Crimea and Caucasus, p. 39, pl. II, figs. 22–25.
1962 *Gibbirhynchia curviceps* (Quenstedt). – AGER, British Liassic Rhynchonellidae, p. 96, text-fig. 57, pl. VIII, fig. 4.
1964 *Gibbirhynchia curviceps* (Quenst.) – RĂILEANU & IORDAN, Brach. Lias. zona Svinița, p. 9, pl. I, fig. 7.
? 1967 *Gibbirhynchia curviceps* (Quenst), – PREDA, Brachiopod. jur. Roşia, p. 49, pl. II, fig. 1.
1969 *Gibbirhynchia curviceps* (Quenstedt), 1858 – SUČIĆ-PROTIĆ, Mid. Lias. Brach. Yugosl. Carpatho-Balkanids (1), p. 43, pl. IX, figs 1–3, pl. XXXII, fig. 1, pl. LII, fig.1.
v 1983 *Gibbirhynchia cf. curviceps* (Quenstedt, 1858) – VÖRÖS, Stratigraphic distribution, p. 34.
1993 *Gibbirhynchia curviceps* (Quenstedt). – ALMÉRAS et al., Evolution du genre Prionorhynchia, p. 62, pl. I, fig. 13.
1993 *Gibbirhynchia curviceps* (Quenstedt, 1856) – MANCEÑIDO, Early Jurassic brachiopods from Greece, p. 85, pl. I, fig. 3.
v 1997 *Gibbirhynchia curviceps* (Quenstedt) – VÖRÖS, Jurassic brachiopods of Hungary, p. 25, Appendix: fig. 54.
2000 *Gibbirhynchia curviceps* (Quenstedt, 1856) – ALMÉRAS & FAURÉ, Pyrénées, p. 146, figs. 46–49, pl. 15, figs. 1–20.
? 2003 *Gibbirhynchia curviceps* (Quenstedt, 1852) – DULAI, Hettangian and Early Sinemurian, p. 42, pl. VI, figs. 14–16.
2003 *Gibbirhynchia curviceps* (Quenstedt) – ELMI et al., Grands bivalves en Algérie occidentale, p. 701, figs. 4/12, 5/3.
2004 *Gibbirhynchia curviceps* (Quenstedt, 1858) – BAEZA-CARRATALÁ & TENT-MANCLÚS, Sierra de los Frailes, p. 215, fig. 4: 1a.
2007 *Gibbirhynchia curviceps* (Quenstedt, 1856) – ALMÉRAS et al., Algérie occidentale, p. 74, figs. 9, 10, pl. 4, figs. 9–12.
v 2007 *Gibbirhynchia* cf. *curviceps* (Quenstedt, 1858) – VÖRÖS & DULAI, Transdanubian Range, p. 55.
2008 *Gibbirhynchia curviceps* (Quenstedt, 1852) – BAEZA-CARRATALÁ, Patrimonio J. de Cisneros, p. 206, pl. VII, figs. 1–4.

Material: one incomplete double valve.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Borzavár, Páskom	16.0	?	12.3	13.0

Description:

External characters: This is a large *Gibbirhynchia* with very rounded subpentagonal outline. The lateral margins are a little concave. The apical angle can not be measured because of the incomplete state of preservation. The maximum width seems to be at the anterior third of the length. The valves are almost equally convex; the maximum convexity is attained near the middle of the length. A low dorsal fold develops anteriorly. The beak is massive but depressed, slightly incurved. Pedicle opening and delthyrium are not visible. The beak ridges are blunt and delimit a poorly defined planarea in the ventral valve. The lateral commissure is poorly preserved but sinuous, with a dorsal deflection posteriorly. The anterior commissure is uniplicate, highly arched and shows sharp zigzag deflections. The linguiform extension is subtrigonal and do not extend too much beyond the biconvex outline. The valves are multicostate throughout; the ribs appear near the umbones and increase in strength and sharpness toward the anterior margin. The number of major ribs (20 altogether, 6 of which fall to the fold) remains constant through the valves; bifurcations or intercalations were not observed.

Internal characters: These were not studied because of the paucity of the material (single specimen).

Remarks:

G. curviceps is perhaps the most frequently cited rhynchonellid species in Europe. It was recorded in a great number of localities in the Mediterranean region as well. Therefore the above list of synonymy is long but is far from being complete. Except the most crucial NW European items (Quenstedt l. c., Ager l. c.), I included mostly the records from the Mediterranean province, especially those what I was able to check personally in the respective collections. I did not intend to make a full revision and interpretation of this species, but I got the impression that *G. curviceps* became a comfortably used collective taxon among the numerous and partly vaguely defined species of the genus *Gibbirhynchia*.

Distribution:

Upper Sinemurian and Pliensbachian throughout Europe, including the southern countries from Spain to the Crimea, and the Atlas Mountains. The single specimen from the Bakony was found as loose but probably originated from the Lower Pliensbachian (Tables 13, 14).

Gibbirhynchia ? *orsinii* (Gemmellaro, 1874)
Plate XI: 17–19; Figures 58–60.

v * 1874 *Rhynchonella Orsinii,* Gemm. – Gemmellaro, Zona con Terebratula Aspasia, p. 76, pl. XI, fig. 18.
? 1920 *Rhynchonella Orsinii* Gemmellaro – Dareste de la Chavanne, Guelma, p. 14, pl. I, fig. 2.
? 1967 *Pseudogibbirhynchia globosa* sp. n. – Siblík, New species of rhynchonelloids, p. 157 (partim), pl. XII, fig. 1. (non pl. X, fig. 5.)
1969 *Gibbirhynchia orsinii* (Gemmellaro), 1874 – Sučić-Protić, Mid. Lias. Brach. Yugosl. Carpatho-Balkanids (1), p. 44, text-fig. 3; pl. IX, figs. 4, 5; pl. XXXII, fig. 2; pl. LII, 2.
v 1983 *Gibbirhynchia* ? *orsinii* (Gemmellaro, 1874) – Vörös, Stratigraphic distribution, p. 34.
1994 *Gibbirhynchia orsinii* (Gemmellaro, 1874) – Tchoumatchenco, Ouarsenis, p. 38, pl. I, figs. 7, 9, 10, text-fig. 7.
v 1997 *Gibbirhynchia* ? *orsinii* (Gemmellaro) – Vörös, Jurassic brachiopods of Hungary, p. 16, Appendix: fig. 13.
2003 *Gibbirhynchia orsinii* (Gemmellaro, 1874) – Dulai, Hettangian and Early Sinemurian, p. 44, pl. VI, figs. 17–19.
v 2007 *Gibbirhynchia* ? *orsinii* (Gemmellaro, 1874) – Vörös & Dulai, Transdanubian Range, p. 55.
2008 *Gibbirhynchia orsinii* (Gemmellaro, 1874) – Baeza-Carratalá, Patrimonio J. de Cisneros, p. 215, pl. XV, fig. 1.

Material: 53, partly incomplete double valves.
Description:

Localities	*Measurements (mm)*				*Localities*	*Measurements (mm)*			
	L	W	T	Ch		L	W	T	Ch
Kericser/14	11.3	12.3	8.7	4.2	Kericser/29	12.4	12.9	9.0	5.8
Kericser/15	13.2	14.0	9.3	4.5		12.4	11.3	8.2	6.6
Kericser/17	12.0	13.0	8.9	4.5		11.4	11.2	8.3	5.2
	11.0	11.3	7.8	3.1	Kericser/30	13.7	14.2	9.8	7.5
Kericser/20	13.0	12.5	8.8	7.0		13.5	12.7	9.9	7.5
	11.2	10.8	6.8	2.9		13.1	12.9	9.5	5.8
	13.6	14.2	9.1	5.9	Kericser/35	13.3	14.2	8.7	5.5
Kericser/21	12.7	13.3	8.4	5.4		12.9	14.4	8.6	4.8
Kericser/23	13.0	14.8	9.2	4.3	Kericser I/a	13.6	14.8	9.7	5.6
Kericser/25	13.1	14.8	8.9	6.7		12.0	11.8	9.0	6.6
	11.3	11.7	8.6	5.4	Kericser I/f	14.0	14.1	9.7	6.7
	12.1	12.0	8.8	3.5		11.4	9.9	8.0	4.3
Kericser/27	12.1	12.7	8.7	6.5	Kericser II/k	15.6	16.1	10.8	6.8
	11.9	12.2	8.8	4.7		13.6	13.5	10.1	7.5
Kericser/28	13.4	14.0	9.9	7.9	Kericser (scree)	12.5	14.3	8.8	6.8
	13.6	12.6	10.0	7.2		11.8	11.3	7.6	?
	12.5	12.2	9.1	7.5	Kőris-hegy B/5	15.7	17.5	12	8.6

External characters: This is a large *Gibbirhynchia* with very rounded subpentagonal outline. The lateral margins are nearly straight and diverge with an apical angle of 95–100°. The maximum width seems to be at about the middle of the length. The valves are almost equally convex; the maximum convexity is attained near the middle of the length or is shifted a little posteriorly. Low dorsal fold and ventral sulcus develop anteriorly. The linguiform extension is somewhat trapezoidal and does not project beyond the outline in lateral view. The beak is depressed, slightly incurved. Pedicle opening and delthyrium are not visible. The beak ridges are very poorly defined. In lateral view the lateral commissures are sinuous; in their posterior part they are strongly arched dorsally, then they run diagonally to the anterolateral extremities, where they start to show marked angular deflections and pass along a continouos curve to the anterior commissure. The anterior commissure is uniplicate; the uniformly arched plica is strongly serrated. The zigzag deflections start to develop along the lateral sides of the uniplication and their amplitude increases in the central portion, where they attain a number of five. The valves are multicostate throughout; the ribs appear near the umbones and increase in strength and sharpness toward the anterior margin. The number of the ribs (14–20 altogether, 4–5 of which fall to the fold) remains constant through the valves; bifurcations or intercalations were not observed.

Internal characters (Figs. 58–60): *Ventral valve*: The delthyrial cavity is rather high subquadrate in cross-section. The umbonal cavities are more or less oval. The dental plates are subparallel. The hinge teeth are straight and expanded laterally; denticula are well developed. Pedicle collar and deltidial plates were not recorded. *Dorsal valve*: Cardinal process is not seen. There is a deep and long septalium formed by the steeply inclined inner hinge plates. It is connected to a short, stout median septum which seems to be restricted to the umbonal cavity of the dorsal valve, posterior to the plane of articulation. The outer socket ridges are strong. The inner socket ridges are well-developed, moderately high. The outer hinge plates are rather wide and arched ventrally. The crural bases project dorsally and give rise to crura of modified subfalciform type.

Remarks:

G. orsinii has some degree of similarity to several other species of the

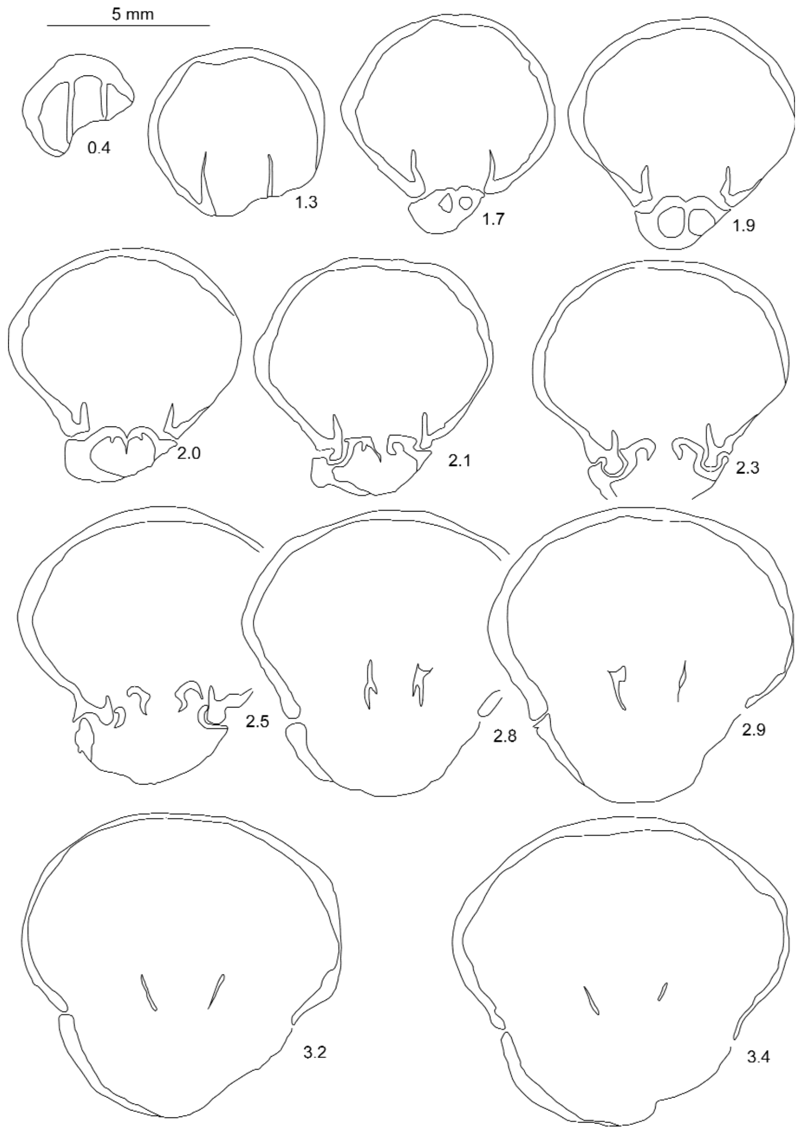


Figure 58. *Gibbirhynchia* ? *orsinii* (GEMMELLARO, 1874). Twelwe transverse serial sections through the posterior part of a specimen from Kericser, Bed 23, Pliensbachian, Ibex Zone. M 2007.291.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 13.0 mm

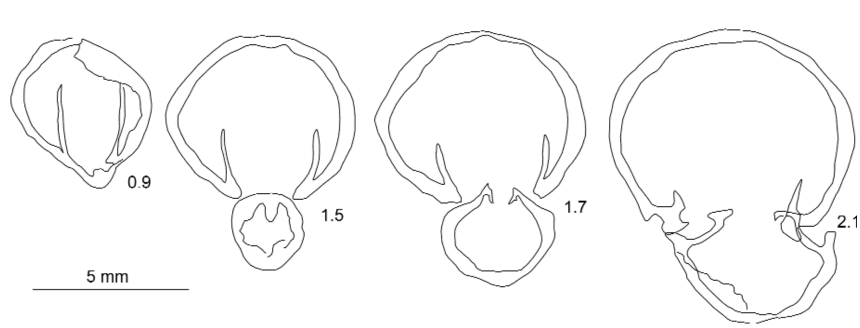


Figure 59. *Gibbirhynchia* ? *orsinii* (GEMMELLARO, 1874). Four transverse serial sections through the posterior part of a specimen from Kericser, Bed 25, Pliensbachian, Ibex Zone. M 2007.290.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 12.1 mm. The crura were not seen

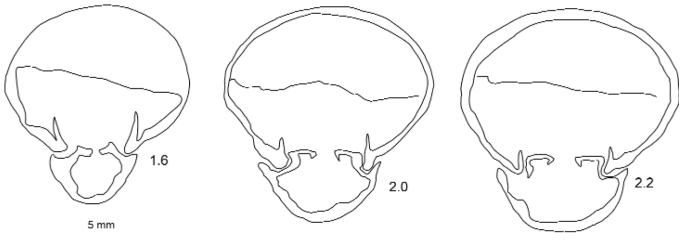


***Figure 60**. Gibbirhynchia* ? *orsinii* (GEMMELLARO, 1874). Three transverse serial sections through the posterior part of a specimen from Kericser, Bed 20, Pliensbachian, Ibex Zone. M 2007.289.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 13.6 mm. The crura were not seen

genus *Gibbirhynchia*. In its general shape, *G. orsinii* stands close to *G. amalthei* (QUENSTEDT, 1852) and *G. muirwoodae* AGER, 1954, but the latters have dense ribbing (25 to 35 ribs), while *G. orsinii* has 14 to 18, and never more than 20 ribs. Three other species, *G. northamptonensis* (DAVIDSON, 1878), *G. thorncombiensis* (BUCKMAN, 1922) and *G. tiltonensis* AGER, 1954, may be compared to *G. orsinii* in the number of costae, but the first two of them have significantly greater convexity, while *G. tiltonensis* is more depressed and stratigraphically restricted to the Toarcian. Furthermore, in the collection of the Palermo University I had the opportunity to study GEMMELLARO's holotype (which was authentically re-figured by SUČIĆ-PROTIĆ, l. c.), and I am convinced that *G. orsinii* is an individual species distributed in the Mediterranean region, separate from the other species of *Gibbirhynchia* widespread in NW Europe.

There are serious doubts about the generic attribution of this species. Its external features fit perfectly to those of the genus *Gibbirhynchia*, and previous authors (AGER 1962, p. 91, SUČIĆ-PROTIĆ, l. c., TCHOUMATCHENCO, l. c., DULAI, l. c.) did not hesitate to attribute *orsinii* to that genus. But, as AGER (1962, p. 109) pointed out, there is a strong homoeomorphy between *Gibbirhynchia* and *Pseudogibbirhynchia*; in his opinion this was "among the Liassic rhynchonellids, the only serious homoeomorphic difficulties which have been encountered ". AGER (l. c.) also stated that the "prefalcifer crura and the almost vestigial dorsal median septum" separate *Pseudogibbirhynchia* from *Gibbirhynchia* internally, and "the presence of a slight posterior flattening of the brachial valve", externally.

Taking into account the above criteria, we may state, that a posteror flattening does not appear on *orsinii*, therefore, externally, its attribution to *Gibbirhynchia* seems to be justified. On the other hand, the internal features of *orsinii* are either not properly known or look rather similar to those of *Pseudogibbirhynchia*. The serial sections of the specimens identified as *G. orsinii* by SUČIĆ-PROTIĆ (l. c., pl. XXXII, fig. 2) show a moderately developed median septum, and the type of crura is difficult to decide, even SUČIĆ-PROTIĆ (l. c., p. 45) qualified them as "abnormal". The serial sections of *G. orsinii* figured by TCHOUMATCHENCO (l. c.) are also not very informative: the distal parts of the crura are missing. The figures presented in the present monograph (Figs. 58–60) provide further details but, at the same time, increase the doubts about the generic attribution of *orsinii*. The dorsal median septum is absent or weakly developed in these three specimens. The crura was seen only in the specimen in Fig. 58; it is essentially of subfalciform type but bear curious flanges, very similar to those figured recently by TOMAŠOVÝCH (2006, figs. 8, 9) in the description of his new genus *Jakubirhynchia*. The weakly developed median septum and the subfalciform crura are typical internal features of *Pseudogibbirhynchia*.

In spite of these strong arguments provided by the internal morphology, at the moment I am not inclined to attribute *orsinii* either to *Pseudogibbirhynchia* or to *Jakubirhynchia*, because the external features would not support this.

It may be added that one of the specimens figured by SIBLÍK (1967, l. c.) as belonging to his new species *Pseudogibbirhynchia globosa*, seems to be conspecific with *G. orsinii,* as judged from its external morphology. More data on the internal morphology of *G. orsinii* — especially from the topotypical material — would be needed in order to solve this problem.

Distribution:

Sinemurian and Pliensbachian of Sicily (Italy), the Gerecse and Bakony Mts (Hungary), the Carpatho-Balkanides (Serbia), the Betic Cordilleras (Spain), the Atlas Mountains (Ageria), and possibly of the West Carpathians (Slovakia). The Pliensbachian specimens of the Bakony came from two localities, from the Ibex and Davoei Zones (Tables 13, 14).

Gibbirhynchia ? cf. *urkutica* (BÖCKH, 1874)
Plate XI: 15.

v * 1874 *Rhynchonella Urkutica* n. sp. – BÖCKH, Südlichen Theiles des Bakony, p. 157, pl. IV, figs. 5, 6.
v 1983 *Gibbirhynchia* ? n. sp., aff. *urkutica* (BÖCKH, 1874) – VÖRÖS, Stratigraphic distribution, p. 34.
2003 *Gibbirhynchia* ? *urkutica* (Böckh, 1874) – DULAI, Hettangian and Early Sinemurian, p. 46, pl. VII, figs. 4–6.
v 2007 *Gibbirhynchia* ? aff. *urkutica* (Böckh, 1874) – VÖRÖS & DULAI, Transdanubian Range, p. 55.

Material: One moderately preserved double valve.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser/33	15.8	13.7	10.7	7.4

Description:

External characters: This is a large *Gibbirhynchia* with elongated subpentagonal outline. The lateral margins are nearly straight and diverge with an umbonal angle of 90°. The maximum width is at about the middle of the length. The valves are almost equally convex; the maximum convexity is attained near the middle of the length. Dorsal fold and ventral sulcus develop anteriorly. The linguiform extension is slightly projected anteriorly beyond the outline in lateral view. The beak is broken off but its curvature might not be strong. Pedicle opening and delthyrium are not visible. The beak ridges are very poorly defined; there are no true planareas. In lateral view the posterior part of the lateral commissures are arched dorsally, then they run diagonally, and their anterolateral parts show marked angular deflections. The anterior commissure is uniplicate; the uniformly arched plica is strongly serrated. The steep-sided uniplication is somewhat asymmetrical, and bears four zigzag deflections in the central portion, while the lateral sides remain unbroken. The valves are multicostate throughout; the moderately sharp ribs appear near the umbones and increase in strength and number (by bifurcations in the umbonal region) toward the anterior margin. The number of major ribs is 12, from which 4 fall to the fold.

Internal characters: These were not studied by serial sectioning because of the paucity of the material (single specimen). Subparallel dental plates are seen on the broken surface of the beak.

Remarks:

Two of the original specimens of *G. urkutica*, corresponding to figs. 10 and 12 by Böckh (l. c.), were found in the collection of the Geological Institute of Hungary under the inventory number J. 1030. Böckh's figures reflect more or less properly the morphological characters, though the beak of the specimen on fig. 10 is broken and only the mould of its umbonal cavity is preserved. The general constitution and ornamentation of my specimen from Kericser fits rather well to those of Böckh's originals.

The generic position of this species is questionable, partly because its internal features are unknown. The character of the ribbing and the general shape bring close *urkutica* to the genus *Gibbirhynchia* but, at the same time, may correspond to some other, far related rhynchonellid genera, such as *Pseudogibbirhynchia, Salgirella*, or the recently described *Alebusirhynchia* Baeza-Carratalá, 2008. The question can not be decided without knowing the details of internal morphology of *urkutica*, therefore, tentatively and temporarily, I maintained its attribution to *Gibbirhynchia* with question mark.

Distribution:

Sinemurian and Pliensbachian of the Bakony (Hungary). The specimen here described came from Kericser, from the Ibex Zone (Tables 13, 14).

Order Athyridida Boucot, Johnson & Staton, 1964
Suborder Koninckinidina Harper, 1993
Superfamily Koninckinoidea Davidson, 1853
Family Koninckinidae Davidson, 1853

Genus *Amphiclinodonta* Bittner, 1888

Amphiclinodonta liasina Bittner, 1888
Plate XI: 20.

* 1888 *Amphiclina (Amphiclinodonta) liasina* nov. sp. – Bittner, Ueber Koninckiniden des alpinen Lias, p. 288, pl. XIV, fig. 7.
1894 *Amphiclinodonta liasina* Bittn. – Bittner, Neue Koninckiniden des alpinen Lias, p. 140, pl. IV, fig. 12.
v 1983 *Amphiclinodonta liasina* Bittner, 1888 – Vörös, Stratigraphic distribution, p. 34.
v 2007 *Amphiclinodonta liasina* Bittner, 1888 – Vörös & Dulai, Transdanubian Range, p. 55.

Material: One moderately preserved double valve.

Localities	*Measurements (mm)*		
	L	*W*	*T*
Eplény	5.8	5.9	?

Description:

External characters: Small-sized *Amphiclinodonta* with subtrigonal outline. The hinge margin is nearly straight and very short, it occupies less than one-fifth of the width of the shell. The lateral margins are straight and diverge with an apical angle of 105°. They pass gradually, along a continuous curve, to the gently convex anterior margin. The ventral valve is of low convexity; the maximum convexity is located at about the mid-length of the shell. The characters of the beak can not be observed. The beak ridges are sharp; the interarea seems to be narrow and low. The dorsal valve is gently concave but filled with limestone matrix. The lateral commissures are nearly straight. The anterior margin is incomplete but the anterior commissure seems to form a shallow sinus. The surface of the shells are smooth.

Internal characters: These were not studied by serial sectioning because of the paucity of the material (single specimen).

Remarks:

A. liasina is the type species of the genus *Amphiclinodonta* and shows the characters of the genus distinctive among koninckinids: the very small size, the pointed posterolateral region with the almost unnoticeable hinge margin. Closely related species are: *A. adnethica* Bittner, 1894 distinguished by its very elongated, drop-shaped outline, and *A. bittneri* Böse, 1898, which is similar in outline to *A. liasina* but its dorsal valve shows a distinct medial sulcus.

Distribution:

Pliensbachian of the Northern Calcareous Alps (Austria) and the Bakony Mts (Hungary). The Pliensbachian specimen of the Bakony came from Eplény, from the Margaritatus(?) Zone (Tables 13, 14).

Genus *Koninckodonta* Bittner, 1894

This generic name is often cited with the date of 1893. Bittner's work, where he introduced the name *Koninckodonta* (originally at subgeneric rank) appeared in the yearbook of the Geologische Reichsanstalt, Vienna, for the year 1893, but the volume was published in 1894. Therefore the proper date of the authorship is 1894.

Koninckodonta cf. *waehneri* (Bittner, 1894)
Plate XI: 24–26; Figure 61.

* 1894 *Koninckina Wähneri* nov. spec. – Bittner, Neue Koninckiniden des alpinen Lias, p. 137, pl. IV, fig. 11.
v 1983 *Koninckodonta* cf. *waehneri* (Bittner, 1888) – Vörös, Stratigraphic distribution, p. 34.
v 2003 *Koninckodonta* cf. *waehneri* (Bittner, 1894) – Vörös, Koninckinids from Tivoli, p. 180, pl. IV, fig. 4.
v 2003 *Koninckodonta* cf. *waehneri* (Bittner, 1894) – Vörös et al., Schafberg, p. 78, pl. VIII, fig. 29.
v 2007 *Koninckodonta* cf. *waehneri* (Bittner, 1894) – Vörös & Dulai, Transdanubian Range, p. 55.
? 2008 *Koninckodonta waehneri* (Bittner, 1894) – Baeza-Carratalá, Patrimonio J. de Cisneros, p. 298, pl. XXIII, figs. 1–3.

Material: 16, mostly fragmentary double valves.

Localities	*Measurements (mm)*		
	L	*W*	*T*
Papod 82	6.0	6.9	?
Papod 86	6.1	6.6	2.2
	6.6	6.6	2.8
	7.6	8.4	2.9
	7.4	7.4	3.0
Papod 87	7.4	8.7	?
	8.5	10.3	?
Fenyveskút 5/C	9.3	~9.6	3.4

Description:

External characters: Small-sized *Koninckodonta* with rounded subquadrate to subtrigonal outline. The hinge margin is straight and occupies two-thirds of the width of the shell. The convex lateral margins are more or less perpendicular to the hinge margin. They pass gradually to the gently convex anterior margin. The ventral valve is of medium convexity; the maximum convexity is located near the mid-length. The beak is suberect and pointed; it is truncated by a small, epithyrid foramen. The beak ridges are sharp; the interarea is moderately wide, and low. The symphytium is not visible. The dorsal valve is rather deeply concave in the posteromedian part and becomes nearly flat at the posterolateral portions. The ventral interarea is not discernible. The lateral commissures are nearly straight. The anterior commissure shows a wide, very shallow sinus. The surface of the shell is completely smooth.

Internal characters (Fig. 61): *Ventral valve*: The umbonal cavity is subcircular in cross section. The hinge teeth are massive and penetrate deeply into the sockets. Secondary, laterally elongated teeth-like buttresses reinforce the articulation.

Dorsal valve: There is a low and short median myophore. The outer socket ridges are low; the inner socket ridges are well-developed. The crural bases grow horizontally from the inner margins of the inner socket ridges then they become convergent medially. The distal part of the crura and the brachidium are broken away.

Remarks:

Bittner (l. c.) regarded this species as belonging to *Koninckella*, but his figures seem to contradict this view: the long hinge margin and the moderate convexity support the attribution of this species to *Koninckodonta*. One of the Bakony specimens (pl. XI, fig. 24) shows close similarity to that figured by Bittner (l. c.), the other two represent slightly more expanded and elongated variants, respectively. *K. fornicata* (Canavari, 1883) differs from *K. waehneri* by its much more incurved beak.

Distribution:

Early Jurassic (Pliensbachian to Toarcian ?) of the Central Apennines (Italy), the Northern Calcareous Alps (Austria) and the Bakony (Hungary). The Bakony specimens came from four localities from the Late Pliensbachian (Margaritatus Zone) (Tables 13, 14).

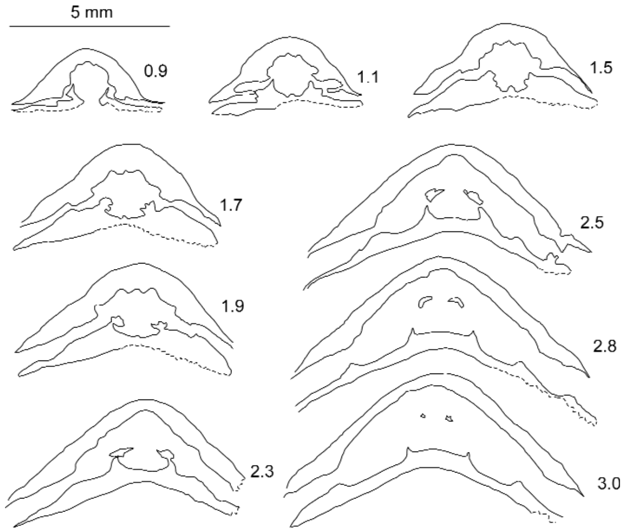


Figure 61. *Koninckodonta* cf. *waehneri* (Bittner, 1894). Nine transverse serial sections through the posterior part of a specimen from Fenyveskút, scree, Pliensbachian, Margaritatus Zone. M 2008.120.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 12.0 mm. The spiralia were broken away

Koninckodonta fuggeri Bittner, 1894
Plate XI: 21, 22; Figure 62.

* 1894 *Koninckina* (*Koninckodonta* nov. subgen.) *Fuggeri* nov. spec. – Bittner, Neue Koninckiniden des alpinen Lias, p. 137, pl. IV, figs. 4–9.

v 1898 *Koninckodonta Fuggeri* Bittner. – Böse, Brachiopodenfauna der östlichen Nordalpen, p. 223, fig. 9.

v 1983 *Koninckodonta fuggeri* Bittner, 1893 – Vörös, Stratigraphic distribution, p. 34.

1993 *„Koninckodonta" fuggeri* (Bittner) – Mance□ido, Early Jurassic brachiopods from Greece, p. 87, pl. I, fig. 7.

v 2007 *Koninckodonta fuggeri* Bittner, 1894 – Vörös & Dulai, Transdanubian Range, p. 55.

Material: 122 specimens, mostly incomplete double valves.

Localities	*Measurements (mm)*		
	L	*W*	*T*
Fenyveskút p2	12.5	15.7	?
	10.5	12.7	?
Fenyveskút É	11.2	13.5	?
	13.6	17.0	?
	13.3	17.0	?
Eplény	10.6	12.5	?
	10.0	12.7	?
	10.4	12.5	?
	11.6	15.1	?
	10.1	11.5	?
	12.1	14.1	5.1

Description:

External characters: Medium-sized *Koninckodonta* with rounded subquadrate to laterally elongated oval outline. The hinge margin is straight and occupies about the half of the width of the shell. The convex lateral margins join the hinge margin with a very obtuse angle; they form an almost continuous elliptical curve with the convex anterior margin. The maximum width can be measured at about the anterior one-third of the length. The ventral valve is of medium convexity; the maximum convexity is attained near the mid-length. The beak is suberect and pointed; it is truncated by a small, epithyrid foramen. The beak ridges are sharp; the interarea is rather wide, and moderately high. The narrow triangular symphytium is moderately convex. The dorsal valve is rather deeply and uniformly concave. The ventral interarea is covered by matrix. The lateral

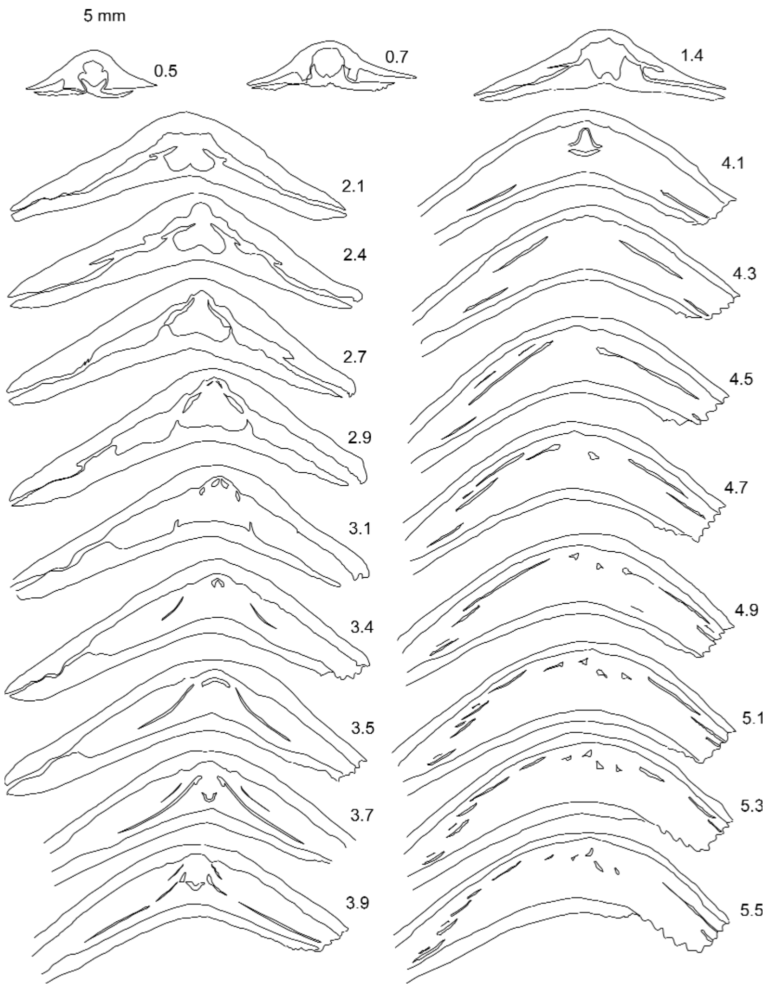


***Figure 62**. Koninckodonta fuggeri* BITTNER, 1894. Twenty transverse serial sections through a specimen from Eplény, Pliensbachian, Margaritatus(?) Zone. M 2008.119.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 12.0 mm

commissures are nearly straight. The anterior commissure shows a wide, shallow sinus. The surface of the shell is completely smooth.

Internal characters: (Fig. 62): *Ventral valve*: The umbonal cavity is subcircular in cross section. The hinge teeth are massive and penetrate deeply into the sockets. Secondary, laterally elongated teeth-like buttresses reinforce the articulation. *Dorsal valve*: The posterior termination is bilobed. There is a low and short median myophore. The inner socket ridges are well-developed. The crural bases grow subhorizontally from the inner socket ridges, then become convergent ventrally. The crura are thin, rod-like. The jugum has a rather long, narrowly bifurcate posterior extension, almost touching the ventral valve. Anteriorly it becomes flat and massive, then bifurcates again and gives rise to the primary spiral lamellae. The primary lamellae are closely followed by much thinner, ventral, accessory lamellae. The jugum bears another, dorsal, U-shaped extension which forms a tube-like structure together with the ventral part of the jugum. The long arms of the first volutions of the spiralia diverge from the jugum and reach the outermost part of the mantle cavity. The outer parts of the double volutions can be well seen, especially on the left side. The double spiralia consist of at least five volutions. The dorsal, primary lamellae and the narrower, accessory lamellae run parallel.

Remarks:

K. fuggeri is the designated type species of *Koninckodonta* and portrays most of the general characters of the genus. Some other species of *Koninckodonta*, e. g. *K. fornicata* (CANAVARI, 1883), *K. aquoniae* (PARONA, 1893), *K. intermedia* (CATERINI, 1919), stand also close to this "mean morphotype". Previously (VÖRÖS 2003) I suggested to lump together these morphologically rather similar forms under the first published name *K. fornicata*. But, in the course of the present work, I found some features of *K. fuggeri* (less convexity, less incurved beak, much lower inner socket ridges, less distinct median myophore, parallel lamellae of the spiralia) which separate it from *K. fornicata*. Another similar species, *K. waehneri* (BITTNER, 1894) differs from *K. fuggeri* by its longer hinge margin, and less expanded outline.

Distribution:

Pliensbachian of the Northern Calcareous Alps (Austria), Corfu (Greece) and the Bakony (Hungary). The Pliensbachian specimens of the Bakony came from three localities, from the Ibex and Margaritatus Zones (Tables 13, 14).

Koninckodonta eberhardi (BITTNER, 1888)
Plate XI: 23.

* 1888 *Koninckina Eberhardi* Bittn. – BITTNER, Ueber Koninckiniden des alpinen Lias, p. 284, pl. XIV, figs. 1–5.
1893 *Koninckina*, cfr. *Eberhardi,* Bittn. – PARONA, Revisione Gozzano, p. 20, pl. I, fig. 8.
1894 *Koninckina Eberhardi* Bittn. – BITTNER, Neue Koninckiniden des alpinen Lias, p. 135, pl. IV, figs. 1, 2.
v 1911 *Koninckina Eberhardi,* Bittn. – DE TONI, Vedana (Belluno), p. 28, pl. I, fig. 11.
? 1919 *Koninckina Eberhardi* (?) Bittn. – CATERINI, Nuove forme koninckinidi del Lias, p. 160, pl. IV, figs. 5, 6.
v 1983 *Koninckodonta* n. sp., aff. *fuggeri* Bittner, 1893 – VÖRÖS, Stratigraphic distribution, p. 34.
v 2007 *Koninckodonta* aff. *fuggeri* Bittner, 1894 – VÖRÖS & DULAI, Transdanubian Range, p. 55.

Material: Three double valves of various state of preservation.

Localities	*Measurements (mm)*		
	L	*W*	*T*
Eplény	9.7	10.3	10.7
	11.5	14.8	4.2

Description:

External characters: Medium-sized *Koninckodonta* with laterally elongated oval outline. The hinge margin is straight and occupies about one third of the width of the shell. The posterior part of the lateral margins are nearly straight to gently concave; they join the hinge margin with a very obtuse angle. The rest of the lateral margins are uniformly convex and pass gradually to the slightly convex, almost straight anterior margin. The maximum width can be measured at about the middle of the length. The ventral valve is weakly convex; the maximum convexity is attained near the mid-length. The beak is suberect and pointed; it is truncated by a small, epithyrid foramen. The beak ridges are sharp; the interarea is rather narrow, and moderately high. The narrow triangular symphytium is moderately convex. The central, major portion of the dorsal valve is rather deeply concave, while it is flattened posterolaterally. These two narrow triangular segments are connected to the hinge margin and are well demarcated from the central portion. The ventral interarea is covered by matrix. The lateral commissures are gently sinuous. The anterior commissure bears a well-developed, wide, shallow sinus. The surface of the shell is completely smooth.

Internal characters: These were not studied by serial sectioning because of the paucity of the material.

Remarks:

K. eberhardi was one of the earliest described Alpine species of koninckinids by Bittner (1888). In his subsequent work, Bittner (1894), although only in the plate explanation, tentatively attributed *eberhardi* to his newly introduced subgenus *Koninckodonta*, and this was widely accepted later. In this paper Bittner (1894, l. c.) illustrated *K. eberhardi* much better than in the original description, particularly as far as the details of the hinge margin are concerned. One of the figures by Bittner (l. c., pl. IV, fig. 2) is especially informative and shows the narrow and relatively high interarea and the flattened posterolateral triangles of the dorsal valve. On the basis of these features, the Bakony specimens were identified with *K. eberhardi* and separated from the closely related *K. fuggeri* (Bittner, 1894). By the same criteria, the specimens figured by Parona (l. c.) and De Toni (l. c.) (the latter record confirmed personally in the collection of the Padova University) seem to belong to *K. eberhardi*.

Distribution:

Pliensbachian of the Central Apennines and the Southern Alps (Italy), the Northern Calcareous Alps (Austria) and the Bakony Mts (Hungary). The Bakony specimens came from one locality from the Upper Pliensbachian Margaritatus Zone(?) (Tables 13, 14).

Order Spiriferinida Ivanova, 1972
Suborder Spiriferinidina Ivanova, 1972
Superfamily Pennospiriferinoidea Dagys, 1972
Family Lepismatinidae Xu & Liu, 1983
Subfamily Dispiriferininae Carter, 1994

Genus *Dispiriferina* Siblík, 1965

Dispiriferina cf. *segregata* (Di Stefano, 1887)
Plate XII: 1.

v * 1887 *Spiriferina segregata* Di-Stef. – Di Stefano, Lias inferiore di Taormina, p. 44, pl. I, fig. 18.
v 1891 *Spiriferina segregata* Di-Stef. – Di Stefano, M. San Giuliano, p. 173, pl. I, figs. 8–12.
1911 *Spiriferina Haueri* Sss. m. f. *segregata* di Stef. – Hahn, Achensee-gegend, p. 539, pl. 20, fig. 1.
? 1930 *Spiriferina segregata* Di Stef. – De Gregorio, M. San Giuliano, p. 43, pl. XII, figs. 7–22; pl. XIII, fig. 1.
? 1934 *Spiriferina taurica* n. sp. – Moisseiev, Jur. Brach. Crimea and Caucasus, p. 31, 176, pl. II, figs. 10–13.
? 1935 *Spir. Tessoni* David. – Jiménez de Cisneros, Cerro de la Cruz, p. 24, pl. I, fig. 7.
? 1935 *Spir. Torbolensis* Tausch. – Jiménez de Cisneros, Cerro de la Cruz, p. 25, pl. I, fig. 5.
v 1983 *Spiriferina* cf. *segregata* Di Stefano, 1887 – Vörös, Stratigraphic distribution, p. 35.
? 1990 *Spiriferina* cf. *oxyptera* (Buvignier, 1842) – Tchoumatchenco, Kotel II., p. 6 (partim), pl. II, fig. 7 (non pl. I, fig. 3, pl. II, fig. 6).
v 1992 *Dispiriferina segregata* (Di Stefano, 1886) – Dulai, Lókút Hill, p. 64, text-fig. 32, pl. III, fig. 6.
v 2003 *Dispiriferina segregata* (Di Stefano, 1886) – Dulai, Hettangian and Early Sinemurian, p. 67, pl. XI, figs. 8–10.
v 2007 *Dispiriferina* cf. *segregata* (Di Stefano, 1887) – Vörös & Dulai, Transdanubian Range, p. 55.
2008 *Spiriferina segregata* Di Stefano, 1887 – Baeza-Carratalá, Patrimonio J. de Cisneros, p. 349, pl. XXIX, figs. 2, 3.

Material: Two incomplete dorsal valves.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kőris-hegy B/5	4.46	6.96	?	?

Description:

External characters: Very small specimen for the genus *Dispiriferina*. The isolated dorsal valve is incomplete, therefore the entire outline is not seen, but it is wider than long. The hinge margin is straight. The umbo emerges above the hinge margin. The valve is moderately convex and bears a rather wide dorsal fold. The valve is multicostate throughout; from the nine ribs, three fall to the fold. Bifurcation of the ribs occur occasionally.

Internal characters: These were not studied because of the paucity of the material (isolated dorsal valves).

Remarks:

The original type specimens of *D. segregata* were inspected in the collections of the Palermo University, and the identification of the Bakony specimens, even though they are incomplete, is confirmed.

D. segregata stands morphologically very close to *D. davidsoni*, the type species of the genus *Dispiriferina*, but differs in its constantly and diagnostically smaller size and its relatively coarse ribbing. Even SIBLÍK (1965), when erected the genus *Dispiriferina*, kept *D. segregata* as a separate species.

The specimens figured by HAHN (l. c.) and MOISSEIEV (l. c.) seem to belong to *D. segregata*. MOISSEIEV wrote that his new species *taurica* differed from *segregata* by the feature that the ribs did not cover the whole surface, but this is regarded here as a very vague character and even the figures (MOISSEIEV, l. c.) do not seem to support that difference.

DE GREGORIO (l. c.) figured a series of specimens attributed to *D. segregata*, but the poor quality of the illustration makes their identification doubtful.

Two specimens figured by JIMÉNEZ DE CISNEROS (l. c.), named as "*Tessoni*" and "*Torbolensis*", respectively, are tentatively identified with *D. segregata*, because their ribbing is apparently very similar to our species. They were synonymized with *segregata* also by BAEZA-CARRATALÁ (2008, p. 349).

One of the specimens figured by TCHOUMATCHENCO (l. c.) as *D. oxyptera* (BUVIGNIER, 1842), seems to be different from that species, characterized by extremely alate shell, with extended and pointed wings, and probably belongs to *D. segregata* of stout shape and subrounded outline.

BAEZA-CARRATALÁ (l. c.) gave good illustration of this species, but he attributed *segregata* to the genus *Spiriferina* on the basis of internal morphology, especially by the presence of a dorsal median septum in his specimens. He provided nice cross sections shown in cellulose acetate peels, where a clear, but very low dorsal median crest is seen. This kind of structure can be interpreted either as a low septum or as a myophragm. In the present case, the latter interpretation seems to be more plausible, because ROUSSELLE (1977, p. 161), in the redefinition of the genus *Dispiriferina*, also mentioned that many of the dissolved shells possessed a low dorsal ridge. In my opinion, the presence of this low dorsal septum or ridge seems to be an occasional feature which may easily be overlooked during sectioning the specimens, therefore I do not attach great importance to this feature in the generic attribution. On the other hand, I regard the external morphology, namely the presence of ribs in the sulcus and fold of *Dispiriferina*, as diagnostic character of this genus, and keep the species *segregata* in the genus *Dispiriferina*.

Distribution:

Sinemurian and Pliensbachian of Sicily (Italy), the Northern Calcareous Alps (Germany), the Betic Cordilleras (Spain) and the Bakony (Hungary), and probably in the Pliensbachian of the Balkan Mountains (Bulgaria) and the Crimean Mountains (Ukraine). The Bakony specimens came from the Kőris-hegy A locality from the Upper Pliensbachian (Tables 13, 14).

Superfamily Spiriferinoidea DAVIDSON, 1884
Family Spiriferinidae DAVIDSON, 1884
Subfamily Spiriferininae DAVIDSON, 1884

Genus *Liospiriferina* ROUSSELLE, 1977

Liospiriferina alpina (OPPEL, 1861)
Plate XII: 2.

* 1861 *Spiriferina alpina* Opp. – OPPEL, Brachiopoden des unteren Lias, p. 541, pl. XI, fig. 5.
1879 *Spiriferina alpina* Oppel. – NEUMAYR, Nordalpen, p. 9, pl. I, fig. 4.
1883 *Spiriferina alpina* Opp. – CANAVARI, Strati a Terebratula Aspasia III, p. 78, pl. IX, fig. 3.

1883 *Spiriferina undata* n. f. – CANAVARI, Strati a Terebratula Aspasia III, p. 80, pl. IX, fig. 4.
1885 *Spiriferina alpina,* Oppel, 1861. – HAAS, Alpes Vaudoises I, p. 27, pl. II, figs. 8–10.
v 1889 *Spiriferina alpina* Opp. – GEYER, Hierlatz, p. 71, pl. VIII, figs. 4–8.
v 1891 *Spiriferina alpina* Opp. – DI STEFANO, M. San Giuliano, p. 153.
1893 *Spiriferina alpina*, Opp. – PARONA, Revisione Gozzano, p. 21, pl. I, fig. 9.
v 1895 *Spiriferina alpina* Opp. – FUCINI, Monte Pisano, p. 156, pl. VI, fig. 10.
v ? 1898 *Spiriferina* nov. sp. innom. aff. *Sp. alpina* Opp. – BÖSE, Brachiopodenfauna der östlichen Nordalpen, p. 219, pl. XVI, fig. 14.
1907 *Spiriferina alpina*, Opp. – DAL PIAZ, Tranze di Sospirolo, p. 11, pl. I, fig. 1.
v 1916 *Spiriferina alpina* Opp. – KULCSÁR, Geol. Beobacht. NW-Karpathen, p. 205.
1923 *Spiriferina alpina* Opp. – JIMÉNEZ DE CISNEROS, Rincón de Egea, p. 40 (partim), pl. VI, fig. 17 (non fig. 18).
1927 *Spiriferina Alpina* Oppel, 1868 – CORROY, Spiriféridés du lias Européen, p. 9, pl. I, figs. 1–4, 5–8.
1934 *Spiriferina alpina* Opp. – MOISSEIEV, Jur. Brach. Crimea and Caucasus, p. 23, 174, pl. I, figs. 1–7.
1943 *Spiriferina alpina* Opp. – VIGH, Gerecse, p. 349, fig. 14.
1951 *Spiriferina* cf. *alpina* Oppel – WANNER & KNIPSCHEER, Ost-Seran (Molukken), p. 19, pl. II, fig. 23.
1951 *Spiriferina alpina* Oppel var. *dettingmeyeri* n. v. – WANNER & KNIPSCHEER, Ost-Seran (Molukken), p. 18, pl. II, figs. 20, 21.
? 1954 *Spiriferina alpina* Oppel – CONTI, Val Solda, p. 194, pl. IX, figs. 5–9.
1960 *Spiriferina alpina* Opp. – FÜLÖP et al., Vértes, p. 17, pl. I, fig. 1.
v 1961 *Spiriferina alpina* Opp. – VIGH, Esquisse géol. Gerecse, p. 577.
1964 *Spiriferina alpina* Oppel – RĂILEANU & IORDAN, Brach. Lias. zona Svinița, p. 10, pl. II, fig. 10.
1964 *Spiriferina alpina* Oppel, 1861 – SIBLÍK, Lias. Brach. Belanské Doliny, p. 158, pl. VII, fig. 2.
1966 *Spiriferina alpina* Oppel, 1861 – SIBLÍK, Ramenon. Kostelec. bradla, p. 143, pl. I, fig. 3.
non 1966 *Spiriferina alpina* Opp. – BIZON et al., Bouleiceras nitescens Cordill. Bétiques, p. 902, pl. XXVIIa, fig. 4.
? 1967 *Spiriferina alpina* Oppel – PREDA, Brachiopod. jur. Roşia, p. 50, pl. III, fig. 3.
1967 *Spiriferina rostrata* Schl. morfotipo *alpina,* – SACCHI VIALLI & CANTALUPPI, Nuovi fossili di Gozzano, p. 90, pl. XIII, fig. 12.
1969 *Spiriferina alpina* Oppel – DELANCE, Brach. lias. Nord-Est del'Espagne, p. 9 (partim), pl. A, fig. 6 (non pl. A, fig. 4).
1971 *Spiriferina alpina* Opp. var. *falloti* Corroy – TURCULEȚ, Jur. eocret. Rarău-Breaza, p. 94, pl. V, fig. 4.
1975 *Spiriferina alpina* Oppel 1861 – COMAS-RENGIFO & GOY, Ribarredonda, p. 315, pl. I, fig. 2.
v 1976 *Spiriferina alpina* Opp. 1861 – VIGH in FÜLÖP, Liassic Brach. Tata, p. 34.
v 1983 *Spiriferina alpina* Oppel, 1861 – VÖRÖS, Stratigraphic distribution, p. 34.
1990 *Spiriferina alpina alpina* Oppel, 1861 – TCHOUMATCHENCO, Brach. jur. Kotel II., p. 6, pl. III, figs. 4–7, pl. IV, figs. 1–5.
1992 *Liospiriferina alpina* (Oppel, 1861) – DULAI, Lókút Hill, p. 55, pl. II, fig. 4.
1993 *Liospiriferina alpina* (Oppel.) – SIBLÍK, Review, p. 130, pl. I, fig. 5.
1993 *Liospiriferina alpina* (Oppel, 1861) – SIBLÍK, Steinplatte, p. 970, pl. 2, fig. 7.
? 1994 *Spiriferina alpina alpina* Oppel – UCHMAN & TCHOUMATCHENCO, Central Western Carpathians, p. 199, pl. I, figs. 3–6.
1994 *Liospiriferina alpina alpina* (Oppel, 1861) – TCHOUMATCHENCO, Ouarsenis, p. 33, pl. I, fig. 6.
1999 *Liospiriferina alpina* (Oppel, 1861) – SULSER, Brachiopoden der Schweiz, p. 125 + fig. (unnumbered).
2000 *Liospiriferina alpina* (Oppel, 1861) – ALMÉRAS & FAURÉ, Pyrénées, p. 212, pl. 23, fig. 1.
v 2003 *Liospiriferina alpina* (Oppel, 1861) – VÖRÖS et al., Schafberg, p. 74, pl. VI, figs. 41–43.
2003 *Liospiriferina alpina* (Oppel, 1861) – DULAI, Hettangian and Early Sinemurian, p. 50, pl. VIII, figs. 4–6.
2003 *Liospiriferina alpina* (Oppel) – SIBLÍK, Hallstatt, p. 69, pl. I, fig. 5.
non 2007 *Liospiriferina alpina* (Oppel, 1861) – ALMÉRAS et al., Algérie occidentale, p. 37, pl. I, fig. 3.
v 2007 *Liospiriferina alpina* (Oppel, 1861) – VÖRÖS & DULAI, Transdanubian Range, p. 54, 55.
2008 *Liospiriferina alpina* (Oppel, 1861) – BAEZA-CARRATALÁ, Patrimonio J. de Cisneros, p. 309, pl. XXIV, figs. 1–3.

Material: 12 specimens, mostly isolated ventral valves; one partly worn double valve.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser 11	22.32	24.12	?	?
	18.42	18.36	?	?
Kericser 14	17.64	19.6	?	?
	17.79	16.73	?	?
Kericser 15	20.76	22.02	?	?
Kericser I/a	21.97	22.99	16.36	1.55
Kericser II/a	17.08	18.66	?	?
Lókút 465	18.6	15.86	?	?

Description:

External characters: This is a medium-sized *Liospiriferina* with rounded, almost circular outline. The hinge margin is straight and wide, exceeding the three-fourth of the width of the shell, but does not protrude from the outline. The apical angle is about 110°. The maximum width is attained at mid-length. The valves are almost equally convex; the maximum convexity lies near the posterior third of the length. The dorsal valve is strongly inflated posteriorly. The ventral umbo is wide and pulled ventrally. The beak rises well above the hinge margin; it is suberect; in some cases its point is slightly incurved. The interarea is wider than high, gently concave, apsacline. The delthyrium is rather narrow and high. The dorsal umbo is well developed. In lateral view, the lateral commissures are nearly straight, very gently sinuous. The anterior commissure is rectimarginate to very slightly sulcate. The surface of the shells is smooth, except some weak growth lines.

Internal characters: These were not studied by serial sectioning because of the paucity of the material (isolated dorsal valves and a single double valve). Some specimens with broken beak reveal slightly divergent dental plates and a ventral median septum.

Remarks:

L. alpina is extremely frequently cited in the literature. Obviously due to its very generalized form and simple morphology, it was recorded in almost innumerable localities, all around the Alpine and Tethyan region, therefore the above synonymy, however vast, is far from being complete. The possibility arises that *L. alpina* is not a homogeneous species but a "dustbin" taxon, but the attempts to introduce a series of subspecies were not convincingly successful in my opinion. GEYER (l. c.) gave a splendid illustration of the range of variability of *L. alpina* and in the present work I consider it a highly variable but uniform species, and regard the use of the subspecies names as superfluous. Following this principle, the species *L. undata* (CANAVARI, 1883) and some forms described as subspecies of *alpina* are included into the list of synonymy.

From among the other species of *Liospiriferina* with basically similar form, *L. apenninica* (CANAVARI, 1880) differs from *L. alpina* in having much lower and shorter beak and very short hinge margin; *L. globosa* (BÖSE, 1898) has a low and erect beak; its dorsal umbo emerges higher than the ventral one. By these criteria, the records by BIZON et al. (l. c.) and DELANCE (l. c., partim) are considered as representatives of *L. globosa*, rather than *L. alpina*. BÖSE (l. c.) described a specimen as "aff. *Sp. alpina*". It was inspected in the Bayerische Staatssammlung (München) and it seemed to stand between *L. globosa* and *L. alpina*, somewhat closer to the latter species, although its interarea was almost orthocline.

The specimen figured by ALMÉRAS et al. (l. c.) portrays very strongly incurved beak and anacline interarea, therefore it may not belong to *L. alpina*.

Some records are queried in the list of synonymy. The figures by CONTI (l. c.), PREDA (l. c.) and UCHMAN & TCHOUMATCHENCO (l. c.) are not informative enough to decide their identity.

Distribution:

Widespread in the Sinemurian and Pliensbachian of the peri-Tethyan belt, from Spain through Crimea to Indonesia. The Bakony specimens came from five localities, from the Davoei and Margaritatus Zones (Tables 13, 14).

Liospiriferina cf. *brevirostris* (OPPEL, 1861)
Plate XII: 3.

* 1861 *Spiriferina brevirostris* Opp. – OPPEL, Brachiopoden des unteren Lias, p. 541, pl. XI, fig. 6.
v 1889 *Spiriferina brevirostris* Opp. – GEYER, Hierlatz, p. 73 (partim), pl. VIII, figs. 9, 10,12 (non fig. 11).
v non 1895 *Spiriferina brevirostris* Opp. – FUCINI, Monte Pisano, p. 154, pl. VI, fig. 5.
v 1976 *Spiriferina brevirostris* Opp. 1861 – VIGH in FÜLÖP, Liassic Brach. Tata, p. 34.
v 1983 *Spiriferina* cf. *brevirostris* Oppel, 1861 – VÖRÖS, Stratigraphic distribution, p. 34.
? 1992 *Liospiriferina* cf. *brevirostris* (Oppel, 1861) – DULAI, Lókút, p. 62, text-fig. 20, pl. III, fig. 5.
v 2003 *Liospiriferina brevirostris* (Oppel, 1861) – VÖRÖS et al., Schafberg, p. 74, pl. VI, figs. 4–6.
? 2003 *Liospiriferina brevirostris* (Oppel, 1861) – DULAI, Hettangian and Early Sinemurian, p. 55, pl. IX, figs. 1–3.
2003 *Liospiriferina brevirostris* (Oppel) – SIBLÍK, Hallstatt, p. 69, pl. I, fig. 11.
2007 *Liospiriferina brevirostris* (Oppel, 1861) – ALMÉRAS et al., Algérie occidentale, p. 37, pl. I, fig. 5.
v 2007 *Liospiriferina brevirostris* (Oppel, 1861) – VÖRÖS & DULAI, Transdanubian Range, p. 54, 55.

Material: One well-preserved double valve.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser 7	10.04	8.67	5.58	0

Description:

External characters: This is a small *Liospiriferina* with drop-shaped, oval outline. The hinge margin is straight and moderately long, attains about the half of the width of the shell, and does not protrude from the outline. The posterior part of the lateral margins is somewhat concave, therefore the apical angle can not be measured exactly, but it seems to be around 80°. The maximum width is attained at around the mid-length. The maximum convexity lies in the anterior third of the length. The ventral valve is strongly and uniformly convex, while the dorsal valve is almost flat. The ventral umbo is rather narrow and follows the strong curvature of the valve. The beak is strongly incurved; its point leans close to the hinge margin and is almost in touch with the dorsal valve. The interarea is wider than high, strongly concave, anacline. The delthyrium is covered by matrix. The dorsal umbo can not be seen properly. In lateral view, the lateral commissures are sinuous. The anterior commissure is widely and gently sulcate. The surface of the shells is almost smooth, except a weak radial capillation on the dorsal valve.

Internal characters: These were not studied by serial sectioning because of the paucity of the material (a single double valve).

Remarks:

L. brevirostris is very characteristic by its strongly incurved ventral umbo and beak and the almost flat dorsal valve. The curvature of the beak reaches or even goes below the hinge line. The only similar Early Jurassic spiriferinid species is *L. gryphoidea* (Uhlig, 1880) which is, however, significantly larger, its ventral umbo is much higher, and its strongly incurved beak stands well above the hinge line. Applying this distinction, I regard some of the records of *L. brevirostris* by Geyer (l. c., partim) and Fucini (l. c.) as belonging probably to *L. gryphoidea*.

The beak of the specimen figured by Dulai (1992, 2003, l. c.) is broken off, therefore the degree of its curvature can not be estimated; moreover, the specimen shows weak multiplication at its anterior margin. Consequently, its attribution to *L. brevirostris* is very doubtful.

Distribution:

Sinemurian and Pliensbachian of the Central Apennines (Italy), the Northern Calcareous Alps (Austria), the Gerecse and Bakony Mts (Hungary), and the Atlas Mountains (Algeria). The Pliensbachian specimens of the Bakony came from Kericser, from the Margaritatus Zone (Tables 13, 14).

Liospiriferina obtusa (Oppel, 1861)

Plate XIII: 1.

- * 1861 *Sp. obtusa* – Oppel, Brachiopoden des unteren Lias, p. 542, pl. XI, fig. 8.
- 1880 *Spiriferina obtusa* Oppel. – Uhlig, Sospirolo, p. 13, pl. I, fig. 5.
- 1880 *Spiriferina obtusa* Opp. – Canavari, Strati a Terebratula Aspasia I, p. 335, pl. III, fig. 9.
- v 1889 *Spiriferina obtusa* Opp. – Geyer, Hierlatz, p. 75 (partim), pl. VIII, figs. 13, 14 (non fig. 15), pl. IX, figs. 2–5 (non fig. 1).
- ? 1893 *Spiriferina obtusa*, Opp. – Parona, Revisione Gozzano, p. 23, pl. I, fig. 12.
- v 1895 *Spiriferina obtusa* Opp. – Fucini, Monte Pisano, p. 151, pl. VI, figs. 8, 9.
- 1900 *Spiriferina* cfr. *angulata* Opp. – Böse & Schlosser, Südtirol, p. 199, pl. XVIII, figs. 20, 23, 25.
- 1910 *Spiriferina angulata* Opp. – Vinassa de Regny, Prealpi dell'Arzino, p. 187, pl. VII, figs. 15, 16.
- v 1915 *Spiriferina obtusa* Opp. – Vadász, Persány, p. 268.
- ? 1920 *Spiriferina angulata* Oppel var. *obtusa* Oppel – Dareste de la Chavanne, Guelma, p. 47, pl. III, fig. 14.
- ? non 1923 *Spiriferina obtusa* Opp. – Jiménez de Cisneros, Rincón de Egea, p. 41, pl. VI, figs. 19, 20.
- ? 1930 *Spiriferina sicula* Gemm. – De Gregorio, M. San Giuliano, p. 44, pl. XIII, figs. 22, 23.
- 1934 *Spiriferina obtusa* Opp. – Moisseiev, Jur. Brach. Crimea and Caucasus, p. 25, 175, pl. I, figs. 16–22.
- ? 1934 *Spiriferina angulata* Opp. – Moisseiev, Jur. Brach. Crimea and Caucasus, p. 26, 175, pl. I, figs. 23–25.
- ? 1943 *Spiriferina obtusa* Opp. – Vigh, Gerecse, p. 351, pl. III, figs. 33–35.
- ? 1958 *Spiriferina obtusa* Oppel – Mahel, Stratenská Hornatina, p. 160, pl. 8, figs. 6–10.
- 1967 *Spiriferina obtusa* Opp. sensu Geyer – Sacchi Vialli & Cantaluppi, Nuovi fossili di Gozzano, p. 89, pl. XIII, fig. 8.
- ? 1975 *Spiriferina obtusa* Oppel – Bujnovský, Jura Nízkych Tatier, p. 75, pl. XV, figs. 3, 4.
- v 1983 *Spiriferina* cf. *obtusa* Oppel, 1861 – Vörös, Stratigraphic distribution, p. 34.
- v 1987 *L.* cf. *obtusa* (Opp.) – Vörös et al., Panormide, p. 245.
- 1988 *Liospiriferina obtusa* (Oppel, 1861) – Iñesta, Cerro de la Cruz, p. 55, pl. I, fig. 2.
- v 1992 *Liospiriferina obtusa* (Oppel, 1861) – Dulai, Lókút Hill, p. 56, text-fig. 14, pl. II, fig. 5.
- v 1992 *Liospiriferina* aff. *obtusa* (Oppel, 1861) – Dulai, Lókút Hill, p. 57, text-fig. 15, pl. II, fig. 6.
- 1993 *Liospiriferina obtusa* (Oppel.) – Siblík, Review, p. 130, pl. II, fig. 5.
- 1993 *Liospiriferina obtusa* (Oppel, 1861) – Siblík, Steinplatte, p. 971, pl. 2, fig. 6.
- 1999 *Liospiriferina obtusa* (Oppel, 1861) – Iñesta, Catálogo de braquiópodos, p. 21, pl. IV, fig. 4.
- 2000 *Liospiriferina angulata* (Oppel, 1861) – Alméras & Fauré, Pyrénées, p. 214, pl. 23, figs. 2, 3.
- v 2003 *Liospiriferina obtusa* (Oppel, 1861) – Vörös et al., Schafberg, p. 74, pl. VII, figs. 14–17.
- v 2003 *Liospiriferina obtusa* (Oppel, 1861) – Dulai, Hettangian and Early Sinemurian, p. 60, pl. X, figs. 1–3.
- v 2003 *Liospiriferina* aff. *obtusa* 1. (Oppel, 1861) – Dulai, Hettangian and Early Sinemurian, p. 62, pl. X, figs. 4–7.
- 2006 *Cisnerospira angulata* (Oppel) – Comas-Rengifo et al., Spiriferinida del Jurásico Inferior, p. 153, fig. 4-4.
- v 2007 *Liospiriferina obtusa* (Oppel, 1861) – Vörös & Dulai, Transdanubian Range, p. 54, pl. I, figs. 24, 25.
- 2008 *Liospiriferina obtusa* (Oppel, 1861) – Baeza-Carratalá, Patrimonio J. de Cisneros, p. 330 (partim), pl. XXV, figs. 1, 2 (non figs. 3, 4).

Material: One well-preserved double valve.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Fenyveskút (scree)	12.92	15.06	10.47	4.97

Description:

External characters: This is a medium-sized *Liospiriferina* with transversely elongated, rounded subpentagonal outline. The hinge margin is straight and wide, its length is less than the two-third of the width of the shell, and does not protrude from the outline. The surface of the ventral umbo is concave, therefore an apical angle can not be measured. The maximum width is attained at mid-length. Both valves are convex; their maximum convexity lies posteriorly. The ventral valve is rather conical, almost subpyramidal; its umbo is pulled in ventral direction, far from the hinge margin. The beak does not rise much above the hinge margin; it is erect. The interarea is nearly as wide as high, gently concave, apsacline. The delthyrium is rather narrow and high. The dorsal umbo is moderately developed. In lateral view, the lateral commissures are nearly straight, very gently sinuous and run diagonally in ventral direction, where they pass gradually to the anterior commissure, forming a continuous curve. The anterior commissure is rather highly uniplicate showing an unbroken arch which tends to be slightly pointed in its medial part. The valves are smooth, except some weak growth lines.

Internal characters: These were not studied by serial sectioning because of the paucity of the material (a single double valve).

Remarks:

The species name *L. obtusa* was introduced by OPPEL (l. c.) within the description of "*Spiriferina angulata*" and this resulted in a great deal of confusion in the subsequent palaeontological studies (see the respective items of the above synonymy). OPPEL (l. c.) remarked that *obtusa* is smaller than and perhaps may pass to *angulata* but at the same time he gave good figures which portrayed the significant morphological difference between the two forms. Later, GEYER (l. c.), based on a profuse material from the Hierlatz limestones, clearly demonstrated the difference between the two species, what I would summarize in current terms as follows: *angulata* has a distinctive, pyramidal ventral valve with wide and sharply delimited, catacline to procline interarea and a long and deep ventral sulcus, whereas *obtusa* is a more "ordinary looking", more or less biconvex spiriferinid, with incurved ventral umbo and apsacline interarea and rather shallow and less delimited ventral sulcus. This marked difference is expressed also by the recent generic attribution of the two species: *angulata* is a typical representative of the genus *Cisnerospira* MANCEÑIDO, 2004, whereas *obtusa* belongs to *Liospiriferina* (MANCEÑIDO 2004, BAEZA-CARRATALÁ 2008).

Another species, often confused with *L. obtusa*, is *L. sicula* (GEMMELLARO, 1874). Here again, the primary cause of the misunderstanding was the incomplete original documentation of the species. GEMMELLARO (1874, pl. X, fig. 5) illustrated only a poorly preserved ventral valve, and the proper documentation of *L. sicula* was given only later by DI STEFANO (1891). I had the possibility to study the originals in the collection of the Palermo University and I reached to the following opinion. *L. obtusa* and *L. sicula* stand morphologically rather close as typical representatives of the genus *Liospiriferina*. MANCEÑIDO (1993, p. 88) even suggested to give *sicula* a subspecies rank within *obtusa* ("*S. obtusa sicula* GEMM."), but here I treat them as separate species. Their general constitution is variable but basically similar, though *L. obtusa* is usually somewhat wider and has slightly deeper ventral sulcus, despite, its anterior commissure has usually lower dorsal plica. The most important difference is in the form of the ventral valve: in *sicula* the beak is strongly incurved, the interarea is barely seen, and the distance between the point of the beak and the hinge margin is less than half of the thickness of the ventral valve; in *obtusa* the interarea is open and high and the beak lies in a significant distance from the hinge margin. Applying these principles, some of the specimens figured as *L. obtusa* by GEYER (l. c.) and BAEZA-CARRATALÁ (l. c.) are regarded here as *L. sicula*. The same holds probably true for the record by J. DE CISNEROS (l. c.). On the other hand, as it can be decided from the poor illustrations, DE GREGORIO's (l. c.) specimens, figured as *L. sicula*, may belong rather to *L. obtusa*.

The specimen listed without documentation by VADÁSZ (l. c.) was retrieved in the old collection of the Geological Institute of Hungary; it shows the important characters of *L. obtusa*. It seems extremely globose, but this is probably due to the preservation: the double valve was embedded with somewhat gaping valves. The specimens, illustrated by VIGH (l. c.) do not show convincingly the main characters of *L. obtusa*, therefore their identification is questionable. This regards also to the records by MAHEL (l. c.) and BUJNOVSKÝ (l. c.) where the figures are not informative enough.

DULAI (1992, 2003, l. c.) introduced, with open nomenclature, a new species closely related to *L. obtusa* ("aff. *obtusa* 1."). Further data probably will endorse the independence of this species, but, taken into account the presently available documentation, this form seems to be fit into the wide range of variation of *L. obtusa*.

Distribution:

Sinemurian and Pliensbachian of the Central Apennines and the Southern Alps (Italy), the Northern Calcareous Alps (Austria), the Gerecse and Bakony Mts (Hungary), the Inner West Carpathians (Slovakia), the Pyrenees (France), the Iberian Cordilleras and the Betic Cordilleras (Spain), the Atlas Mountains (Algeria) and the Crimean Mountains (Ukraine). The Pliensbachian specimen of the Bakony came from Fenyveskút, from the Margaritatus Zone (Tables 13, 14).

Liospiriferina sicula (GEMMELLARO, 1874)
Plate XIII: 2–4; Figure 63.

v * 1874 *Spiriferina Sicula,* Gemm. – GEMMELLARO, Zona con Terebratula Aspasia, p. 55, pl. X, fig. 5.
v ? 1886 *Sp. sicula* Gemmellaro 1874 – ROTHPLETZ, Vilser-Alpen, p. 161, pl. XIII, figs. 7, 8.
1886 *S. undulata* Seg. – SEGUENZA, Spiriferina Lias messinese, p. 466, pl. XXI, fig. 2.
v 1889 *Spiriferina obtusa* Opp. – GEYER, Hierlatz, p. 75 (partim), pl. VIII, fig. 15 (non figs. 13, 14), pl. IX, fig. 1 (non figs. 2–5).
? 1890 *Spiriferina Torbolensis* n. f. – TAUSCH, Grauen Kalke Süd-Alpen, p. 10 (partim), pl. IX, fig. 8. (non pl. IX, figs 9, 10).
v 1891 *Spiriferina sicula* Gemm. – DI STEFANO, M. San Giuliano, p. 159 (partim), pl. I, figs. 1, 2 (non fig. 3)
? 1911 *Spiriferina sicula* Gem. var. *undulata* Seg. – HAHN, Achensee-gegend, p. 545, pl. XX, fig. 4.
? 1923 *Spiriferina obtusa* Opp. – JIMÉNEZ DE CISNEROS, Rincón de Egea, p. 41, pl. VI, figs. 19, 20.
non 1930 *Spiriferina sicula* Gemm. – DE GREGORIO, M. San Giuliano, p. 44, pl. XIII, figs. 22, 23.
1932 *Spiriferina sicula* Gemmellaro var *corfiotica* Renz (nov. var.). – RENZ, Westgriechischen Lias, p. 16, pl. I, figs. 3, 4.
1932 *Spiriferina aviformis* nov. sp. – TSCHANG-YÜN TSCHAU, Spiriferinen im Lias Norddeutschlands, p. 143, pl. 11, figs. 1–3.
v 1939 *Spiriferina sicula* Gemm. – TRICOMI, Cozzo di Cugno, p. 5.
1969 *Spiriferina rostrata* Zieten – DELANCE, Brach. lias. Nord-Est del'Espagne, p. 16, pl. A, fig. 3.
1977 *Liospiriferina undulata* (Seguenza) – ROUSSELLE, Spiriférines du Lias moyen, p. 168, fig. 12, pl. 1, fig. 10.
v 1983 *Spiriferina sicula* Gemmellaro, 1874 – VÖRÖS, Stratigraphic distribution, p. 34.
v 1987 *L. sicula* (Gemm.) – VÖRÖS et al., Panormide, p. 245.
v 1992 *Liospiriferina sicula* (Gemmellaro, 1874) – DULAI, Lókút, p. 59, text-fig. 17, pl. III, fig. 2.
v 1997 *Liospiriferina sicula* (Gemmellaro) – VÖRÖS, Jurassic brachiopods of Hungary, p. 16, Appendix: fig. 19.
v 2003 *Liospiriferina sicula* (Gemmellaro, 1874) – VÖRÖS et al., Schafberg, p. 78, pl. VIII, figs. 26–28.
v 2003 *Liospiriferina sicula* (Gemmellaro, 1874) – DULAI, Hettangian and Early Sinemurian, p. 64, pl. XI, figs. 4–7
v 2007 *Liospiriferina sicula* (Gemmellaro, 1874) – VÖRÖS & DULAI, Transdanubian Range, p. 55, pl. II, fig. 18.
2008 *Liospiriferina obtusa* (Oppel, 1861) – BAEZA-CARRATALÁ, Patrimonio J. de Cisneros, p. 330 (partim), pl. XXV, figs. 3, 4 (non figs. 1, 2).

Material: 85 specimens of various state of preservation, a quarter of them double valves.

Localities	*Measurements*			
	L	*W*	*T*	*Ch*
Kericser 7	12.36	16.23	10.06	5.49
Kericser 12	15.41	18.51	11.99	4.06
Kericser 13	11.59	12.79	8.15	2.93
	14.09	17.66	11.61	4.97
Kericser 19	13.69	16.41	10	3.86
Kericser 22	13.68	17.23	?	?
Kericser 23	20.78	?	16.93	9.32
Kericser 24	14.22	17.22	11.32	6.14
Kericser 25	11.54	13.32	8.86	3.69
	17.48	18.83	13.85	6.98
Kericser 26	13.18	13.68	10.38	5.63
	20.93	23.45	17.3	8.93
Kericser 29	16.95	17.77	13.8	6.48
Kericser 30	18.18	19.95	14.61	7.24
Kericser I/f	19.79	21.03	15.55	7.87
Kericser (scree)	18.49	19.43	13.35	8.95
Fenyveskút 5/c	19.91	21.35	15.19	10.44
	19.94	21.38	13.53	10.23
Közöskút 21	11.99	14.17	9.78	?

Description:

External characters: This is a medium-sized *Liospiriferina* with rounded subpentagonal to subquadrangular outline. The hinge margin is straight and moderately wide, its length attains the half of the width of the shell, and only slightly protrudes from the outline. The surface of the ventral umbo is concave, therefore an apical angle can not be measured. The maximum width is attained in the posterior one-third of the length. The valves are almost equally convex; the maximum convexity is at about mid-length. The dorsal valve is more inflated posteriorly. The ventral umbo is wide and gibbose. The beak rises well above the hinge margin; it is slightly incurved. The interarea is much wider than high, apsacline but strongly concave. The delthyrium is rather narrow and high. The dorsal umbo is well developed. In lateral view, the lateral commissures are gently sinuous and run diagonally in ventral direction, where they pass gradually to the anterior commissure, forming a continuous curve. The anterior commissure is highly uniplicate forming an unbroken arch. The linguiform extension is distinctly protracted anterodorsally. The valves are smooth, except some weak growth lines.

Internal characters (Fig. 63): *Ventral valve*: The umbonal part is circular in cross section. The delthyrial cavity is narrow and high, divided by the ventral median septum. The umbonal cavities have the shape of half-circle. The dental plates are first divergent ventrally, then become subparallel. The teeth are well-developed. The ventral median septum is high and persists nearly to the one-third of the length of the shell. Its anterodorsal end is bifurcate in cross section (possibly interpreted as tichorhinum). *Dorsal valve*: The outer socket ridges are wide. The inner socket ridges are narrow and give rise to slightly convergent, long crural bases. Most part of the crura and the brachidium were missing from this sectioned specimen.

Decades ago, a *L. sicula* specimen, coming from the Ibex Zone, Kericser, Bakony Mts, labelled as *S. obtusa* at that time, was loaned to Mr. Alun Thomas who prepared his Ph. D. thesis at the University of Swansea, U. K. His thesis was never published, but, on my request, he sent me a copy of his drawings of serial sections made from the above specimen. His drawings complement the knowledge on the internal morphology of *L. sicula*. The sections reveal a ventrally arched jugum and a well-developed spiral brachidium with laterally oriented spiralia, bearing five coils, each.

Remarks:

L. sicula is the most frequent spiriferinid species in the Pliensbachian of the Bakony and it is very widespread in the Mediterranean region. In general shape and constitution, it stands very close to *L. obtusa* (OPPEL, 1861). MANCE□IDO (1993, p. 88) even suggested to draw *sicula* into *obtusa* at subspecies rank ("*S. obtusa sicula* GEMM."), but here I keep *sicula* as a

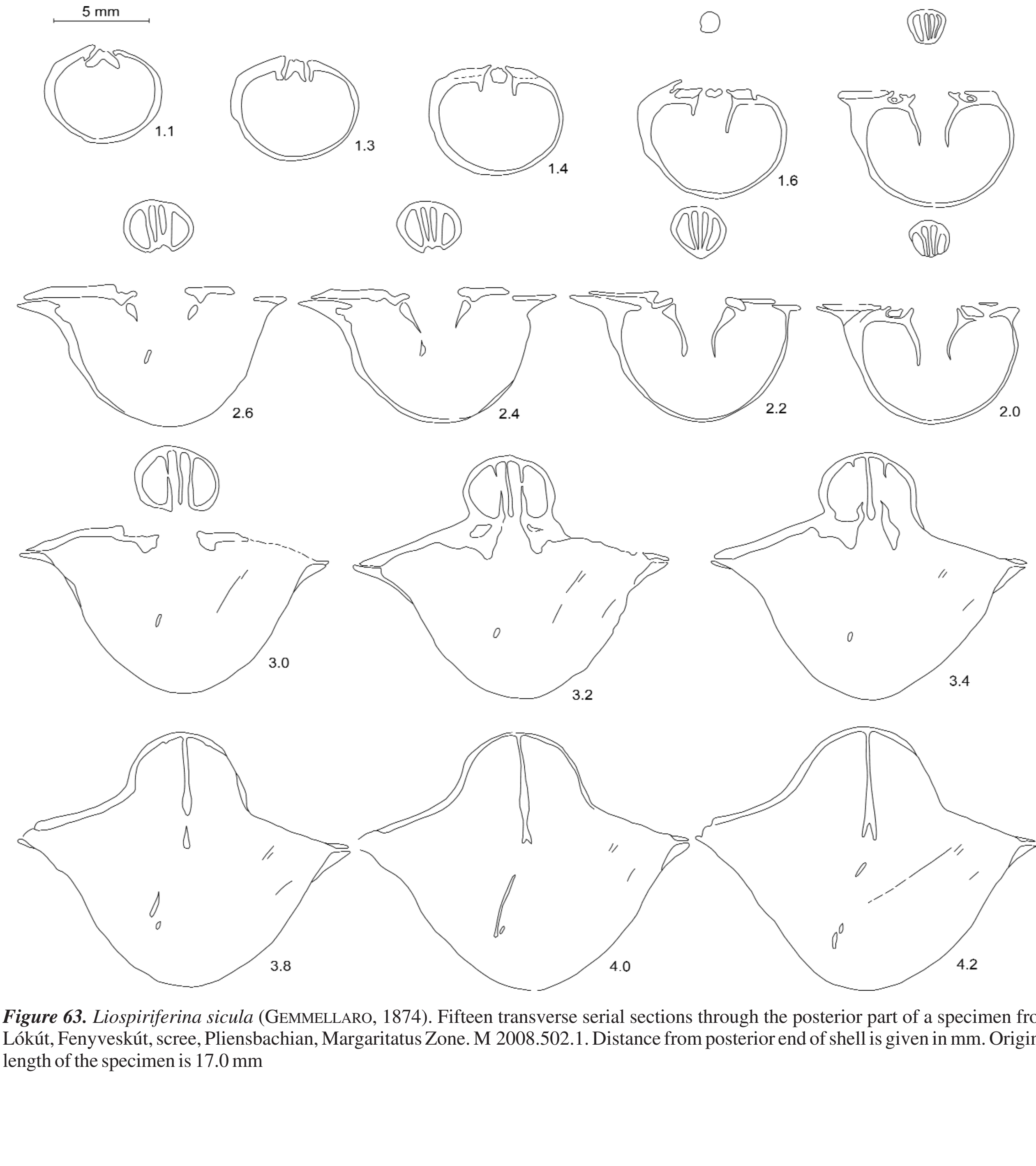


Figure 63. *Liospiriferina sicula* (GEMMELLARO, 1874). Fifteen transverse serial sections through the posterior part of a specimen from Lókút, Fenyveskút, scree, Pliensbachian, Margaritatus Zone. M 2008.502.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 17.0 mm

separate species. *L. obtusa* is usually somewhat wider and has slightly deeper ventral sulcus than *L. sicula*, despite, its anterior commissure has usually lower dorsal plica, whereas in *L. sicula* the linguiform extension is usually very marked. The most important difference between the two forms is in the shape of the ventral valve: in *sicula* the beak is strongly incurved, the interarea is barely seen, and the distance between the point of the beak and the hinge margin is less than half of the thickness of the ventral valve; in *obtusa* the interarea is open and high, and the beak lies in a significant distance from the hinge margin. On the basis of these principles, some of the specimens figured as *L. obtusa* by GEYER (l. c.) and BAEZA-CARRATALÁ (l. c.) are regarded here as *L. sicula*. The same holds probably true for the record by J. DE CISNEROS (l. c.); moreover, some of the forms introduced as new species by various authors, as TAUSCH (l. c.), SEGUENZA (l. c.) and TSCHANG-YÜN TSCHAU (l. c.) seem to belong also to *L. sicula*. On the other hand, as it can be decided from the poor illustrations, DE GREGORIO's (l. c.) specimens, figured as *L. sicula*, may belong rather to *L. obtusa*.

DELANCE's (l. c.) record of "*S. rostrata*" was qualified as *L. undulata* (SEGUENZA) by ROUSSELLE (1977, p. 168); I agree with this morphological identification but, since I regard *undulata* as synonymous with *sicula*, I put DELANCE's *rostrata* to the above list of synonymy.

The specimens figured by ROTHPLETZ (l. c.) were inspected in the collection of the Bayerische Staatssammlung (München); their outline is laterally elongated so much that their identity with *L. sicula* is rather dubious.

Subsequent to GEMMELLARO's (l. c.) rather poor figures, the first proper documentation of *L. sicula* was given by DI STEFANO (l. c.). I had the possibility to study the originals in the collection of the Palermo University and I was convinced that two of DI STEFANO's figures (l. c., pl. I, figs. 1, 2) portray excellently the typical *L. sicula*, while his fig. 3 shows a dorsal valve with well-visible ribs on the flanks. This was recorded also by RENZ (1932, p. 19) who introduced a new variety ("*sicula* GEMMELLARO var. *Odyssei* RENZ") for this form. However, recently MANCE□IDO (1993, p. 88) re-examined RENZ's holotypes and recognized that the "ribbing" is somehow connected to the internal structure of the shell, and is not visible on the external surface. This may be true for the material from Greece, but as for DI STEFANO's originals, I am still inclined to exclude the ribbed specimen from *L. sicula.*

Distribution:

Sinemurian and Pliensbachian of Sicily, the Central Apennines and the Southern Alps (Italy), the Northern Calcareous Alps (Austria), the Gerecse and Bakony Mts (Hungary), Western Greece, Germany and the Betic Cordilleras (Spain). The Pliensbachian specimens of the Bakony came from four localities, from the Ibex to the Margaritatus Zones. (Tables 13, 14).

Liospiriferina gryphoidea (UHLIG, 1880)
Plate XII: 4–6.

v * 1880 *Spriferina gryphoidea* n. f. – UHLIG, Sospirolo, p. 15, pl. I, figs. 1–3.
? 1883 *Spiriferina* sp. (cfr. *Spir. gryphoidea,* Uhlig.). – PARONA, Appennino centrale, p. 656, pl. III, fig. 20.
v 1889 *Spiriferina brevirostris* Opp. – GEYER, Hierlatz, p. 73 (partim), pl. VIII, fig. 11 (non figs. 9, 10,12).
v ? 1895 *Spiriferina brevirostris* Opp. – FUCINI, Monte Pisano, p. 154, pl. VI, fig. 5.
1900 *Spiriferina gryphoidea* Uhlig. – BÖSE & SCHLOSSER, Südtirol, p. 200 (partim), pl. XVIII, figs. 26, 29 (non fig. 27).
v 1907 *Spiriferina pyriformis,* Seg. – DAL PIAZ, Tranze di Sospirolo, p. 14, pl. I, fig. 3.
1907 *Spiriferina gryphoidea,* Uhl. – DAL PIAZ, Tranze di Sospirolo, p. 16, pl. I, fig. 4.
1909 *Spiriferina gryphoidea,* Uhl. – DAL PIAZ, Sette Comuni, p. 5, pl. [I], fig. 2.
1910 *Spiriferina gryphoidea* Uhl. – VINASSA DE REGNY, Prealpi dell'Arzino, p. 189, pl. VII, figs. 17, 18.
? 1911 *Spiriferina piriformis,* Seg. – DE TONI, Vedana (Belluno), p. 11, pl. I, fig. 2.
? 1932 *Spiriferina gryphoidea* Uhlig var. – RENZ, Westgriechischen Lias, p. 25, pl. I, fig. 2.
? 1951 *Spiriferina gryphoidea* Uhlig var. *niefensis* n. v. – WANNER & KNIPSCHEER, Ost-Seran (Molukken), p. 15, pl. II, fig. 15.
v 1983 *Spiriferina gryphoidea* Uhlig, 1880 – VÖRÖS, Stratigraphic distribution, p. 35.
v ? 2003 *Liospiriferina gryphoidea* (Uhlig, 1879) – VÖRÖS et al., Schafberg, p. 74.
v 2003 *Liospiriferina gryphoidea* (Uhlig, 1879) – DULAI, Hettangian and Early Sinemurian, p. 57, pl. IX, figs. 6–8.
v 2007 *Liospiriferina gryphoidea* (Uhlig, 1879) – VÖRÖS & DULAI, Transdanubian Range, pp. 54, 55, pl. II, fig. 19.
2008 *Liospiriferina gryphoidea* (Uhlig, 1879) – BAEZA-CARRATALÁ, Patrimonio J. de Cisneros, p. 327, pl. XXV, figs. 5–7.

Material: 58 isolated ventral valves of various state of preservation.

Localities	*Measurements (mm)*		
	L	*W*	*T*
Kericser 8	17.97	14.70	?
	40.56	32.88	?
Kericser 15	17.97	16.54	?
Kericser 18	13.82	13.21	?
	28.91	23.76	?

Kericser 20	16.17	15.12	?
	19.06	16.02	?
Kericser 21	20.35	18.14	?
	20.51	16.33	?
Kericser 24	43.39	35.73	?
Kericser 26	16.36	14.99	?
	38.11	26.53	?
	42.20	32.50	?
Kericser 35	38.93	29.56	?
Kericser II/k	16.06	14.78	?
	22.16	17.99	?
Mohoskő 1 m	32.26	24.79	?
Büdöskút 21	35.53	31.23	?
Kávás-hegy A/2	21.40	16.49	?
Kőris-hegy A/1	24.98	19.57	?
Hamuháza 20	14.30	9.91	?
Hamuháza 24	32.88	24.28	?

Description:

External characters: This is a very large-sized *Liospiriferina* with elongated oval outline. The hinge margin is straight and moderately long, attains about the half of the width of the shell, and does not protrude from the outline. The apical angle varies between 70–85°. The maximum width is attained at about the mid-length. The ventral valve is strongly and uniformly convex, its maximum convexity lies at around the mid-length, or shifted a little posteriorly in larger specimens. The ventral umbo is massive and high and follows the strong curvature of the valve. The beak is strongly incurved; its point leans towards the hinge but remains high above the hinge margin. The interarea is nearly as wide as high, strongly concave, apsacline. The delthyrium is rather wide. In lateral view, the lateral commissures are almost straight, gently sinuous. The anterior commissure is rectimarginate. The surface of the shells is almost smooth, except the irregularly spaced growth lines.

Internal characters: These were not studied by serial sectioning because of the absence of double valves. In many cases, the translucent shell or the broken surface of the ventral beak reveal the presence of divergent dental plates and a median septum.

Remarks:

L. gryphoidea is a very characteristic, perhaps the largest, spiriferinid of the Alpine–Mediterranean region. It is rather easy to recognize by its usually very large size and its high and peculiarly incurved beak, resembling a giant parrot's or a gryphon's beak, so aptly reflected by the species name. The only closely similar Early Jurassic spiriferinid species is *L. brevirostris* (Oppel, 1861). *L. gryphoidea* is, however, significantly larger, its ventral umbo is much higher, and its strongly incurved beak stands well above the hinge line. On the basis of these differences, I included some of the records of *L. brevirostris* by Geyer (l. c., partim) and Fucini (l. c.) into the above synonymy.

In the cases of some items of the list of synonymy, the characters of the beak did not convincingly support the attribution to *L. gryphoidea*.

One of the specimens figured by Böse & Schlosser (l. c.) as *gryphoidea* shows subpentagonal outline, moderately incurved beak and uniplicate anterior commissure, therefore it may not belong to this species but probably to *L. obovata* (Principi, 1910).

Dal Piaz (l. c.) figured a specimen as "*Spiriferina pyriformis*" Seguenza what I checked in the collection of the Padova University, and I found that it was morphologically very close to *L. gryphoidea*. On the other hand it looks rather different from "*S. pyriformis*", at least Seguenza's figure (Seguenza 1886, pl. XX, fig. 1) portrays a very globose form with almost circular outline. On the same ground, De Toni's (l. c.) record of "*pyriformis*" is also queried.

The species name *gryphoidea* is often cited with the date of 1879; sometimes I also made this mistake. In fact, Uhlig's work appeared in the transactions of the Academy of Sciences, Vienna, for the year 1879, but the volume was published in 1880. Therefore the proper date of the authorship is 1880.

Distribution:

Sinemurian and Pliensbachian of the Central Apennines and the Southern Alps (Italy), the Northern Calcareous Alps (Austria), the Bakony Mts (Hungary), the Betic Cordilleras (Spain) and possibly of Western Greece and Indonesia. The Pliensbachian specimens of the Bakony came from seven localities, from the Jamesoni to the Margaritatus Zones (Tables 13, 14).

Liospiriferina apenninica (Canavari, 1880)
Plate XII: 7.

* 1880 *Spiriferina apenninica,* nov. form., – Canavari, Suavicino, p. 71, pl. I, fig. 2.
1912 *Spiriferina apenninica* Canavari. – Haas, Ballino, p. 228, pl. XIX, fig. 1.
1921 *Spiriferina apenninica* Canavari var. *integra* n. f. – Franceschi, Appennino Centrale, p. 219, pl. I, fig. 3.
v 1987 *Spiriferina apenninica* Canavari, 1880 – Vörös, Stratigraphic distribution, p. 35.
v 1997 *Liospiriferina apenninica* (Canavari) – Vörös, Jurassic brachiopods of Hungary, p. 16, Appendix: fig. 17.
v 2007 *Liospiriferina apenninica* (Canavari, 1880) – Vörös & Dulai, Transdanubian Range, p. 55, pl. II, fig. 17.

Material: 2 specimens, a single and a double valve.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser 7	18.39	17.35	?	?
	20.51	19.25	13.08	?

Description:

External characters: This is a medium-sized *Liospiriferina* with rounded, almost circular outline. The hinge margin is straight and wide, attains the half of the width of the shell, and characteristically protrudes from the outline. The apical angle (disregarding from the cardinal protrusions) is around 100°. The maximum width is attained at mid-length. The valves are rather strongly and almost equally convex; the maximum convexity lies near the middle of the length. The ventral umbo is wide and low. The beak moderately rises above the hinge margin; it is erect; its point approaches the plane of the lateral commissures. The interarea is wider than high, strongly concave, apsacline to orthocline. The delthyrium is concealed by matrix. The dorsal umbo is low. In lateral view, the lateral commissures are straight. The anterior commissure is poorly preserved but seems to be rectimarginate. The surface of the shells is smooth, except a very fine radial capillation.

Internal characters: These were not studied by serial sectioning because of the paucity of the material (single double valve).

Remarks:

From among the rectimarginate Early Jurassic spiriferinids, *L. apenninica* stands the closest to *L. alpina* (Oppel, 1861). The beak of *L. apenninica* is usually much lower, erect and curves close to the plane of the lateral commissures, whereas the beak of *L. alpina* is suberect and pulled ventrally. The most diagnostic differential feature of *L. apenninica* is that its hinge margin markedly protrudes from the subcircular outline, forming angular "shoulders".

Distribution:

Pliensbachian of the Central Apennines and the Southern Alps (Italy) and the Bakony Mts (Hungary). The Pliensbachian specimens of the Bakony came from the Kericser section, from the Margaritatus Zone. (Tables 13, 14).

Liospiriferina aff. *handeli* (Di Stefano, 1887)
Plate XIII: 5.

? 1977 *Liospiriferina semicircularis* (Böse) – Rousselle, Spiriférines du Lias moyen, p. 170, fig. 14.
v 1983 *Spiriferina* cf. *handeli* Di Stefano, 1887 – Vörös, Stratigraphic distribution, p. 35.
v 2007 *Liospiriferina* cf. *handeli* (Di Stefano, 1887) – Vörös & Dulai, Transdanubian Range, p. 55.

Material: 4, partly incomplete double valves.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser 26	15.69	18.35	?	5.04
	17.43	21.79	13.57	3.20
Kericser 34	18.20	23.21	15.67	3.97
Kericser 35	7.61	9.20	5.64	1.55

Description:

External characters: This is a small to medium-sized *Liospiriferina* with transversely elongated elliptical outline. The hinge margin is straight and wide, its length exceeds the half of the width of the shell, and slightly protrudes from the outline. The surface of the ventral umbo is concave, therefore an apical angle can not be measured. The maximum width is attained at around the half of the length. The valves are almost equally convex; the maximum convexity can be measured near the mid-length. The dorsal valve is more inflated posteriorly. The ventral umbo is wide and gibbose. The beak rises a very little above the hinge margin; it is slightly incurved. The interarea is much wider than high, apsacline and strongly concave. The delthyrium is rather narrow and high. The dorsal umbo is low. In lateral view, the lateral commissures are nearly straight and run diagonally in ventral direction, where they pass gradually to the anterior commissure, forming a continuous curve. The anterior commissure is gently uniplicate; the plica forms a very low unbroken arch. Linguiform extension is not developed. The valves are smooth, except some weak growth lines.

Internal characters: These were not studied by serial sectioning because of the paucity of the material (one complete double valve with sparite infilling).

Remarks:

This species stands somewhat between *L. handeli* and *L. semicircularis* (Böse, 1898). It differs from both in the shape of its ventral umbo and beak which is more depressed and incurved than those of the above mentioned two species. I tentatively bring this species in closest relationship with *L. handeli* because they share the gently but regularly uniplicate form of the anterior commissure, whereas *L. semicircularis* has an almost straight, asymmetrically deflected anterior commissure. On the same ground, the specimen figured by Rousselle (l. c.) as *L. semicircularis*, may belong to the species here described. In my previous works (Vörös, l. c.) I was wrong to tentatively identify this species with *L. handeli*, apparently because I overemphasized the shape of the anterior commissure and ignored the character of the beak.

This species has some overall similarity to *Cingolospiriferina cingolana* Pozza, 1992 (Pozza 1992, p. 212, figs. 2A, 8) but the latter differs by having a marked ventral sulcus and a corresponding dorsal fold.

Distribution:

The Pliensbachian specimens of the Bakony Mts came from the Kericser section, from the Ibex Zone (Tables 13, 14).

Liospiriferina cf. *semicircularis* (Böse, 1898)
Figures 64, 65.

v * 1898 *Spiriferina semicircularis* nov. sp. – Böse, Brachiopodenfauna der östlichen Nordalpen, p. 219, pl. XVI, figs. 15, 16.
1971 *Spiriferina semicircularis* Böse, 1897 – Sučić-Protić, Mid. Lias. Brach. Yugosl. Carpatho-Balkanids (II), p. 47, pl. XVII, figs. 1, 2, pl. XXXV, fig. 2.
? non 1977 *Liospiriferina semicircularis* (Böse) – Rousselle, Spiriférines du Lias moyen, p. 170, fig. 14.
v 1983 *Spiriferina* cf. *handeli* Di Stefano, 1887 – Vörös, Stratigraphic distribution, p. 35 (partim).
v 2003 *Liospiriferina semicircularis* (Böse, 1898) – Vörös et al., Schafberg, p. 80, pl. VIII, figs. 23–25.
v 2007 *Liospiriferina* cf. *handeli* (Di Stefano, 1887) – Vörös & Dulai, Transdanubian Range, p. 55 (partim).

Material: One double valve.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Fenyveskút (scree)	14.5	18.0	10.7	0.0

Description:

External characters: This is a small to medium-sized *Liospiriferina* with transversely elongated elliptical outline. The hinge margin is straight and wide, its length exceeds the half of the width of the shell; it slightly protrudes from the outline but the cardinal extremities are subrounded. The apical angle can not properly be measured. The maximum width is attained at around the half of the length. The maximum convexity lies in the posterior one-third of the length. The ventral valve is less convex than the dorsal valve which tends to be somewhat pyramidal. The ventral umbo is pulled in ventral direction, far from the hinge margin. The beak does not rise much above the hinge margin; its point is broken but it seems to be suberect. The interarea is wider than high, gently concave, apsacline, tending to be catacline. The delthyrium is moderately wide. The dorsal umbo is low. In lateral view, the lateral commissures are straight and run vertically. The anterior commissure is rectimarginate but shows a very weak, asymmetrical deflection in its middle portion. The valves are smooth, except some weak growth lines.

Internal characters (Fig. 64): *Ventral valve*: The umbonal part is almost circular in cross section. The delthyrial cavity is very narrow and high, divided by the ventral median septum. The umbonal cavities are drop-shaped. The dental plates are first divergent dorsally, then become subparallel. The ventral median septum is high and persists nearly to the one-fourth of the length of the shell. Its anterodorsal part is slightly club-shaped in cross section. *Dorsal valve*: The outer socket ridges are wide. The inner socket ridges are narrow and give rise to slightly convergent, long crural bases. In the umbonal part,

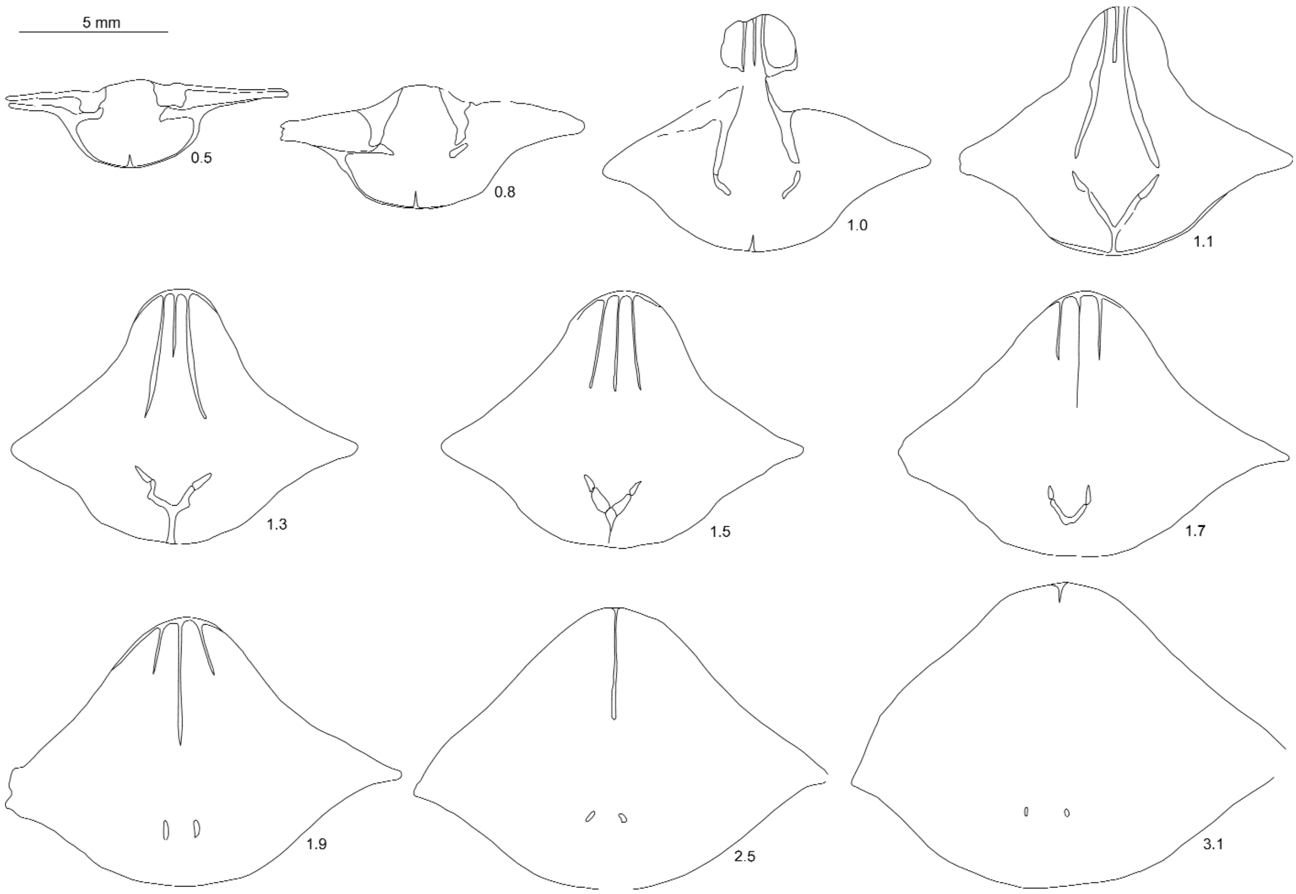


Figure 64. *Liospiriferina* cf. *semicircularis* (Böse, 1898). Ten transverse serial sections through the posterior part of a specimen from Lókút, Fenyveskút, scree, Pliensbachian, Margaritatus Zone. M 2008.503.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 14.5 mm

there is a low dorsal median septum and a well-developed septalium supporting the crura. The distal portion of the brachidium was missing.

Remarks:

The outline and the general constitution of the ventral umbo of *L. semicircularis* is similar to *L. handeli* (Di Stefano, 1887), though its beak is significantly lower. The most important difference is in the shape of the anterior commissure: it is definitely uniplicate in *L. handeli*, whereas the anterior commissure of *L. semicircularis* is almost rectimarginate with a slight asymmetrical deflection. The original specimens of Böse (l. c.) (which I inspected in the Bayerische Staatssammlung, München) and the figures by Sučić-Protić (l. c.) and Vörös et al. (l. c.) well demonstrate these diagnostic features. In spite of this, I made a mistake when previously put the above described specimen into *L. handeli* and selected it for serial sectioning. After all, at the moment only the plaster casts of this specimen are available, but these clearly show the characters of *L. semicircularis* (Fig. 65).

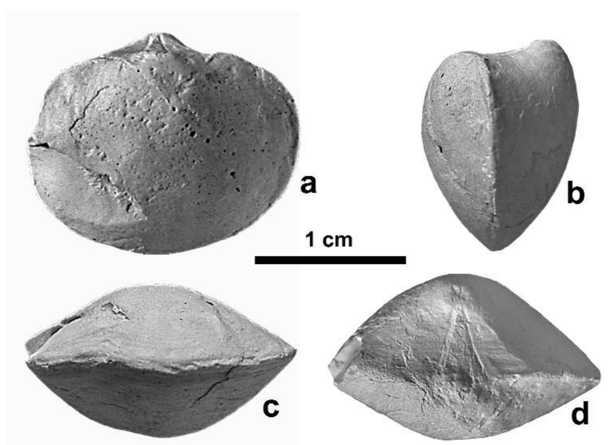


Figure 65. *Liospiriferina* cf. *semicircularis* (Böse, 1898). Plaster cast of the sectioned specimen from Lókút, Fenyveskút, scree, Pliensbachian, Margaritatus Zone. M 2008.503.1. a: dorsal view, b: lateral view, c: anterior view, d: posterior view

The specimen figured by Rousselle (l. c.) as *L. semicircularis* shows rather strongly incurved beak and weakly uniplicate anterior commissure, therefore it is tentatively excluded from the present synonymy.

Distribution:

Pliensbachian of the Northern Calcareous Alps (Austria), the Bakony Mts (Hungary) and the Carpatho–Balkanides (Serbia). The Pliensbachian specimen of the Bakony came from Fenyveskút, from the Margaritatus Zone (Tables 13, 14).

Liospiriferina cf. *globosa* (Böse, 1898)
Plate XIII: 6.

v * 1898 *Spiriferina globosa* nov. sp. – Böse, Brachiopodenfauna der östlichen Nordalpen, p. 216, pl. XVI, figs. 5–7.
? 1966 *Spiriferina alpina* Opp. – Bizon et al., Bouleiceras nitescens Cordill. Bétiques, p. 902, pl. XXVIIa, fig. 4.
? 1969 *Spiriferina alpina* Oppel – Delance, Brach. lias. Nord-Est del'Espagne, p. 9 (partim), pl. A, fig. 4.
v 1983 *Spiriferina* cf. *globosa* Böse, 1898 – Vörös, Stratigraphic distribution, p. 35.
v 2007 *Liospiriferina* cf. *globosa* (Böse, 1898) – Vörös & Dulai, Transdanubian Range, p. 55.

Material: 3 partly incomplete double valves.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser 36	18.01	19.10	14.11	2.30
Kericser I/f	22.22	24.12	16.45	1.89
Kericser II/k	18.06	20.05	13.03	1.94

Description:

External characters: This is a small to medium-sized *Liospiriferina* with rounded, almost circular outline. The hinge margin is straight and moderately wide, attaining the half of the width of the shell, and only slightly protrudes from the outline. The apical angle can not be measured correctly. The maximum width is attained at mid-length. The valves are almost equally convex; the maximum convexity lies at around the posterior third of the length. The ventral umbo is wide and somewhat depressed. The beak only slightly rises above the hinge margin; it is erect. The interarea is wider than high, moderately concave, apsacline. The delthyrium is concealed by matrix. The dorsal umbo is moderately developed. In lateral view, the lateral commissures are nearly straight, slightly arched ventrally. The anterior commissure is rectimarginate but shows gentle and somewhat irregular, asymmetric folding. The surface of the shells is smooth.

Internal characters: These were not studied by serial sectioning because of the paucity of the material.

Remarks:

L. globosa has certain similarity to *L. alpina* (Oppel, 1861) and *L. aequiglobata* (Uhlig, 1900) and in some respects stands between the two. It differs from *L. alpina* by its lower and more incurved beak, while *L. aequiglobata* has an even more depressed beak, closely inclined to the hinge margin. The irregularly rectimarginate anterior commissure is another feature of *L. globosa*, differing from the above two species. In fact, Böse (l. c., fig. 6c) figured only one anterior view, showing slightly sulcate anterior commissure, but, when I inspected Böse's originals in the collection of the Bayerische Staatssammlung (München), I have seen specimens with more irregular anterior commissure, partly tending to be uniplicate.

On the basis of the above principles, some of the specimens figured by Bizon et al. (l. c.) and Delance (l. c.) may belong to *L. globosa*, rather than to *L. alpina*.

Distribution:

Pliensbachian of the Northern Calcareous Alps (Austria), the Bakony Mts (Hungary), and perhaps the Iberian Cordilleras and the Betic Cordilleras (Spain). The Pliensbachian specimens of the Bakony came from the Kericser section, from the Ibex Zone (Tables 13, 14).

Liospiriferina cf. *obovata* (Principi, 1910)
Plate XIII: 7.

? 1900 *Spiriferina gryphoidea* Uhlig. – Böse & Schlosser, Südtirol, p. 200 (partim), pl. XVIII, fig. 27 (non figs. 26, 29).
* 1910 *Spiriferina obovata* nov. sp. – Principi, Castel del Monte, p. 67, pl. III, fig. 1.
v 1983 *Spiriferina* cf. *obovata* Principi, 1910 – Vörös, Stratigraphic distribution, p. 35.
v 2007 *Liospiriferina* cf. *obovata* (Principi, 1910) – Vörös & Dulai, Transdanubian Range, p. 55, pl. II, fig. 20.

Material: 2 specimens, a slightly worn double valve and an isolated dorsal valve.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kőrishegy A/3	30.35	28.63	?	?
Csókakő	35.36	24.50	23.17	4.51

Description:

External characters: This is a large-sized *Liospiriferina* with elongated oval to subpentagonal outline. The hinge margin is straight and moderately long, attains nearly the half of the width of the shell, and does not protrude from the outline. The apical angle is about 90°. The maximum width is attained at the posterior one-third of the length. The maximum convexity can be measured near the mid-length; the ventral valve is significantly more convex than the dorsal valve. The ventral umbo is massive and moderately high and follows the curvature of the valve. The beak is slightly incurved; its point remains rather high above the hinge margin. The interarea is wider than high, moderately concave, orthocline but tends to be anacline. The delthyrium is concealed by matrix. In lateral view, the lateral commissures are markedly sinuous; in their posterior part is arched dorsally, then they are bent ventrally. The narrow anterior commissure is slightly uniplicate. The surface of the shells is almost smooth, except some stronger, irregularly spaced growth lines.

Internal characters: These were not studied by serial sectioning because of the paucity of the material. On the broken surface of the ventral beak a strong median septum and divergent dental plates can be seen.

Remarks:

L. obovata is one of the largest species of *Liospiriferina* distinguished by its elongated subpentagonal outline and especially by its characteristically tapering anterior region. It has some similarity to *L. gryphoidea* (Uhlig, 1880), but its beak is not so high and not so strongly incurved. Moreover, *L. obovata* has sinuous lateral and uniplicate anterior commissures and subpentagonal outline, in contrast to the straight and rectimarginate commissures and oval outline of *L. gryphoidea*. Based on these criteria, one of the specimens figured by Böse & Schlosser (l. c., fig. 27) as *L. gryphoidea* can be allocated to *L. obovata*, as it was stated also by Principi (l. c.). The Hungarian specimens possess significantly more convex dorsal valves than the type specimen (Principi, l. c.), therefore their identification is tentative (*L.* cf. *obovata*).

A somewhat similar form was figured by Rousselle (1977, pl. 1, fig. 9) under the name "*Liospiriferina rostrata* (Schloth.) morphotype *terebratuloides*" with reference to Seguenza (1886). However, Seguenza's (1886, pl. XX, fig. 3) figures portray a quite different, rather small form with subcircular outline, therefore Seguenza's *terebratuloides* may not be included to the present synonymy. Moreover, Rousselle's *terebratuloides* also markedly differs from *L. obovata* in the shape of the lateral and anterior commissures.

Distribution:

Pliensbachian of the Central Apennines (Italy), the Northern Calcareous Alps (Austria) and the Bakony and Vértes Mts (Hungary). The Pliensbachian specimen of the Bakony came from Kőris-hegy, probably from the Margaritatus Zone (Tables 13, 14).

Subfamily Paralaballinae Carter, 1994

Genus *Cisnerospira* Mance□ido, 2004

This genus was introduced in the proceedings of a local symposium in Spanish language by Mance□ido (2004, p. 272). The generic description deviated from the usual style (was inserted to the running text), and probably due to the above reasons, *Cisnerospira* was omitted from the 5th volume of the „revised Treatise" (Carter & Johnson 2006) and was not mentioned even in the 6th (Supplement) volume (Gourvennec & Carter 2007). Neverteheless, *Cisnerospira* is a valid generic name, because a type species was designated („*S.*" *adscendens* Deslongchamps, 1859) and the diagnostic differences (e. g. the smooth surface, and the straight, subpyramidal ventral valve) were shortly mentioned by Mance□ido (2004, p. 272). The subpyramidal ventral valve makes *Cisnerospira* basically different from *Liospiriferina*, and, mainly on this ground, Baeza-Carratalá (2008, p. 358) placed *Cisnerospira* to the subfamily Paralaballinae Carter, 1994. This opinion is accepted here, despite that the representatives of Paralaballinae was previously recorded only from the Upper Triassic (Carter & Johnson 2006, p. 1933).

Cisnerospira darwini (Gemmellaro, 1878)

Plate XIV: 1.

v 1874 *Spiriferina* cfr. *angulata*, Opp. – Gemmellaro, Zona con Terebratula Aspasia, p. 56, pl. X, figs. 6,7.
v * 1878 *Spiriferina Darwini,* Gemm. – Gemmellaro, Casale e Bellampo, p. 409, pl. XXXI, figs. 22–26.
v 1891 *Spiriferina Darwini* Gemm. – Di Stefano, M. San Giuliano, p. 163, pl. I, fig. 4.
? 1930 *Spiriferina Darwini* Gemm. – De Gregorio, M. San Giuliano, p. 44, pl. XIV, figs. 6, 7.
? 1932 *Spiriferina Darwini* Gemmellaro mut *graeca* Renz (nov. mut.). – Renz, Westgriechischen Lias, p. 7, pl. I, fig. 5.

1951 *Spiriferina* cf. *darwini* Gemm. – Wanner & Knipscheer, Ost-Seran (Molukken), p. 16 (partim), pl. II, fig. 17 (non fig. 16).
? 1956 *Spiriferina darwini* Gemmellaro – Selli, Fossili Mesoz. Isonzo, p. 19, pl. I, fig. 11.
v 1983 *Spiriferina darwini* Gemmellaro, 1878 – Vörös, Stratigraphic distribution, p. 35.
v 2003 *Liospiriferina darwini* (Gemmellaro, 1878) – Vörös et al., Schafberg, p. 74, pl. VII, figs. 11–13.
v 2003 *Liospiriferina darwini* (Gemmellaro, 1878) – Dulai, Hettangian and Early Sinemurian, p. 56, pl. IX, figs. 4, 5.
v 2007 *Cisnerospira darwini* (Gemmellaro, 1878) – Vörös & Dulai, Transdanubian Range, p. 55.

Material: 19 specimens, mostly incomplete ventral valves and one double valve.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser 8	11.82	12.39	?	?
Kericser 14	10.78	11.50	?	?
Kericser 15	12.90	11.21	?	?
Kericser 22	13.28	13.30	?	?
Kericser 35	11.51	10.84	?	?
Fenyveskút 5/c	10.77	10.96	7.89	0.84

Description:

External characters: This is a small *Cisnerospira* with subcircular outline. The hinge margin is straight and rather wide, exceeding the two-third of the width of the shell, and gently protrudes from the outline. The apical angle is about 110°. The maximum width is attained at mid-length. The maximum convexity lies near the posterior fourth of the length. The dorsal valve is moderately convex; lid-like. The ventral valve is low conical, somewhat cyrtiniform. The ventral umbo is wide and pulled ventrally. The beak does not rise above the hinge margin; it is straight. The interarea nearly as wide as high, gently concave, almost catacline. The delthyrium is rather wide and high. The dorsal umbo is weak. In lateral view, the lateral commissures are nearly straight; gently arched dorsally. The anterior commissure is almost rectimarginate; gently uniplicate in the centre. Corresponding to the plica, a slight ventral sulcus is developed near the anterior margin of the ventral valve. The surface of the shells is smooth, except a very weak radial striation on the dorsal valve.

Internal characters: These were not studied by serial sectioning because of the paucity of the material (a single double valve).

Remarks:

This is a relatively less cyrtiniform species of *Cisnerospira*, i. e. the ventral valve is low conical; this is the main difference from *C. meneghiniana* (Canavari, 1880). The strength of the ventral sulcus seems to be rather varied according to different authors.

The specimen figured by Gemmellaro (1874, l. c.) as "cfr. *angulata*" was compared to the originals of *C. darwini* (also kept in the collection of the Palermo University) and it seemed to belong to the latter species. Remarkably, on the label of the specimen in question the identification "*darwini*" was written (perhaps by G. Di Stefano).

The figures given by De Gregorio (l. c.) and Selli (l. c.) are not informative enough, but probably portray *C. darwini*. Renz's (l. c.) record was confirmed by Manceñido (1993, p. 89) and that specimen has in fact a much more cyrtiniform ventral valve, standing closer to *C. meneghiniana*. Only one of the specimens figured by Wanner & Knipscheer (l. c., fig. 17) fits well to *C. darwini*; the other specimen shows marked radial ribbing, especially in the ventral sulcus, therefore must be excluded from this species.

Distribution:

Sinemurian and Pliensbachian of Sicily and the Southern Alps (Italy), the Northern Calcareous Alps (Austria), the Bakony Mts (Hungary), Western Greece and Indonesia. The Pliensbachian specimens of the Bakony came from three localities, from the Ibex to the Spinatum Zones (Tables 13, 14).

Cisnerospira meneghiniana (Canavari, 1880)
Plate XIV: 2, 3.

* 1880 *Spiriferina Meneghiniana,* nov. form., – Canavari, Suavicino, p. 71, pl. I, fig. 5.
v 1983 *Spiriferina meneghiniana* Canavari, 1880 – Vörös, Stratigraphic distribution, p. 35.
v 1997 *Liospiriferina meneghiniana* (Canavari) – Vörös, Jurassic brachiopods of Hungary, p. 16, Appendix: fig. 18.
v 2003 *Liospiriferina meneghiniana* (Canavari, 1880) – Vörös et al., Schafberg, p. 65.
v 2007 *Cisnerospira meneghiniana* (Canavari, 1880) – Vörös & Dulai, Transdanubian Range, p. 55.

Material: 15, mostly incomplete ventral valves.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser 20	8.72	9.63	?	?
	11.36	10.7	6.84	?
Kericser 26	7.28	9.44	?	?
Kericser 27	7.84	9.25	?	?
Kericser 32	7.25	8.44	6.23	?
Városlőd 7	6.34	7.90	?	?

Description:

External characters: This is a small *Cisnerospira* with subcircular outline. The hinge margin is straight and rather short, attaining the half of the width of the shell, and does not protrude from the outline. The apical angle varies between 70–80°. Only the ventral valve is known; it is highly conical, strongly cyrtiniform. The ventral umbo is pulled powerfully to ventral direction. The beak is straight and does not rise above the hinge margin. The interarea is higher than wide, gently concave, almost flat; catacline. The delthyrium is rather narrow and high. The lateral and anterior commissures are not entire but seem to be straight, with a very slight plica in the centre. A shallow but marked sulcus runs through the ventral valve, from the beak to the anterior margin. The surface of the shells is smooth, except some weak growth lines.

Internal characters: These were not studied by serial sectioning because of the paucity of the material (only disintegrated ventral valves).

Remarks:

The most important diagnostic feature of *C. meneghiniana* is the narrow and shallow, but marked sulcus on its ventral valve, running from the beak to the anterior margin. This, together with the strikingly cyrtiniform shell, differentiates it from the other species of *Cisnerospira*. The Pliensbachian specimens from the Bakony correspond rather well to the figures published by CANAVARI (l. c.), except that CANAVARI's original specimen has a slightly more concave interarea.

Distribution:

Pliensbachian of the Central Apennines (Italy), the Northern Calcareous Alps (Austria) and the Bakony Mts (Hungary). The Pliensbachian specimens of the Bakony came from three localities, from the Ibex to the Margaritatus Zone (Tables 13, 14).

Order Terebratulida WAAGEN, 1883
Suborder Terebratulidina WAAGEN, 1883
Superfamily Uncertain
Family Orthotomidae MUIR-WOOD, 1936

Genus Orthotoma QUENSTEDT, 1869

This genus was redefined and very comprehensively discussed by MUIR-WOOD (1936) who stated that it is the senior synonym of *Orthoidea* FRIREN, 1876, and that its position within the order Terebratulida is very uncertain because of the character of its beak, hypothyrid foramen, delthyrium and loop. *Orthotoma* was enumerated in the supplement volume of the "revised Treatise" (LEE et al. 2007, p. 2805), but still as *incertae sedis*. The best illustration of several species of *Orthotoma* was given from South Germany by RAU (1905); these minute forms are usually moderately convex and partly sulcate. ROUSSELLE (1969, 1973) reported larger and even more biconvex species of *Orthotoma* from North Africa.

Orthotoma apenninica (CANAVARI, 1883)
Plate XIV: 4, 5; Figures 66, 67.

* 1883 *Leptaena* (?) *apenninica* n. f. – CANAVARI, Strati a Terebratula Aspasia III, p. 73, pl. IX, fig. 7.
? 1900 *Pseudokingena Capellinii* Di-Stefano. – BÖSE & SCHLOSSER, Südtirol, p. 179, pl. XVII, fig. 3.
1936 *Leptaena* (?) *apenninica* Canavari – RAMACCIONI, Monte Cucco, p. 187, pl. VII, figs. 18, 19.
v 1983 *Orthotoma apenninica* (Canavari, 1883) – VÖRÖS, Stratigraphic distribution, p. 35.
v 2003 *Orthotoma apenninica* (Canavari, 1883) – VÖRÖS et al., Schafberg, p. 75.
v 2007 *Orthotoma apenninica* (Canavari, 1883) – VÖRÖS & DULAI, Transdanubian Range, p. 55, pl. II, fig. 21.

Material: 38, partly incomplete, double valves.

Localities	*Measurements (mm)*		
	L	*W*	*T*
Kericser 7	8.56	9.42	2.96
	7.22	8.58	3.14
	6.83	8.57	2.67
	7.33	8.62	2.86
	7.47	8.74	3.23
	7.99	8.95	3.06
	7.37	8.11	2.99
	6.85	8.10	3.00
	6.74	7.87	2.67
	7.80	8.49	3.08
	7.19	7.74	2.76
	7.62	8.54	3.22
Kericser 8	7.23	7.95	3.03
	7.85	9.81	3.26
	7.36	8.1	3.15
Fenyveskút (scree)	13.78	15.46	6.11
Papod 81	7.28	8.20	2.90

Description:

External characters: This is a small to medium-sized *Orthotoma* with transversely elongated subcircular outline. The hinge margin is straight and wide, attains the half of the width of the shell, and does not protrude from the outline. The apical angle is around 130°. The maximum width is attained at mid-length. The valves are gently convex; the maximum convexity lies in the posterior one-third of the length. The ventral valve is more convex than the dorsal valve which tends to be almost flat. The beak is suberect and pointed, with sharp beak ridges. The wide and low interarea is rather concave and show dense striae parallel to the hinge margin. The foramen is hypothyrid; the deltidial plates are narrow, but their jugate character can not be confirmed because the respective part is poorly preserved or covered by matrix. The lateral commissures are straight or very gently sinuous. The anterior commissure is almost straight, with a wide, very shallow sinus. The outer surface of the shell is smooth, but a deeper shell layer shows radial capillation of two orders of magnitude (Pl. XIV, 4a).

Internal characters (Figs. 66, 67): *Ventral valve*: Dental plates are absent. *Dorsal valve*: The articulation and the posterior part of the hinge plates are masked with callus thickenings. There is no median septum. The crural bases are tiny; the crura are crescentic in cross section at the crural processes. The loop is short and narrow and ends in a rather highly arched transverse band (Fig. 67).

Remarks:

In their all important external morphological features, the Bakony specimens correspond well to the illustrations of *O. apenninica* given by CANAVARI (l. c.). This species largely differs from the widespread NW European and North African species in being somewhat smaller, much less convex and only incipiently sulcate. *O. apenninica* was tentatively placed by its author to "*Leptaena*" (the name commonly used at those times for the koninckinids) probably because of the concave interarea and the somewhat foliated shell structure. Later however, CANAVARI himself put the generic name "*Orthoidea*" to

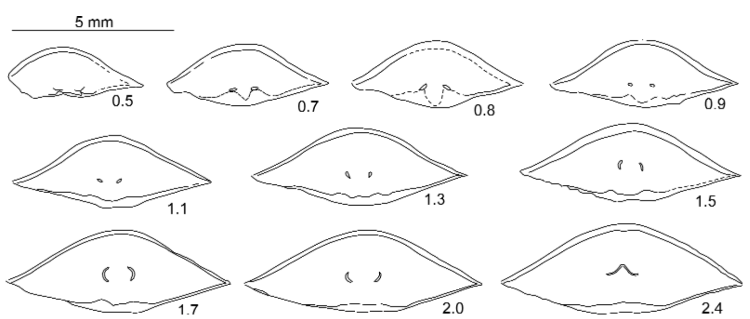


Figure 66. *Orthotoma apenninica* (CANAVARI, 1883). Ten transverse serial sections through the posterior part of a specimen from Lókút, Papod A/82, Pliensbachian, probably Early Pliensbachian. M 2008.504.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 6.3 mm

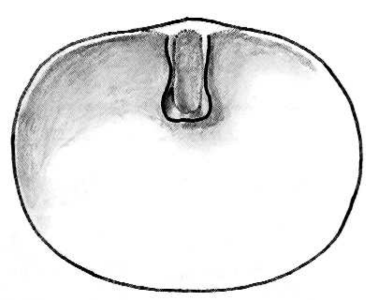


Figure 67. *Orthotoma apenninica* (CANAVARI, 1883). Ventral view of the dorsal valve interior. Reconstruction based on serial sections of a specimen from Lókút, Papod A/82, Pliensbachian, probably Early Pliensbachian. M 2008.504.1.

the museum's label (cf. FRANCESCHI 1921, p. 218). Nevertheless, the former binomen was still applied by RAMACCIONI (1936, l. c.).

The specimen figured by BÖSE & SCHLOSSER (l. c.) as "*Pseudokingena Capellinii* DI-STEFANO" does not belong to DI STEFANO's species (which is a true *Pseudokingena*, with granulate ornamentation, as I saw in the collection of the Palermo University), but, on the basis of its general shape and radial capillation, probably represents *O. apenninica*.

Distribution:

Sinemurian and Pliensbachian of the Central Apennines and the Southern Alps (Italy), the Northern Calcareous Alps (Austria) and the Bakony Mts (Hungary). The Pliensbachian specimens of the Bakony came from four localities, from the Margaritatus Zone (Tables 13, 14).

Orthotoma aff. *apenninica* (CANAVARI, 1883)
Plate XIV: 6, 7.

v 1983 *Orthotoma apenninica* (Canavari, 1883) – VÖRÖS, Stratigraphic distribution, p. 35 (partim).
v 2007 *Orthotoma* aff. *apenninica* (Canavari, 1883) – VÖRÖS & DULAI, Transdanubian Range, p. 56 (partim).

Material: Three, partly incomplete double valves.

Localities	*Measurements (mm)*		
	L	*W*	*T*
Kericser 35	5.47	5.51	2.10
	6.65	7.00	2.39

Description:

External characters: This is a very small *Orthotoma* with rounded, almost circular outline. The hinge margin is straight and wide, shorter than the half of the width of the shell, and does not protrude from the outline. The apical angle is around 110°. The maximum width is attained at mid-length. The valves are gently convex; the maximum convexity lies close to the posterior one-third of the length. The dorsal valve is significantly more convex than the ventral valve. The beak is suberect and pointed, with sharp beak ridges. The interarea is moderately wide and rather high. The foramen is hypothyrid; the deltidial plates are narrow, but their jugate character can not be seen because of poor preservation. The lateral commissures are straight or very gently sinuous. The anterior commissure is nearly straight. The shells are ornamented by radial capillation of two orders of magnitude.

Internal characters: These were not studied by serial sectioning because of the paucity of the material (three specimens with sparite infilling).

Remarks:

This species stands close to *O. apenninica* (CANAVARI, 1883) but significantly differs in the relative convexity of the valves: in the presently described species the dorsal valve is constantly more convex than the ventral one, whereas in *O. apenninica* the dorsal valve is always less convex. In the literature I did not find any Early Jurassic species of *Orthotoma* with so weakly convex ventral valve. In my earlier papers the three specimens of this species was taken as belonging to *O. apenninica*.

Distribution:

Pliensbachian of the Bakony Mts, where the specimens came from the Kericser section, from the Ibex Zone (Tables 13, 14).

Superfamily Loboidothyridoidea MAKRIDIN, 1964
Family Plectoconchidae DAGYS, 1974

Genus *Lychnothyris* VÖRÖS, 1983

This generic name was regularly introduced and defined, with *Lychnothyris rotzoana* (SCHAUROTH, 1865) as type species (VÖRÖS 1983a, p. 11), and it was used correctly by SIBLÍK (2003c) and BAEZA-CARRATALÁ (2008), who added a new species to this, previously monospecific, genus. It is regrettable, that *Lychnothyris* was not included in the "revised Treatise" (LEE et al. 2006) and it is missing also from the "Supplement" (LEE et al. 2007). Therefore the classification of the "Treatise" can be used only tentatively for the higher systematic position of this genus. When it was introduced (VÖRÖS 1983a), *Lychnothyris* was placed into the subfamily Plectoconchinae Dagys, 1974. This subfamily was revised and emended by Cooper (1983) as including *Plectoconcha* Cooper, 1942 and *Merophricus* Cooper, 1983, and recently was elevated to family rank (Lee et al. 2006). In the present work, I maintain the opinion that, except the absence of ribbing, the overall external and internal morphological similarity makes reasonable to associate *Lychnothyris* with the above genera in the family Plectoconchidae.

Lychnothyris rotzoana (Schauroth, 1865)
Plate XIV: 8–11; Figure 68.

* 1865 *Terebratula Rotzoana* n,. n. sp., – Schauroth, Versteinerungen Coburg, p. 125, pl. II, fig. 6.
1869 *Terebratula Rotzoana.* Schaur. – Zittel, Central-Appenninen, p. 137, pl. XV, fig. 4.
v 1880 *Terebratula Rotzoana* Sch. – Canavari, Strati a Terebratula Aspasia, p. 342, pl. II, figs. 3, 4.
1890 *Terebratula Rotzoana* Schauroth. – Tausch, Grauen Kalke Süd-Alpen, p. 5, pl. II, figs. 7, 8, 10, 11.
v 1891 *Terebratula Rotzoana* Schaur. – Di Stefano, M. San Giuliano, p. 234 (partim)
1923 *Terebratula* cfr. *rotzoana* v. Schaur. – Krumbeck, Palaeontologie von Timor, p. 64, pl. CLXXII, figs 16–19.
v 1983 *Lychnothyris rotzoana* (Schauroth) – Vörös, Some new genera, p. 12, fig. 5.
v 1983 *Lychnothyris rotzoana* (Schauroth, 1865) – Vörös, Stratigraphic distribution, p. 35.
2003 *Lychnothyris rotzoana* (Schauroth, 1865) – Siblík, Salzkammergut, p. 72, fig. A.
v 2007 *Lychnothyris rotzoana* (Schauroth, 1865) – Vörös & Dulai, Transdanubian Range, p. 56.

Material: 13 specimens of poor preservation; mostly double valves.

Localities	*Measurements (mm)*		
	L	*W*	*T*
Lókút 465	16.36	15.20	9.63
	16.09	15.06	9.74
	14.35	14.20	7.74
Kávás-hegy A 2	29.66	28.11	?
Kávás-hegy A 8	>18.41	?	?
Bocskor-hegy 28	30.66	29.50	?
Hamuháza 1	23.80	19.81	?
Hamuháza 8	22.03	20.35	11.75
Úrkút (scree)	31.70	26.10	?

Description:

External characters: Medium to large shells with elongated oval outline. The apical angle varies between 65–75°. The maximum width is attained at about the anterior one-third of the length. The valves are rather strongly and almost equally convex; the maximum convexity lies near the middle of the length. The ventral umbo is very massive and incurved; gibbose in larger specimens. It is truncated by a large, permesothyrid foramen. The delthyrium is poorly preserved or covered by matrix. In lateral view, the lateral commissures are straight or gently sinuous. The anterior commissure is, when preserved, rectimarginate. The surface of the shells is smooth. The double valve has a typical "lampshell" appearance.

Internal characters (silicified specimen: Pl. XIV, 11a–b; serial sections: Fig. 68): *Ventral valve*: There is a well-developed pedicle collar. The thin deltidial plates are fused posteriorly. The delthyrial cavity is subcircular, with traces of ventral muscle scars. The hinge teeth are strong and expanded laterally. The denticula are well-developed, sharp. *Dorsal valve*: There is a very massive, bilobate and crenulated cardinal process, protruding anteriorly into the ventral delthyrial cavity. The outer and inner socket ridges are very strong. The outer hinge plates are massive, subhorizontal. The crural bases develop on the medial ends of the hinge plates. The crural processes are indistinct, low and pointed ventromedially. The anterior part of the loop was not preserved.

Remarks:

L. rotzoana is very easy to recognize after its strongly biconvex, smooth shells and gibbose beak with large foramen. Schauroth's (l. c.) original figures are not very informative, but portray well the basic features; even the lateral view (l. c., fig. 6b) (though it is a line drawing) clearly demonstrates the "lampshell" character. The findings from the Central Apennines (Zittel l. c., Canavari l. c.) and the Southern Alps (Tausch l. c.) enriched the morphological variety of this species. Siblík (l. c.) figured a variant with extremely incurved beak. I had the possibility to collect dozens of *L. rotzoana* specimens near the type area, from Bosco Chiesanuova (Lessini Mts, Southern Alps) from a marly intercalation in the Upper Pliensbachian Calcari Grigi formation. It was a monospecific assemblage; mostly double valves of various size, exceeding 4 cm in length in many cases. This material (and others seen in local museums) supports the picture of the wide morphological variation of this "lampshell".

The specimens figured by Di Stefano (l. c., pl. IV, figs. 3–5) as "*Terebratula Rotzoana* Schaur. var. *plicata*, Tausch" are, in fact, ribbed in their anterior half, therefore they represent *Merophricus* cf. *mediterraneus* (Canavari, 1883), but in the collection of the Palermo University I found a specimen corresponding to a small variant of *L. rotzoana*.

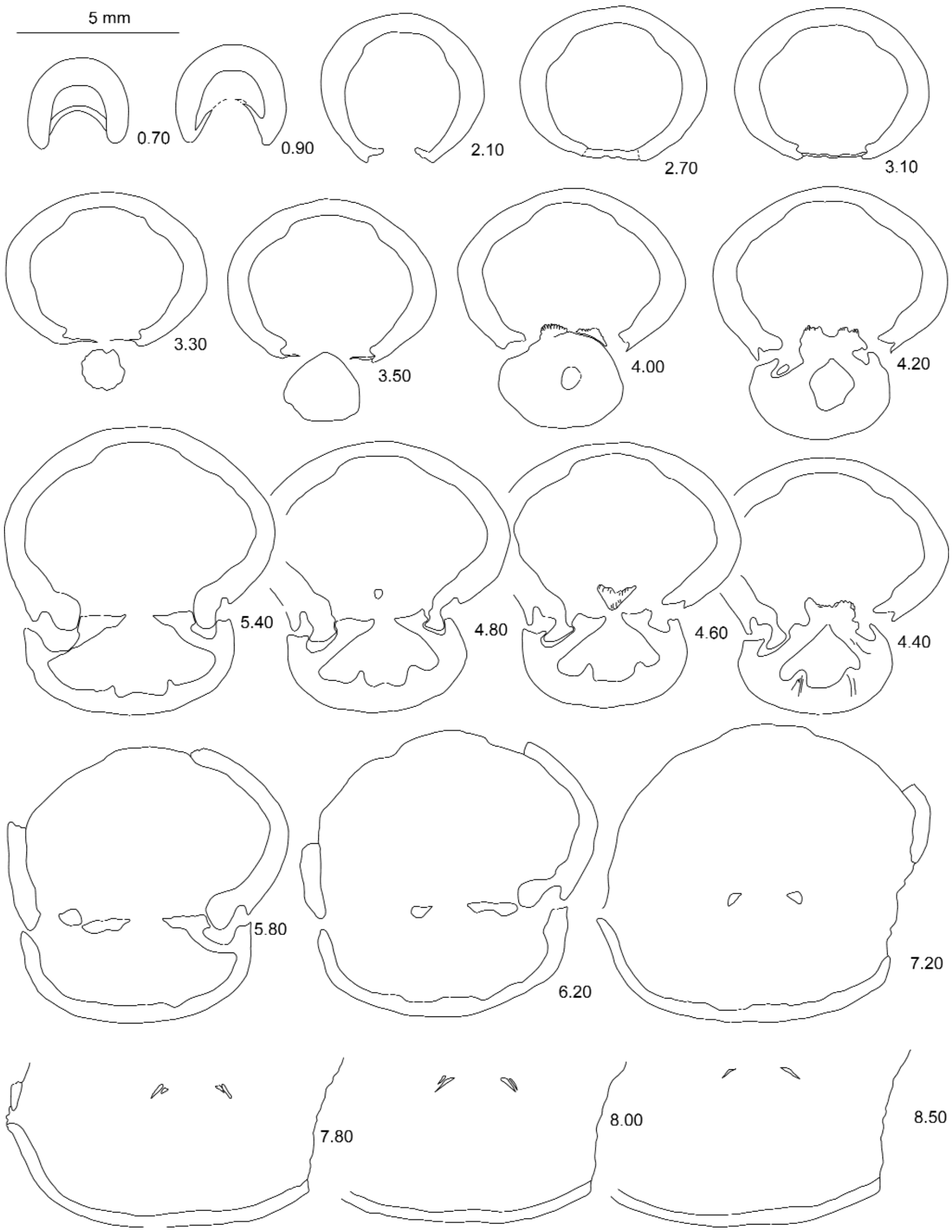


Figure 68. *Lychnothyris rotzoana* (Schauroth, 1865). Nineteen transverse serial sections through the posterior part of a specimen from Lókút, Lókúti-domb IV, Bed 465, Pliensbachian, Davoei Zone. M 2008.505.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 20.4 mm

Distribution:

Pliensbachian of Sicily, the Central Apennines and the Southern Alps (Italy), the Northern Calcareous Alps (Austria), the Bakony Mts (Hungary), and of Timor. The Pliensbachian specimens of the Bakony came from six localities, from the Davoei and Margaritatus Zones (Tables 13, 14).

Genus *Merophricus* Cooper, 1983

This genus was erected by Cooper (1983) for semicostate Early Jurassic terebratulids which have some similarity to *Hesperithyris* Dubar, 1942, but their ribbing, or multiplication, is weaker and is restricted to the anterior part of the shells. The designated type species is *M. dubari* (Cooper, 1983), split from "*T. semiarata*" (Dubar, 1942). On the basis of the similarity in loop characters, Cooper (1983) placed *Merophricus* to the subfamily Plectoconchinae Dagys, 1974 which was later elevated to family rank (Lee et al. 2006). Cooper (1983, p. 89) also stated that this unique loop is unlike any seen in his studies, except that of *Hesperithyris*, which however differs from *Merophricus* by its poorly defined hinge plates. After all, taken into account the apparent external similarity between *Hesperithyris* and the Late Triassic *Plectoconcha*, it may be recommended to include *Hesperithyris* also to the family Plectoconchidae, instead of its own family, where it stands alone.

Merophricus cf. *mediterraneus* (CANAVARI, 1883)
Plate XV: 3, 4.

? 1880 *Terebratula fimbrioides* E. Desl. – CANAVARI, Strati a Terebratula Aspasia, p. 339 (partim), pl. II, fig. 1 (non fig. 2).
v 1881 *Terebratula fimbrioides* E. Desl. – CANAVARI, Alcuni nuovi Brachiopodi, p. 182, pl. IX, fig. 10.
v * 1883 *Terebratula mediterranea* n. f. – CANAVARI, Strati a Terebratula Aspasia III, p. 85.
1890 *Terebratula mediterranea* Can. – TAUSCH, Grauen Kalke Süd-Alpen, p. 8, pl. III, figs. 4, 5.
v 1891 [*Terebratula Rotzoana* Schaur.] Var. *plicata,* Tausch. – DI STEFANO, M. San Giuliano, p. 235, pl. IV, figs. 3–5.
? 1942 *Terebratula mediterranea* Canav. – DUBAR, Térébratules et zeilléries multiplissées, p. 56, pl. III, fig. 12.
v 1983 *Hesperithyris* cf. *pacheia* (Uhlig, 1880) – VÖRÖS, Stratigraphic distribution, p. 35.
? 1997 *Merophricus mediterranea* (Canavari, 1884) – OWEN & ROSE, Gibraltar, p. 507, pl. I, figs. 1–11.
v 2007 *Hesperithyris* cf. *pacheia* (Uhlig, 1879) – VÖRÖS & DULAI, Transdanubian Range, p. 56.

Material: Two, partly worn specimens.

Localities	*Measurements (mm)*		
	L	*W*	*T*
Hamuháza 1	~20.00	21.37	?
Hamuháza 10	19.54	15.77	12.96

Description:

External characters: Small to medium-sized *Merophricus* with drop-shaped, elongated oval to subtriangular outline. The apical angle varies between 80–100°. The maximum width is attained at about the anterior one-third of the length. The valves are very strongly and almost equally convex; the maximum convexity lies near the middle of the length. The ventral umbo is massive, high and erect; rather gibbose in the larger specimen. The double valve has globose appearance. The large foramen is poorly preserved but seems to be permesothyrid. The delthyrium is covered by matrix. In lateral view, the lateral commissures are slightly sinuous, almost straight. The anterior commissure is poorly preserved but seems to be gently uniplicate. The surface of the shells is smooth in the posterior part; anteriorly, 8–12 ribs (or plicae) of various strength appear gradually.

Internal characters: These were not studied by serial sectioning because of the paucity of the material (a single double valve).

Remarks:

The new species name "*Terebratula mediterranea*" was introduced by CANAVARI (1883, l. c.) for some representatives of the series of specimens he described and illustrated previously (CANAVARI 1880, 1881, l. c.) as "*T. fimbrioides* E. DESL.". He rightly recognized that the Appenninic forms were significantly different from the NW European *fimbrioides*, and that a new name was necessary for them. When introducing "*T. mediterranea*", CANAVARI (1883, p. 85) referred exclusively to the specimen he figured earlier (CANAVARI 1881, pl. IX, fig. 10) as "*T. fimbrioides*". I was fortunate to see this specimen, labelled by CANAVARI as "*T. mediterranea*" in the collection of the Pisa University, which may be taken as the holotype of this species. This is a rather globose, gently uniplicate form, which is very similar to the Bakony specimen. On the other hand, it is markedly different from the other, much more flattened and rectimarginate specimens figured earlier by CANAVARI (1880, l. c.) as "*mediterranea*". The figures by TAUSCH (l. c.) and DI STEFANO (l. c., under the name "var. *plicata*") portray specimens fitting well to "*T. mediterranea*".

The specimen figured by DUBAR (l. c.) as "*T. mediterranea*" (not to speak about the variants *pentagona, elongata, radians* and *pectita*), is somewhat different from CANAVARI's type, being more pluricostate and having more depressed and less gibbose beak. The same holds partly true for the "*Merophricus mediterranea*" specimens from Gibraltar (OWEN & ROSE, l. c.), except that on pl. I, figs. 1–3, which corresponds rather well to the Appenninic type.

For a long time, I was mislead by the apparent ambiguity in the "*fimbrioides* vs. *mediterranea*" question, and used the name "*Hesperithyris pacheia* (UHLIG, 1880)" for the Bakony specimens (VÖRÖS l. c., VÖRÖS & DULAI l. c.). This species stands close to *Merophricus mediterraneus* in general constitution and in semicostate ornamentation but its ribbing (or multiplication) is stronger.

Distribution:

Sinemurian (?) and Pliensbachian of Sicily, the Central Apennines and the Southern Alps (Italy), the Bakony Mts (Hungary), Gibraltar and perhaps of Morocco. The Pliensbachian specimens of the Bakony came from the Hamuháza section, from the Davoei and Margaritatus Zones (Tables 13, 14).

Merophricus aff. *moreti* (Dubar, 1942)
Plate XIV: 12.

v 1983 *Hesperithyris* ? n. sp., aff. *renierii* (Catullo, 1827) – Vörös, Stratigraphic distribution, p. 35.
v 2007 *Hesperithyris* ? aff. *renierii* (Catullo, 1827) – Vörös & Dulai, Transdanubian Range, p. 56.

Material: One poorly preserved double valve.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Lókút 465	21.21	17.14	13.17	?

Description:

External characters: This is a medium-sized *Merophricus* with drop-shaped, elongated oval outline. The apical angle is about 70°. The maximum width is attained at about the anterior one-third of the length. The valves are moderately and almost equally convex; the maximum convexity lies near the middle of the length. The ventral umbo is massive, high and erect. The foramen is poorly preserved but seems to be large and permesothyrid. The delthyrium is covered by matrix. In lateral view, the lateral commissures are nearly straight. The anterior commissure is poorly preserved but seems to be rectimarginate. After a very posterior smooth part, about 20 weak ribs appear on the surface of the shells; their number somewhat increases by rare bifurcations towards the anterior margin.

Internal characters: These were not studied by serial sectioning because of the paucity of the material (a single double valve).

Remarks:

In my previous works (Vörös 1983b, 1997, Vörös & Dulai 2007, etc.) I tentatively regarded this single specimen as related to *Hesperithyris renierii* (Catullo, 1827). However, the detailed discussion of the relationship between *Hesperithyris* Dubar, 1942 and *Merophricus* Cooper, 1983 given by Alméras et al. (2007) has convinced me that this weakly costate form should be attributed to *Merophricus*. Looking through the array of similar forms figured by Dubar (1942), and included to *Merophricus* by Alméras et al (2007), I found *M. moreti* (Dubar, 1942) as the most comparable to my specimen from the Bakony. Especially one exemplar figured by Dubar (1942, pl. V, fig. 2) shares many features of my specimen, except that its ventral umbo is less developed. For this reason, and taking into account that in some cases the similarity between the Moroccan and the Appenninic–Alpine multiplicate terebratulids is misleading and does not mean identity, it was advisable to use the open nomenclature in the specific identification of the Bakony specimen, and indicate that it is probably related to *M. moreti*.

Distribution:

Pliensbachian of the Bakony Mts, where the specimen came from the Lókút section, from the Davoei Zone (Tables 13, 14).

Family Hesperithyrididae Cooper, 1983

Genus *Hesperithyris* Dubar, 1942

In his careful synthesis of Mesozoic to Recent short-looped terebratulids, Cooper (1983) redefined this genus, first described by Dubar (1942), and differentiated it from his new genus *Merophricus* Cooper, 1983. He put special emphasis on the mode of ornamentation, stating that the valves of *Hesperithyris* are smooth but plicated, whilst *Merophricus* is ribbed (semicostate). Although this distinction may work in typical cases, it may turn to be unreliable in *Hesperithyris* species with numerous plicae, because in terebratulids the ribs are in fact plicae on the ruffled shell. Cooper (1983, p. 89), when discussing the cardinalia and crura of *Hesperithyris*, mentioned that "this combination of structures is unlike any seen in this study except for *Merophricus*". Nevertheless, he kept the above two genera in different families, and this view was accepted in the "revised Treatise" (Lee et al. 2006) as well. I would be inclined to include *Hesperithyris* to the family Plectoconchidae but, for the sake of stability, here I followed the systematic order of the "revised Treatise".

Hesperithyris is the emblematic genus of Early Jurassic multiplicate terebratulids and, after its erection by Dubar (1942), it was widely interpreted and widely used as a marker taxon in palaeoecological and palaeobiogeographical syntheses (e. g. Ager & Walley 1977, Vörös 1986). Recent taxonomical work (splitting, reinterpretation: Cooper 1983, Alméras et al. 2007) however hints some doubt on the reliability of some of the conclusions of the above syntheses.

An even more troubling problem regards to the type species of *Hesperithyris*. When he introduced this new genus, Dubar (1942, pp. 78–80) definitely included *H. renierii* (Catullo, 1827) but, in a rather unusual way, he designated a variety of *renierii* ("*Hesperithyris renierii* var. *sinuosa*") as "genotype". It is true that the name of a variety, if it was published before 1961, comes to subspecies rank (ICZN 1999, Art. 45.6.4.), but it remains within the species where it was originally introduced. In this case the type species was evidently *H. renierii* (with CATULLO as author), as I stated elsewhere (VÖRÖS 1994, p. 358) and as it was written in the "Treatise" (LEE et al. 2006, p. 2096) in the form "*Terebratula renierii* CATULLO, 1827, var. *sinuosa* DUBAR, 1942". Therefore the criticism by ALMÉRAS et al. (2007, p. 106) against my above statement was not justified. As a matter of fact, the typical, Alpine–Appenninic *H. renierii* is rather different from DUBAR's subspecies *sinuosa*, which is less gibbose, subtriangular in outline and has very few, but strong plicae. Therefore, if the intention of the author was to confine the scope of *Hesperithyris* to the *sinuosa*-type forms, what was apparently accentuated by COOPER (1983), then CATULLO's *renierii* may represent only a morphologically marginal species of that genus. ALMÉRAS et al. (2007, pp. 105, 106) obviously reached at this conclusion and raised *sinuosa* at the species level and excluded CATULLO's *renierii* from *Hesperithyris*. However, at the same time, they indicated "*Terebratula renierii* (non CATULLO, sensu DUBAR) var. *sinuosa* DUBAR" as the type species of *Hesperithyris*. This is an unacceptable solution, because if one maintain *renierii* as a nominal type species he must keep its original author (CATULLO) as well. A correct procedure would be to raise *sinuosa* to species rank (as ALMÉRAS et al. 2007 in fact did it) and designate it as the type species of *Hesperithyris* (as ALMÉRAS et al. 2007 did it implicitly). However, this is a secondary designation, substituting the original designation, and this act should be clearly stated, with reference to the Article 70.3.2. of the ICZN (the case of misidentified type species), and cite together both the name previously cited as type species and the name of the species selected. But, in my opinion, this act would not "serve stability and universality", as required by the ICZN (l. c.).

In the reinterpreted *Hesperithyris*, ALMÉRAS et al. (2007) included mostly the North African species, more or less closely allied to *H. sinuosa* namely *H. termieri* (DUBAR, 1942), *H. atlantis* (DUBAR, 1942), *H. costata* (DUBAR, 1942), *H. marucchiensis* (DUBAR, 1942) and *H. hebbriensis* (DUBAR, 1942). On the other hand, "*Terebratula renierii* CATULLO, 1827" was transferred to *Merophricus*. Rather surprisingly, "*T. pacheia* UHLIG, 1879" and "*T. synophrys* UHLIG, 1879" were allowed to stay in *Hesperithyris*, although they are only anteriorly ribbed, therefore, according to the diagnosis by COOPER (1983, p. 113), stand closer to *Merophricus* than the almost entirely costate *renierii*.

Hesperithyris renierii (CATULLO, 1827)
Plate XIV: 13; Plate XV: 1, 2; Figure 69.

* 1827 *Terebratula Renierii* nob. – CATULLO, Saggio di Zoologia Fossile, p. 167, pl. V, figs i, l.
? 1865 *Terebratula fimbriaeformis* n., n. sp., – SCHAUROTH, Versteinerungen Coburg, p. 124, pl. II, fig. 5.
1869 *Terebratula Renierii.* Catullo. – ZITTEL, Central-Appenninen, p. 123, pl. XV, fig. 3.
v 1880 *Terebratula Renierii* Cat. – CANAVARI, Strati a Terebratula Aspasia, p. 343, pl. II, figs. 9, 10.
1890 *Terebratula Renieri* Cat. – TAUSCH, Grauen Kalke Süd-Alpen, p. 7 (partim), pl. II, figs. 12, 13 (non pl. II, figs. 9–11 and pl. III, fig. 3).
? 1896 *Terebratula Renieri* ? Cat. – GRECO, Rossano Calabro, p. 99, pl. I, fig. 3.
1903 *Terebratula Renierii* Cat. – CHOFFAT, Terebratula Renierii Cat. en Portugal, p. 117, fig. 1.
1923 *Terebratula Renieri* Cat. var. *timorensis* var. nov. – KRUMBECK, Palaeontologie von Timor, p. 59, pl. CLXXII, figs. 1–14.
? 1942 *Hesperithyris* cf. *Renierii* Catullo sp. – DUBAR, Térébratules et zeilléries multiplissées, p. 80, pl. IX, figs 2, 3.
? 1966 *"Terebratula" renierii* Cat. – CANTALUPPI, „Corso bianco" ad Est di Brescia, p. 117, pl. XVII, fig. 11.
v 1983 *Hesperithyris renierii* (Catullo, 1827) – VÖRÖS, Stratigraphic distribution, p. 35.
v 1997 *Hesperithyris renierii* (Catullo) – VÖRÖS, Jurassic brachiopods of Hungary, p. 16, Appendix: fig. 23.
? 2003 *Hesperithyris* ex gr. *renierii* (Catullo, 1827) – SIBLÍK, Salzkammergut, p. 72, fig. B.
v 2007 *Hesperithyris renierii* (Catullo, 1827) – VÖRÖS & DULAI, Transdanubian Range, p. 56, pl. II, fig. 34.

Material: 14 specimens of various state of preservation.

Localities	*Measurements (mm)*		
	L	*W*	*T*
Szentgál T-I/6	13.25	12.52	8.54
Középhát 15	24.49	23.85	17.34
Bocskor-hegy 2	18.67	16.33	14.31
Bocskor-hegy 13	27.76	27.83	18.88
Hamuháza 4	15.82	14.27	11.30
Hamuháza 8	23.76	20.16	17.79
Hamuháza 14	32.96	29.80	23.20

Description:

External characters: This is a medium to large *Hesperithyris* with elongated oval, sometimes transversely elongated outline. The apical angle can be measured rather arbitrarily, but it seems to vary between 80–90°. The maximum width is attained at about the middle of the length. The valves are very strongly and almost equally convex; the maximum convexity lies near the middle of the length, but the maximum convexity of the ventral valve is shifted posteriorly. The ventral umbo is gibbose, very massive, high and incurved. It is truncated by a large, permesothyrid foramen which is somewhat enlarged and resorbed transapically in larger (older) specimens. The delthyrium is concealed by the incurved beak. In lateral view, the lateral commissures are straight and start to be gently serrated anteriorly. The anterior commissure is rectimarginate or slightly uniplicate and bears a series of zigzag deflections of variable sharpness and amplitude, corresponding to the multiplication. The shells are multiplicated, except the very umbonal parts where the smoothnes may be due to subsequent erosion. The number of the radial plicae of various strength varies between 12 and 18.

Internal characters (Fig. 69): *Ventral valve*: The ventral umbo of the sectioned specimen was broken, therefore only vestiges of the pedicle collar were recorded. The thin deltidial plates are fused posteriorly, forming a concave plate, V-shaped in cross section. The delthyrial cavity is rounded subpentagonal in cross section. The hinge teeth are well developed and long; denticula are barely seen. *Dorsal valve*: The cardinal process and the whole structure of the umbonal part is masked by secondary callotest. The inner socket ridges and/or the outer hinge plates are buttressed by subvertical lamellae (corresponding to fulcral plates of COOPER 1983). The crura are indistinct; crural processes are high and inclined ventromedially. The descending branches seem to diverge strongly; the distal part of the loop is missing (dissolved ?).

Remarks:

H. renierii has been the type species of the genus *Hesperithyris*, since DUBAR (1942) designated a single variety "*Hesperithyris Renierii* var *sinuosa* nov. var." as "genotype". *H. renierii* (CATULLO, 1827) was regularly denoted as type species by several authors (COOPER 1983, VÖRÖS 1994, SIBLÍK 2003) and by the two editions of the "Treatise" (MUIR-WOOD 1965, LEE et al. 2006), because a *variety* in itself can not be a type *species*. Recently the variety (or subspecies) *sinuosa* was explicitly raised to species rank, and was secondarily designated as the type species of *Hesperithyris* by ALMÉRAS et al. (2007). At the same time, (1) the specimens figured by DUBAR (1942) as "*Hesperithyris* cf. *Renierii* CATULLO sp." were revised and identified as *H. termieri* (DUBAR, 1942), and (2) CATULLO's *renierii* (the classical Alpine–Appenninic form) was suggested to be transferred to *Merophricus* COOPER, 1983. ALMÉRAS et al. (2007) based their judgments on a detailed study of an abundant local material from North Africa, therefore their first act can duly be agreed. On the other hand, I can not accept to include *renierii* into *Merophricus*, because this genus was defined by COOPER (1983, pp. 113, 114) as embracing semicostate forms, whose "surface of anterior half to three-quarters radially costate", whereas *renierii* is entirely costate in most cases. Therefore I maintain to attribute *renierii* to *Hesperithyris*, which, even after the revision by ALMÉRAS et al. (2007), profusely contains densely ribbed, sometimes gibbose forms (*H. termieri, H. costata, H. marucchiensis,* all DUBAR, 1942) standing not very far from *renierii*.

The original figure of *H. renierii* given by CATULLO (l. c.) is not fully revealing but the ventral view clearly shows the wholly costate ornament. ZITTEL's (l. c.) figures are also not perfect, but here again, the ventral view exhibits the radial plicae running throughout the valve; the smooth umbonal area on the dorsal valve may possibly be due to secondary abrasion.

CANAVARI (l. c.) depicted several specimens of *H. renierii*, which I checked in the collection of the Pisa University; they excellently show the characters of the umbo and foramen and correspond well to my specimens from the Bakony.

The first really informative and impressive pictures of *H. renierii* were published by TAUSCH (l. c., pl. II, figs. 12, 13), though his other figures (pl. II, figs. 9–11) probably belong to *Lychnothyris rotzoana* (SCHAUROTH, 1865) or represent a very atypical, finely ribbed variant (pl. III, fig. 3). KRUMBECK (l. c.) gave a copious illustration of his *H. renierii* var. *timorensis*. In spite of the large present-day geographical distance, KRUMBECK's specimens seem to fit well into the range of variation of the Alpine–Appenninic *H. renierii*.

Some records of *H. renierii* are included in the above list of synonymy with question marks because they are supported by very poor figures (e. g. GRECO, l. c., CANTALUPPI, l. c.). It does not regard to the illustration by SIBLÍK (l. c.) what is fine, but shows an only partially ribbed specimen, tentatively assigned to *H. renierii*, with the mark *ex gr*. If the posterior smoothness of the specimen is due to the state of preservation (abrasion ?) it may belong to *H. renierii*. If the semicostate feature is genuine, the specimen may represent *Merophricus pacheia* (UHLIG, 1880) or *M. synophrys* (UHLIG, 1880). The record of *H. renierii* by DUBAR (1942, l. c., pl. IX, figs. 2, 3) is excellently illustrated, but was included by ALMÉRAS et al. (2007) into *H. termieri* (DUBAR, 1942), therefore I used question mark to indicate some reservations.

Other species of *Hesperithyris*, according to the revision by ALMÉRAS et al. (2007), besides the newly suggested type species *H. sinuosa* (DUBAR, 1942), are the following: *H. termieri* (DUBAR, 1942), *H. atlantis* (DUBAR, 1942), *H. costata* (DUBAR, 1942), *H. marucchiensis* (DUBAR, 1942) and *H. hebbriensis* (DUBAR, 1942). "*T. pacheia* UHLIG, 1879" and "*T. synophrys* UHLIG, 1879" were also included in *Hesperithyris*, however these only anteriorly ribbed forms may better belong to *Merophricus*, according to the diagnosis by COOPER (1983, p. 113).

An apparent, common feature of these North African species, deviating from *H. renierii*, is their lower and less gibbose beak. From among them, *H. sinuosa* is the most markedly different from *H. renierii*, because it is much less convex, subtriangular in outline and has very few, but strong plicae. The same holds partly true for *H. atlantis*, at least according to the figures by ALMÉRAS et al. (2007), although the original documentation by DUBAR (1942, pl. IV, figs. 13, 17) shows more densely plicated specimens. Similarly, a low number of plicae differentiates *H. hebbriensis* from *H. renierii*, but in this species the

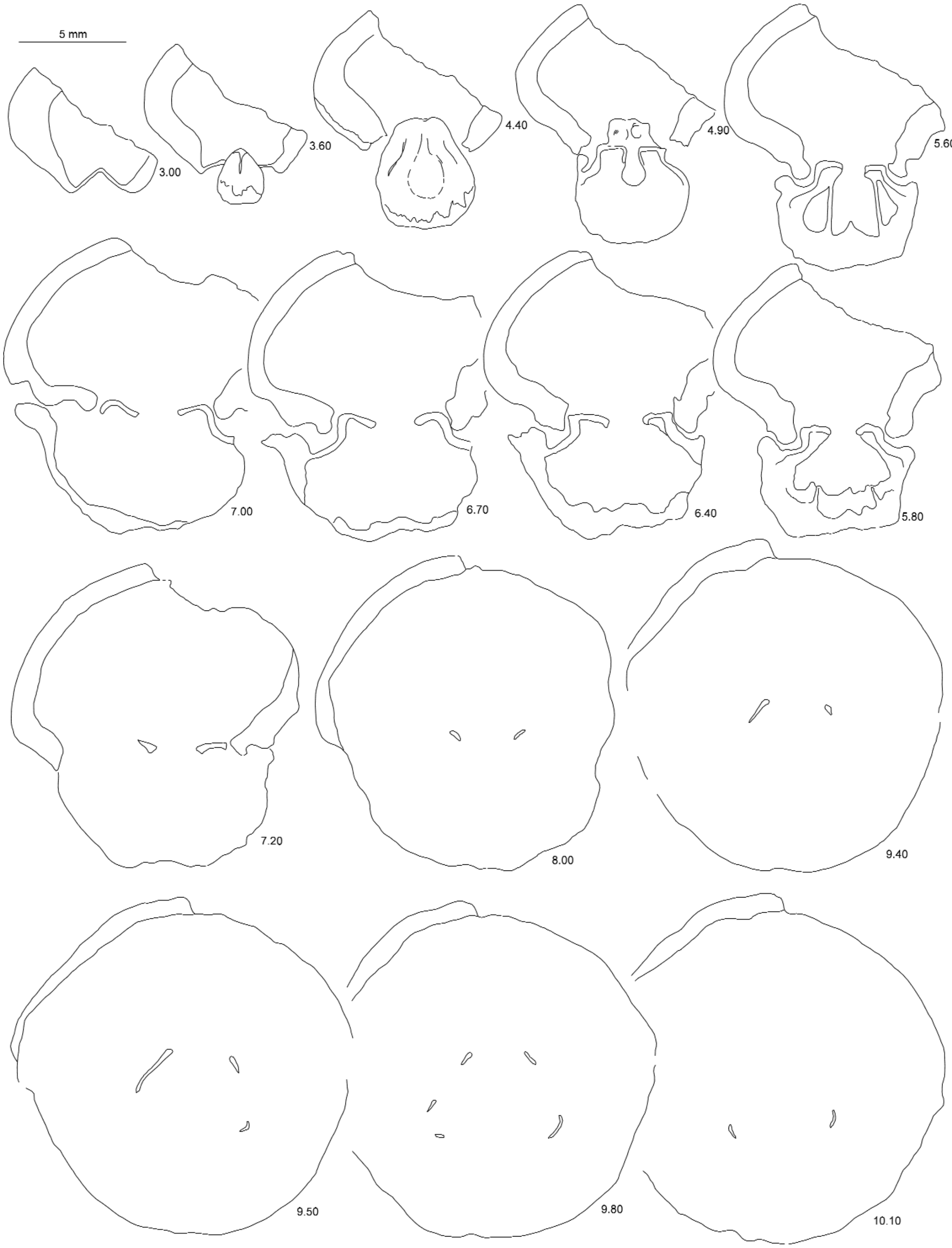


Figure 69. *Hesperithyris renierii* (Catullo, 1827). Fifteen transverse serial sections through the posterior part of a specimen from Szentgál, Gombáspuszta, Fg–IV, Bed 5, Pliensbachian, Ibex Zone. M 2008.506.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 23.2 mm

plicae are restricted to the anterior shell region what may hint to the attribution of *H. hebbriensis* to *Merophricus*. *H. marucchiensis* differs from *H. renierii* by its very numerous and fine ribs. It is to be noted that Alméras et al. (2007) included only one specimen of *H. marucchiensis* (pl. 6, fig. 9 in Dubar 1942) into *Hesperithyris*.

The other two nominal species of *Hesperithyris*, listed by Alméras et al. (2007), seem to stand rather close to *H. renierii*. *H. costata* differs in having more elongated outline and rather sharp plicae. *H. termieri* appears to be the most similar to *H. renierii*, in the number and strength of the plicae. They seem to differ in the height and gibbosity of the umbo, but even in this feature, there are transitions. It is worth mentioning that one of the specimens of *H. renierii* figured by TAUSCH (l. c., pl. II, fig. 12) and KRUMBECK's (l. c.) record were included to the synonymy of *Hesperithyris termieri* (DUBAR, 1942) by ALMÉRAS et al. (2007) and they did so with the record of *Hesperithyris* cf. *renierii* by DUBAR (l. c., pl. IX, figs. 2, 3), what I tentatively listed in my synonymy of *H. renierii*. This clearly shows that *H. termieri* and *H. renierii* stands rather close, and implies the possibility to unite these two species, in which case *H. renierii* would have the priority.

Distribution:

Sinemurian to Pliensbachian of the Southern and Central Apennines and the Southern Alps (Italy), the Northern Calcareous Alps (Austria), the Bakony Mts (Hungary), Timor and probably of the Atlas Mountains (Morocco, Algeria). The Pliensbachian specimens of the Bakony came from five localities, from the Jamesoni to the Margaritatus Zone (Tables 13, 14).

Hesperithyris cf. *costata* (DUBAR, 1942)
Plate XV: 5.

* 1942 *Terebratula costata* n. sp. – DUBAR, Térébratules et zeilléries multiplissées, p. 68, pl. V, figs 12-14, 15, 19.
v 1983 *Hesperithyris* ? cf. *costata* (Dubar, 1942) – VÖRÖS, Stratigraphic distribution, p. 35.
v 2007 *Hesperithyris* ? cf. *costata* (Dubar, 1942) – VÖRÖS & DULAI, Transdanubian Range, p. 56.

Material: One incomplete ventral valve.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser 25	21.93	19.17	?	?

Description:

External characters: This is a medium-sized *Hesperithyris* with elongated oval outline. The apical angle is around 65°. The maximum width is attained at about the anterior one-third of the length. The ventral valve is rather strongly but uniformly convex; the maximum convexity lies near the middle of the length. The ventral umbo is broken but it seems to be high and massive, and bears blunt beak ridges. The umbo and delthyrium are missing. The lateral commissure seems to be straight and is gently serrated anteriorly. The anterior commissure is poorly preserved but it seems to be rectimarginate and shows a series of rather sharp zigzag deflections. The valve is rather strongly multiplicated throughout; it bears 10 plicae, V-shaped in cross section.

Internal characters: These were not studied by serial sectioning because of the paucity of the material (a single valve).

Remarks:

H. costata is a rare species of *Hesperithyris*, first described from Morocco by DUBAR (1942) and now from the Bakony Mts. In my previous works I listed this species with question mark after the generic name, but in their revision, ALMÉRAS et al. (2007) definitely attributed it to *Hesperithyris*, therefore here I omitted the query.

H. renierii (CATULLO, 1827) is the most closely similar species to *H. costata*, but the latter is more elongated and has fewer and sharper ribs (or plicae).

Distribution:

Sinemurian of Morocco and Pliensbachian of the Bakony Mts, where the specimen came from the Kericser section, from the Ibex Zone (Tables 13, 14).

Family Lobothyrididae MAKRIDIN, 1964
Subfamily Lobothyridinae MAKRIDIN, 1964

Genus *Lobothyris* BUCKMAN, 1918

Lobothyris punctata (J. SOWERBY, 1813)
Plate XV: 6.

* 1813 *Terebratula punctata.* – J. SOWERBY, Mineral Conchology, p. 46, pl. XV, fig. 4.
1885 *Terebratula punctata,* Sow. – PARONA, Saltrio e Arzo, p. 249 (partim), pl. III, figs. 16–25, pl. IV, figs. 1–4, 7, 9, 11–14 (non figs. 5, 6, 8, 15–19).

? 1886 *Terebratula punctata* Sow. – Winkler, Untern Lias bairisch. Alpen, p. 9 (partim), pl. II, fig. 3 (non figs. 4, 5)
v 1887 *Terebratula punctata* Sow. – Di Stefano, Lias inferiore di Taormina, p. 82, pl. III, figs. 21–30.
v 1889 *Terebratula punctata* Sow. – Geyer, Hierlatz, p. 1 (partim), pl. I, figs. 1, 2, 12-16 (non figs. 3–11).
1889 *Terebratula punctata*. Sow. – Radovanović, Liasablagerungen von Rgotina, p. 75, pl. I, figs 9–11.
1890 *Terebratula punctata* Sow. 1812. – Tausch, Grauen Kalke Süd-Alpen, p. 9, pl. II, figs 2–6.
v 1891 *Terebratula punctata* Sow. – Di Stefano, M. San Giuliano, p. 225 (partim).
? 1892 *Terebratula punctata*, Sow. – Fucini, Longobucco, p. 27, pl. I, fig. 1.
1893 *Terebratula punctata*, Sow. – Fucini, Alpi Apuane, p. 303, pl. IV, figs. 10, 11.
? 1910 *Terebratula punctata* Sow. – Vinassa de Regny, Prealpi dell'Arzino, p. 184, pl. VII, figs. 12, 13.
? 1911 *Terebratula punctata* Sowerby – Flamand, Haut-Pays de l'Oranie et Sahara, p. 871, pl. III, figs. 13a, b.
v 1913 *Terebratula punctata* Sow. – Vadász, Liasfossilien aus Kleinasien, p. 68.
v ? 1924 *Terebratula punctata* Sow. – Maugeri-Patané, S. Teresa in Riva, p. 30, pl. I, fig. 6.
1925 *Terebratula punctata* Sow. – Dubar, Lias des Pyrénées, p. 289, pl. III, fig. 3.
? 1931 *Terebratula punctata*, Sow. – Cohen, Vorbalkan von Tetewen, p. 64, pl. I, fig. 8.
1934 *Terebratula punctata* Sow. – Moisseiev, Jur. Brach. Crimea and Caucasus, p. 93, pl. IX, figs. 13–23.
? 1953 *Terebratula punctata* Sow. – Rossi Ronchetti & Brena, Lias del Monte Albenza, p. 119, pl. X, fig. 1.
1964 *Lobothyris punctata* (Sow.) – Sacchi Vialli, Revisione Saltrio V., p. 14, pl. III, figs. 1–4.
? 1964 *Lobothyris punctata* (Sow.) – Răileanu & Iordan, Brach. Lias. zona Svinița, p. 12, pl. IV, fig. 17.
1966 *Lobothyris punctata* (Sow.) – Bizon et al., Bouleiceras nitescens Cordill. Bétiques, p. 902, pl. XXVIIa, fig. 1.
1966 *Lobothyris punctata* (Sowerby, 1812) – Siblík, Kostelec, p. 138, pl. I, fig. 1.
? 1967 *Lobothyris punctata* (Sow.) – Preda, Brachiopod. jur. Roşia, p. 52, pl. V, fig. 6.
1969 *Lobothyris punctata* (Sowerby) – Delance, Brach. lias. Nord-Est del'Espagne, p. 28, pl. B, fig. 2.
1975 *Lobothyris punctata* (Sowerby 1813) – Comas-Rengifo & Goy, Ribarredonda, p. 316, pl. 2, fig. 8.
1981 *Lobothyris punctata* (J. Sowerby), 1813 – Giovannoni, Revisione critica, p. 219, pl. 7, figs. 1–3.
1982 *Lobothyris punctata* (Sowerby) – Alméras & Elmi, Ammonit. Brachiopod. jurassiques Méditerranée Occ., p. 171, pl. 1, fig. 11.
1982 *Lobothyris punctata* (J. Sowerby, 1812) – Alméras & Moulan, Provence, p. 89, pl. 5, figs. 1–8.
v 1983 *Lobothyris punctata* (Sowerby, 1812) s. l. – Vörös, Stratigraphic distribution, p. 35.
v 1987 *Lobothyris* cf. *punctata* (Sow.) – Vörös et al., Panormide, p. 245.
1990 *Lobothyris punctata* (J. Sowerby, 1813) – Ager, British Liassic Terebratulida, p. 13, pl. I, fig. 1.
v 1992 *Lobothyris punctata* (Sowerby, 1812) – Dulai, Lókút Hill, p. 65, text-fig. 23, pl. IV, fig. 2.
? 1994 *Lobothyris punctata* (J. Sowerby, 1813) – Gaković & Tchoumatchenco, Herzegovina, p. 24, pl. III, fig. 7.
v 1997 *Lobothyris punctata* (Sowerby) – Vörös, Jurassic brachiopods of Hungary, p. 25, Appendix: fig. 59.
1999 *Lobothyris punctata* (J. Sowerby 1813) – Sulser, Brachiopoden der Schweiz, p. 179 + fig. (unnumbered).
? 1999 *Lobothyris punctata* (Sowerby, 1812) – I□esta, Catálogo de braquiópodos, p. 26, pl. VII, fig. 5.
2003 *Lobothyris punctata* (Sowerby) – Elmi et al., Grands bivalves en Algérie occidentale, p. 701, fig. 4/13.
2003 *Lobothyris punctata* (Sow.) – Siblík, Hallstatt, p. 69, pl. I, fig. 9.
v 2003 *Lobothyris punctata* (Sowerby, 1812) – Vörös et al., Schafberg, p. 75, pl. VII, figs. 18–20.
v 2003 *Lobothyris punctata* (Sowerby, 1812) – Dulai, Hettangian and Early Sinemurian, p. 74, pl. XIII, figs. 7–9.
2005 *Lobothyris punctata* (J. Sowerby 1812) – Sulser & Furrer, Lias von Arzo, p. 37, figs. 26, 27.
2007 *Lobothyris punctata* (J. Sowerby, 1812) – Alméras et al., Algerie Occidentale, p. 88, pl. 6, figs. 5–13.
v 2007 *Lobothyris punctata* (Sowerby, 1813) – Vörös & Dulai, Transdanubian Range, p. 56.
2008 *Lobothyris punctata* (Sowerby, 1813) – Baeza-Carratalá, Patrimonio J. de Cisneros, p. 404, pl. XXXIV, figs. 2, 3.

Material: One well preserved double valve.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser 7	13.59	11.58	6.60	0

Description:

External characters: This is a small-sized *Lobothyris* with elongated oval outline. The apical angle is about 80°. The maximum width is attained at around the anterior one-third of the length. The valves are moderately and almost equally convex; the maximum convexity lies near the middle of the length. The beak is small, erect. The foramen is damaged but seems to be mesothyrid. The delthyrium is concealed by matrix. In lateral view, the lateral commissures are straight; the anterior commissure is rectimarginate. The surface of the shells is smooth, except a few growth rugae.

Internal characters: These were not studied by serial sectioning because of the paucity of the material (a single double valve).

Remarks:

L. punctata is, perhaps the most widespread and most frequently cited Early Jurassic brachiopod species. This is obviously connected to its rather generalized "*Terebratula*" shape, what implies that some of its records may be erroneous. A critical revision of *L. punctata* is beyond the scope of the present monograph, and it is unnecessary because it was done recently by prominent brachiopod workers, e. g. ALMÉRAS & MOULAN (l. c.) and AGER (l. c.). The single specimen from the Margaritatus Zone of the Bakony fits well into the range of variation of *L. punctata* outlined by the above authors.

In the above list of synonymy I focussed on the South European – Mediterranean records of *L. punctata* and, besides these, from the plentiful items from NW Europe, I cited only the original description by SOWERBY (l. c.) and the latest interpretation by AGER (l. c.). Nevertheless, the list is rather long, but still it is far from being complete.

From among the *Lobothyris* species, frequent in the Alpine region, *L. andleri* (OPPEL, 1861) and *L. ovatissima* (QUENSTEDT, 1858) stand the closest to *L. punctata*. GEYER (l. c.) separated them only as varieties, and DI STEFANO (1891, l. c.) even included them to *punctata* (as I was ascertained by inspecting the originals in the collection of the Palermo University). However, in my opinion, it is justified to keep them as separate species, because *L. andleri* is regularly subpentagonal, while *L. ovatissima* shows marked anterolateral corners, in contrast to the oval outline of *L. punctata*. Remarkably, SUČIĆ-PROTIĆ (1971, p. 27) considered *andleri* so different from *punctata* that she included *andleri* to her new genus *Serbiothyris*. On the basis of these criteria, some of the specimens figured by PARONA (l. c.) as *punctata* belong rather to *L. andleri*.

Many items of the synonymy are queried. Some of the specimens figured by WINKLER (l. c.) are too sharply uniplicate, or aberrant. FUCINI's (1892, l. c.) and RĂILEANU & IORDAN's (l. c.) specimens are too much convex. VINASSA DE REGNY's (l. c.) specimens are very small and circular. The specimen figured by I□ESTA (l. c.) shows a marked dorsal depression. The items by FLAMAND (l. c.), MAUGERI-PATANÉ (l. c.), COHEN (l. c.), ROSSI RONCHETTI & BRENA (l. c.), PREDA (l. c.) and GAKOVIĆ & TCHOUMATCHENCO (l. c.) portray poorly figured or poorly preserved specimens.

There is some inconsistency between different authors in the date of publication of this species. Many of them cited 1812 as valid date, as I did also in my earlier papers, others used the 1813 date. The root of the problem was that the first volume of "The Mineral Conchology of Great Britain" by J. SOWERBY was dated as 1812–1815. The work probably appeared in several parts in different years within the above time interval, but these details can not be deciphered from the complete volume in an average library. Therefore, in this case, I relied upon the standpoint of a leading authority (AGER 1990, p. 13) and the "revised Treatise" (LEE et al. 2006) who cited *L. punctata* (SOWERBY) with the date 1813.

Distribution:

Sinemurian and Pliensbachian throughout Europe, including the southern countries from Spain to the Crimea, and the Atlas Mountains. The single specimen from the Bakony came from the Kericser section, from the Margaritatus Zone (Tables 13, 14).

Genus ***Rhapidothyris*** TULUWEIT, 1965

This genus was introduced by TULUWEIT (1965, p. 72), who characterized *Rhapidothyris* with sulcate anterior commissure and strongly ventrally concave, thin hinge plates, which attach to the deeper (dorsal) part of the inner socket ridges. Besides his two new species, *R. arciferens* (the type species) and *R. tendinea*, TULUWEIT (l. c.) included also "*Terebratula reversa* Ager, 1956" by its elongate outline and sulcate shape. This was endorsed by AGER (1990, p. 34). The scope of the genus *Rhapidothyris* was significantly enlarged by TCHORSZHEVSKY (1985) with the insertion of further two species: *R. ovimontana* (BÖSE, 1898) and *R. vialovi* TCHORSZHEVSKY, 1985 from the Alpine–Carpathian region. TCHORSZHEVSKY (l. c.) gave a very detailed illustration of the internal morphology of *Rhapidothyris* and stressed the deeply concave character of the hinge plates, and the occasional presence of "dorsal mantle lamellae". In the definition of *Viallithyris* (VÖRÖS 1978, p. 61) I used the term "brachidium support" for this secondary structure of probably spicula skeletal origin. After all, on the basis of its cardinalia, principally the concave hinge plates, *Rhapidothyris* remains systematically close to *Lobothyris*, as it was stated by AGER (1990) and accepted in the "revised Treatise" (LEE et al. 2006).

The sulcate nature of *Rhapidothyris* raises an interesting case of isochronous homoeomorphy to several other sulcate taxa of the Mediterranean terebratulid brachiopods (Fig. 70).

(1) The most obvious example is connected to the Nucleatidae, as it was also noted by COOPER (1983, p. 143) and AGER (1990, p. 34). This family is represented in the Early Jurassic first of all by *Linguithyris* which is, typically, laterally expanded and deeply sulcate, but some variants may be reminiscent of *Rhapidothyris*. However, even in these cases, the internal features, especially the very simple, narrow hinge plates, significantly differ from those of *Rhapidothyris*.

(2) Another homoeomorphic sulcate genus is *Viallithyris* VÖRÖS, 1978 which is really very similar externally to *Rhapidothyris*, but internally differs above all by its wide, horizontal hinge plates and crural bases given off dorsally.

(3) A third, curious homoeomorphic group is formed by "*Terebratula* (*Waldheimia*)" *furlana* ZITTEL, 1869 and its variants *elongata, abreviata* and *angustata* described by CANAVARI (1880). Although the details of its internal morphology remained unknown, ZITTEL's *furlana* is definitely not a zeilleriid, but a short-looped terebratulid, as I was convinced by the examination of the original specimen in the Bayerische Staatssammlung, München. CANAVARI's originals, copious specimens from all three of the variants, were studied in the collection of the Pisa University. The three variants are not far from each other in their external morphology; their difference is mirrored by their names: *elongata* is the longest, *abreviata* is the

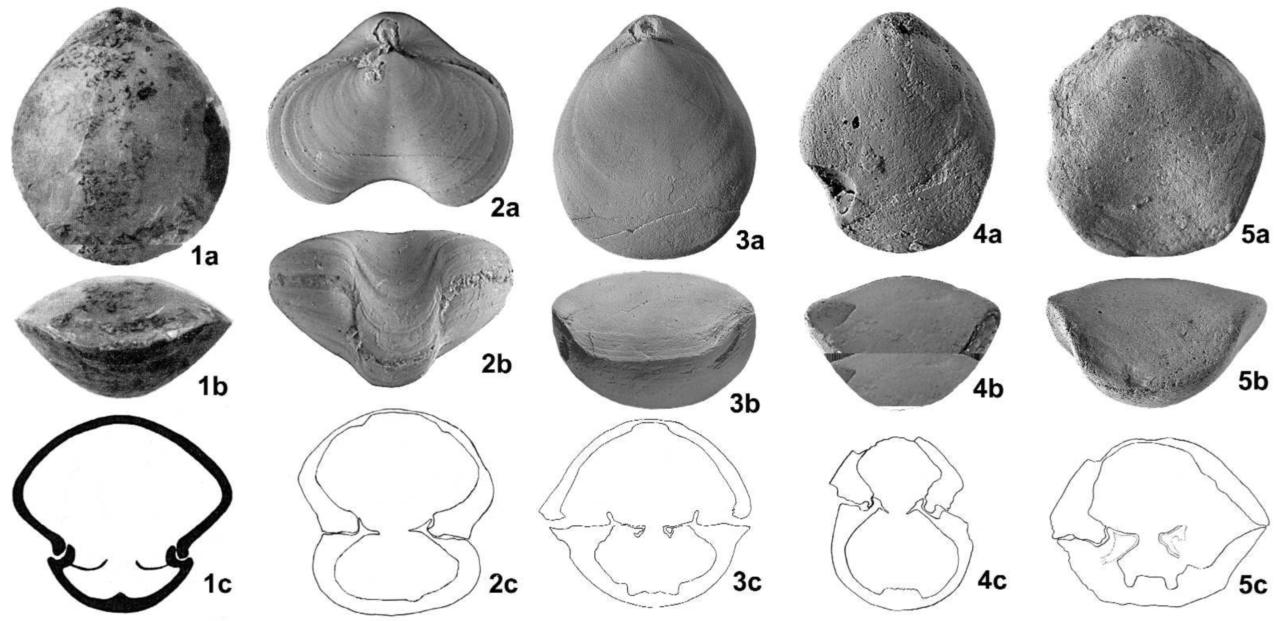


Figure 70. Isochronous homoeomorphy between far-related, sulcate Pliensbachian terebratulides, illustrated by their dorsal (a) and anterior (b) views (natural size) and representative cross sections showing the dissimilar nature of their hinge plates (2× magnification). 1a–c: *Rhapidothyris* (after Tuluweit 1965, pl. 8: 4, fig. 13); 2a–c: *Linguithyris* (this work, pl. XXVI: 3, fig. 93), 3a–c: *Viallithyris* (this work, pl. XVI: 8, fig. 78), 4a–c: "*Terebratula* (*Waldheimia*)" *furlana* Zittel, 1869 var. *elongata* Canavari, 1880 (this work, new), 5a–c: "*Terebratula* (*Waldheimia*)" *furlana* Zittel, 1869 var. *angustata* Canavari, 1880 (this work, figs. 74, 75)

shortest, and *angustata*, tending to be subpentagonal in outline, is between the first two. The variant *angustata* seems to stand the closest to Zittel's *furlana*. The whole group shows apparent similarity to *Rhapidothyris*. I received typical specimens from the three variants for making serial sections, but only two sectioning (from *elongata* and *angustata*) were successful. It was revealed that these, externally similar forms are markedly different in their internal morphology. The cardinalia and loop of the variant *elongata* can be best compared to those of the Nucleatidae (especially of *Linguithyris aspasia*, see in the present work) particularly as the very narrow and dorsomedially inclined hinge plates are regarded. The umbonal sections of the variant *angustata* are masked by secondary shell material, but yet it is clearly seen that the hinge plates are wide, bend deeply toward the floor of the dorsal valve and give rise to dorsally pendant crural plates and crural bases. This structure is common in the higher Jurassic (e. g. Muirwoodellidae) while it is rare in Early Jurassic terebratulids, except *Viallithyris*, and a new genus, exemplified by the species "*T.*" *cerasulum* (Zittel, 1869) in the present work. After all, it is concluded that the "variants" *elongata* and *angustata* should belong to different families but, at the same time, both are distinctly different from the externally homoeomorphic *Rhapidothyris* which has ventrally concave hinge plates.

Although *Rhapidothyris* was first recognized and described from the NW European faunal province (Germany: Tuluweit 1965, Southern England: Ager 1956, 1990), it seems that it is more diversely represented in the Mediterranean province. In addition to Tchorszhevsky's (l. c.) records of *R. ovimontana* and *R. vialovi*, in the present work I attribute two classical Alpine forms, *R. beyrichi* (Oppel, 1861) and *R. delorenzoi* (Böse, 1900), and a new species from the Bakony to *Rhapidothyris*.

Rhapidothyris cf. *ovimontana* (Böse, 1898)
Plate XVI: 1.

v * 1898 *Terebratula ovimontana* nov. sp. – Böse, Brachiopodenfauna der östlichen Nordalpen, p. 169, pl. XII, figs. 1, 2.
1964 *"Terebratula" beyrichi* Oppel, 1861. – Siblík, Lias. Brach. Belanské Doliny, p. 161, text-fig. 1, pl. VII, fig. 1.
v ? 1976 *"Terebratula" ovimontana* Böse – Vigh in Fülöp, Liassic Brach. Tata, p. 34,
v 1983 *Rhapidothyris* ? cf. *ovimontana* (Böse, 1898) – Vörös, Stratigraphic distribution, p. 35.
1985 *Rhapidothyris ovimontana* (Böse, 1898) – Tchorszhevsky, Rhapidothyris, p. 37, fig. 1, pl. (unnumbered), fig. 1.
1988 *Lobothyris* aff. *gozzanensis* (Parona, 1880) – I□esta, Cerro de la Cruz, p. 57, pl. II, fig. 6.
1999 *Lobothyris* aff. *gozzanensis* (Parona, 1880) – I□esta, Catálogo de braquiópodos, p. 26, pl. VII, fig. 4.
2003 *Linguithyris beyrichi* (Oppel) – Siblík, Hallstatt, p. 69, pl. I, fig. 10.
v 2003 *Rhapidothyris* ? cf. *ovimontana* (Böse, 1898) – Vörös et al., Schafberg, p. 65.
v ? 2003 *Rhapidothyris* ? *ovimontana* (Böse, 1898) – Dulai, Hettangian and Early Sinemurian, p. 83, pl. XX, figs. 7–9.
v 2007 *Rhapidothyris* ? cf. *ovimontana* (Böse, 1898) – Vörös & Dulai, Transdanubian Range, p. 56.

Material: One, rather well preserved double valve.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser II k	17.64	14.08	10.49	3.41

Description:

External characters: This is a medium-sized *Rhapidothyris* with elongated oval outline. The apical angle is about 90°. The valves are moderately convex; the maximum convexity lies near the middle of the length; the ventral valve is more inflated posteriorly. The beak is moderately high, slightly incurved. The foramen seems to be mesothyrid. The delthyrium is low but covered by matrix. Beak ridges are indistinct. In lateral view, the lateral commissures are gently arched dorsally; they join with a continuous curve to the unisulcate anterior commissure. The sinus is a little asymmetrically but uniformly arched; it is moderately wide; it occupies nearly the two-third of the width of the shell. Definite sulcus and fold are not developed. The surface of the shells is almost smooth except the numerous growth lines.

Internal characters: These were not studied by serial sectioning on the Bakony material because of the paucity of specimens (a single double valve).

Remarks:

I examined the original specimens figured by Böse (l. c.) in the Bayerische Statssammlung, München. They do not show any trace of dental plates, mentioned by Böse, what is in accordance with the conclusion drawn by Böse on the basis of the loop characters, that *ovimontana* belongs to the short-looped terebratulids. The Bakony specimen seems to fit well to the range of variation of Böse's originals. When I first saw those specimens, I had the impression that, in its external features, *ovimontana* stands somehow between *Viallithyris gozzanensis* (Parona, 1880) and "*Terebratula* (*Waldheimia*)" *furlana* Zittel, 1869 var. *elongata* Canavari, 1880. It is known, that *Viallithyris* has peculiar cardinalia with wide, horizontal hinge plates and crural bases given off dorsally (see Vörös 1978 and Fig. 70-3c in this monograph). On the other hand, a topotypical specimen of the mentioned variant *elongata* was sectioned and now it is clear that it is definitely not a zeilleriid, but a short-looped terebratulid, with reduced hinge plates (Fig. 70-4c), reminding those of *Linguithyris*. In order to avoid the pitfall of homoeomorphy discussed previously, I made some sections across the umbonal part of a specimen of *R. ovimontana*, what I collected from the type area (Meislalm, not far from Schafberg, Upper Austria) (Fig. 71). They clearly show the wide and deeply concave hinge plates grown from the lower (dorsal) part of the inner socket ridges, what is the diagnostic feature of the genus *Rhapidothyris*.

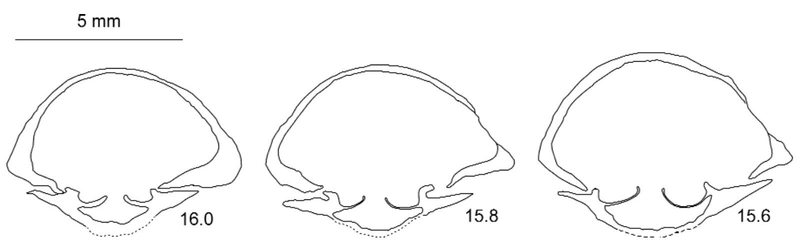


Figure 71. *Rhapidothyris* cf. *ovimontana* (Böse, 1898). Three transverse serial sections through the posterior part of a specimen from Meislalm, Schafberg area, Upper Austria, Pliensbachian. M 2008.507.1. The umbonal part was broken off, therefore the original length of the specimen is unknown and the distances are given from the anterior end of shell in mm

Some items of the above list of synonymies (Vigh in Fülöp l. c., Dulai l. c.) are queried because the respective specimens are rather marginal members of the range of variation of *R. ovimontana*, and without knowledge on their internal features, even their generic attribution is doubtful.

The specimens figured by Siblík (1964 and 2003, l. c.) as *beyrichi* (attributed to "*Terebratula*" and *Linguithyris*, respectively), on the basis of their elongate oval outline and weak sinus, probably belong to *R. ovimontana*, since *R. beyrichi* has a subpentagonal outline and a deep sinus.

Iñesta's (1988, 1999, l. c.) records of "*Lobothyris* aff. *gozzanensis*" show the same general shape as *R. ovimontana*. Due to the mentioned homoeomorphy, externally they may be compared to *Viallithyris gozzanensis* (Parona, 1880). In fact, Mr. Iñesta showed me his specimens in the early 1980's and at those times I supported this identification. However, later he made and published serial sections (Iñesta 1988, l. c.) showing the lobothyrid hinge plates. The ventrally concave hinge plates almost touching the floor of the dorsal valve, shown in these figures, confirm the attribution of the specimens to the genus *Rhapidothyris*, because *Viallithyris* has quite different internal features.

Distribution:

Sinemurian and Pliensbachian of the Northern Calcareous Alps (Austria), the Carpathians (Slovakia, Ukrainia), the Bakony and Gerecse Mts (Hungary), and the Betic Cordilleras (Spain). The single specimen from the Bakony came from the Kericser section, loose from the Ibex or Davoei Zone (Tables 13, 14).

Rhapidothyris delorenzoi (Böse, 1900)
Plate XV: 7.

v * 1900 *Terebratula De Lorenzoi* nov. sp. – Böse & Schlosser, Südtirol, p. 181, pl. XVII, figs. 7, 8.
1912 *Terebratula (Dictyothyris)* ? cf. *De Lorenzoi* Böse – Haas, Ballino, p. 263, pl. XIX, fig. 30.
v 1921 *Terebratula interamnensis* Canavari in sch. – Franceschi, Appennino Centrale, p. 225, pl. I, fig. 8.
? 1936 *Terebratula* cfr. *De Lorenzoi* Böse e Schlosser – Ramaccioni, Monte Cucco, p. 178, pl. VII, fig. 13.
v 1983 *Viallithyris* ? *delorenzoi* (Böse, 1900) – Vörös, Stratigraphic distribution, p. 35.
v 2007 *Viallithyris* ? *delorenzoi* (Böse, 1900) – Vörös & Dulai, Transdanubian Range, p. 56, pl. II, fig. 24.
2008 *Rhapidothyris delorenzoi* (Böse in Böse & Schlosser, 1900) – Baeza-Carratalá, Patrimonio J. de Cisneros, p. 417, pl. XXXIV, figs. 4, 5; pl. XXXV, fig. 1.

Material: One, rather well preserved double valve.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser 6	27.50	25.05	14.58	6.97

Description:

External characters: This is a large *Rhapidothyris* with subcircular outline. The apical angle is about 100°. The valves are moderately and almost equally convex; the maximum convexity lies near the middle of the length. The beak is rather high, slightly incurved. The foramen is incomplete but seems to be permesothyrid. The delthyrium is barely visible but seems to be narrow and covered by a symphytium. The beak ridges are blunt. In lateral view, the lateral commissures are slightly sinuous; they join with a continuous curve to the plicosulcate anterior commissure. The anterior part of the specimen is a little distorted and asymmetrical: the sinus on the anatomically left side is more strongly projected ventrally. Between the two sinuses there is a rather wide plica, the top of which remains well below the plane of the lateral commissures. The surface of the shells is almost smooth except some irregular growth lines.

Internal characters: These were not studied by serial sectioning because of the paucity of specimens (a single double valve).

Remarks:

This is a very peculiar species, unique among Early Jurassic terebratulids by its distinctive bifid sulcation. There are some similar forms in the Middle Jurassic, e. g. "*Terebratula*" *rossii* Canavari, 1880, but the generic name *Dictyothyris* may not be applied to them because they lack the reticulate ornamentation of that genus. In my previous works (Vörös 1983b, 1997, Vörös & Dulai 2007), without knowing the internal features of my single specimen, I tentatively placed *delorenzoi* to *Viallithyris* on the basis of its general shape and wide, angular sinus. Recently Baeza-Carratalá (l. c.) was successful to reveal the interior of this species by nice serial sections, showing the deeply concave hinge plates, and now it is clear that *delorenzoi* belongs to the genus *Rhapidothyris*.

The specimens of "*Terebratula*" *interamnensis*, figured by Franceschi (l. c.) were inspected in the collection of the Pisa University and they fit well into the species *delorenzoi*. The name *interamnensis* was given by Canavari probably in the 1880's, but since it was a manuscript name, first published by Franceschi (1921), it may not obtain priority.

Ramaccioni's (l. c.) record of *delorenzoi* is very doubtful, because the figured specimen is very stout, bears strong beak ridges and the internal plica of the plicosulcate anterior commissure is very high.

Distribution:

Pliensbachian of the Central Apennines and the Southern Alps (Italy), the Bakony Mts (Hungary), and the Betic Cordilleras (Spain). The Pliensbachian specimen of the Bakony came from the Kericser section, from the Spinatum Zone (Tables 13, 14).

Rhapidothyris beyrichi (Oppel, 1861)
Plate XVI: 2; Figures 72, 73.

v * 1861 *Terebratula Beyrichi* Opp. (*Waldheimia*?) – Oppel, Brachiopoden des unteren Lias, p. 539, pl. XI, fig. 3.
v 1889 *Terebratula Beyrichi* Opp. – Geyer, Hierlatz, p. 12, pl. II, figs. 4–8.
? 1934 *Glossothyris beyrichi* Opp. – Moisseiev, Jur. Brach. Crimea and Caucasus, p. 128, pl. XVII, figs. 20–23.
? 1936 *Terebratula Beyrichi* Opp. – Ramaccioni, Monte Cucco, p. 178, pl. VII, fig. 7.
? 1943 *Glossothyris* (?) *beyrichi* Opp. – Vigh, Gerecse, p. 335, pl. II, fig. 3.
? 1960 *Glossothyris beyrichi* Opp. – Fülöp et al., Vértes, p. 18, pl. I, fig. 2.
non 1964 *"Terebratula" beyrichi* Oppel, 1861. – Siblík, Lias. Brach. Belanské Doliny, p. 161, text-fig. 1, pl. VII, fig. 1.

v 1983 *Rhapidothyris* ? n. sp., aff. *beyrichi* (Oppel, 1861) – Vörös, Stratigraphic distribution, p. 35 (partim).
1999 *Linguithyris beyrichi* (Oppel, 1861) – Böhm et al., Adnet, p. 201, pl. 30, fig. 9.
non 2003 *Linguithyris beyrichi* (Oppel) – Siblík, Hallstatt, p. 69, pl. I, fig. 10.
v non 2003 *Rhapidothyris* ? cf. *beyrichi* (Oppel, 1861) – Dulai, Hettangian and Early Sinemurian, p. 81, pl. XX, figs. 1–3, 4–6.
v 2007 *Rhapidothyris* ? *beyrichi* (Oppel, 1861) – Vörös & Dulai, Transdanubian Range, p. 54, pl. I, fig. 31.
v 2007 *Rhapidothyris* ? aff. *beyrichi* (Oppel, 1861) – Vörös & Dulai, Transdanubian Range, p. 56 (partim).

Material: 6, partly incomplete double valves.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser 7	10.7	10.9	5.9	2.8
	14.1	13.2	8.3	5.7
	14.4	14.7	7.8	5.8
Kericser 8	15.0	14.0	7.9	5.7

Description:

External characters: This is a medium-sized *Rhapidothyris* with rounded subtrigonal to subpentagonal outline. The apical angle varies between 100–110°. The maximum width is attained at around the middle of the length. The valves are moderately convex; the maximum convexity lies in the posterior third of the ventral valve, while it is placed anteriorly in the dorsal valve. The beak is moderately high, slightly incurved. The foramen seems to be mesothyrid. The delthyrium is concealed by matrix. There are weak and short, but definite beak ridges. In lateral view, the lateral commissures are gently sinuous, almost straight; they join with an abrupt bend to the unisulcate anterior commissure. The sinus is uniformly arched and wide, it occupies nearly the two-third of the width of the shell. A shallow sulcus in the dorsal valve and a corresponding fold in the ventral valve develop anteriorly. The linguiform extension is gently projected ventrally but does not surpass the length of the double valve. The surface of the shells is almost smooth.

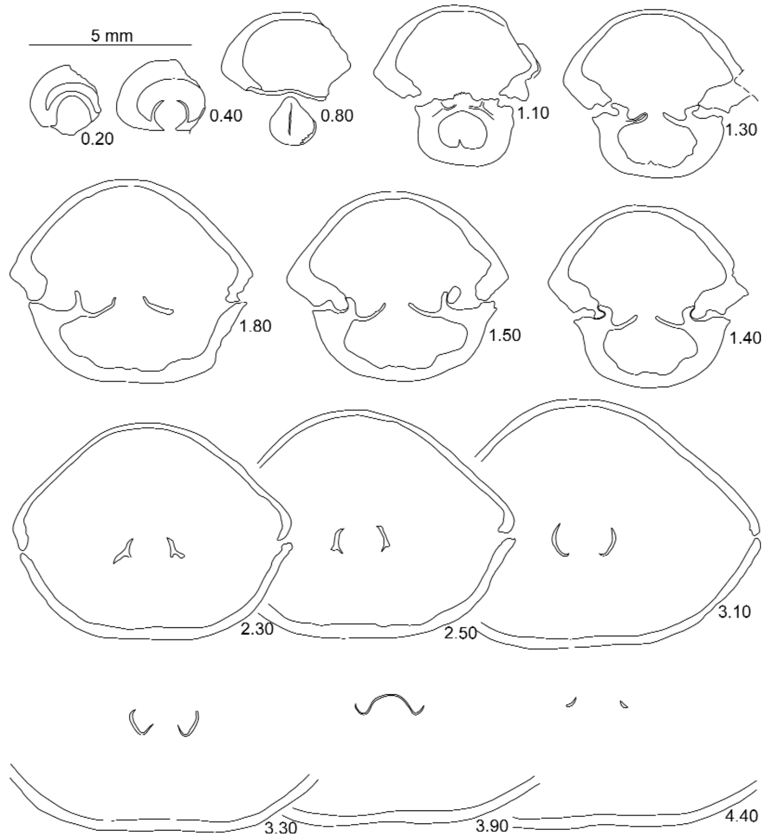


Figure 72. *Rhapidothyris beyrichi* (Oppel, 1861). Fourteen transverse serial sections through the posterior part of a specimen from Lókút, Kericser VI, Bed 8, Pliensbachian, Margaritatus Zone. M 2008.508.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 15.0 mm

Internal characters (Figs. 72, 73): *Ventral valve*: There is a well-developed pedicle collar. The thin deltidial plates are fused. The delthyrial cavity is laterally expanded oval in cross section, with rather sharp angles along the beak ridges. The hinge teeth are moderately developed and long; denticula are present. *Dorsal valve*: The cardinal process is prominent but the structure of the umbonal part is masked by secondary callotest. The low dorsal median crest (seen at 1.1 mm) is interpreted rather as a myophragm than a true septum. The outer socket ridges are very massive. The inner socket ridges lean well over the sockets. The hinge plates are spoon-shaped in cross section; they attach to the dorsal part of the inner socket ridges, a little below the plane of articulation. The hinge plates are gently but definitely concave ventrally; their ends curve ventromedially and give rise to thin crural bases. The crural processes are massive and moderately high. The loop is short, with narrow descending lamellae. The transverse band is low, with short terminal points (Fig. 73).

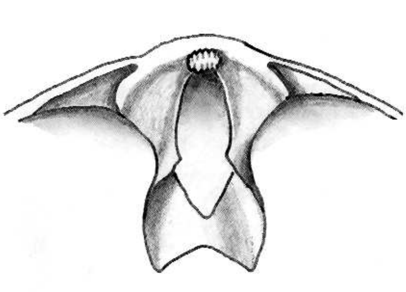


Figure 73. *Rhapidothyris beyrichi* (Oppel, 1861). Ventral view of the dorsal valve interior. Reconstruction based on serial sections of a specimen from Lókút, Kericser VI, Bed 8, Pliensbachian, Margaritatus Zone. M 2008.508.1.

Remarks:

This species was nicely illustrated by Oppel (l. c.), though the short vertical line on the umbonal part of the dorsal valve was a little misleading, giving the impression of a median septum. This was the reason why Oppel (l. c.) used tentatively the generic name "*Waldheimia* ?" for his species. Geyer's (l. c.) splendid documentation of the external features and the basic characters of the loop of *beyrichi* dispelled the doubts, and most of the later authors sought the generic place of this species among the short-looped terebratulids. The only exception was Antostschenko (1973) who, without explanation, listed *beyrichi* among the species of her new zeilleriid genus *Spinulothyris*. The serial sections of the *beyrichi* specimens from the Bakony (Fig. 72) and from the type locality, Hierlatz (Figs. 74, 75) have revealed the cardinalia with wide and ventrally concave hinge plates and the simple, short loop. On the basis of this information on the internal morphology, the species *beyrichi* is definitely attributed to *Rhapidothyris*, despite that it is more deeply sulcate than the type species.

Influenced by the sulcate appearance of *beyrichi*, some authors attached it to *Glossothyris* Douvillé, 1879 (the junior synonym of *Nucleata* Quenstedt, 1868), or to *Linguithyris* Buckman, 1918. However these homoeomorphic nucleatid genera have very simple cardinalia with indistinct hinge plates, in contrast to the wide and ventrally concave hinge plates of *R. beyrichi*.

Another homoeomorphic counterpart of *R. beyrichi* is "*Terebratula* (*Waldheimia*)" *furlana* Zittel, 1869, especially its variant *angustata* Canavari, 1880. I received from the collection of the Pisa University a topotypical specimen of the mentioned variant for making serial sections (Figs. 76, 77). Now it is clear that it is definitely not a zeilleriid, but a short-looped terebratulid, with wide hinge plates bending deeply toward the floor of the dorsal valve and giving rise to dorsally pendant crural plates and crural bases (Fig. 76). This structure reminds that of *Viallithyris*, but markedly differs from that of *Rhapidothyris*,

In the collections of the Bayerische Staatssammlung, München and the Geologische Bundesanstalt, Wien, I had the opportunity to study the originals of *R. beyrichi*, figured by Oppel (l. c.) and Geyer (l. c.), respectively. They gave the image of a subpentagonal, rather deeply and widely sulcate form, which the Bakony specimens perfectly fit to.

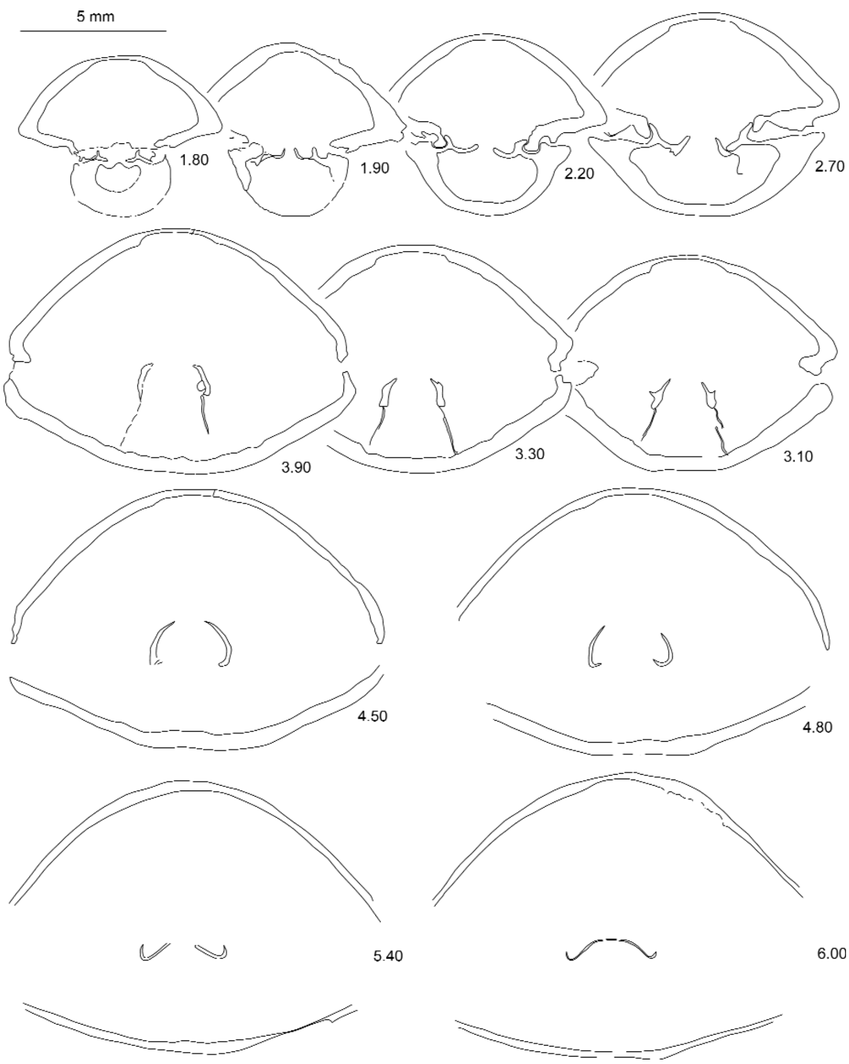


Figure 74. *Rhapidothyris beyrichi* (Oppel, 1861). Eleven transverse serial sections through the posterior part of a specimen from Hierlatz, Austria, Lower Jurassic. M 2008.509.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 18.4 mm

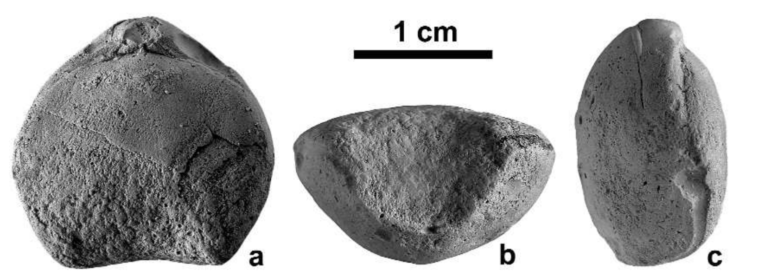


Figure 75. *Rhapidothyris beyrichi* (Oppel, 1861). Plaster cast of the sectioned specimen from Hierlatz, Austria, Lower Jurassic. M 2008.509.1. a: dorsal view, b: anterior view, c: lateral view

The above list of synonymies is meant to be critical, but in many cases (MOISSEIEV, RAMACCIONI, VIGH, FÜLÖP et al. l. c.) the attribution is doubtful, because the figures are rather poor and, without information on the internal features, the opinion may be false, due to the mentioned homoeomorphy. An exception is the record by BÖHM et al. (1999, l. c.), where, even without knowledge on the internal morphology, the figures are very convincing.

The specimen figured by SIBLÍK (1964, l. c.) is much more elongated than the typical *R. beyrichi*, and even the single cross section clearly shows that its hinge plates are extremely deeply concave dorsally, almost touching the floor of the dorsal valve. This combination of the external and internal features strongly approaches SIBLÍK's specimen to those figured by TCHORSZHEVSKY (1985, p. 37, fig. 1, pl. 1, fig. 1) as *R. ovimontana* (BÖSE, 1898).

SIBLÍK's another record of *beyrichi* (SIBLÍK 2003, l. c.) portrays a very elongate and rather convex, sulcate terebratulid, which seems to be very similar to the typical *R. ovimontana*.

DULAI's (l. c.) specimens figured as *R.* ? cf. *beyrichi* are too much globose and only gently sulcate (and partly aberrant). They are rather different from *R. beyrichi* and stand closer to *R. ovimontana*, but not identical with that.

In my previous works (e. g. VÖRÖS 1983b, 1997, VÖRÖS & DULAI 2007) the specimens now described as *R. beyrichi* were included to a tentatively outlined new species (*R.* ? aff. *beyrichi*). In the course of the present work they were separated from the new species which is described below.

Distribution:

Sinemurian and Pliensbachian of the Central Apennines (Italy), the Northern Calcareous Alps (Austria), the Transdanubian Range (Hungary), and of Crimea. The Pliensbachian specimens of the Bakony came from the Kericser section, from the Margaritatus Zone (Tables 13, 14).

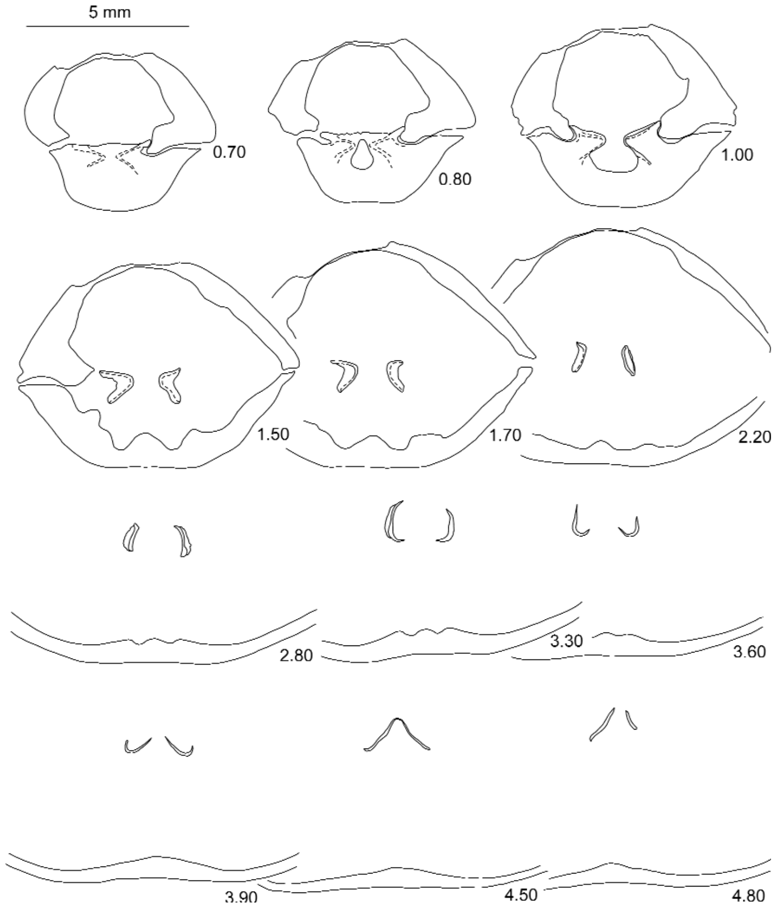


Figure 76. "*Terebratula* (*Waldheimia*)" *furlana* ZITTEL, 1869 var. *angustata* CANAVARI, 1880. Twelve transverse serial sections through the posterior part of a specimen from Monticelli near Rome, Italy, Pliensbachian. M 2008.510.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 18.0 mm

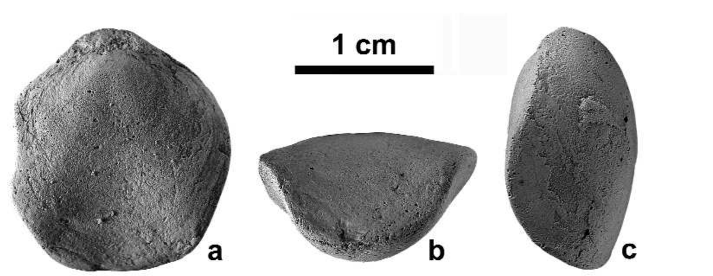


Figure 77. "*Terebratula* (*Waldheimia*)" *furlana* ZITTEL, 1869 var. *angustata* CANAVARI, 1880. Plaster cast of the sectioned specimen from Monticelli near Rome, Italy, Pliensbachian. M 2008.510.1. a: dorsal view, b: anterior view, c: lateral view

Rhapidothyris lokutica n. sp.
Plate XVI: 3, 4; Figures 78–80.

v 1983 *Rhapidothyris* ? n. sp., aff. *beyrichi* (Oppel, 1861) – VÖRÖS, Stratigraphic distribution, p. 35 (partim).
v 2007 *Rhapidothyris* ? aff. *beyrichi* (Oppel, 1861) – VÖRÖS & DULAI, Transdanubian Range, p. 56 (partim).

Holotype: Hungarian Natural History Museum (Budapest), inventory number: M 2008.391.1.
Locus typicus: Lókút, Kericser section, Bed 8.
Stratum typicum: Hierlatz limestone, Upper Pliensbachian, Margaritatus Zone.

Paratype: Hungarian Natural History Museum (Budapest), inventory number: M 2008.390.1.

Derivatio nominis: After the name of the village Lókút, Bakony Mountains, Hungary.

Diagnosis: Medium-sized *Rhapidothyris* with rounded subpentagonal outline. Beak high, erect; beak ridges short. Lateral commissures straight, anterior commissure deeply unisulcate. Dorsal sulcus and ventral fold well-developed. Anteroventrally projected linguiform extension protruding from outline. Shell surface smooth, except anterior capillation. Hinge plates deeply concave ventrally; crural processes nearly vertical, crescentic. Loop narrow and short; transverse band moderately arched. "Brachidium support" (spicula skeleton) may be present.

Material: 10 specimens of various state of preservation (mostly double valves).

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser 8	16.04	13.52	8.51	4.50
Kericser 9	14.75	12.64	8.21	5.76
Büdöskút 3	18.89	16.38	9.90	8.13
	18.86	17.12	10.49	7.07

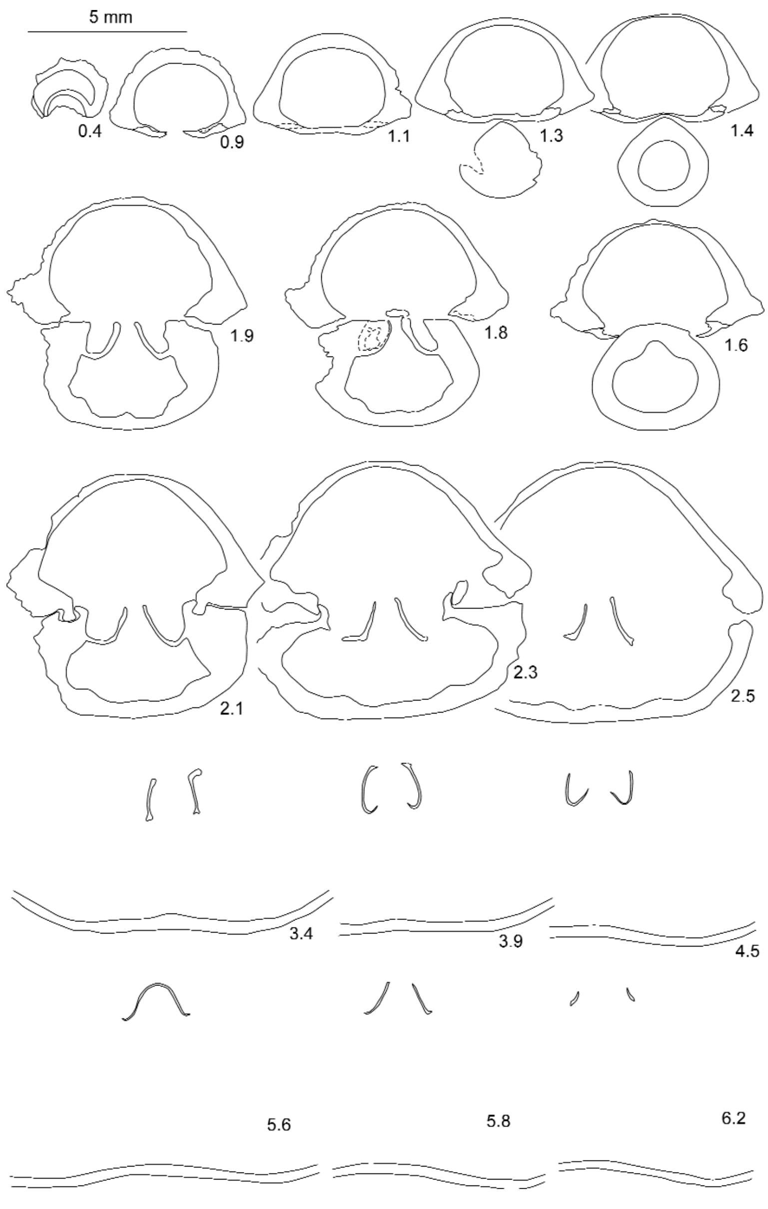


Figure 78. *Rhapidothyris lokutica* n. sp. Seventeen transverse serial sections through the posterior part of a specimen from Lókút / Gyulafirátót, Büdöskút X, Bed 2, Margaritatus Zone. M 2008.511.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 18.7 mm

Description:

External characters: This is a medium-sized *Rhapidothyris* with rounded subpentagonal to quadrangular outline. The apical angle varies between 90–100°. The maximum width is attained at around the middle of the length. The valves are moderately convex; the dorsal valve is a little more inflated than the other. The maximum convexity lies at about mid-length. The beak is broken off in most cases, but when it is preserved, it is rather high and erect. The foramen seems to be mesothyrid. The delthyrium is concealed by matrix. There are short beak ridges of variable sharpness. In lateral view, the lateral commissures are almost straight; they join with a rather abrupt bend to the unisulcate anterior commissure. The sinus is uniformly arched, deep and wide, it occupies less than two-third of the width of the shell. A well-developed sulcus in the dorsal valve and a corresponding fold in the ventral valve appear anteriorly. The linguiform extension is markedly projected anteroventrally and protrudes from the outline. The surface of the shells is smooth, except the anterior part of the sulcus where a distinct capillation can be observed.

Internal characters (Figs. 78–80): *Ventral valve*: There is a well-developed pedicle collar. The strong deltidial plates are fused anteriorly. The delthyrial cavity is laterally expanded oval or kidney-shaped in cross section. The hinge teeth are moderately developed and long; denticula were not observed. *Dorsal valve*: A cardinal process is present. The outer socket ridges are wide and very massive. The inner socket ridges lean moderately over the sockets. The hinge plates appear early, i. e. posterior to the plane of articulation; they originate very low from the dorsal part of the inner socket ridges. They are very deeply concave ventrally; at their ventral tip they give rise to thin crural bases. The crural processes are nearly vertical,

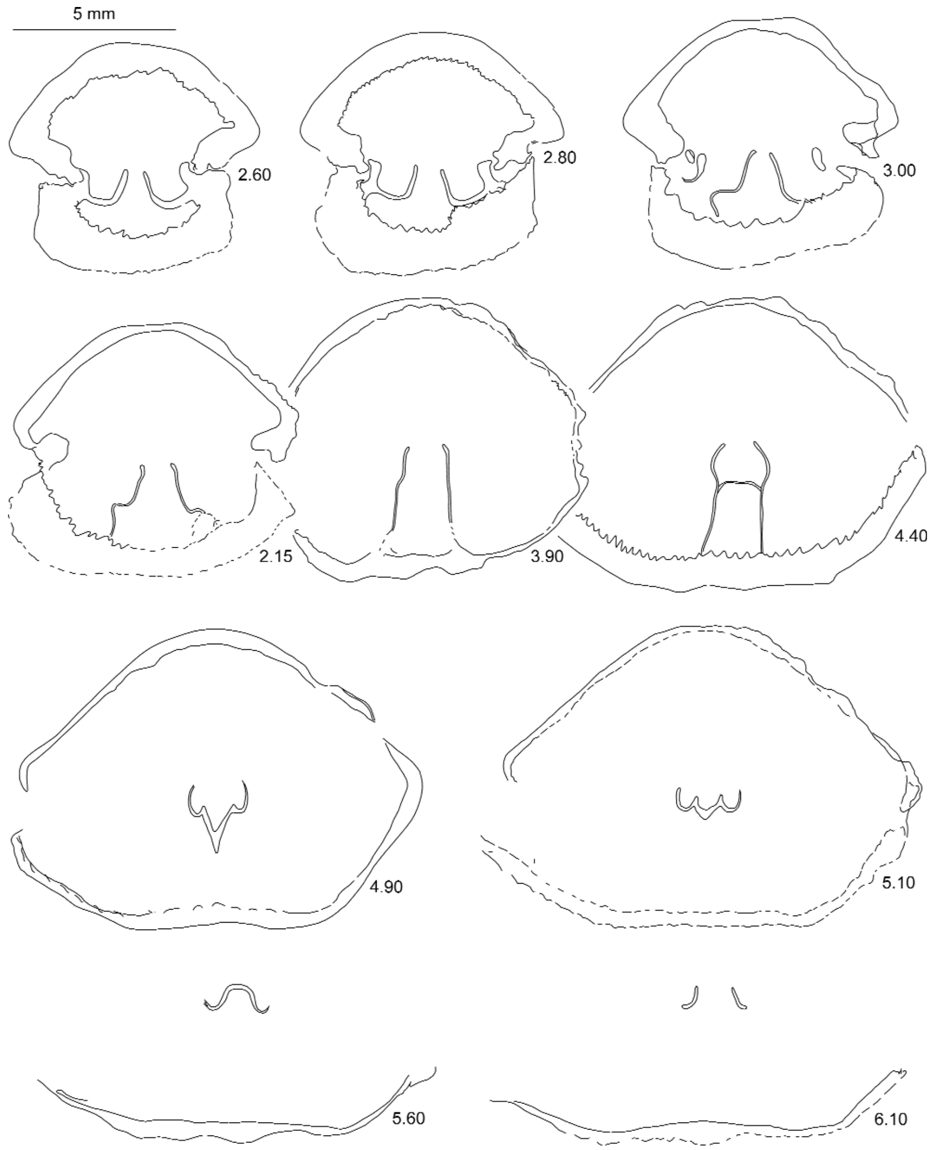


Figure 79. *Rhapidothyris lokutica* n. sp. Ten transverse serial sections through the posterior part of a specimen from Zirc, Bocskor-hegy, Bed 8, Margaritatus Zone. M 2008.512.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 20.1 mm

crescentic. The descending lamellae are narrow. The loop is narrow and moderately long. The transverse band is moderately and uniformly arched; the terminal points are rather long (Fig. 80). In one of the sectioned specimens (Fig. 79) "brachidium support" (spicula skeleton connecting the crura and loop to the dorsal valve floor) was recorded.

Remarks:

R. lokutica differs externally from most of the other species of *Rhapidothyris* by its subpentagonal and rather deeply sulcate shape. In these characters, it is almost mistakenly similar to *R. beyrichi*, though the anteroventrally projected linguiform extension and the marginal capillation give clue for the separation of the two species. They differ also in an important internal feature: the hinge plates are only slightly concave in *R. beyrichi*, while very deeply curved in *R. lokutica*. Due to the above mentioned external similarity, in my previous papers (e. g. Vörös 1983b, 1997, Vörös & Dulai 2007) I did not make difference between the two species and they were both listed as *R.* ? aff. *beyrichi*.

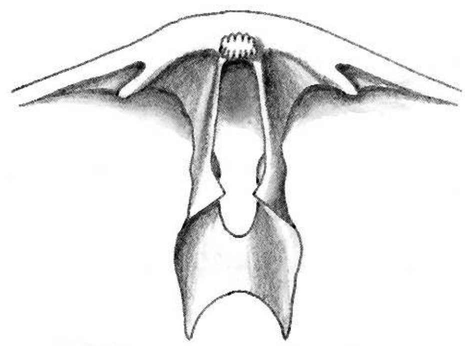


Figure 80. *Rhapidothyris lokutica* n. sp. Ventral view of the dorsal valve interior. Reconstruction based on serial sections of a specimen from Lókút / Gyulafirátót, Büdöskút X, Bed 2, Margaritatus Zone. M 2008.511.1. Scale bar = 5 mm

Distribution:
Pliensbachian of the Bakony Mts, where the specimens came from four localities, from the Margaritatus Zone (Tables 13, 14).

Family Uncertain

Genus *Viallithyris* Vörös, 1978

The higher systematic position of this genus is still uncertain. When I introduced *Viallithyris* and described its internal features (Vörös 1978) I suggested to attribute it to the family Gibbithyrididae on the basis of the horizontal hinge plates and pendant (given off dorsally) crural bases. At the same time I stressed, perhaps excessively, the importance of the "brachidium support", what later turned to be secondary spicula skeleton, not always present in *Viallithyris* specimens. Cooper (1983, p. 164) went even further and deemed these "struts" the most important feature of this genus. Probably for this reason, Cooper (l. c.) left open the question of the placement of *Viallithyris*, and this opinion was inherited to the "revised Treatise" (Lee et al. 2006). Recently, Baeza-Carratalá (2008) restored my original view and placed *Viallithyris* to the Gibbithyrididae. This solution brings about the difficulty of the time gap, because Gibbithyrididae appear only in the Cretaceous. There are many Jurassic terebratulid genera with horizontal hinge plates and pendant crural bases, possibly linked to *Viallithyris*, e. g. *Karadagithyris* Tchorszhevsky, 1974, *Placothyris* Westphal, 1970, or *Goniothyris* Buckman, 1918, but these are presently placed to different families in the "revised Treatise" (Lee et al. 2006). In my view, the best place to incorporate *Viallithyris* seems to be the family Muirwoodellidae. However it is not intended to rearrange the existing systematic order of the "revised Treatise" in the present work.

At the moment *Viallithyris* seems to be monotypic, with its originally designated type species, *V. gozzanensis* (Parona, 1880). Baeza-Carratalá (2008) tentatively placed "*Terebratula*" *furlana* Zittel, 1869 to *Viallithyris* but this was not supported by any features of the internal morphology, and the high probability of the homoeomorphy makes this attribution very questionable. I made serial sections from "*Terebratula*" *furlana* Zittel var. *angustata* Canavari (see Fig. 76) which, in fact, showed some similarity to *Viallithyris* in the cardinalia. This variant *angustata* stands the closest to Zittel's *furlana* externally, but it is not sure that they are conspecific, because the internal feature of the latter are unknown. Therefore I hesitate to attribute Zittel's *furlana* to *Viallithyris*.

Viallithyris gozzanensis (Parona, 1880)
Plate XVI: 5–8; Plate XVII: 1–3; Figures 81–84.

* 1880 *Terebratula Gozzanensis* n. sp. – Parona, Gozzano, p. 196, pl. I, fig. 8.
1880 *Terebratula Sismondai* n. sp. – Parona, Gozzano, p. 197, pl. I, fig. 9.
1885 *Terebratula (Pygope (?)) Gozzanensis*, Par. – Parona, Saltrio e Arzo, p. 252, pl. V, figs. 1, 2.
1893 *Terebratula Gozzanensis,* Par. – Parona, Revisione Gozzano, p. 42, pl. II, figs. 14–17.
v 1898 *Terebratula Gozzanensis* Parona. – Böse, Brachiopodenfauna der östlichen Nordalpen, p. 165, text-fig. 2, pl. XI, figs. 8, 10–12.
v 1900 *Pygope gozzanensis* Parona. – Böse & Schlosser, Südtirol, p. 184, pl. XVII, figs. 5, 9, 10.
v 1961 *Terebratula gozzanensis* Par. – Vigh, Esquisse géol. Gerecse, p. 576.
v 1961 *T. gozzanensis* Par. – Vigh, Esquisse géol. Gerecse, p. 577.
1967 *"Terebratula" gozzanensis* Par. – Sacchi Vialli & Cantaluppi, Nuovi fossili di Gozzano, p. 97, text-figs. 22, 23, pl. XV, figs. 1–3.
v 1978 *Viallithyris gozzanensis* (Parona) – Vörös, Viallithyris, p. 63, text-figs. 3–5, pl. I, figs. 1–6.
v 1997 *Viallithyris gozzanensis* (Parona) – Vörös, Jurassic brachiopods of Hungary, p. 16, Appendix: fig. 22.
v 2003 *Viallithyris gozzanensis* (Parona, 1880) – Vörös et al., Schafberg, p. 80, pl. VIII, figs. 35–37.
2005 *Viallithyris gozzanensis* (Parona 1880) – Sulser & Furrer, Lias von Arzo, p. 32, figs. 22, 23.
v 2007 *Viallithyris gozzanensis* (Parona, 1880) – Vörös & Dulai, Transdanubian Range, p. 56, pl. II, fig. 23.
2008 *Viallithyris gozzanensis* (Parona, 1880) – Baeza-Carratalá, Patrimonio J. de Cisneros, p. 439, pl. XXXV, fig. 2.

Material: 208 specimens of very variable state of preservation.

Localities	*Measurements (mm)*				*Localities*	*Measurements (mm)*			
	L	*W*	*T*	*Ch*		*L*	*W*	*T*	*Ch*
Kericser 7	20.6	21.9	12.9	5.3		20.4	18.1	12.2	5.1
Kericser 8	24.3	23.8	15.3	6.5		18.1	17.5	9.2	3.4
	19.3	18.4	11.5	4.3		19.4	18.7	10.0	3.0
Kericser 9	19.3	17.7	11.0	2.9	Kericser 16	19.7	19.8	11.5	4.2

Localities	*L*	*W*	*T*	*Ch*	*Localities*	*L*	*W*	*T*	*Ch*
	Measurements (mm)					*Measurements (mm)*			
Kericser 20	19.0	17.0	8.8	3.5	Kericser 26	15.8	15.7	7.1	2.4
	18.9	18.6	11.0	4.0	Kericser 28	22.9	20.5	13.8	4.3
	24.0	19.6	13.3	4.3	Kericser 29	23.4	19.6	12.8	5.7
Kericser 21	19.8	18.1	11.2	3.6	Kericser 30	20.5	18.3	10.4	2.2
	24.8	19.4	14.5	5.7	Kericser 31	24.0	21.7	13.4	3.4
	24.6	20.9	13.8	5.8	Kericser 32	22.8	20.8	12.5	3.7
	21.7	19.9	12.9	4.5		22.1	20.0	12.3	3.7
	20.8	19.1	11.5	5.1		20.4	19.0	11.5	3.9
	19.9	18.1	11.2	3.3		15.4	15.3	7.5	1.8
	19.2	20.3	10.5	3.6	Kericser 33	25.3	22.0	12.9	3.6
	18.4	17.1	11.4	4.6		25.1	22.7	16.5	5.8
	13.3	13.5	7.3	2.0		24.1	22.4	14.5	4.6
Kericser 22	27.8	25.1	16.5	6.2		21.8	19.0	12.7	4.4
	20.5	19.0	10.6	3.5		17.4	15.9	8.5	2.9
	19.3	17.5	11.7	3.7		14.1	13.1	6.6	1.3
	18.6	16.4	10.5	4.4	Kericser 34	20.0	16.9	12.0	4.0
	17.4	16.9	8.6	2.7	Kericser 35	22.6	21.6	13.0	3.4
	14.8	14.0	8.0	3.0		23.8	21.5	16.1	6.0
Kericser 23	20.8	18.6	11.6	5.7	Kericser I/a	22.0	20.2	12.6	3.6
	20.8	18.0	12.8	5.4		26.0	23.7	16.4	4.3
	20.4	19.6	11.8	3.9	Kericser II/a	15.5	15.0	7.3	1.7
	20.2	17.8	12.0	5.5		13.6	14.6	6.4	1.4
	19.8	18.4	13.0	3.9	Kericser II/k	24.3	21.9	14.7	4.6
	18.7	18.9	8.9	?		21.3	20.3	12.2	3.7
	17.6	17.7	9.2	2.8		21.1	18.0	11.8	2.9
	17.6	17.8	9.6	3.8		19.7	18.7	11.7	4.7
	17.5	17.0	9.5	2.7		18.1	16.6	9.9	4.7
	17.0	18.9	8.8	2.9		17.0	17.0	8.6	2.9
	16.8	16.1	9.4	2.7		13.2	14.4	6.2	1.9
	26.4	21.5	13.4	4.9	Kericser (scree)	18.5	18.3	10.1	4.6
	21.3	17.4	11.3	3.9	Fenyveskút p2	28.3	27.5	19.5	?
	19.4	19.1	12.5	6.2		27.2	26.9	17.1	6.1
	19.0	17.5	10.1	3.7	Eplény	18.1	18.4	7.8	2.1
	17.6	17.4	8.6	2.2		15.8	15.7	8.1	1.5
Kericser 25	24.4	22.8	15.3	5.1					

Description:

External characters: Medium-sized terebratulids with very rounded subpentagonal to oval outline. The apical angle varies between 90–105°. The maximum width is attained at around the middle of the length or a little more anteriorly. The valves are moderately to strongly convex; the maximum convexity lies near mid-length. The ventral valve is usually somewhat more convex than the other. The beak is moderately high, erect to slightly incurved. The foramen is mesothyrid to permesothyrid. The delthyrium is concealed by matrix but seems to be rather wide and low. The beak ridges are blunt. In lateral view, the lateral commissures are gently sinuous, almost straight; they join with a continuous arch to the unisulcate anterior commissure. The sinus is moderately deep and wide; usually it occupies nearly the whole width of the shell. In typical cases, the sinus has a trapezoidal shape with rounded corners, rarely it may be uniformly arched. Definite dorsal sulcus or ventral fold are not developed. The surface of the shells is almost smooth, except fine growth lines and occasional radial capillation.

Internal characters (Figs. 81–84): *Ventral valve*: There is a well-developed pedicle collar. The thin deltidial plates are fused, forming a symphytium. The delthyrial cavity is laterally expanded oval in cross section, with traces of ventral muscle scar. The hinge teeth are well developed, strong; denticula are present. *Dorsal valve*: The cardinal process is wide and crenulated and somewhat projects posteriorly to the delthyrial cavity. There are definite, narrow, subparallel adductor muscle scars. The outer socket ridges are very massive and wide. The inner socket ridges lean well over the sockets. The hinge plates are thin, subhorizontal and rather wide; they attach to the medial part of the inner socket ridges. They give rise to dorsally pendant crural bases, which curve laterally. The crural processes are subvertical and crescentic in cross section. The loop is narrow and short. The transverse band is highly and acutely arched; the terminal points (flanges) are moderately

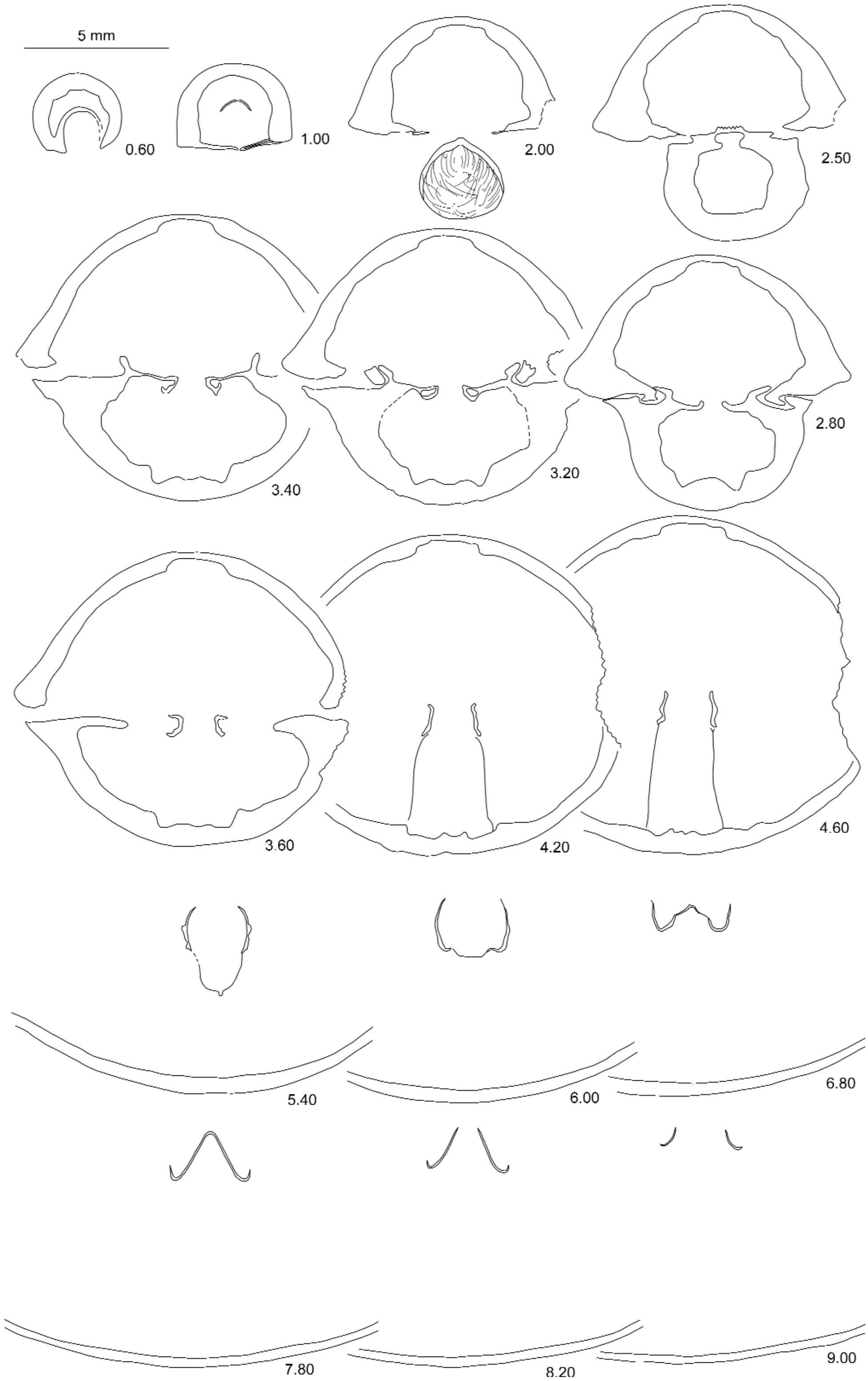


Figure 81. *Viallithyris gozzanensis* (PARONA, 1880). Sixteen transverse serial sections through the posterior part of a specimen from Lókút, Kericser VI, Bed 33, Ibex Zone. J.9178. Distance from posterior end of shell is given in mm. Original length of the specimen is 27.8 mm. Redrawn after Fig. 4 in VÖRÖS (1978)

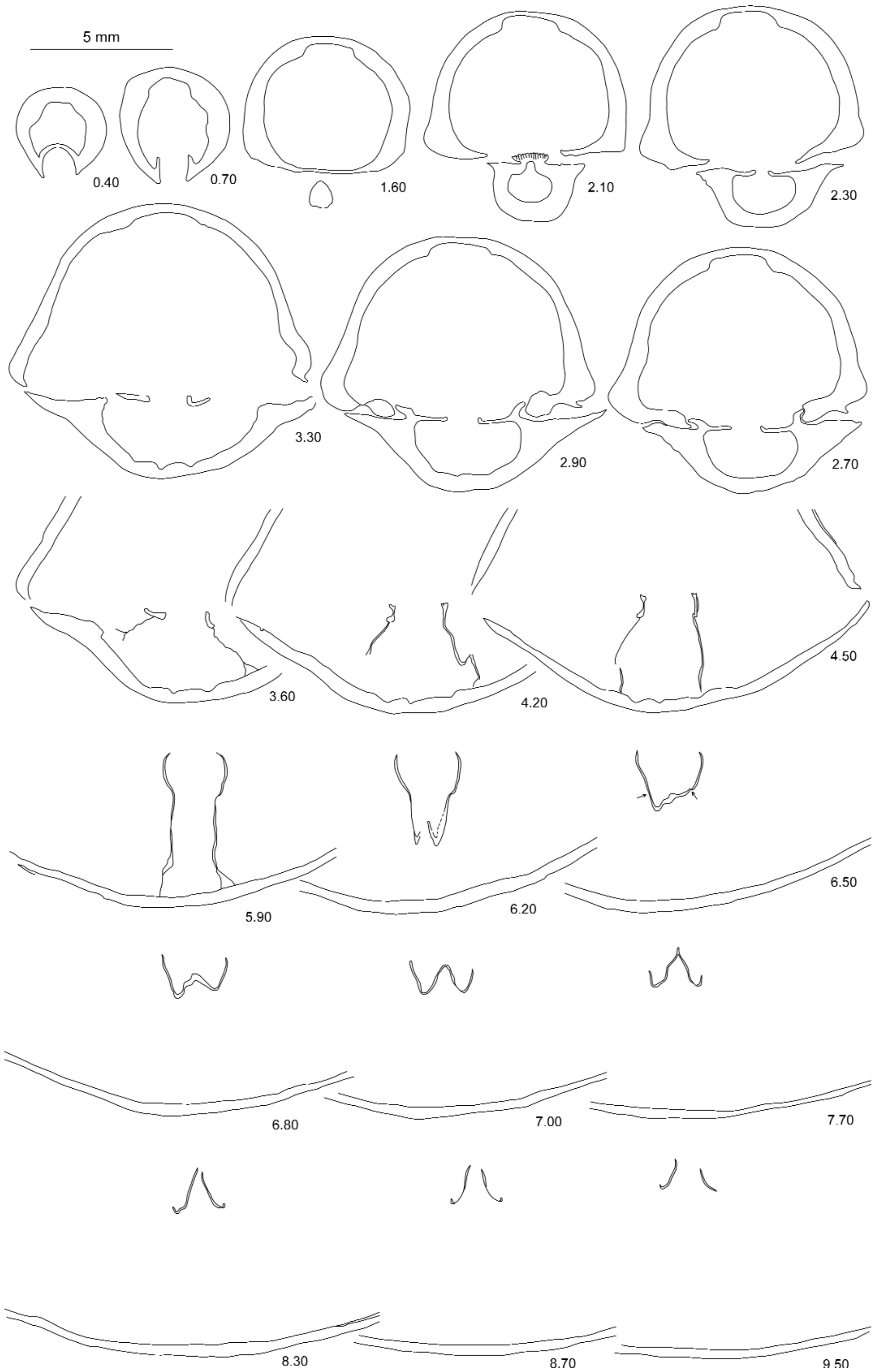


Figure 82. *Viallithyris gozzanensis* (Parona, 1880). Twenty transverse serial sections through the posterior part of a specimen from Lókút, Fenyveskút, p2, Margaritatus Zone. M 2008.513.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 29.0 mm

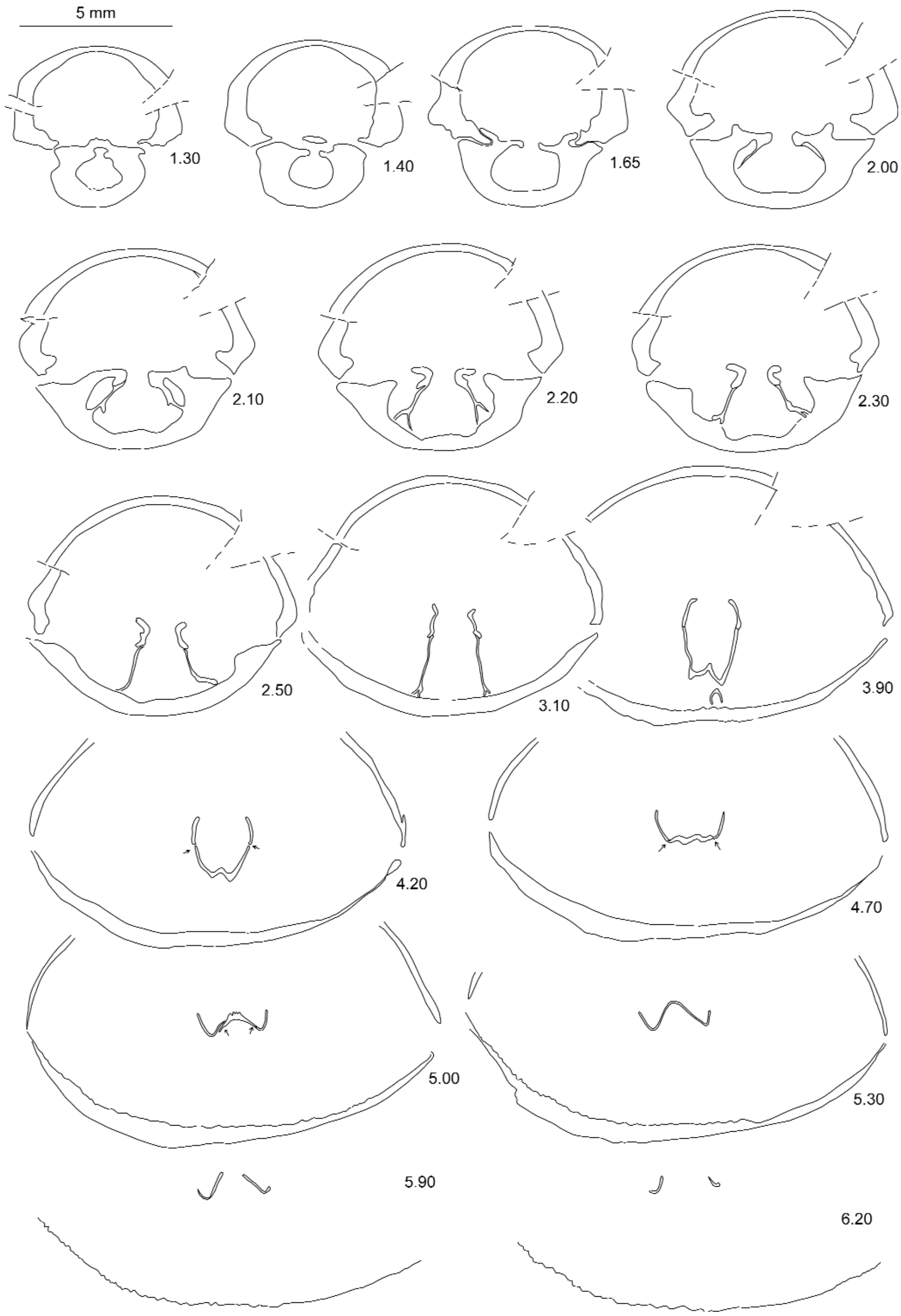


Figure 83. *Viallithyris gozzanensis* (Parona, 1880). Sixteen transverse serial sections through the posterior part of a specimen from Lókút, Kericser VI, Bed 35, Ibex Zone. M 2008.514.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 21.2 mm. Redrawn after Fig. 3 in Vörös (1978).

long (Fig. 84). Most of the sectioned specimens contained "brachidium support" i. e. lamellae of spicula skeleton connecting the crura and loop to the dorsal valve floor; the shape and construction of this structure varies from specimen to specimen.

Remarks:

V. gozzanensis is the type species of, and the single species unquestionably belonging to the genus *Viallithyris*. Other, possibly related Early Jurassic species are "*Terebratula*" *neumayri* Haas, 1884 and "*T.*" *furlana* Zittel, 1869, which latter was tentatively placed to *Viallithyris* by Baeza-Carratalá (2008), but in both cases, the positive information on the internal features are missing. Moreover, "*T.*" *neumayri* shows a definite dorsal sulcus, while "*T.*" *furlana* is rather flat in contrast to *V. gozzanensis*.

"*T.*" *sismondai* PARONA, 1880 is listed in the synonymy in accordance with the self-revision by PARONA (1885, 1893) who united this large subcircular variant with the more subpentagonal types of *V. gozzanensis*. This view is supported by the large material from the Bakony, where the transition to the "*sismondai*" type (Pl. XVII: 2) seems to be continuous.

The rather poorly figured specimens by BÖSE (l. c.) and BÖSE & SCHLOSSER (l. c.) have been checked in the collection of the Bayerische Staatssammlung, München; most of them are typical representatives of *V. gozzanensis*. The records by VIGH (1961, l. c.) have been confirmed in the collection of the Geological Institute of Hungary (inventory numbers J. 209, J. 210 and J. 485), respectively.

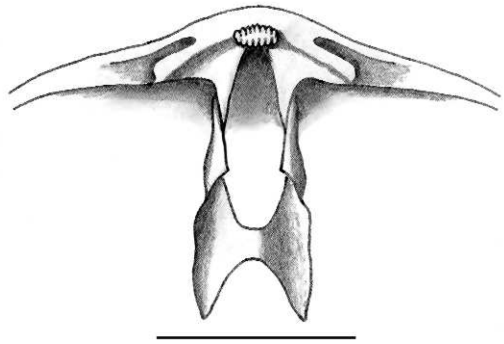


Figure 84. *Viallithyris gozzanensis* (PARONA, 1880). Ventral view of the dorsal valve interior. Reconstruction based on serial sections of a specimen from Lókút, Kericser VI, Bed 33, Ibex Zone. J.9178. Scale bar = 5 mm

In my previous publication (VÖRÖS 1978) "*T.*" *engeli* HAAS, 1884 was synonymized with *V. gozzanensis*, following the suggestion by BÖSE & SCHLOSSER (1900). However, after looking more thoroughly at the nice figures by HAAS (1884, pl. III, figs. 3–5.) I had to change my opinion. The figures portray a rather large, laterally expanded form with principally rectimarginate anterior commissure, which does not fit into the range of *V. gozzanensis*. On the other hand, taking into account the indications that the Lower Jurassic brachiopod fauna of HAAS (1884, pp. xi, and 12) may contain Middle Jurassic brachiopods (e. g. *Apringia atla*), due to collecting bias, I would put forward that HAAS' specimens of "*T.*" *engeli* may, in fact, belong to *Karadagithyris gerda* (OPPEL, 1863) of Bajocian or Bathonian age.

A rather curious structure, supporting the loop, was recorded in the interior of several specimens of *V. gozzanensis* in the Bakony material and also in Arzo (SULSER & FURRER, l. c.). The shape and construction of this structure varies from specimen to specimen, and a further, even more complicated type of "brachidium support" of *V. gozzanensis* was portrayed by SACCHI VIALLI & CANTALUPPI (1967, fig. 22). TCHORSZHEVSKY (1985) recognized similarly variable lamellae in *Rhapidothyris* specimens and interpreted this structure as spicula skeleton of secondary origin. After all, the taxonomical significance of this "brachidium support", what was emphasized by VÖRÖS (1978) and COOPER (1983), seems to be vanished and only some kind of environmental implication may be supposed.

Distribution:

Pliensbachian of the Southern Alps (Italy), the Northern Calcareous Alps (Austria), the Bakony and Gerecse Mts (Hungary), and the Betic Cordilleras (Spain). The Pliensbachian specimens of the Bakony came from six localities, from the Ibex to the Margaritatus Zones (Tables 13, 14).

Genus *Eplenyithyris* n. gen.

Type species: Eplenyithyris cerasulum (ZITTEL, 1869) by monotypy.

Diagnosis: Small terebratulids with subcircular outline; biconvex, nearly globose, maximum convexity at mid-length. Beak depressed; foramen small, permesothyrid. Blunt beak ridges, ill-defined planareas. Lateral commissures straight; anterior commissure nearly straight, gently unisulcate. No sulcus or fold. Shell smooth. Cardinal process indistinct. Adductor muscle scars short, narrow, parallel. Hinge plates wide, straight, bent dorsally, forming crural plates. Loop narrow, short; transverse band moderately arched; terminal points short.

Derivatio nominis: After the name of the locality Eplény, in the Bakony Mountains, Hungary.

Discussion: The type species, *Eplenyithyris cerasulum* was attributed to the subgenus "*Pallasiella*" by RENZ (1932) what was later elevated to genus rank and, because of homonymy, substituted by the new name *Phymatothyris* by COOPER & MUIR-WOOD (1951). The combination of the species name *cerasulum* either to "*Pallasiella*" (RAMACCIONI 1939, ALMÉRAS 1964) or to *Phymatothyris* (e. g. VÖRÖS 1983b, 1997, SIBLÍK 2003b) was widely used until ALMÉRAS et al. (2007) documented some important features of the internal morphology of *P. kerkyraea* (RENZ, 1932), the type species of *Phymatothyris*. It has very strong cardinal process forming a bridge between the narrow hinge plates, and has nothing like dorsally oriented crural plates. On the basis of these significant differences in internal morphology, the species *cerasulum* can not be attributed to *Phymatothyris* any more. This is the main reason of the introduction of the new generic name *Eplenyithyris* for *cerasulum*. Furthermore, *Eplenyithyris* differs also externally from *Phymatothyris* in its smaller and less gibbous beak, globose shape and nearly rectimarginate anterior commissure.

The most diagnostic internal features of *Eplenyithyris*, the wide, straight hinge plates, and the dorsally pendant crural plates, were observed also in the sectioned specimen of "*Terebratula* (*Waldheimia*)" *furlana* ZITTEL, 1869 var. *angustata*

CANAVARI, 1880 (see Fig. 76). But this species is fairly different externally (more elongated and definitely unisulcate), therefore it may represent another genus, perhaps allied to *Eplenyithyris* on family or subfamily level.

In the present work, *Eplenyithyris* is placed into a family of uncertain position, together with *Viallithyris* which shares some basic features of cardinalia (hinge plates) with it. In this respect, the systematics of the "revised Treatise" (LEE et al. 2006) is followed, but in my opinion the family Muirwoodellidae would be a more proper place for both genera.

Distribution: Pliensbachian of Sicily, the Apennines and the Southern Alps (Italy), the Northern Calcareous Alps (Austria) and the Bakony (Hungary), Western Greece and the Betic Cordilleras (Spain).

Eplenyithyris cerasulum (ZITTEL, 1869)
Plate XXVII: 1–13; Figures 85–88.

v 1869 *Terebratula cerasulum.* Zitt. – ZITTEL, Central-Appenninen, p. 125, pl. XIV, figs. 5, 6.
v 1880 *Terebratula sphenoidalis* Mgh. – CANAVARI, Strati a Terebratula Aspasia I, p. 340 (partim), pl. II, fig. 6 (non fig. 5).
v 1880 *Terebratula undata* Mgh. – CANAVARI, Strati a Terebratula Aspasia I, p. 340, pl. II, figs. 7, 8.
v 1880 *Terebratula cerasulum* Zitt. – CANAVARI, Strati a Terebratula Aspasia I, p. 344.
v 1883 *Waldheimia* (?) *sentinensis* n. f. – CANAVARI, Strati a Terebratula Aspasia III, p. 89, pl. X, fig. 8.
1883 *Terebratula cerasulum,* Zitt. – PARONA, Appennino centrale, p. 662, pl. IV, fig. 3.
1894 *Terebratula cerasulum* Zitt. – STEINMANN in PHILIPPSON & STEINMANN, Lias in Epirus, p. 124, pl. XI, fig. 6.
v 1895 *Terebratula cerasulum* Zittel – FUCINI, Monte Pisano, p. 194, pl. VII, fig. 17.
? 1910 *Waldheimia cerasulum* v. Zitt. – VINASSA DE REGNY, Prealpi dell'Arzino, p. 194, pl. VII, figs. 22–25.
? 1921 *Terebratula cerasulum* Zittel var. *scutella* n. f. – FRANCESCHI, Appennino Centrale, p. 224, pl. I, fig. 7.
1932 *Terebratula (Pallasiella) cerasulum* Zittel. – RENZ, Westgriechischen Lias, p. 44, pl. III, fig. 7.
1932 *Terebratula (Pallasiella) cerasulum* Zittel var. *hellenica* Renz (nov. nom.). – RENZ, Westgriechischen Lias, p. 46, pl. III, fig. 5.
1939 *Terebratula (Pallasiella) cerasulum* Zittel – RAMACCIONI, Giuraliassica Monte Cucco, p. 146, pl. X, figs. 19, 20.
v 1983 *Phymatothyris cerasulum* (Zittel, 1869) – VÖRÖS, Stratigraphic distribution, p. 35.
v 1987 *Phymatothyris* cf. *cerasulum* (Zitt.) – VÖRÖS et al., Panormide, p. 245.
v 1997 *Phymatothyris cerasulum* (Zittel) – VÖRÖS, Jurassic brachiopods of Hungary, p. 16, Appendix: fig. 25.
2003 *Phymatothyris cerasulum* (Zittel) – SIBLÍK, Hallstatt, p. 69, pl. I, fig. 3.
v 2007 *Phymatothyris cerasulum* (Zittel, 1869) – VÖRÖS & DULAI, Transdanubian Range, pp. 54, 56, pl. II, fig. 22.
2008 *Phymatothyris cerasulum* (Zittel, 1869) – BAEZA-CARRATALÁ, Patrimonio J. de Cisneros, p. 477, pl. XXXVIII, figs. 4–6.

Material: 253 specimens, mostly double valves of various state of preservation.

Localities	*Measurements (mm)*		
	L	*W*	*T*
Kericser 16	14.5	14.3	10.4
	10.3	9.7	6.4
Kericser 19	12.9	13.7	8.6
	12.8	11.9	7.1
Kericser 20	13.7	12.6	7.4
	13.1	12.6	8.1
	13.4	13.6	7.6
	12.2	12.4	7.2
	12.6	12.7	7.9
	13.7	12.3	7.3
	13.4	12.7	7.8
	11.2	11.4	6.1
	11.1	11.7	7.2
	9.8	9.5	5.8
	10.2	9.2	5.5
Kericser 21	15.0	14.2	8.8
	12.4	11.4	6.9
	12.6	12.2	7.1
	12.5	12.9	7.0
	11.5	10.7	6.1
	11.1	11.7	6.3
	11.3	10.2	6.8
Kericser 23	6.3	5.4	3.6
Kericser 31	11.4	10.7	6.9

Localities	*Measurements (mm)*		
	L	*W*	*T*
	12.4	12.0	6.7
Kericser 32	14.2	13.3	9.1
	13.4	12.7	7.6
	13.5	13.1	8.9
Kericser 33	9.9	10.2	4.2
	14.7	13.3	8.6
	19.5	15.4	12.3
Kericser 34	13.8	13.5	8.5
Kericser I/a	11.5	9.9	6.1
Kericser II/a	9.5	9.5	4.7
	10.3	10.0	4.5
	8.4	7.9	4.4
Kericser II/k	13.9	13.1	7.6
	13.7	12.6	8.6
	14.8	14.9	9.0
	14.6	14.1	9.1
	13.8	13.4	8.7
	13.2	13.0	7.2
	14.4	14.6	8.9
	12.7	12.2	8.0
	12.3	12.4	6.6
	13.3	12.6	7.7
	11.8	10.3	7.4
	10.3	10.6	5.9

Localities	Measurements (mm)		
	L	W	T
	8.4	8.0	3.6
	7.1	7.5	3.1
	6.7	6.4	3.3
Fenyveskút 7	6.9	6.7	4.9
	6.8	6.5	4.8
	6.1	4.9	4.3
	6.1	6.1	4.0
Eplény	14.8	13.2	8.5
	14.6	13.0	9.9
	14.1	12.7	9.1
	13.8	11.1	8.0
	10.4	9.4	7.5
	10.3	9.7	7.4
	10.2	9.8	7.4
	9.8	8.4	7.0
	9.8	8.7	7.5
	9.8	8.4	6.7
	9.7	8.7	7.2
	9.5	9.2	7.1
	9.4	8.5	6.8

Localities	Measurements (mm)		
	L	W	T
	9.3	8.2	6.9
	9.2	8.3	6.6
	9.0	8.3	6.4
	9.0	8.4	6.2
	9.0	9.0	6.9
	8.8	7.9	6.7
	8.8	8.0	6.4
	8.7	8.3	6.0
	8.6	7.6	6.3
	8.4	8.2	6.0
	8.4	8.1	5.5
	8.2	7.6	5.8
	8.0	7.5	6.0
	8.0	7.3	5.5
	8.0	8.2	4.1
	7.9	7.8	5.4
	7.8	8.0	5.3
	7.5	7.7	4.8
	6.9	6.9	4.7
	6.7	6.7	4.4
	6.6	5.9	4.5

Description:

External characters: Small to medium-sized terebratulids with subcircular outline. The apical angle varies between 100 and 120°. The maximum width is attained at around the middle of the length. The valves are strongly and equally convex; the maximum convexity lies near the middle of the length. The small individuals are almost globose (Pl. XXVII: 3, 4); the smallest and the largest specimens are less convex (Pl. XXVII: 1, 13) (The range of morphological variation is shown in Fig. 85.) The beak is small and depressed, incurved. The foramen is small, seems to be permesothyrid. The delthyrium is regularly concealed by the depressed beak. In lateral view, the lateral commissures are straight. The anterior commissure is rectimarginate or shows a very wide and shallow sinus in larger specimens. Sulcus and fold are not developed. The surface of the shells is smooth; growth lines are rarely seen on some specimens.

Internal characters (Figs. 86–88): *Ventral valve*: Pedicle collar is present. The deltidial plates are poorly visible. The delthyrial cavity is oval to high subtriangular in cross section, with traces of deep ventral muscle scars. The hinge teeth are massive but poorly differentiated; denticula seems to be present. *Dorsal valve*: The cardinal process is poorly developed. There are narrow and short, almost perfectly parallel, deep adductor muscle scars. The outer socket ridges are wide and flat. The inner socket ridges lean moderately over the sockets. The hinge plates are attached to the ventral part of the inner socket ridges; from this point, they gently dip dorsomedially. After a wide straight part they curve dorsally and approach the floor of the dorsal valve forming crural plates. (It is to be noted that the umbonal parts of all sectioned specimens were largely filled with callus, which partly masked the details of the cardinalia.) The crural bases are dorsally pendant. The crural

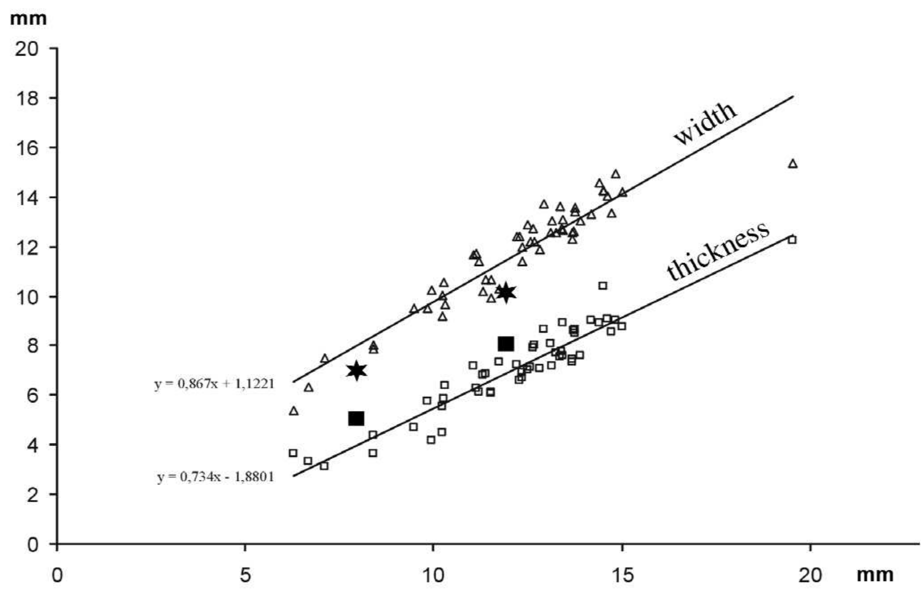


Figure 85. *Eplenyithyris cerasulum* (ZITTEL, 1869). Scatter diagram showing the width (open triangles) and thickness (open squares) data against the length (horizontal axis) of 50 measured specimens from the Ibex and Davoei zones of the Kericser section. The respective data (solid stars and solid squares) of the type specimens measured by ZITTEL (1869, p. 125) are shown for comparison

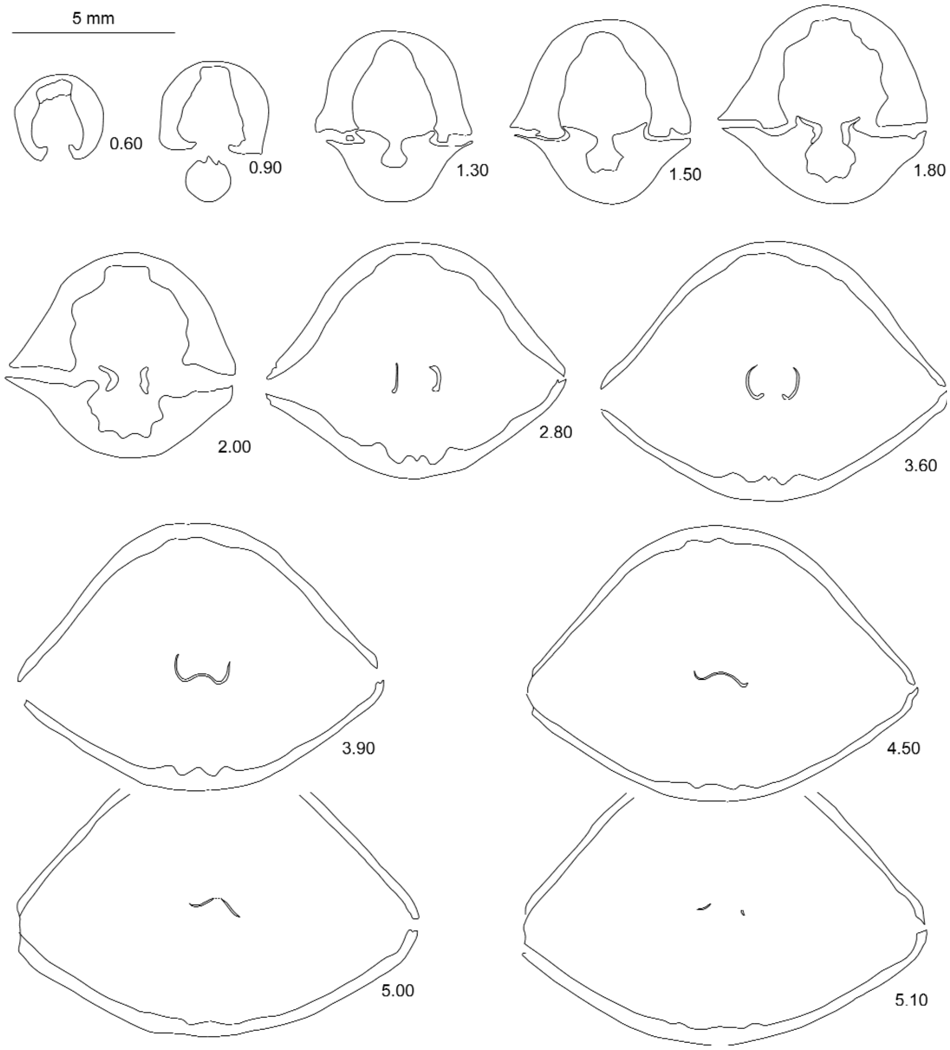


Figure 86. *Eplenyithyris cerasulum* (Zittel, 1869). Twelve transverse serial sections through the posterior part of a specimen from Eplény, Margaritatus Zone. M 2008.515.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 16.5 mm

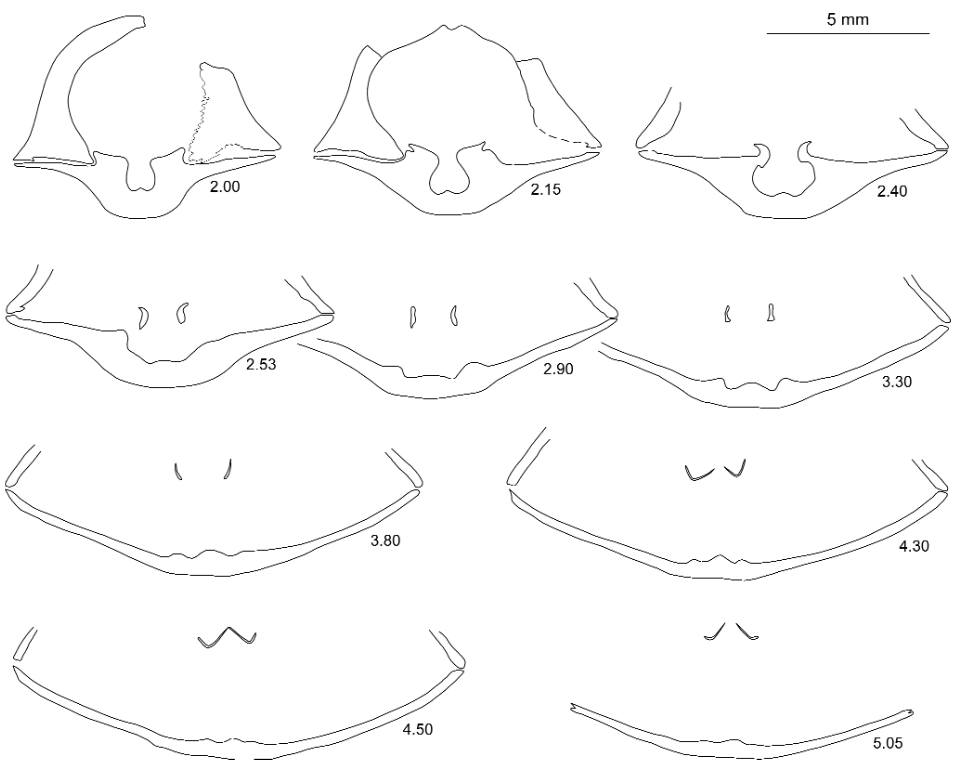


Figure 87. *Eplenyithyris cerasulum* (Zittel, 1869). Ten transverse serial sections through the posterior part of a specimen from Lókút, Kericser VI, scree, probably Lower Pliensbachian. The specimen is vanished. Distance from posterior end of shell is given in mm. Original length of the specimen is ~ 15 mm

processes are subvertical and partly crescentic in cross section. The loop is very narrow and short: 0.25 dorsal valve length. The transverse band is moderately arched; the terminal points are rather short (Fig. 88).

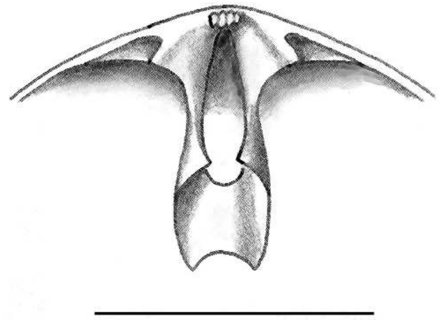


Figure 88. *Eplenyithyris cerasulum* (Zittel, 1869). Ventral view of the dorsal valve interior. Reconstruction based on serial sections of a specimen from Eplény, Margaritatus Zone. M 2008.515.1. Scale bar = 5 mm

Remarks:

This species was based on small, globose specimens by Zittel (l. c.) as it was reflected by the species name *cerasulum*, referring to the fruit (or the stone) of cherry. Later on, the morphological variation of this species became somewhat extended (see Renz, l. c.) and the more than two hundred specimens from different localities of the Bakony showed that *E. cerasulum* includes less convex morphotypes as well. The examination of Canavari's original specimens in the collection of the Pisa University convinced me that one of the specimens figured by Canavari (1880, l. c.) as "*T. sphenoidalis* Mgh." belongs to *E. cerasulum*, and two of Canavari's new species, "*T. undata*" and "*Waldheimia* (?) *sentinensis*" (Canavari 1880, l. c., Canavari 1883, l. c.) also fit into the rather wide range of variation of this species. The rate of convexity and the length/with ratio of 50 measured specimens (all from the Kericser section) are shown in Fig. 85, together with the data of Zittel's original specimens which fit well into the scatter of the Bakony specimens.

E. cerasulum was classically attributed to "*Terebratula*" until Renz (1932), probably on the basis of its depressed, incurved beak, put this species into his new subgenus *Pallasiella*, of which the type species was "*Terebratula* (*Pallasiella*) *kerkyraea* Renz, 1932. *Pallasiella* was later elevated to genus rank and, because of homonymy, substituted by the new name *Phymatothyris* by Cooper & Muir-Wood (1951). The combination of the species name *cerasulum* either to "*Pallasiella*" (Ramaccioni 1939, l. c., Alméras 1964, p. 88) or to the valid *Phymatothyris* (e. g. Vörös 1983b, l. c., 1994, p. 358, 1997, l. c., Siblík 2003, l. c.) became widely used. It is hard to understand, why Alméras et al. (2007, p. 101) accused me alone for attributing *cerasulum* to *Phymatothyris*, since it was dated from Renz (1932). But, what is more important in the generic attribution of *cerasulum*, Alméras et al. (2007) documented some basic features of the internal morphology of *P. kerkyraea* (Renz, 1932), the type species of *Phymatothyris*. The very strong cardinal process forming a bridge between the narrow hinge plates, and the absence of dorsally oriented crural plates what Alméras et al. (2007, figs. out of text 19–22) presented, definitely exclude the species *cerasulum* from *Phymatothyris*. The separation is further supported by external differences: *cerasulum* is globose and nearly rectimarginate, in contrast to the clearly unisulcate shape of *Phymatothyris*. The above pieces of evidence justify the introduction of the new generic name *Eplenyithyris* with the type species E. *cerasulum*.

Two other small and more or less globose terebratulid species "*T.*" *rudis* Gemmellaro, 1874 and "*T.*" *taramellii* Gemmellaro, 1874 seem to stand close to *E. cerasulum*. The examination of Gemmellaro's originals in the collection of the Palermo University convinced me that they are different from *E. cerasulum*, partly in the somewhat less depressed beak, partly in the less uniform convexity of their valves, therefore here they are regarded as independent species. On the other hand, a detailed study on their internal morphology would be needed to prove if they belong to *Eplenyithyris*.

The small specimens described and figured by Dulai (2003, p. 87, text-fig. 16, pl. XIV, figs. 13–15) as *Phymatothyris* aff. *cerasulum* stand close to the present species but, in fact, seem to represent a different taxon. The portrayed serial sections are not informative enough, as for the cardinalia, but the form seems to belong to *Eplenyithyris* rather than to *Phymatothyris*.

Distribution:

Pliensbachian of Sicily, the Apennines and the Southern Alps (Italy), the Northern Calcareous Alps (Austria), the Bakony (Hungary), Western Greece and the Betic Cordilleras (Spain). The Pliensbachian specimens of the Bakony came from seven localities, from the Ibex to the Margaritatus Zones (Tables 13, 14).

Superfamily Dyscolioidea Fischer & Oehlert, 1891
Family Pygopidae Muir-Wood, 1965
Subfamily Triangopinae Mance□ido, 1993

Genus *Securithyris* Vörös, 1983

When I introduced this genus (Vörös 1983a, p. 13) I placed it in the family Pygopidae. This was accepted in the "revised Treatise" (Lee et al. 2006), though, in the meantime, Mance□ido (1993, p. 203) suggested to include *Securithyris* into the family Nucleatidae. The type species, *S. adnethensis* (Suess, 1855) strongly resembles to the recent *Dyscolia* Fischer & Oehlert, 1890, both externally and internally; this was the main reason why I suggested a phylogenetic connection between them (Vörös 1983a, p. 13) and a lineage from *Securithyris* through the Late Jurassic *Triangope* Dieni & Middlemiss, 1981 and the Late Cretaceous *Moraviaturia* Sahni, 1960 to the Recent *Dyscolia* (Vörös 2005, p. 229). This direct connection was apparently not accepted in the "revised Treatise" (Lee et al. 2006) where the members of this "lineage" appeared in two different subfamilies of different families. I do not agree with this view but for the sake of consistency it is applied in the present work.

S. adnethensis is the morphologically most conservative species of *Securithyris*. The other three species included, *S. paronai* (Canavari, 1880), *S. filosa* (Canavari, 1880) and *S. helenae* (Renz, 1932), represent wider morphological variations. *S. helenae*, with its expanded "axiniform" shape and concave lateral sides has certain similarity to the Late Jurassic *Triangope* which is a probable descendant of *Securithyris*. The ligate shape of *S. filosa* and the incipient sulcation of *S. paronai* resemble the morphological modifications recorded in some Late Jurassic Pygopidae but direct phylogenetic connection is not supposed in these cases.

Securithyris adnethensis (Suess, 1855)
Plate XVII: 4–11; Plate XVIII: 1–5; Plate XIX: 1–4; Plate XX: 1–4; Plate XXI: 1–3;
Plate XXII: 1, 2; Plate XXIII: 1, 2; Figures 89–93.

1852 [*T. diphya*] – Suess, Über Terebratula diphya, p. 557, pl. I, figs 18, 19.
* 1855 *Terebratula Adnethensis* – Suess, Brach. Hallstätter Schichten, p. 31,
1867 *Terebratula Erbaensis,* Suess. – Pictet, Groupe de la T. diphya, p. 184, pl. 33, fig. 8.
v 1869 *Terebratula Erbaensis.* Suess. – Zittel, Central-Appenninen, p. 135, pl. XV, figs. 5–10.
1881 *Terebratula Erbaensis* Suess – Meneghini, Lombardie et Apennin central, p. 165, pl. XXIX, figs. 4–8.
1883 *Terebratula (Pygope) Erbaensis,* Suess. – Parona, Appennino centrale, p. 660, pl. III, fig. 24.
1884 *Terebratula adnethica* Suess – Haas, Südtyrol und Venetien, p. 23, pl. III, fig. 2.
1885 *Terebratula (Pygope) adnethica,* Suess. – Parona, Saltrio e Arzo, p. 252, pl. V, figs. 3–6.
1887 *Terebratula (Pygope) incisiva* Stoppani. – De Stefani, Appennino settentrionale, p. 42, pl. I, figs. 1–5.
1889 *Pygope erbaensis* Suess. sp. – Kilian, Andalousie, p. 611, pl. XXIV, fig. 9.
1896 *Terebratula Erbaensis* Suess. – Greco, Rossano Calabro, p. 99, pl. I, fig. 2.
v 1898 *Terebratula Adnethensis* Suess. – Böse, Brachiopodenfauna der östlichen Nordalpen, p. 161, text-fig. 1, pl. XI, figs. 1–6, 9.
1914 *Terebratula erbaensis* Pict. – Kulcsár, Mittellias. Gerecse, p. 167, pl. I, figs. 2a, b, 2c, d, 2e, 3a–c.
v non 1918 [*Terebratula*] *adnethensis* Suess – Vadász, Posidonomya alpina-Schichten in Anatolien, p. 217.
v 1920 *Terebratula Erbaensis* Suess. – Fucini, Taormina, p. 85, pl. IV, fig. 6.
1932 *Terebratula (Pygope) adnethensis* Suess. – Renz, Westgriechischen Lias, p. 32, pl. II, fig. 4.
1932 *Terebratula (Pygope) adnethensis* Suess var. *mendrisiensis* Renz (nov. var.). – Renz, Westgriechischen Lias, p. 37, pl. II, fig. 2.
v 1939 *Terebratula (Pygope) adnethica* Suess – Tricomi, Cozzo di Cugno, p. 5.
1939 *Terebratula erbaensis* Suess – Ramaccioni, Giuraliassica Monte Cucco, p. 145, pl. X, fig. 18.
v 1961 *Terebratula adnethensis* Suess – Vigh, Esquisse géol. Gerecse, p. 577.
1962 *Pygope erbaensis* Suess sp., 1852. – Jarre, Révision du genre Pygope, p. 81, pl. H, fig. 5.
1966 *Pygope adnethensis* (Suess) – Cantaluppi, „Corso bianco" ad Est di Brescia, p. 117, pl. XVII, fig. 12.
1971 *Pygope adnethensis* (Suess) – Brambilla, Prealpi lombarde, p. 470, pl. I, fig. 2.
1971 *Pygope* cf. *erbaensis* (Suess) – Brambilla, Prealpi lombarde, p. 471, pl. I, fig. 3.
1975 *Lobothyris adnethensis* (Suess) – Bujnovský, Jura Nízkych Tatier, p. 75, pl. XV, figs. 1, 2.
v 1976 *Pygope adnethensis* (Suess) – Vigh in Fülöp, Liassic Brach. Tata, p. 35.
v 1983 *S.[ecurithyris] adnethensis* (Suess, 1855) – Vörös, Some new genera, p. 13, figs. 6, 13–15.
v 1983 *Securithyris adnethensis* (Suess, 1855) – Vörös, Stratigraphic distribution, p. 35.
v 1987 *Securithyris adnethensis* (Suess) – Vörös et al., Panormide, p. 245.
1993 *Securithyris adnethensis* (Suess, 1855) ? – Mance□ido, Early Jurassic brachiopods from Greece, p. 92, pl. 2, fig. 3.
v 1997 *Securithyris adnethensis* (Suess) – Vörös, Jurassic brachiopods of Hungary, p. 16, Appendix: fig. 20.
1999 *Securithyris adnethensis* (Suess 1855) – Sulser, Brachiopoden der Schweiz, p. 154 + fig. (unnumbered).
v 2003 *Securithyris adnethensis* (Suess, 1855) – Vörös et al., Schafberg, p. 80, pl. VIII, figs. 38–42.
2005 *Securithyris adnethensis* (Suess 1855) – Sulser & Furrer, Lias von Arzo, p. 35, fig. 25.
v 2007 *Securithyris adnethensis* (Suess, 1855) – Vörös & Dulai, Transdanubian Range, p. 56, pl. II, figs. 25–27.
non 2008 *Securithyris* cf. *adnethensis* (Suess, 1855) – Baeza-Carratalá, Patrimonio J. de Cisneros, p. 454, pl. XIV, figs. 5–8.

Material: 888 specimens of very variable state of preservation.

Localities	*Measurements (mm)*			*Localities*	*Measurements (mm)*		
	L	*W*	*T*		*L*	*W*	*T*
Kericser 7	33.09	30.22	?		43.70	35.47	24.35
	54.91	38.81	?	Kericser 15	12.67	11.32	5.75
Kericser 8	12.36	12.60	6.33		14.23	11.04	7.23
	28.58	25.90	13.63	Kericser 16	14.89	12.12	7.56

Localities	*Measurements (mm)*		
	L	*W*	*T*
Kericser 17	13.16	11.77	5.58
	19.40	17.89	8.50
	22.88	19.05	10.38
	34.76	30.53	16.72
Kericser 18	15.43	14.12	6.33
	23.47	19.29	10.66
	29.39	24.58	17.93
Kericser 20	8.54	7.66	4.05
	10.14	9.44	4.87
	10.79	10.20	5.42
	14.20	13.68	6.70
	22.38	16.58	10.50
	35.41	30.17	19.04
	25.76	22.73	13.27
	32.29	31.61	17.95
Kericser 23	17.20	15.05	7.95
Kericser 26	23.28	24.17	13.20
	27.09	23.37	14.43
Kericser 27	15.73	15.19	7.84
	31.15	25.34	13.98
	36.13	34.98	17.24
	32.65	27.90	16.94
Kericser 28	11.72	9.18	5.86
	15.15	13.42	7.08
	20.35	17.88	9.59
	19.36	17.46	8.21
	22.59	18.13	10.57
	24.04	18.60	10.31
	23.85	21.62	10.75
	27.17	24.80	11.38
	31.52	27.82	17.70
	32.35	30.52	13.26
	30.18	26.20	13.33
	30.23	31.10	14.22
	31.82	31.24	16.39
	34.95	31.93	22.67
	35.34	33.99	23.70
	38.23	42.38	21.60
	36.68	33.73	14.82
	34.74	36.05	22.65
	35.08	29.67	22.23
	30.59	24.34	13.29
Kericser 29	34.12	31.74	16.72
	38.14	39.22	22.81
	37.93	36.67	23.29
	39.36	39.29	25.14
Kericser 30	32.99	27.65	16.30
	35.79	32.11	21.91
	39.03	40.02	25.63
Kericser 31	27.33	24.38	12.98
	24.69	23.03	11.29
	28.75	27.61	14.80
Kericser 32	32.56	32.40	14.80
	36.70	33.42	19.83
	43.74	45.83	24.66

Localities	*Measurements (mm)*		
	L	*W*	*T*
	40.30	30.49	18.63
	34.13	29.88	14.15
Kericser 33	12.49	11.90	6.14
	40.99	36.31	23.58
	20.50	15.28	9.27
Kericser 34	32.36	29.26	14.91
Kericser 36	25.11	22.64	11.31
	32.34	28.97	12.44
Kericser 1/a	35.15	34.57	20.58
	39.42	33.04	23.56
	38.28	33.70	22.63
	43.42	36.90	21.29
Kericser I/f	13.60	14.05	7.66
	23.26	20.69	10.23
	22.22	17.99	9.72
	26.14	21.95	10.68
	24.31	22.54	10.40
	27.99	24.05	12.31
	29.35	28.18	13.71
	39.52	34.15	20.16
	34.74	34.77	18.54
	36.98	38.08	22.33
	25.13	22.85	11.37
Kericser II/a	9.34	8.12	4.81
	18.25	16.81	7.67
Kericser II/k	12.05	10.02	5.92
	15.27	13.23	6.73
	15.12	11.72	5.76
	22.88	18.48	10.67
	32.35	26.23	16.20
Kericser (scree)	11.81	8.77	5.44
	12.09	11.08	5.61
Fenyveskút 5/a	45.97	47.60	27.60
Fenyveskút 5/c	21.67	23.95	11.04
	36.78	36.6	16.36
	46.07	48.27	26.73
	33.40	24.92	14.64
Fenyveskút 7	30.04	26.90	12.88
Fenyveskút (scree)	43.04	38.51	23.97
	39.00	43.69	25.26
	42.34	36.97	21.15
	41.25	36.09	22.56
Büdöskút 1/b	35.86	33.48	15.95
Lókút 458	33.35	30.53	16.77
Eplény	8.19	8.58	4.00
	17.36	16.96	8.66
	46.10	47.17	28.80
	38.77	37.24	27.94
	35.37	29.72	25.78
	6.84	6.06	3.27
	46.94	47.86	29.67
	42.50	36.60	30.62
	38.22	35.68	22.80
	44.92	41.33	30.17
	42.21	38.87	25.68

Localities	*Measurements (mm)*			*Localities*	*Measurements (mm)*		
	L	*W*	*T*		*L*	*W*	*T*
	25.90	25.14	13.33		42.79	40.46	27.73
	24.43	21.64	11.49		45.61	44.89	33.19
	12.68	11.3	5.75		46.34	42.73	26.61
	16.86	15.9	7.78		44.05	41.47	29.36
	18.09	16.75	7.51		43.79	44.06	22.55
	18.96	18.95	9.07		42.51	38.44	23.12
	14.10	14.18	6.70		36.14	36.80	26.79
	17.66	15.77	8.75		40.46	36.54	18.02
	17.80	15.96	8.55		45.40	41.98	25.04
	22.24	20.46	10.68		45.16	47.02	25.61
	22.65	21.62	9.92		36.61	33.83	20.14
	38.02	34.69	24.44		32.13	32.00	16.57
	40.92	39.01	25.13		36.81	40.08	20.95
	37.07	36.32	23.37		38.25	34.31	26.88
	39.77	37.48	23.35		40.97	46.33	22.87
	44.42	42.61	29.65		38.89	36.18	24.79
	43.43	41.90	28.41		35.65	31.62	24.36
	44.75	39.95	24.65		41.17	38.98	23.08
	39.25	34.05	26.17		42.23	39.46	25.52
	45.71	45.24	31.90		44.51	42.59	26.72
	39.71	36.98	24.39		37.59	41.28	25.60
	35.56	37.17	23.24		41.46	37.76	25.04
	41.75	38.68	25.10		38.46	34.32	26.22
	45.90	42.75	26.59		43.37	42.06	26.06
	41.46	39.88	24.46		44.91	45.39	28.33
	40.80	40.17	22.00		37.52	30.34	24.57
	38.37	29.93	25.35		41.98	41.52	25.96
	39.91	32.83	27.20		43.52	40.13	21.63
	41.95	36.24	18.53	Szentgál T-I/5	24.19	21.52	10.81
	41.64	40.02	21.71	Hamuháza 3	32.76	33.37	18.06
	43.32	40.78	26.26	Hamuháza 4	31.64	27.95	15.10
	46.84	49.33	24.96		36.93	27.92	17.40
	40.58	36.53	24.51		35.55	27.24	17.05
	38.33	37.22	22.31		32.76	31.06	17.51
	40.65	33.13	21.40		35.75	29.05	18.59
	40.01	41.86	28.86		29.56	26.59	14.44
	40.37	36.88	27.01		35.00	30.52	17.48
	48.29	41.07	29.77	Hamuháza 5	36.77	35.24	17.03
	44.47	44.75	27.12	Hamuháza 6	30.55	28.72	19.23
	37.47	35.50	27.75		34.84	30.31	18.88
	34.54	26.40	22.05	Bakonycsernye 93	38.30	36.54	19.07
	40.85	37.36	25.13	Úrkút (scree)	29.50	25.60	?
	39.67	37.59	23.62				

Description:

External characters: This is a large *Securithyris* with variable, elongated oval to subtriangular outline. In many cases (e. g.: Pl. XVIII, 3; Pl. XIX, 2, 4) the outline may be termed as “axiniform” (axe-shaped). The lateral margins are usually straight or gently convex, but in many specimens they are slightly (Pl. XIX, 2; Pl. XXI, 2) or deeply concave (Pl. XIX, 1, 4). The anterior margin forms an almost perfect half-circle. The apical angle (in fact the angle of the straight lateral margins) is very variable between 55–95°. The maximum width is usually attained at around the middle of the length but it may be shifted to the anterior quarter in elongated forms. The convexity of the valves varies from nearly flat to strongly convex; the maximum convexity lies near mid-length in adult specimens, while it is in the posterior one-third in juveniles. The rate of convexity and the length/with ratio of 200 measured specimens are shown in Fig. 89. In some specimens (Pl. XVIII, 4; Pl. XX, 1) the dorsal valve is markedly flattened as compared to the ventral one. The beak is moderately high, erect to slightly incurved in convex adults. The foramen is mesothyrid to permesothyrid, but in adults, it migrates transapically by resorption

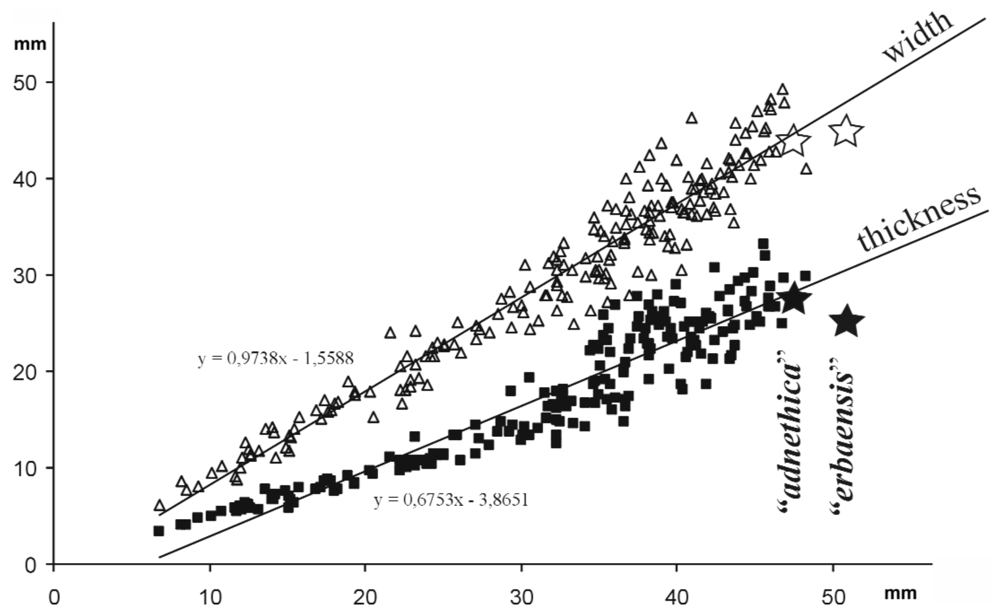


Figure 89. *Securithyris adnethensis* (SUESS, 1855). Scatter diagram showing the width (open triangles) and thickness (solid squares) data against the length (horizontal axis) of 200 measured specimens from the Pliensbachian of the Bakony. The respective data (open stars and solid stars) of the typical specimens of "*erbaensis*" figured by SUESS (1852) and "*adnethica*" by HAAS (1884) are shown for comparison

(Pl. XX, 4). The delthyrium is rarely seen; it forms a wide and low triangle. The lateral parts are usually gently convex or flat but the hinge and the lateral margins meet at an obtuse angle and elevated cardinal extremities are formed (Pl. XVIII, 3; Pl. XIX, 4; Pl. XXI, 2). In many cases planarea-like depressions develop, delimited by blunt beak ridges (Pl. XVIII, 1; Pl. XX, 1; Pl. XXI, 2). On these gently concave planareas the lateral commissures usually form a little elevated crest. In lateral view, the lateral commissures are almost straight or gently arched ventrally. The anterior commissure is rectimarginate. In some specimens, a flattened or even retreated frontal region develops, due to the cessation of longitudinal growth (Pl. XVIII, 1). The surface of the shells is almost smooth, except fine, irregularly spaced growth lines or some stronger growth rugae (Pl. XVII, 11; Pl. XVIII, 2, 4).

At the end of the description of the external morphology of this species it has to be mentioned that irregular growth and traces of healed injuries are often recorded on *S. adnethensis* shells. This species provided the largest specimens and by far the largest "biomass" of the Pliensbachian brachiopod fauna of the Bakony. In some biotopes the individuals probably lived in very dense populations and suffered attacks of predators. Consequently, two types of these pathological phenomena were recognized on *S. adnethensis* specimens and were identified with ichnogenera discussed and illustrated by TCHOUMATCHENCO (1987). These are *Dentisignia* VIALOV, 1974 which denote healed bites of predators (Fig. 90 A–F) and *Convictisignia* VIALOV, 1974 which

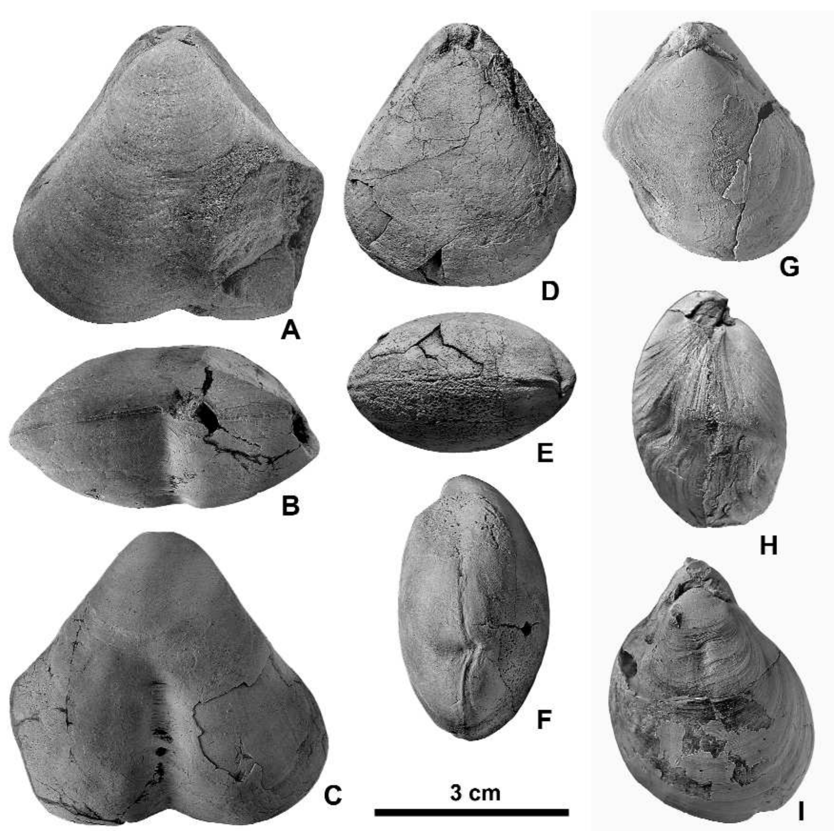


Figure 90. *Securithyris adnethensis* (SUESS, 1855). Pathological specimens showing traces of *Dentisignia* (A–F) and *Convictisignia* (G–I). From Lókút, Fenyveskút, 5/c, M 2008.516.1. (A–C), Lókút, Fenyveskút, scree, M 2008.517.1. (D–F), Eplény, M 2008.518.1. (G–H), Eplény, M 2008.519.1. (I)

deformations were caused by competition for space in overcrowded populations (Fig. 90 G–I). Several specimens of *S. adnethensis* from the Pliensbachian of the Bakony were figured previously by Tasnádi-Kubacska (1962, figs. 95–99) in his handbook on palaeopathology; these are mostly of *Dentisignia* type, but some (e. g. fig. 98) exemplifies *Convictisignia*.

Internal characters (Figs. 91–93): *Ventral valve*: The pedicle collar is well-developed. The delthyrial cavity is rounded subpentagonal in cross section. The hinge teeth are well developed, strong; denticula are clearly seen. The ventral

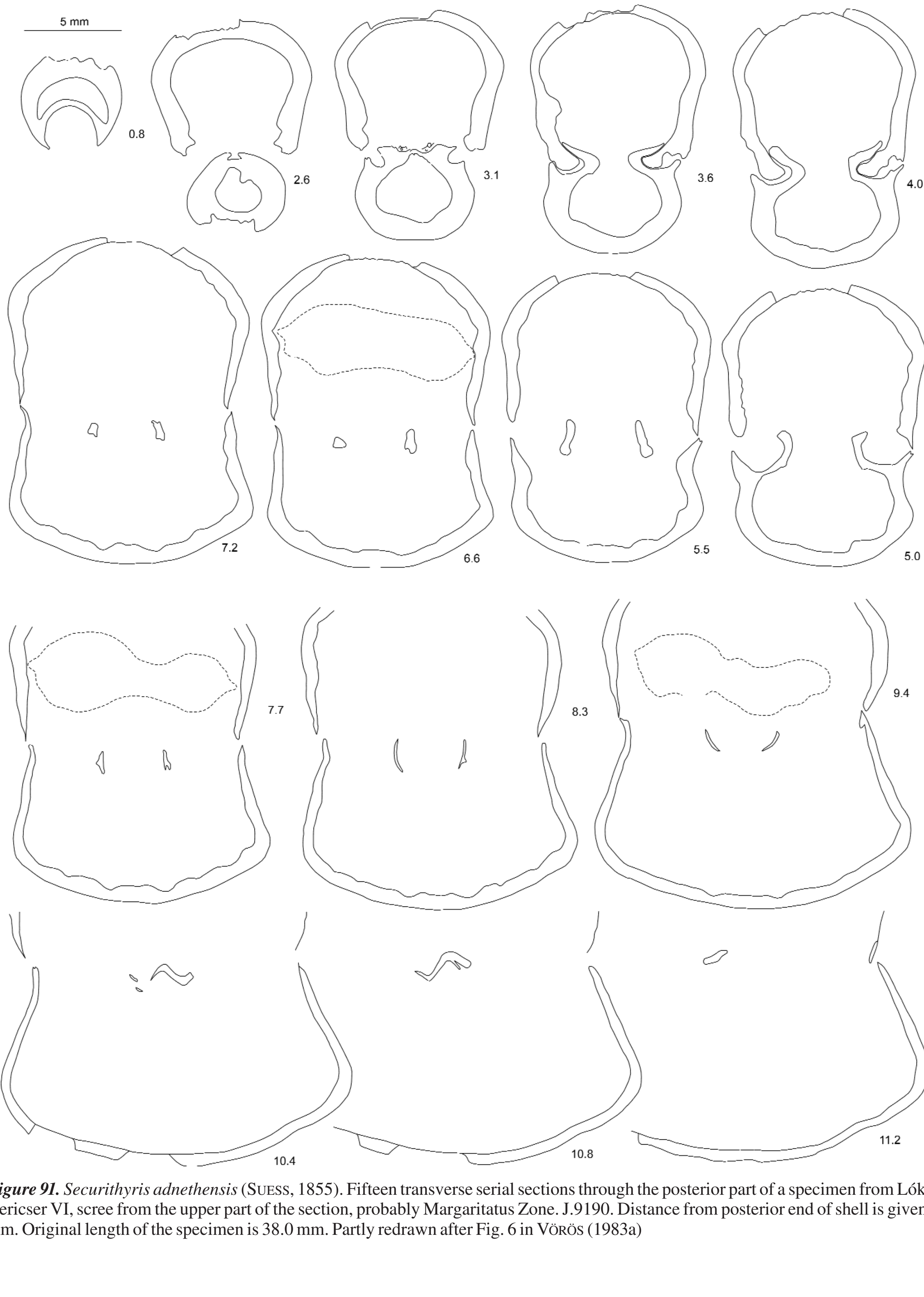


Figure 91. *Securithyris adnethensis* (Suess, 1855). Fifteen transverse serial sections through the posterior part of a specimen from Lókút, Kericser VI, scree from the upper part of the section, probably Margaritatus Zone. J.9190. Distance from posterior end of shell is given in mm. Original length of the specimen is 38.0 mm. Partly redrawn after Fig. 6 in Vörös (1983a)

muscle scars are short, horseshoe shaped; the pinnate pattern of the mantle canal markings are frequently seen on internal moulds (see fig. 14 in Vörös 1983a). *Dorsal valve*: The cardinal process forms a wide platform with a markedly crenulated surface; it may project rather deeply to the delthyrial cavity (Figs. 92, 93). There are definite, narrow and short, slightly divergent adductor muscle scars. The outer socket ridges are rather massive and wide. The inner socket ridges bend considerably over the sockets. The hinge plates are very much reduced; in some specimens they are completely masked by secondary shell material (callus) (Fig. 92). If they are recognized at all, the hinge plates grow from the medial part of the inner socket ridges and inclined dorsally at around 45°. Their ventral surface forms a coherent plane with the ventral part of the inner socket ridges. The crural bases are indistinct, pointlike in cross section. The crural processes are subvertical and subparallel or slightly incurved in cross section. The loop is narrow and short. The transverse band is moderately arched; terminal points are not recorded. A reconstructed view of the dorsal valve interior was shown in Vörös (1983, fig. 15).

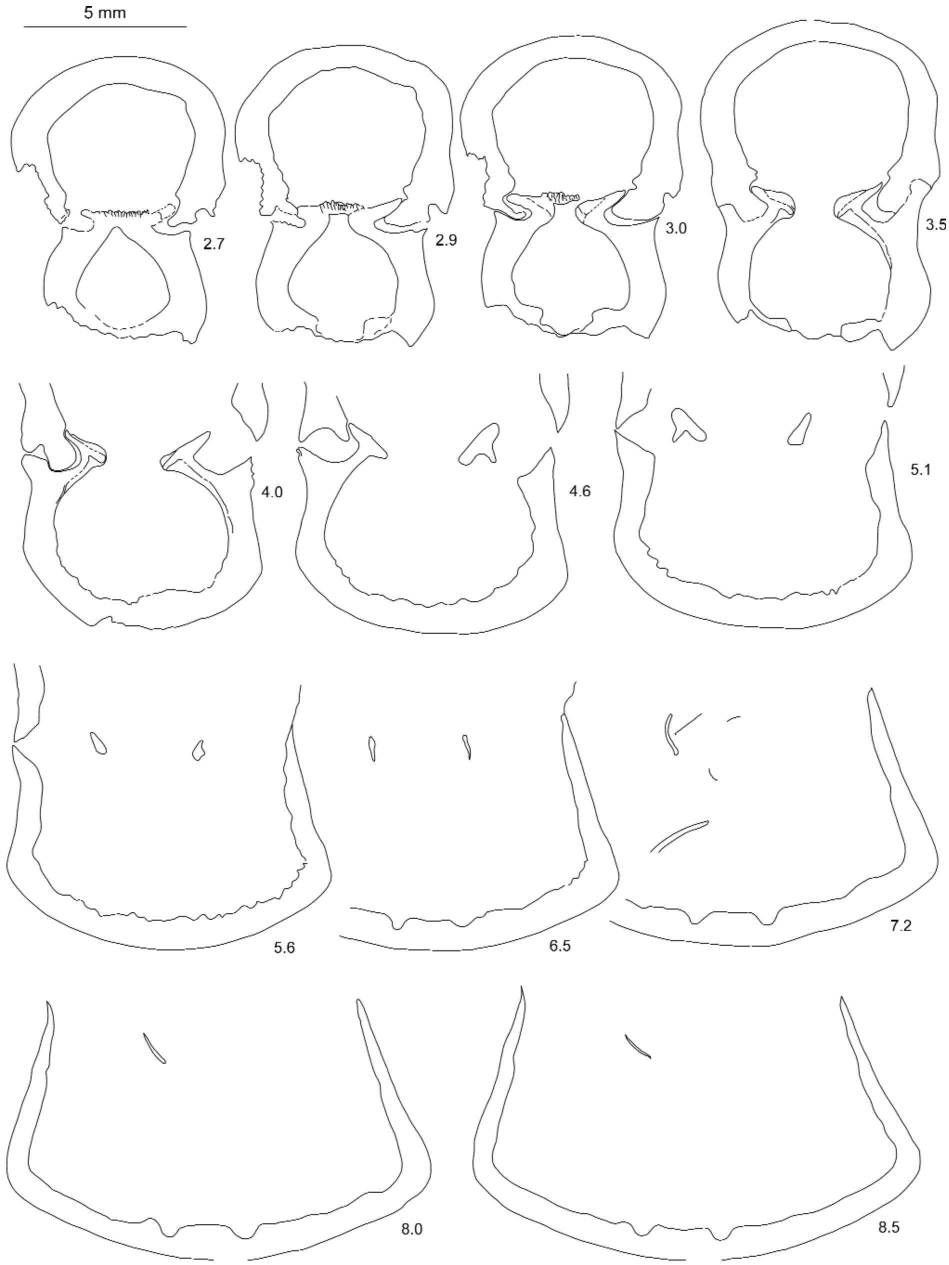


Figure 92. *Securithyris adnethensis* (Suess, 1855). Twelve transverse serial sections through the posterior part of a specimen from Lókút, Kericser VI, scree from the upper part of the section, probably Davoei Zone. M 2008.520.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 38.0 mm

Remarks:

S. adnethensis is the type species of the genus *Securithyris* Vörös, 1983. When I designated it as type species, I gave a concise description and illustration of *S. adnethensis*, focussed on the internal features. In the present work I provide a comprehensive illustration of the external morphology of this widely variable species. It is possible and reasonable because, with its almost one thousand specimens, *S. adnethensis* is the second most abundant species of the Pliensbachian brachiopod fauna of the Bakony.

This species was cited in the last hundred and fifty years under the name *adnethensis, adnethica* and *erbaensis*, from which only the first is valid and used correctly nowadays. From among the three names, *adnethica* was only a different spelling of *adnethensis* made by Gümbel (1861, p. 467, 471, indicating Suess as author) and was not too long in usage. On the other hand, the *adnethensis* vs. *erbaensis* problem was very controversial and resulted in some confusion until Renz (1932, l. c.) cleared it up and offered the solution. In the following I give a summary of this history.

The presently discussed species was first recorded by Suess (1852, l. c.) who figured an "extreme form" of "*Pygope diphya*" without central perforation. This single specimen, collected previously from red limestone of the Erba Mountain (Northern Italy) and stored in a museum in Vienna, was believed to be of Late Jurassic in age, because the other, typical

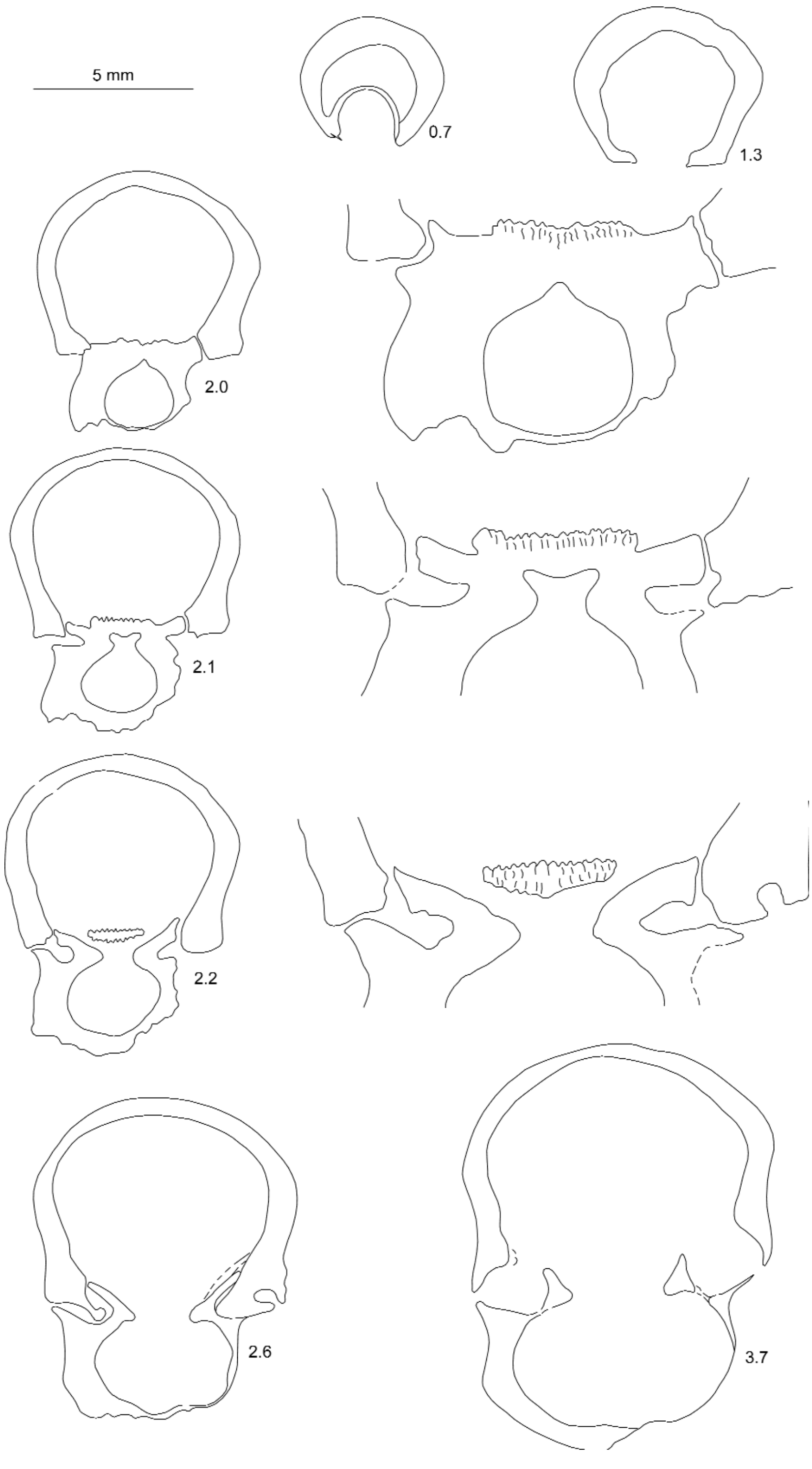


Figure 93. *Securithyris adnethensis* (Suess, 1855). Seven transverse serial sections through the posterior part of a specimen from Lókút, Kericser VI, Bed 28, Ibex Zone. M 2008.521.1. Distance from posterior end of shell is given in mm. Magnified details of the cardinal process are shown in the right column. Original length of the specimen is 36.0 mm

Pygope specimens, studied by Suess, came definitely from the Upper Jurassic red limestones of the Erba Mountain. A few years later, another specimen of this form was delivered to Suess from the Lower Jurassic of Adnet (Austria). Suess (1855, l. c.) recognized that this specimen (and the previous one, coming obviously from the Lower Jurassic red limestone of Erba) represented a new terebratulid species and introduced the name "*Terebratula Adnethensis*" for them. It was a regrettable circumstance that this act was published rather indirectly, in a paper devoted to Late Triassic brachiopods, in the description of "*Rhynchonella*" *longicollis* Suess, with a short indication to pl. I, figs. 18 and 19 in Suess (1852), i. e. to the Erba specimen.

Pictet (1867, l. c.) in his monograph on the pygopids, also recognized that the large, triangular, non-perforated terebratulid from the Erba Mt, figured by Suess (1852), does not belong to the true pygopids. Pictet probably was in communication with Suess, because he mentioned that Suess tentatively regarded this fossil as Liassic in age. On the other hand, Pictet was obviously unaware of the fact that ten years earlier Suess (1855) gave a valid, new name (*adnethensis*) of this Lower Jurassic terebratulid, and described it as "*Terebratula Erbaensis,* Suess". The deliberate indication of Suess as author does not change the real condition, i. e. that the author of the name *erbaensis* is Pictet (1867). But in the description of the new species Pictet clearly stated that *erbaensis* was based on the same, single specimen what was figured by Suess (1852, l. c.), and his figure (Pictet 1867, pl. 33, fig. 8) portrays in fact the same specimen. Consequently, the species name *erbaensis* is a junior objective synonym of *adnethensis*, therefore it must be rejected, and the valid name of this species is *S. adnethensis* (Suess, 1855).

In the next decades, many prominent authors (e. g. Zittel 1869, l. c., Parona 1885, l. c., Kulcsár 1914, l. c.) used separately the two species names (*adnethensis* mostly in the form *adnethica*) and, being unaware that the two "species" were based on the same single specimen, they even tried to invent some morphological difference between them. This way *erbaensis* became denoting the slender, flat shells, while *adnethensis* (or *adnethica*) was suggested to incorporate the more convex forms (Zittel, l. c.). The rate of convexity and the length/with ratio of these "morphotypes" (Fig. 89) fit well into the range of variation shown by the *S. adnethensis* specimens from the Bakony.

Remarkably, Böse (1898, l. c.) noticed the hidden remark by Suess (1855), i. e. the introduction of the name *adnethensis*, and recognized that this was the first valid name of this species. He rightly used the name *adnethensis*, still, he maintained the use of the name *erbaensis*, although only on the rank of variety.

Even after Renz (1932, l. c.) clearly demonstrated that *erbaensis* is junior synonym of *adnethensis* (based on one and the same specimen), some authors (Ramaccioni 1939, l. c., Jarre 1962, l. c.) continued to use the junior synonym, and Brambilla (1971, l. c.) even insisted on the morphological separation of *erbaensis* and *adnethensis*.

The specimens figured by De Stefani (l. c.) as "*T.* (*Pygope*) *incisiva* Stoppani" look like typical representatives of *S. adnethensis*. The records of "*Pygope erbaensis*" by Kilian (l. c.) and "*T.* (*Pygope*) *adnethensis* Suess var. *mendrisiensis*" by Renz (l. c.) show outlines with almost rectilinear anterior margins and, in this respect, these specimens approach to *S. helenae* (Renz, 1832). But Mance□ido (1993, l. c.), in the revision of Renz's brachiopods from western Greece, included the var. *mendrisiensis* to *adnethensis* and this view is accepted here.

Some records of the list of synonymies (Vadász, l. c., Vigh, l. c., Vigh in Fülöp, l. c. and Tricomi, l. c.) were published without figures but the original specimens were checked in the collections of the Geological Institute of Hungary (Budapest) and the Palermo University, respectively, and their identification with *S. adnethensis* was approved.

Baeza-Carratalá (2008, l. c.) figured several specimens tentatively attributed to *S. adnethensis*. In the figures I was not able to recognize any diagnostic features of *S. adnethensis*, therefore in my view they do not belong here but probably represent some species of *Lobothyris*.

Other species of *Securithyris* differ from *S. adnethensis* in the following external characters. *S. filosa* (Canavari, 1880) is somewhat smaller, wider than long and strangulate, i. e. has opposite sulci in both valves. *S. paronai* (Canavari, 1880) is even smaller, wider than long and unisulcate. *S. helenae* (Renz, 1932) is almost as large as *S. adnethensis* but its anterior margin is nearly straight and its lateral margins are deeply concave.

Distribution:

Pliensbachian of Sicily, Calabria, the Central Apennines and the Southern Alps (Italy, Switzerland), the Northern Calcareous Alps (Austria), the Gerecse and Bakony Mts (Hungary), the Inner West Carpathians (Slovakia), Western Greece, Germany and the Betic Cordilleras (Spain). The Pliensbachian specimens of the Bakony came from nine localities, from the Jamesoni to the Margaritatus Zones. (Tables 13, 14).

Securithyris filosa (Canavari, 1880)
Plate XXIII: 3; Plate XXIV: 1, 2; Figures 94, 95.

v * 1880 *Terebratula* (*W*?) *filosa* Mgh. – Canavari, Strati a Terebratula Aspasia, p. 346, pl. II, fig. 13.
v 1961 *W. filosa* Mgh. – Vigh, Esquisse géol. Gerecse, p. 576.
v 1983 *Securithyris filosa* (Canavari, 1880) – Vörös, Stratigraphic distribution, p. 35.
v 1997 *Securithyris filosa* (Canavari) – Vörös, Jurassic brachiopods of Hungary, p. 16, Appendix: fig. 21.
v 2007 *Securithyris filosa* (Canavari, 1880) – Vörös & Dulai, Transdanubian Range, p. 56, pl. II, figs. 29, 30.

Material: 81 specimens of very variable state of preservation.

Localities	*Measurements (mm)*			*Localities*	*Measurements (mm)*		
	L	*W*	*T*		*L*	*W*	*T*
Kericser 17	17.53	17.10	8.51		13.79	14.29	8.16
Kericser 18	11.90	13.94	5.85		16.75	15.72	8.93
	24.97	24.19	13.85		16.71	18.45	10.16
Kericser 20	17.47	19.05	8.98		18.20	18.01	11.78
	25.06	26.74	12.70		20.63	19.01	11.34
	28.03	29.63	13.12		22.44	22.81	12.82
Kericser 22	18.72	19.66	9.23		22.68	22.40	13.55
Kericser 24	23.25	23.94	13.16		24.45	23.75	13.69
Kericser 26	20.55	25.55	12.81		26.00	31.69	14.52
Kericser 27	11.47	12.82	7.71	Kericser (scree)	21.43	22.95	12.35
	14.41	13.03	6.88	Fenyveskút É	22.17	27.18	12.35

Description:

External characters: This is a medium-sized *Securithyris* with rounded subtriangular outline. The lateral margins are usually straight or gently convex; the anterior margin is bilobed. The apical angle (the angle of the straight lateral margins) varies between 85–95°. The maximum width is attained at around the anterior third of the length. The valves are moderately and equally convex. The maximum convexity lies near mid-length or a little shifted to the posterior one-third. The beak is rather low, erect to slightly incurved. The beak ridges are indistinct. The foramen is poorly seen; it seems to be mesothyrid and somewhat atrophied(?) in some specimens. The delthyrium is poorly preserved; it forms a wide and low triangle. True planareas are not present; the lateral parts are gently convex and the lateral commissures run in a narrow groove. In lateral view, the lateral commissures are nearly straight. The anterior commissure is rectimarginate to very weakly sulcate. A shallow but well visible sulcus starts near the umbo of the dorsal valve and runs medially to the anterior margin. The ventral valve remains unfolded, i. e. it has neither fold nor sulcus. Consequently, the anterior part may be termed as non-typical ligate. The surface of the shells is almost smooth, except fine, irregularly spaced growth lines.

Internal characters (Figs. 94, 95): *Ventral valve*: There is a well-developed, long pedicle collar. The delthyrial cavity is rounded subcircular in cross section showing the traces of muscle scars. The hinge teeth are, strong; denticula are well-developed. There is a narrow, fused deltidium. *Dorsal valve*: The cardinal process is wide and forms an elevated platform with

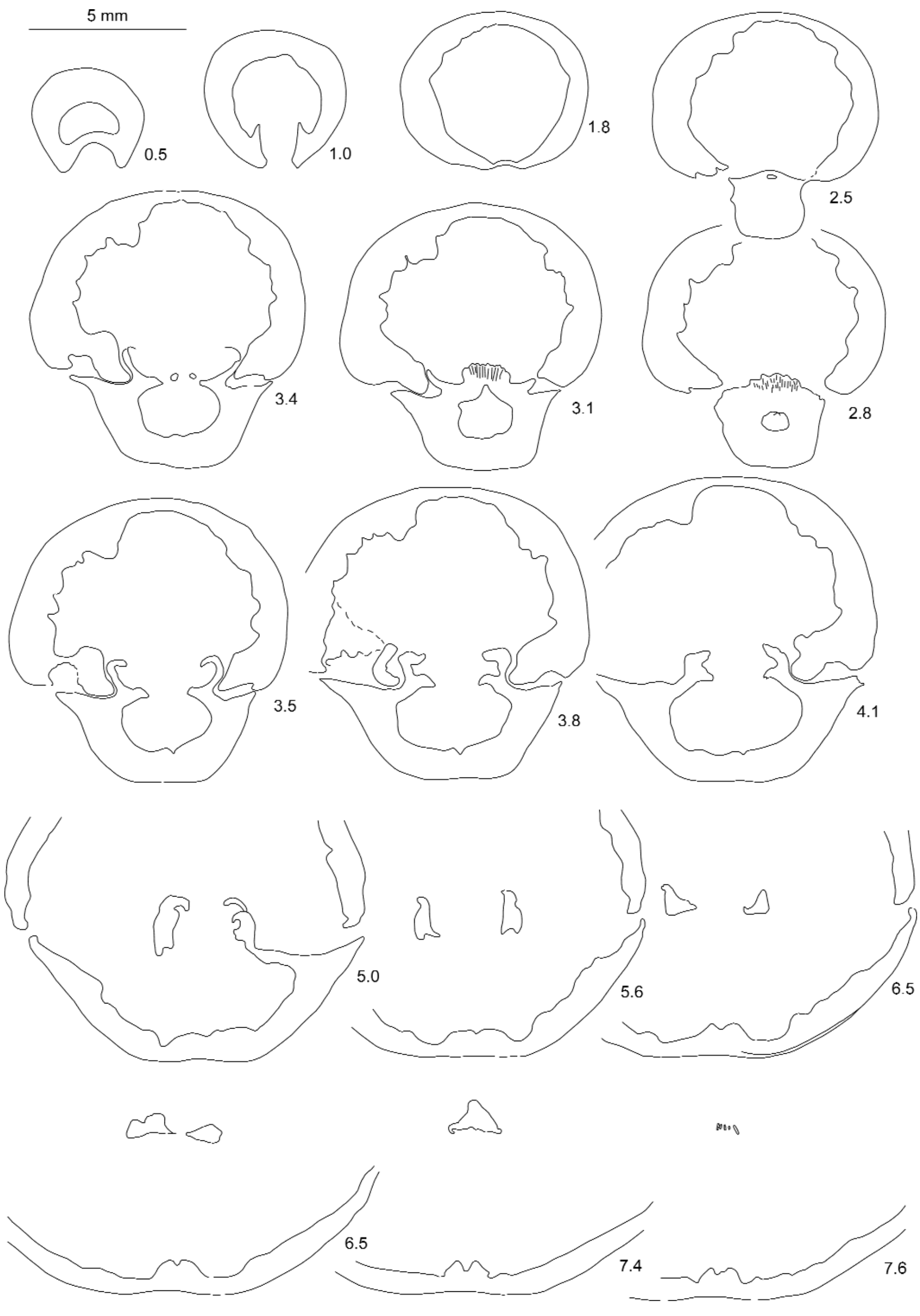


Figure 94. *Securithyris filosa* (Canavari, 1880). Sixteen transverse serial sections through the posterior part of a specimen from Lókút, Kericser VI, Bed 27, Ibex Zone. M 2008.522.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 24.3 mm

a markedly crenulated surface. The outer socket ridges are low and wide. The inner socket ridges bend considerably over the sockets and show different development in the two sectioned specimens. In one specimen (Fig. 94) the ventral termination of the inner socket ridges curves markedly inward and, though the more distal parts are masked by callus, this curved structure seems to continue to the beginning of the loop. In the other specimen (Fig. 95) the inner socket ridges show the simple structure what was also recorded in *S. adnethensis*. The hinge plates are strongly reduced; in some specimens they are somewhat masked by secondary shell material (callus). They join the medial part of the inner socket ridges; their ventral surface forms a

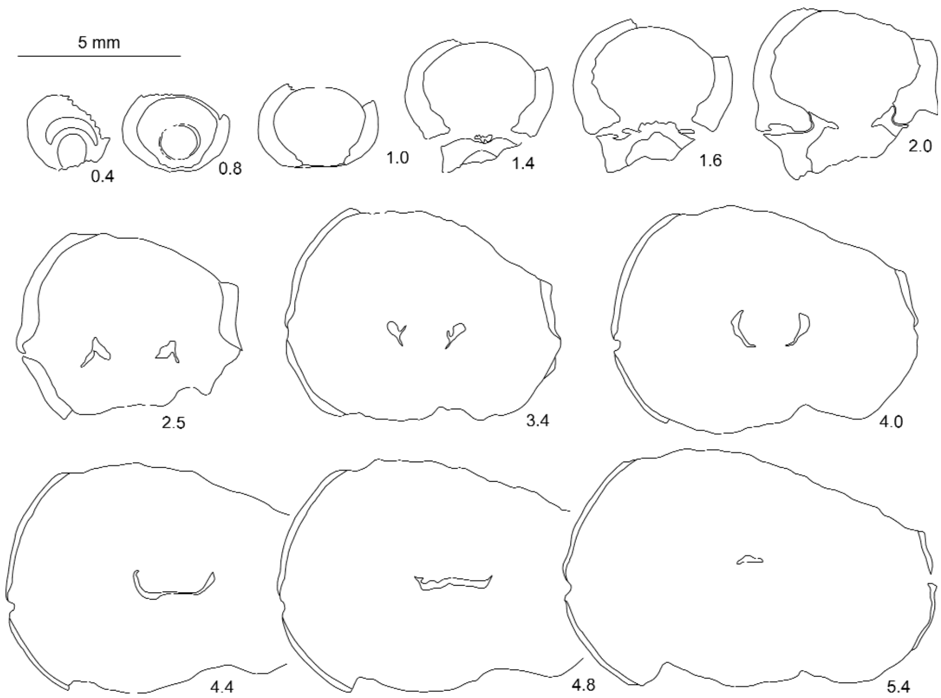


Figure 95. *Securithyris filosa* (Canavari, 1880). Twelve transverse serial sections through the posterior part of a specimen from Lókút, Kericser, scree, probably Lower Pliensbachian. M 2008.523.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 19.0 mm

coherent plane with the ventral part of the inner socket ridges. The crural bases are narrow blade-like in cross section. The crural processes are subvertical and subparallel or slightly incurved in cross section. The loop is narrow and short; lateral flanges are not present. The transverse band is low and forms the most distal part of the loop; it bears minor terminal spines.

Remarks:

The rounded triangular outline, the weak but long dorsal sulcus and the basically ligate anterior margin make this species easily recognizable. Rather surprisingly, earlier authors suggested to attribute *S. filosa* to the zeilleriids ("*Waldheimia*"). The records by Canavari (l. c.) and Vigh (l. c.) were checked in the collections of the Pisa University and the Geological Institute of Hungary (Budapest), respectively, and both turned to be representatives of *Securithyris*. Sharp beak ridges, dental plates and median septum, i. e. the diagnostic features of the zeilleriids, were not observed on them.

S. filosa differs from *S. adnethensis* and *S. helenae* by its marked dorsal sulcus and ligate anterior margin. The fourth known species of this genus, *S. paronai* is, in contrast to *S. filosa*, definitely sulcate, i. e. its dorsal sulcus corresponds to a ventral fold.

S. filosa evokes some distant analogy to the Late Jurassic *Triangope triangulus* (Valenciennes, 1819) but the latter has sharper beak ridges and more pronounced anterolateral corners.

Distribution:

Pliensbachian of the Central Apennines, the Gerecse and Bakony Mts (Hungary). The Pliensbachian specimens of the Bakony came from two localities, from the Ibex to the Margaritatus Zones (Tables 13, 14).

Securithyris paronai (Canavari, 1880)
Plate XXIV: 3, 4.

v * 1880 *Terebratula Paronai,* nov. f. – Canavari, Strati a Terebratula Aspasia, p. 344, pl. II, fig. 11.

v 1983 *Securithyris paronai* (Canavari, 1880) – Vörös, Stratigraphic distribution, p. 35.

v 2007 *Securithyris paronai* (Canavari, 1880) – Vörös & Dulai, Transdanubian Range, p. 56, pl. II, fig. 28.

Material: 4 double valves of various state of preservation.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser 28	15.70	18.54	11.55	3.92
	18.23	17.78	11.63	?
Kericser II/a	15.36	16.69	8.12	2.08

Description:

External characters: This is a small *Securithyris* with rounded subtriangular outline. The lateral margins are usually gently convex; the anterior margin is bilobate. The apical angle varies between 80–95°. The maximum width is attained near the anterior third of the length. The valves are moderately and equally convex. The maximum convexity lies near mid-length or a little nearer to the posterior one-third. The beak is moderately high, slightly incurved; other details of the beak, foramen and delthyrium can not be recorded due to the poor preservation. There are no distinct beak ridges. In lateral view, the lateral commissures are nearly straight. The anterior commissure is distinctly sulcate in its medial portion. A well marked and narrow sulcus starts near the umbo of the dorsal valve and runs to the anterior margin. The corresponding ventral fold is less accentuated and develops only anteriorly. The surface of the shells is almost smooth, except fine growth lines; there are stronger co-marginal rugae on one specimen (Pl. XXIV, 3).

Internal characters: These were not studied by serial sectioning because of the paucity of the material (two complete double valves with sparite infilling).

Remarks:

S. paronai stands very close to *S. filosa* (Canavari, 1880) in many external morphological features but differs in having an entirely sulcate anterior region. Canavari's (l. c.) figures are not fully informative, but the personal study of the original specimen in the collection of the Pisa University convinced me that *S. paronai* was an independent species and the identification of the Bakony specimens was correct.

S. paronai clearly differs from other *Securithyris* species (*S. adnethensis, S. helenae*) by its sulcate shape. A somewhat similar form was figured from the Lower Jurassic ("Oberer Lias") of the Southern Alps by Zittel (1869, p. 127, pl. XV, figs. 1, 2) as *Terebratula* (*Waldheimia*) *bilobata* Stoppani, 1857. It is, however, really very strongly bilobate and bears strong beak ridges in contrast to *S. paronai*. Moreover, it reminds me to some variants of the Late Jurassic *Triangope triangulus* (Valenciennes, 1819), therefore I can imagine that Stoppani's specimen originated from Upper Jurassic beds due to collecting bias.

Distribution:

Pliensbachian of the Central Apennines and the Bakony Mts (Hungary). The Pliensbachian specimens of the Bakony came from the Kericser section, from the Ibex Zone (Tables 13, 14).

Family Nucleatidae Schuchert, 1929

Genus *Linguithyris* Buckman, 1918

This genus was introduced by Buckman (1918) with the Middle Jurassic *L. bifida* (Rothpletz, 1886) as type species. Besides this designation and a very short description, Buckman (1918, p. 99) listed some other Middle Jurassic species intended to include into *Linguithyris*, and figured a new species (*L. umbonata*) and a specimen of *L. bifida* from the British Bajocian beds (Buckman 1918, pl. XX, figs. 3 and 4, respectively).

Linguithyris is a typical genus of the Mediterranean province, widespread in the Lower and Middle Jurassic brachiopod faunas of Southern Europe, therefore, while working on the brachiopods of the Bakony, I felt obviously necessary to examine the original specimens of the type species *L. bifida* kept in the Bayerische Staatssammlung, München. The eight specimens encountered in this collection represent a wide range of variation but correspond well to the figures given by Rothpletz (1886, pl. V, figs. 17–19, 21, 23, 25–27). Besides the bilobate and deeply sulcate shape, the specimens share the features of the dorsal adductor muscle scars which are slightly divergent and rather short (less than one quarter of the length of the dorsal valve). Some details of the internal morphology of *L. bifida* were also given by Rothpletz (1886, p. 115, pl. VIII, fig. 29) who figured and described a short but relatively wide loop with low transverse band.

It seems that there is some kind of inconsistency in the definition of *Linguithyris* by Buckman (1918). Namely, the two British specimens he depicted show rather long dorsal adductor muscle scars (exceeding one third of the length of the dorsal valve), significantly longer than those of Rothpletz's *L. bifida*, what Buckman designated as type species. This, at the same time, implies considerably longer loop in the British specimens. This makes an important divergence, therefore I believe that Buckman's specimens from the Dorset coast (including his "*bifida*" and *umbonata*) differ from the "true" *Linguithyris* at least on the subgenus level. This question remains open until we have detailed information on the internal morphology of the British specimens.

Another controversy in the interpretation of the genus *Linguithyris* appeared recently in a paper by Tchorszhevsky (1989) focussed on the Jurassic Nucleatidae. He retained *L. bifida* as the type species, but gave a redefinition of *Linguithyris* on the basis of four new species described from the Middle Jurassic (Bajocian) of the Ukrainian Carpathians. The four new species are regularly sulcate; the internal morphology of two of them were documented by serial sections (Tchorszhevsky 1989, figs. 1, 2). Both series of cross sections portray U-shaped (ventrally concave) hinge plates, ventrally projected crural bases and markedly high transverse band of the loop. These internal features were considered essential elements in the definition of *Linguithyris* by Tchorszhevsky (1989, pp. 25–26). However, this is in contradiction with the, although limited, knowledge on the internal morphology of the type species (low transverse band), and, in general, with the knowledge on the cardinalia of the Nucleatidae (reduced hinge plates, indistinct crural bases: Cooper 1983, Lee et al. 2006). Therefore, in my opinion, Tchorszhevsky's new species do not represent *Linguithyris*, but may belong to another genus, perhaps a descendant of the Lower Jurassic *Rhapidothyris* (judging from the ventrally concave hinge plates).

Linguithyris is definitely different from *Nucleata* Quenstedt, 1868 which has diagnostic "horseshoe-shaped" dorsal adductor muscle scars and remains rather stout and globose in adult stage, in contrast to the laterally expanded "bifid" shape of *Linguithyris*. Their stratigraphical ranges are also different, though partly overlapping, i. e. *Linguithyris*: Early to Middle Jurassic; *Nucleata*: late Middle to Late Jurassic.

Further brachiopod genera, related to *Linguithyris*, were introduced by Tchorszhevsky (1989, 1990). From among them, the Late Jurassic *Vjalovithyris* Tchorszhevsky, 1989 was synonymized with *Nucleata* in the "revised Treatise" (Lee et al. 2006), while the Middle Jurassic *Kubanithyris* Tchorszhevsky, 1989 was kept in the Treatise as an independent genus, though Mance□ido (1993b, p. 194) intended to give it subgeneric status at the most.

Two related Early Jurassic genera *Carinatothyris* Tchorszhevsky, 1990 and *Buckmanithyris* Tchorszhevsky, 1990 were described in a rather inaccessible periodical (Tchorszhevsky 1990), and probably by this reason, they became included only in the supplement volume of the "revised Treatise" (Lee et al. 2007). There they appeared as classified into the superfamily Dyscolioidea but as members of an uncertain family, although it is quite clear that they should belong to the Nucleatidae. According to Tchorszhevsky (1990) *Carinatothyris* includes *C. carinata* (Haas, 1912) and *C. canavarii* (Parona, 1882). It is very similar to the Early Jurassic representatives of *Linguithyris*, especially to *L. aspasia* (Zittel, 1869), in general shape, but it is plicosulcate, i. e. has a secondary fold in the dorsal sulcus. *Buckmanithyris* is regularly unisulcate but much less expanded laterally than *Linguithyris*, and possesses well-developed, wide hinge plates, markedly curved dorsally, in contrast to the indistinct hinge plates of *Linguithyris*. Besides some new species, Tchorszhevsky (1990, p. 33) listed the following, previously known species as belonging to *Buckmanithyris*: *B. nimbata* (Oppel, 1861), *B. cornicolana* (Canavari, 1881), *B. nepos* (Canavari, 1882), *B. chrysilla* (Uhlig, 1880) and some other nominal taxa (*myrto, minor*) which were only variants of *L. aspasia*. It is not clear from his paper, if Tchorszhevsky studied the internal morphology of all these species, or his decisions were based merely on external features. However, my studies on serial sections revealed that the species *cornicolana* does, in fact, belong to *Buckmanithyris*, whereas "*chrysilla*" definitely not, because the latter has reduced hinge plates and very low transverse band.

Although *Linguithyris* was established on Middle Jurassic material, it seems to be more frequent and widespread in Lower Jurassic deposits (Prosorovskaya & Vörös 1988, Mance□ido 1993b, Vörös 1993a). These sulcate terebratulids, exemplified first of all by the classical "*T. aspasia*" were classified in the last decades into the genera *Pygope*, *Propygope, Nucleata* and *Glossothyris* (the junior synonym of *Nucleata*) by different authors, until Vörös (1983b) suggested the use of the generic name *Linguithyris*. Since then this view became widely accepted and used by leading experts of Jurassic brachiopods (Mance□ido 1993a, 1993b, Siblík 1993b, 2002, Alméras et al. 2007).

Linguithyris is a forerunner of the famous "*Pygope*-stock", or the initial member of the "lineage" leading from the bifid to the perforate stage, as it was reviewed by Mance□ido (1993b). The coherent nature of this lineage, based on observations on external morphology is endorsed by internal features, first of all the very reduced hinge plates recognized in *Linguithyris* (herein) and in *Pygope diphya* (Dieni & Middlemiss 1981, text-figs. 3, 4). The background of the periodical success of this lineage, i. e. the adaptation to deeper or calmer environments, was recognized by Ager (1965) and was further interpreted in time and space by Vörös (2005).

Linguithyris aspasia (Zittel, 1869)
Plate XXIV: 5–13; Plate XXV: 1–11; Plate XXVI: 1–6; Figures 96–104.

v * 1869 *Terebratula Aspasia.* Menegh. – Zittel, Central-Appenninen, p. 126, pl. XIV, figs. 1–4.
v 1874 *Terebratula Aspasia,* Menegh. – Gemmellaro, Zona con Terebratula Aspasia, p. 63, pl. XI, figs. 1–3.
1880 *Terebratula Aspasia* Mgh. – Canavari, Strati a Terebratula Aspasia I, p. 336, pl. I, figs. 1–9.
1881 *Terebratula Aspasia* Mgh. – Meneghini, Calcaire rouge, p. 168, pl. XXXI, figs. 8, 9.
v 1882 *Terebratula Aspasia* Mgh. – Canavari, Lias von Spezia, p. 129, pl. XV, figs. 1, 2.
non 1886 *Terebratula (Pygope) Aspasia* Meneghini, var. *minor* Zitt. – Vacek, Cap S. Vigilio, p. 114, pl. 20, fig. 1.
1887 *Terebratula (Pygope) Aspasia* Meneghini. – De Stefani, Appennino settentrionale, p. 43, pl. I, figs. 6–9.

v 1888 *Terebratula (Pygope) Aspasia* Mgh. – Canavari, Lias inferiore di Spezia, p. 64, pl. I, figs. 1, 2.
v 1889 *Terebratula Aspasia* Menegh. – Geyer, Hierlatz, p. 14, pl. II, figs. 14, 15.
1889 *Pygope Aspasia* Men. sp., var. *major* Zitt. – Kilian, Andalousie, p. 610, pl. XXIV, fig. 3.
? 1896 *Terebratula (Pygope) Aspasia* Mgh. – Levi, M. Calvi, p. 265, pl. VIII, figs. 1, 2.
1897 Terebratula (Pygope) Aspasia Mgh. – Fucini, Monte Calvi, p. 213, pl. XXIV, fig. 1.
1906 *Pygope Myrto* Mgh. – Fucini, Gerfalco, p. 651, pl. XI, figs. 38–40.
1910 *Terebratula Aspasia* Mngh. – Vinassa de Regny, Prealpi dell'Arzino, p. 193, pl. VII, figs. 20, 21.
1911 *Terebratula Aspasia*, mgh. – De Toni, Vedana (Belluno), p. 21, pl. I, fig. 7.
1911 *Pygope Aspasia* Meneghini sp., var. *Major* Zittel – Flamand, Haut-Pays de l'Oranie et Sahara, p. 872, pl. III, figs. 7a–d.
1912 [*Terebratula (Pygope) Aspasia* Meneghini.] Typus – Haas, Ballino, p. 256, pl. XX, figs. 1, 2.
1912 [*Terebratula (Pygope) Aspasia* Meneghini.] variet *Myrto* Meneghini. – Haas, Ballino, p. 257, pl. XX, fig. 3.
1912 [*Terebratula (Pygope) Aspasia* Meneghini.] variet. *minor* Zittel. – Haas, Ballino, p. 257, pl. XX, fig. 4.
1912 *Terebratula (Pygope) Chrysilla* Uhlig nov. variet. *pinguis*. – Haas, Ballino, p. 260, pl. XX, figs. 7, 8.
v 1915 *Terebratula (Pygope) aspasia* Mgh. var. *dilatata* Can. – Vadász, Persány, p. 268.
1920 *Terebratula (Pygope) Aspasia* Meneghini. – Caterini, Ancora sul polimorfismo, p. 6, fig. 1.
v ? 1920 *Pygope Aspasia* Mgh. – Fucini, Taormina, p. 85.
1920 *Terebratula (Pygope) Aspasia* Meneghini var. *minor* Zittel – Dareste de la Chavanne, Guelma, p. 39, pl. III, fig. 9.
1920 *Terebratula (Pygope) Aspasia* Meneghini var. *major* Zittel – Dareste de la Chavanne, Guelma, p. 40, pl. III, fig. 10.
1923 *Pygope (vel Glossothyris) Aspasia* Menegh. – Jiménez de Cisneros, Rincón de Egea, p. 20, pl. III, fig. 4.
v 1924 *Terebratula (Pygope) Aspasia* Mgh. – Maugeri Patané, S. Teresa in Riva, p. 31, pl. I, figs. 8, 9.
? 1930 *Terebratula Aspasia* Menegh. uff. (*juvenis*). [sic] – De Gregorio, M. San Giuliano, p. 33, pl. VI, figs. 3, 27, 42.
1932 *Terebratula (Pygope) Aspasia* Meneghini. – Renz, Westgriechischen Lias, p. 28, pl. II, figs. 3, 5.
1936 *Pygope Aspasia* Mgh. – Ramaccioni, Monte Cucco, p. 175, pl. VII, fig. 22.
1936 *Pygope Aspasia* Mgh. var. *minor* Zittel – Ramaccioni, Monte Cucco, p. 176, pl. VII, fig. 25.
1936 *Pygope Aspasia* Mgh. var. *lata* Caterini – Ramaccioni, Monte Cucco, p. 177, pl. VII, fig. 23.
v 1939 *Terebratula Aspasia* Mgh. var. *major* Zitt. – Tricomi, Cozzo di Cugno, p. 5.
1943 *Glossothyris aspasia* var. *minor* Zitt. – Vigh, Gerecse, p. 332, pl. I, fig. 20.
1943 *Glossothyris aspasia* var. *dilatata* Can. – Vigh, Gerecse, p. 332, pl. I, fig. 21.
1943 *Glossothyris aspasia* var. *comparabile* Can. – Vigh, Gerecse, p. 333, pl. I, fig. 22.
1943 *Glossothyris aspasia* var. (?) – Vigh, Gerecse, p. 333, pl. I, figs. 23–26.
1943 *Glossothyris aspasia* var. (n. var.) – Vigh, Gerecse, p. 333, text-fig. 9, pl. I, figs. 27, 28; pl. II, figs. 1, 2.
1953 *Pygope aspasia* Meneghini – Rossi Ronchetti & Brena, Lias del Monte Albenza, p. 120, pl. X, fig. 3.
1956 *Pygope aspasia minor* (Zittel) – Selli, Fossili Mesoz. Isonzo, p. 20, pl. I, fig. 12.
1959 *Propygope aspasia* Meneghini – Ager, Turkey, p. 1024, pl. 128, fig. 6.
v 1961 *Glossothyris aspasia* Mgh. var. div. – Vigh, Esquisse géol. Gerecse, p. 577.
1962 *Glossothyris aspasia* Meneghini sp., 1863. – Jarre, Révision du genre Pygope, p. 85, pl. J, fig. 1.
1964 *Propygope ? aspasia* (Meneghini, 1854) – Siblík, Lias. Brach. Belanské Doliny, p. 163, pl. VII, fig. 3.
1967 *Nucleata aspasia* (Mgh.) – Sacchi Vialli & Cantaluppi, Nuovi fossili di Gozzano, p. 100, text-fig. 24, pl. XIV, figs. 13–15.
1971 *Nucleata aspasia* (Mgh.) – Brambilla, Prealpi lombarde, p. 470, pl. I, fig. 1.
v 1976 *Glossothyris aspasia* (Mgh.) 1853 – Vigh in Fülöp, Liassic Brach. Tata, p. 34.
v 1983 *Linguithyris aspasia* (Zittel, 1869) – Vörös, Stratigraphic distribution, p. 35.
v 1987 *Linguithyris aspasia* (Zitt.) – Vörös et al., Panormide, p. 245.
1988 *Linguithyris aspasia* (Meneghini, 1863) – I□esta, Cerro de la Cruz, p. 59, pl. I, fig. 3.
? 1990 *Nucleata bodrakensis* (Moisseiev, 1947) – Tchoumatchenco, Brach. jur. Kotel II., p. 16 (partim), pl. VII, fig. 3 (non fig. 2).
1990 *Linguithyris borszhaviensis* Tchorszhevsky, sp. nov. – Tchorszhevsky, Jurassic sulcate Terebratulida, p. 34, pl (unnumbered), fig. 1.
1991 *Nucleata aspasia* (Meneghini) – Ager, Western Pontides, p. 240, text-fig. 2, pl. I, fig. 3.
1992 *Linguithyris aspasia* (Meneghini, 1853) – Dulai, Lókút, p. 67, text-fig. 25, pl. IV, fig. 3.
1993 *Linguithyris aspasia* (Meneghini, 1853) – Siblík, Steinplatte, p. 971, text-fig. 6, pl. 2, figs. 1, 8.
1993 *Linguithyris aspasia* (Menegh.) – Siblík, Review, p. 128, pl. II, figs. 1, 4.
? 1994 Nucleata ex. gr. aspasia (Meneghini, 1853) – Gaković & Tchoumatchenco, Herzegovina, p. 25, pl. III, fig. 6.
v 1997 *Linguithyris aspasia* (Zittel) – Vörös, Jurassic brachiopods of Hungary, p. 16, Appendix: fig. 24.
1999 *Linguithyris aspasia* (Zittel) – Siblík, Hettangian Northern Calcareous Alps, p. 421, pl. 2, fig. 4.
1999 *Linguithyris aspasia* (Meneghini, 1863) – I□esta, Catálogo de braquiópodos, p. 28, pl. VIII, fig. 4.
1999 *Linguithyris aspasia* (Meneghini 1853) – Sulser, Brachiopoden der Schweiz, p. 153 + fig. (unnumbered).
v 2003 *Linguithyris aspasia* (Zittel, 1869) – Vörös et al., Schafberg, p. 80, pl. VIII, figs. 30–34.
v 2003 *Linguithyris aspasia* (Zittel, 1869) – Dulai, Hettangian and Early Sinemurian, p. 84, pl. XIV, figs. 6–9, 10–12.
2005 *Linguithyris aspasia* (Zittel 1869) – Sulser & Furrer, Lias von Arzo, p. 35 (partim), fig. 24a (? fig. 24b).
2007 *Linguithyris aspasia* (Zittel, 1869) – Alméras et al., Algerie Occidentale, p. 99, pl. 8, fig. 17.
v 2007 *Linguithyris aspasia* (Zittel, 1869) – Vörös & Dulai, Transdanubian Range, pp. 54, 56, pl. I, figs. 28, 29; pl. II, figs. 31–33.
2008 *Linguithyris aspasia* nomen conservandum (Zittel, 1869) – Baeza-Carratalá, Patrimonio J. de Cisneros, p. 458, pl. XXXVI, figs. 1–9.

Material: 1659 specimens, mostly double valves.

Photographed specimens illustrated on Plates XXIV, XXV and XXVI

A complete list of 595 measured specimens (all from the Kericser section) is given in Appendix 1.

Localities	*Measurements (mm)*				*Localities*	*Measurements (mm)*			
	L	*W*	*T*	*Ch*		*L*	*W*	*T*	*Ch*
Szentgál Fg–II/25	15.74	19.67	9.87	6.70	Kericser 22 (52/5)	11.23	15.50	7.42	7.08
Kisnyerges 2	13.69	18.33	9.52	9.46	Kericser 24 (54/8)	12.43	19.44	9.81	9.62
Kisnyerges 3	17.29	27.77	10.13	9.85	Kericser 25 (56/4)	12.37	16.68	9.23	8.13
Kericser 18 (31/3)	13.18	20.73	9.35	9.62	Kericser 25 (57/1)	7.18	8.46	4.62	4.18
Kericser 20 (46/1)	10.61	15.13	9.34	8.02	Kericser 25 (58/7)	12.83	16.43	10.04	8.09
Kericser 20 (43/6)	11.17	16.98	9.06	6.22	Kericser 26 (60/1)	9.69	16.80	7.41	7.15
Kericser 20 (43/1)	11.77	18.82	9.36	9.20	Kericser 26 (60/8)	13.16	19.22	9.15	9.56
Kericser 20 (44/10)	11.84	16.81	8.50	7.44	Fenyveskút (scree)	14.38	19.45	12.16	7.80
Kericser 21 (48/5)	12.36	15.69	8.67	5.25	Mohoskő 85	11.39	15.92	7.80	7.12
Kericser 21 (47/2)	12.71	17.95	8.55	7.84	Büdöskút 2	14.47	20.83	10.25	10.73
Kericser 21 (47/3)	11.60	15.85	9.31	6.26	Büdöskút 3	14.00	19.71	9.04	6.72
Kericser 22 (51/2)	7.51	8.16	5.15	5.04	Kőris-hegy A/1	10.82	19.42	9.48	10.29
Kericser 22 (51/3)	6.70	7.76	4.57	3.27	Hamuháza 5	12.85	19.50	10.10	9.72
Kericser 22 (52/2)	8.46	10.81	5.49	3.02					

Description:

External characters: This is a *Linguithyris* species of widely variable dimensions. Its outline varies from subpentagonal (in juvenile specimens) to rounded subtriangular to widely expanded and bilobate in adults. In some cases pygopid-like lateral flanges develop in various ontogenetic stages (Pl. XXIV: 11, Pl. XXV: 7). The apical angle, i. e. the angle of the posterolateral margins, varies between 100° to 125°, generally increasing (but not always proportionally) with size. The maximum width is usually attained between the middle and the anterior third of the length. The valves are resupinate; in longitudinal cross section they are moderately convex. The maximum convexity lies in the middle of the ventral valve, while it is placed somewhat posteriorly in the dorsal valve. The beak is moderately high, erect to slightly incurved. The foramen is mesothyrid. The delthyrium has a wide and low triangle shape. There are weak and short, but definite beak ridges. In lateral view, the lateral commissures are almost straight or gently sinuous; they turn abruptly into the unisulcate anterior commissure. The sinus is usually regularly arched or occasionally tends to be a slightly V-shaped (Pl. XXIV: 13, Pl. XXV: 8, Pl. XXVI: 4). Its width varies considerably in all ontogenetic stages: it may be narrower than the one-third of the width of the shell (Pl. XXIV: 9, 11, Pl. XXV: 1, Pl. XXVI: 6) or may exceed the half of the width (Pl. XXIV: 6, XXV: 2, 6). The amplitude of the sinus is also very variable in all ontogenetic stages (Pl. XXIV: 7 vs. 8, Pl. XXVI: 1 vs. 6). The sulcus in the dorsal valve and the corre-

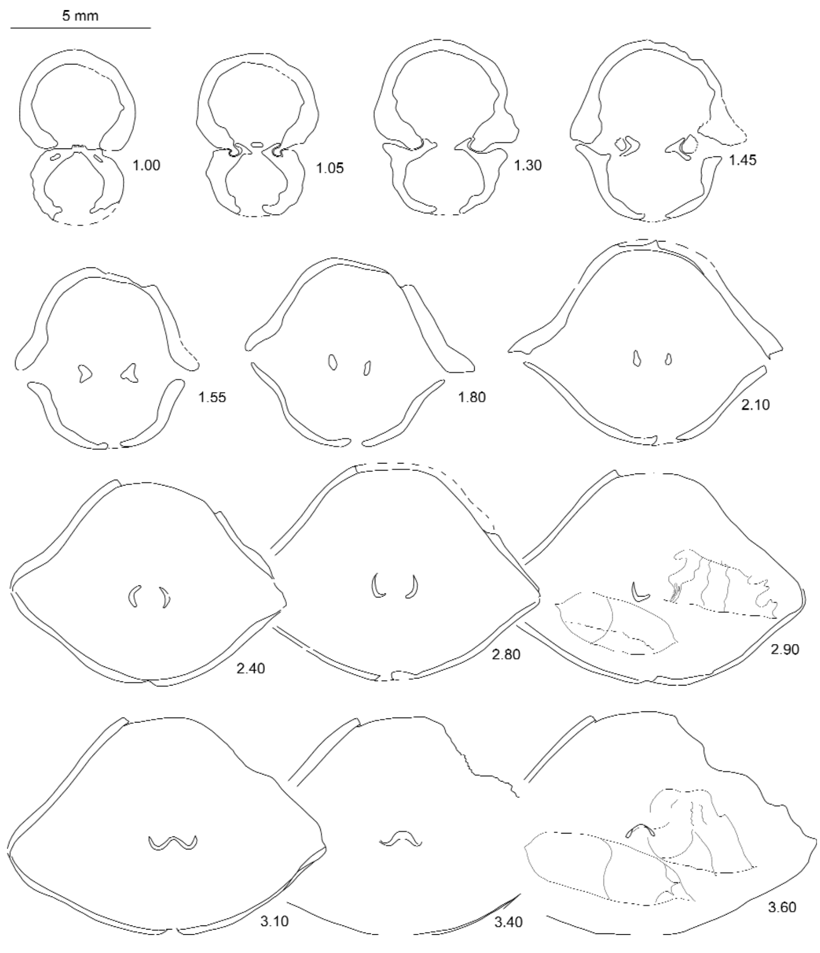


Figure 96. *Linguithyris aspasia* (Zittel, 1869). Thirteen transverse serial sections through the posterior part of a specimen from Lókút, Kericser VI, Bed 7, Pliensbachian, Margaritatus Zone. M 2008.524.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 12.0 mm

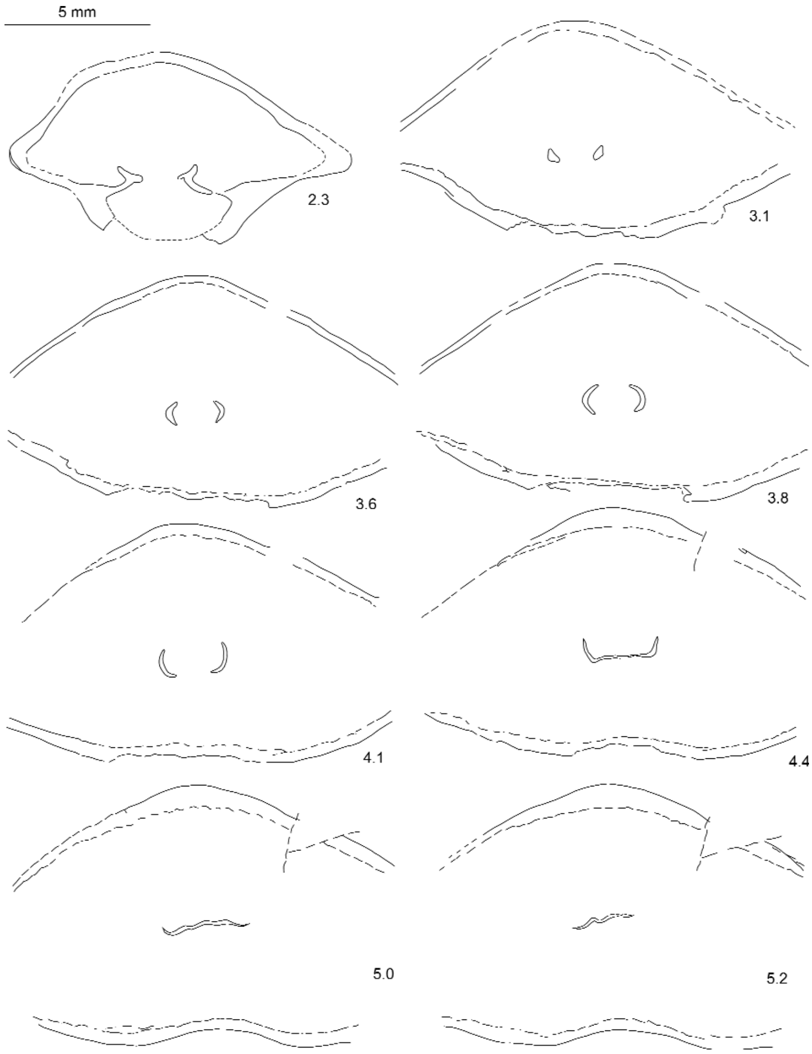


Figure 97. *Linguithyris aspasia* (ZITTEL, 1869). Eight transverse serial sections through the posterior part of a specimen from Hárskút, Kisnyerges, Bed 4, Lower Pliensbachian. M 2008.525.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 13.5 mm

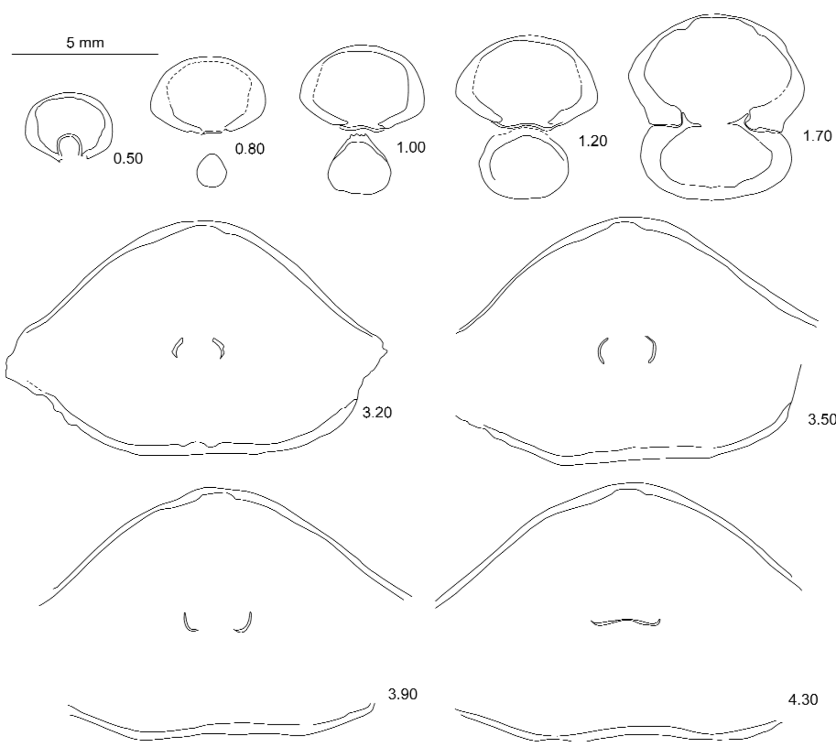


Figure 98. *Linguithyris aspasia* (ZITTEL, 1869). Nine transverse serial sections through the posterior part of a specimen from Hárskút, Közöskút, Bed 21, Pliensbachian, Ibex Zone. M 2008.526.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 14.3 mm

sponding fold in the ventral valve appear usually at around mid-length, but in many specimens they develop only anteriorly (Pl. XXIV: 12, Pl. XXV: 5, Pl. XXVI: 2). The depth of the sulcus is also very variable. The linguiform extension is one of the most characteristic feature of this species. It is projected ventrally in various degree (cf. Pl. XXVI: 1 vs. 6) but does not surpass the length of the lateral flanges (i. e. in lateral view, the angle between the lateral commissure and the anterior front of the linguiform extension is less than 90°). The surface of the shells is almost smooth, except some irregularly spaced growth lines.

Internal characters (Figs. 96–101): *Ventral valve*: The pedicle collar is distinct, well-developed. The delthyrial cavity is subcircular to rounded suntrigonal in cross section showing some traces of muscle scars. The hinge teeth are narrow but distinct, becoming strong distally; denticula are poorly developed. The deltidial plates are thin and become fused and gently sinuous in cross section towards the hinge margin. *Dorsal valve*: The cardinal process forms a narrow, elevated platform with a crenulated surface; it may project to the delthyrial cavity. The narrow and short adductor muscle scars are subparallel to slightly divergent (Pl. XXVI: 5c, 6d). The outer socket ridges are rather massive and wide. The inner socket ridges bend slightly over the sockets. The hinge plates are reduced and grow from the medial part of the inner socket ridges. In most specimens they are inclined dorsally at around 45° and their ventral surface forms a coherent plane with the ventral part of the inner socket ridges (Figs. 96–98). In other cases the hinge plates tend to be subhorizontal but remain very narrow (Figs.

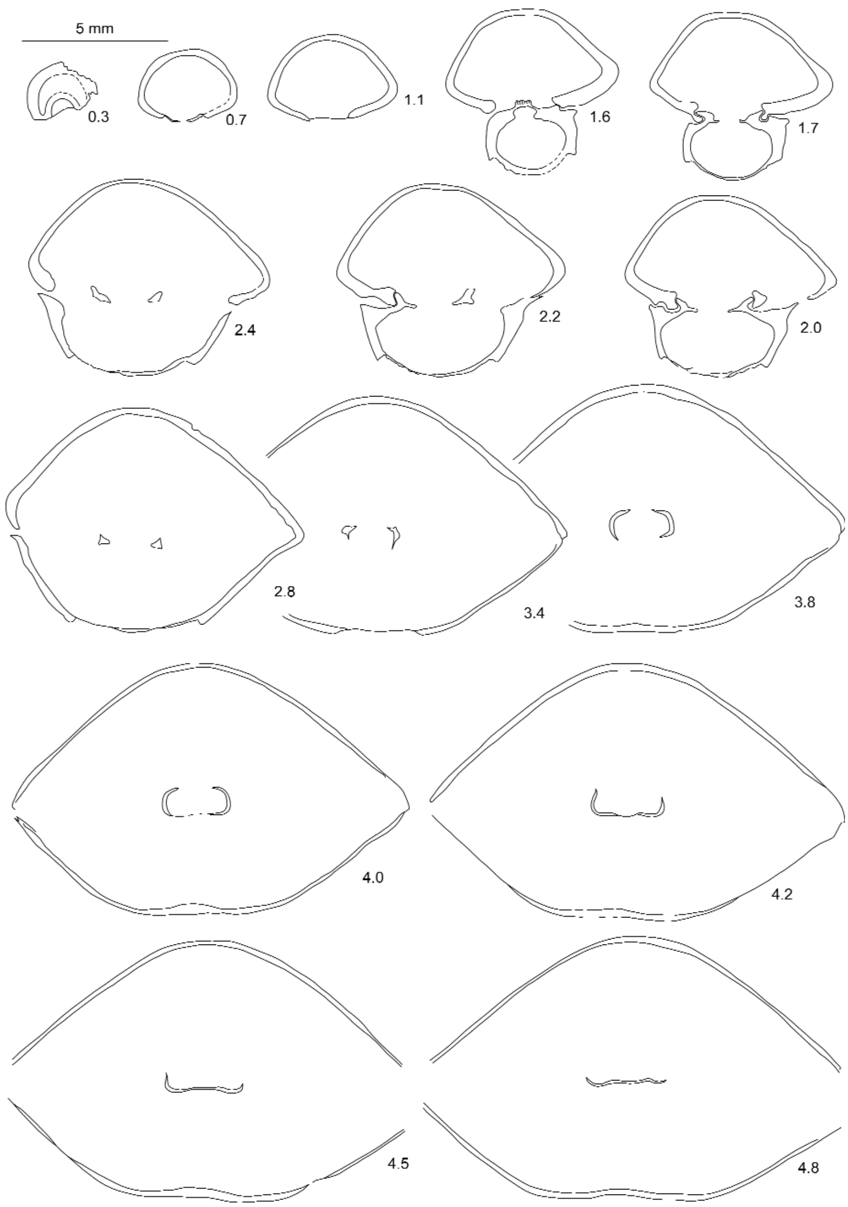


Figure 99. *Linguithyris aspasia* (ZITTEL, 1869). Fifteen transverse serial sections through the posterior part of a specimen from Szentgál, Tűzköves-hegy, T-III, Bed 5, Lower Pliensbachian. The specimen is vanished. Distance from posterior end of shell is given in mm. Original length of the specimen is 16.4 mm

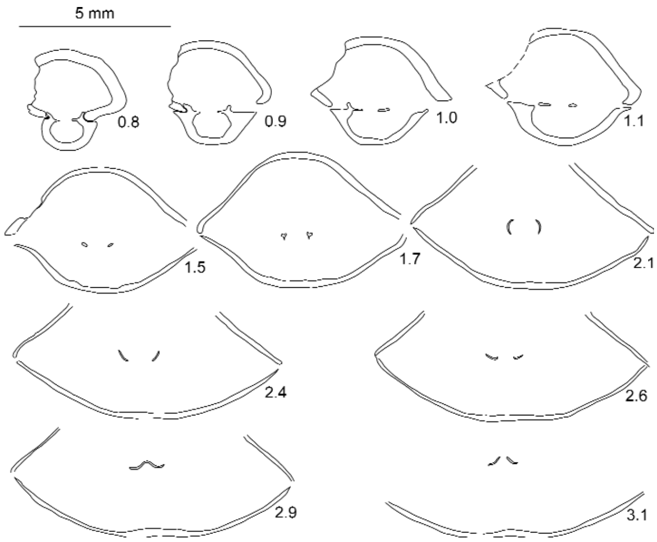


Figure 100. *Linguithyris aspasia* (ZITTEL, 1869). Eleven transverse serial sections through the posterior part of a specimen from Lókút, Kericser VI, Bed 35, Pliensbachian, Ibex Zone. M 2008.527.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 9.8 mm

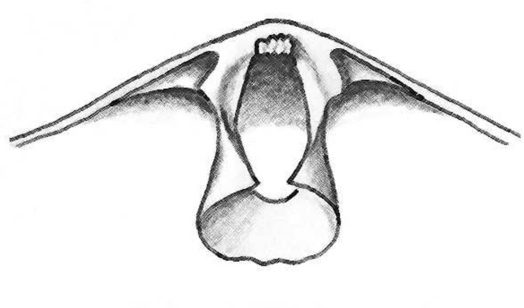


Figure 101. *Linguithyris aspasia* (ZITTEL, 1869). Ventral view of the dorsal valve interior. Reconstruction based on serial sections of a specimen from Szentgál, Tűzköves-hegy, T-III, Bed 5, Lower Pliensbachian. Scale bar = 5 mm

99, 100). The crural bases are indistinct, mostly triangular in cross section. The crural processes are incurved and markedly crescentic in cross section. The loop is very narrow and short. The arch of the transverse band is very low or nearly flat. Terminal points are not developed in larger specimens; in smaller specimens they are very short and slightly convergent (Fig. 101).

Remarks:

L. aspasia is the most wide-ranging Early Jurassic terebratulid species of the Mediterranean region, both geographically and stratigraphically. It is known from the Early Sinemurian to the Early Toarcian, therefore the use of the classical term "*T. aspasia* beds" as the equivalent of the "middle Lias" is evidently obsolete. On the other hand, this expression calls the attention to a remarkable fact, namely that *L. aspasia* occurred in great abundance in many Pliensbachian localities of the Mediterranean region, first of all in Central Italy. Great abundance usually implies great deal of intraspecific variation and, probably by this reason, the early authors (e. g.: ZITTEL 1869, CANAVARI 1880b) introduced a row of names for denoting different morphological variants of *L. aspasia*.

The many infrasubspecific names introduced as varietas within *L. aspasia* until that time, were summarized and revised by CATERINI (1921); his opinion, the resulted items of his revision and his new names of varietas are listed below:

var. *major* ZITTEL, 1869 = var. I. CANAVARI, 1880
var. *minor* ZITTEL, 1869 = var. V. CANAVARI, 1880
var. *minor* GEMMELLARO, 1874 = var. *sicula* CATERINI, 1921
var. II. CANAVARI, 1880 (var. *myrto* MENEGHINI) = species *myrto* MENEGHINI, 1880
var. III. CANAVARI, 1880 = var. *lata* CATERINI, 1921
var. IV. CANAVARI, 1880 = var. *acuta* CATERINI, 1921
var. *carinata* HAAS, 1912 = var. *carinata* HAAS, 1912

To the above list, I add the following remarks. The var. *major* was regarded by all authentic authors as the type of *L. aspasia*. The var. *minor* GEMMELLARO was taken as equivalent of var. *myrto* MENEGHINI by CANAVARI (1880b). The name *myrto* was introduced by MENEGHINI as *nomen nudum,* therefore it may not be used as a species name. The var. *carinata* HAAS does not belong any more to *L. aspasia*, because it was elevated to species rank and designated as the type species of *Carinatothyris* by TCHORSZHEVSKY (1990) (see LEE et al. 2007). The list of the variants revised by CATERINI (1921) was further increased by VIGH (1943) who coined two names (var. *dilatata* and *comparabile*) wrongly ascribed to CANAVARI. However these names came from a false reading of CANAVARI's explanation of plate and VIGH's "variants" correspond to var. *lata* CATERINI, and var. *minor* ZITTEL, respectively.

Looking through the morphological range of variation of the items of CATERINI's revision, I had the firm impression that only var. *carinata* HAAS, 1912 was markedly different from the others (as verified recently by acquiring the rank of a separate genus). All other "variants" of *L. aspasia* seem to display the same overall morphology and differ in degree rather than in kind. The differences are mainly in absolute size, in length/width ratio and the shape of the anterior sinus (always U-shaped, but varying in degree of depth and acuteness). All these variations in shape can be recognized in the multitude of specimens from the Bakony fauna illustrated on Plates XXIV to XXVI of the present work. After all, it seems to me that the classical "variants" of *L. aspasia* are artificially separated categories and their representatives are connected by gradual transitions not only in their shape but also in their size distribution.

The extremely abundant *L. aspasia* material collected from the Pliensbachian of the Bakony offered a good possibility to prove the above observation. Four to six measurements were taken on nearly six hundred specimens (Appendix 1). In some cases, single beds provided 50–60 measurable specimens, thus portraying the size frequency distribution within a brachiopod assemblage approximating a fossil population. In order to compare the most important measurable dimensions of the classical "variants" of *L. aspasia* to those of the Bakony material, I took measurements on the figures published by CANAVARI (1880b, pl. I, figs. 1–7) and GEMMELLARO (1874, pl. XI, figs. 1, 2), presuming that the lithographic plates show the respective specimens reliably, in natural size. These measurements are shown in Table 15.

The principal measurements of the classical "variants" seem to fit well into the range of the representative specimens of *L. aspasia* from the Bakony, listed on the previous pages and illustrated on Pl. XXIV to XXVI (Fig. 102). The most important data (length = L, width = W and the depth of the sinus = Ch) shown in Table 15 are plotted in a diagram together with the respective measurements of a "population" of *L. aspasia* from the Bakony (Kericser section, Bed 7, Margaritatus Zone) (Fig. 103). It is clearly seen that the size distribution of the half of the classical variants (*minor, myrto*, "*sicula*") are connected by gradual transitions, and even the "var. *lata*" falls near the range of this single "population". In order to obtain a broader picture of the size distribution of the *L. aspasia* material from the Bakony, some of the principal measurements (L, W, Ch) of the specimens from the Ibex Zone from the Kericser section were plotted in Fig. 104, together with the respective data of the classical variants (Table 15). The two sets of points almost perfectly overlap each other, only the largest specimen of ZITTEL's "var. *major*" exceeds somewhat the range of the Bakony material.

In conclusion, the empirical, morphological observations and the statistical evaluation of principal measurements both confirm that *L. aspasia* is a highly variable but homogeneous species. The several "variants" introduced by previous authors are connected with continuous transitions within the range of variation of *L. aspasia*, therefore the further use of these infrasubspecific categories within the species *L. aspasia* is unjustified and not recommended.

The species name *aspasia* was introduced by MENEGHINI (1853, p. 13) as "*T. Aspasia* n. sp." but, except the note that the specimen came from white limestone

Table 15. Principal measurements of the classical variants of *L. aspasia*

Variants (respective figures)	Measurements				
	W	L	Ch	CW	Apical angle
From plate I of CANAVARI (1880b)					
major (fig. 1)	30.0	19.1	10.0	14.0	110°
major (fig. 2)	26.5	15.0	8.8	10.6	105°
minor (fig. 5)	17.8	12.8	4.8	7.9	110°
lata (fig. 6)	25.4	15.5	6.5	9.8	120°
acuta (fig. 3)	28.4	18.5	6.0	10.3	105°
myrto (fig. 4)	16.7	12.5	5.0	7.0	105°
myrto (fig. 7)	12.0	10.5	4.0	6.0	100°
From plate XI of GEMMELLARO (1874)					
"*sicula*" (fig. 1)	14.8	12.0	6.0	7.7	100°
"*sicula*" (fig. 2)	12.8	10.7	3.3	7.3	100°

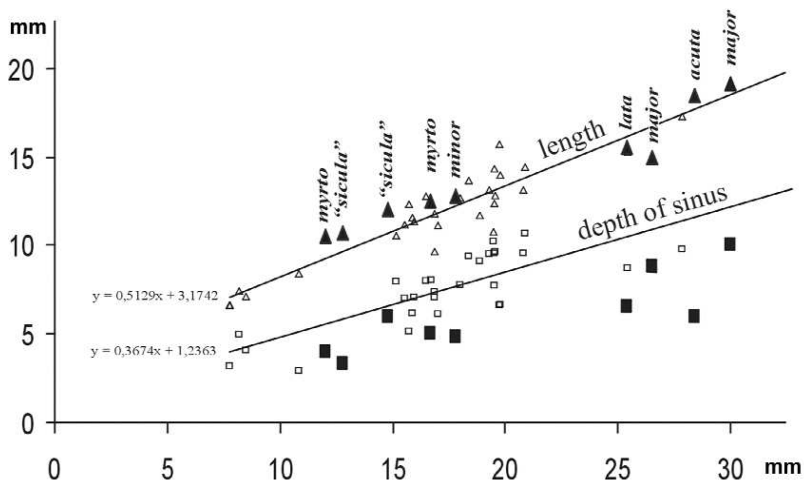


Figure 102. *Linguithyris aspasia* (ZITTEL, 1869). Scatter diagram showing the length (open triangles) and the depth of sinus (open squares) data against the width (horizontal axis) of the photographed specimens from the Pliensbachian of the Bakony. The respective data (solid triangles and solid squares) of the typical specimens of the classical "variants" of *L. aspasia* figured by CANAVARI (1880) and GEMMELLARO (1874) are shown for comparison (see Table 15 for further information)

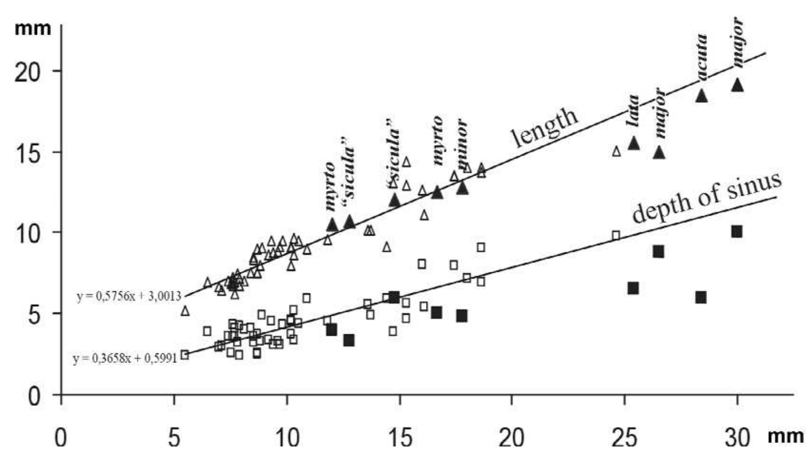


Figure 103. *Linguithyris aspasia* (ZITTEL, 1869). Scatter diagram showing the length (open triangles) and the depth of sinus (open squares) data against the width (horizontal axis) of 49 measured specimens from a single bed (Bed 7) of the Kericser section. The respective data (solid triangles and solid squares) of the typical specimens of the classical "variants" of *L. aspasia* figured by CANAVARI (1880) and GEMMELLARO (1874) are shown for comparison (see Table 15 for further information)

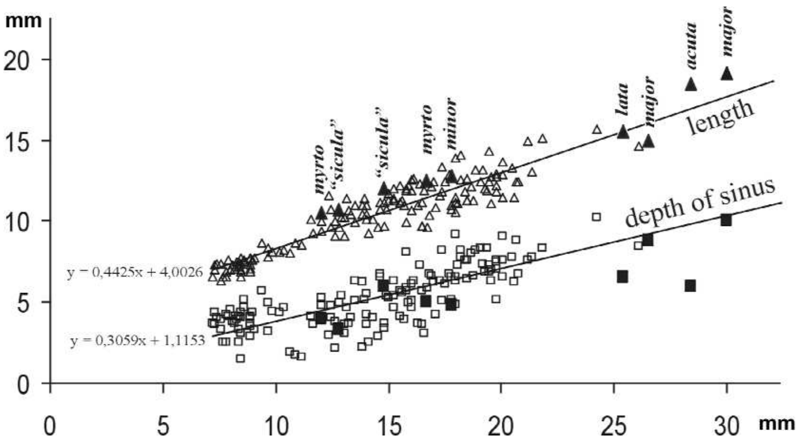


Figure 104. *Linguithyris aspasia* (ZITTEL, 1869). Scatter diagram showing the length (open triangles) and the depth of sinus (open squares) data against the width (horizontal axis) of 177 measured specimens from the Ibex Zone of the Kericser section. The respective data (solid triangles and solid squares) of the typical specimens of the classical "variants" of *L. aspasia* figured by CANAVARI (1880) and GEMMELLARO (1874) are shown for comparison (see Table 15 for further information)

between Mte. Nerone and Cesi, no description or remark on the morphology of the new species can be found in the cited work. Consequently the name given by MENEGHINI (l. c.) must be considered *nomen nudum*. The first informative description and illustration of *aspasia* was published by ZITTEL (1969), therefore, according to the rules, ZITTEL is the author of this species. Nevertheless, ZITTEL and the subsequent Italian authors, e. g. GEMMELLARO (1874) and CANAVARI (1880b) who provided an exhaustive picture of *aspasia*, gave the authorship to the highly respected professor, G. MENEGHINI. This tradition was followed by all later authors until I recognized that MENEGHINI's species name was *nomen nudum* (VÖRÖS 1983b, 1994).

The interpretation of *L. aspasia* as a species of extremely widely variable morphology is one of the explanations of the considerable length of the list of synonyms. Many items of the list, including some of the earliest ones, were checked in the respective museum collections.

The specimen figured by VACEK (l. c.) as *aspasia* came from the Cap San Vigilio Oolite (Aalenian), therefore, though it is similar to *aspasia*, it may rather represent the Middle Jurassic species *L. nepos* (CANAVARI, 1882).

The records by LEVI (l. c.), FUCINI (1920, l. c.) and DE GREGORIO (l. c.) portray poorly preserved or poorly figured specimens, therefore their identification with *L. aspasia* is doubtful.

TCHOUMATCHENCO (1990) figured two specimens of *Nucleata bodrakensis* (MOISSEIEV, 1947). One of them (l. c., pl. VII, fig. 3) probably belong to *L. aspasia*, the other (fig. 2) is too much elongated. The serial sections (l. c., text-fig. 10) do not contradict to this judgment. However, this does not imply that MOISSEIEV's *bodrakensis*, originally described as "*Glossothyris beyrichi*" by MOISSEIEV (1934), is regarded as synonymous with *aspasia*.

The specimen figured by GAKOVIĆ & TCHOUMATCHENCO (l. c.) as *Nucleata* ex. gr. *aspasia* is very flat and has a subcircular outline, therefore it is listed here with serious doubt, as it was noted by the cited authors also when they used the annotation "ex. gr.".

From among the two specimens figured by SULSER & FURRER (l. c.) from the Lias of Arzo, only one (l. c., fig. 24a) can be taken as typical *L. aspasia*; the attribution of the other, rather small specimen (l. c., fig. 24b) is very doubtful.

L. aspasia differs markedly from the other Early Jurassic species, definitely attributed to *Linguithyris*. The recently described *L. agerorum* MANCE□IDO, 1993 (Toarcian) is much more flat, less bilobate and less expanded transversely. The dominantly Sinemurian *L. linguata* (BÖCKH, 1874), which is here considered the senior synonym of *L. chrysilla* (UHLIG, 1880), is more similar to *L. aspasia* in general shape but distinctly differs by having a very elongate linguiform extension projected anteriorly well beyond the lateral flanges.

Two other sulcate terebratulid species, "*T.*" *nimbata* OPPEL, 1861 and "*T.*" *cornicolana* CANAVARI, 1881 are externally very similar to *L. aspasia*. For a long time, they have been attributed to *Linguithyris* by several authors, including myself. However, recently TCHORSZHEVSKY (1990) erected a new genus *Buckmanithyris* for a series of Early Jurassic sulcate terebratulid species, including, among others, *B. nimbata* and *B. cornicolana*. According to the illustrations by TCHORSZHEVSKY (1990), *Buckmanithyris* is externally very similar to *Linguithyris* (though somewhat less bilobate), whereas internally it markedly differs by having wide and dorsally curved hinge plates in contrast to the very reduced hinge plates of *Linguithyris*. It is not clear from TCHORSZHEVSKY's paper if he checked the internal morphology of all species attributed by him to *Buckmanithyris*. I made a diagnostic cross section across a *B. cornicolana* specimen from the Bakony and the attribution of this species to *Buckmanithyris* is now endorsed (see Fig. 106).

The case of *B. nimbata* (OPPEL, 1861) deserves a short discussion. It was recognized by early authors (GEMMELLARO 1874, GEYER 1889) that this species was very similar to the smaller, stout, less bilobate variants of *L. aspasia*. Furthermore, GEYER (1889, pl. II, fig. 11) indicated a gradual transition between the two species, what was supported by VIGH (1943) and SIBLÍK (1993b). In the possession of the very abundant *L. aspasia* material from the Bakony, showing extremely wide range of variation, I arrived to the conclusion that *nimbata* falls within the range of *aspasia*, and the two species are synonymous. But when I recognized that MENEGHINI (1853) introduced a *nomen nudum*, and the valid description of *aspasia* by ZITTEL (1869) postdates the introduction of *nimbata* by OPPEL (1861), it became clear that, as a consequence of this unification, the name *aspasia* should be suppressed and the name *nimbata* should be used instead, as senior synonym. This solution seemed to be highly undesirable, because the use of the species name *aspasia* was absolutely overwhelming in the literature on the Mediterranean Lower Jurassic. Therefore I hesitated for a long time to come out with this matter, but, partly influenced by my advices, my younger colleagues did it. DULAI (1992, 2003) admitted the synonymy between *aspasia* and *nimbata*, but arbitrarily retained *aspasia* as the valid name. BAEZA-CARRATALÁ (2008) went even further, and declared the species name *aspasia* as *nomen conservandum*, thus validating its use against the senior synonym *nimbata*. It must be noted, however, that an act of this kind and its declaration must not be done deliberately by any author, because it is within the competence of the International Commission on Zoological Nomenclature by using its Plenary Power (ICZN 1999, Art. 23.9.3. and Art. 81.). At the moment, after the attribution of *nimbata* to the genus *Buckmanithyris* by TCHORSZHEVSKY (1990), the whole above problem seems to be solved, or at least reduced to an intriguing example of a very close isochronous homoeomorphy. But for a satisfactory and final resolution, detailed information on the internal morphology of the type specimen(s) of OPPEL's *nimbata* would be needed.

Distribution:

Sinemurian and Pliensbachian of Sicily, the Central and Northern Apennines and the Southern Alps (Italy and Switzerland), the Northern Calcareous Alps (Austria), the Gerecse and Bakony Mts (Hungary), the Inner West Carpathians (Slovakia), the Eastern Carpathians (Romania), Western Greece, The Pontides (Turkey), the Betic Cordilleras (Spain), the Atlas Mountains (Algeria) and probably of the Balkan Mountains (Bulgaria) and the Dinarides (Bosnia and Herzegowina). The Pliensbachian specimens of the Bakony came from 25 localities, from the Jamesoni to the Spinatum Zones (Tables 13, 14), but *L. aspasia* occurs also in the Lower Toarcian in the Bakony.

Linguithyris cf. *linguata* (BÖCKH, 1874)
Plate XXVI: 7; Figure 105.

* 1874 *Terebratula* (*Waldheimia* ?) *linguata* n. sp. – BÖCKH, Südlichen Theiles des Bakony, p. 151, pl. I, figs. 15, 17.
1880 *Terebratula Chrysilla* n. f. – UHLIG, Sospirolo, p. 17, pl. I, fig. 6.
1884 *Terebratula (Pygope) Chrysilla* Uhlig. 1879. – HAAS, Südtyrol und Venetien, p. 22, pl. IV, figs. 7, 8.
non 1884 *Waldheimia (Aulacothyris) linguata* Böckh. 1874. – HAAS, Südtyrol und Venetien, p. 25, pl. IV, fig. 5.
1900 *Terebratula chrysilla* Uhlig. – BÖSE & SCHLOSSER, Südtyrol, p. 180, pl. XVII, fig. 4.
v 1907 *Terebratula Chrysilla,* Uhl. – DAL PIAZ, Tranze di Sospirolo, p. 45, pl. III, fig. 3.
v 1983 *Linguithyris* cf. *linguata* (Böckh, 1874) – VÖRÖS, Stratigraphic distribution, p. 35.
v 1992 *Linguithyris linguata* (Böckh, 1874) – DULAI, Lókút, p. 66, text-fig. 24, pl. IV, fig. 4.
v 1997 *Linguithyris linguata* (Böckh) – VÖRÖS, Jurassic brachiopods of Hungary, p. 14, Appendix: fig. 5.
v 2003 *Linguithyris linguata* (Böckh, 1874) – DULAI, Hettangian and Early Sinemurian, p. 84, pl. XIV, figs. 4–5.
v 2007 *Linguithyris linguata* (Böckh, 1874) – VÖRÖS & DULAI, Transdanubian Range, p. 54, pl. I, fig. 30.

Material: A single, isolated, incomplete ventral valve.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Lókút 464	19.25	?	?	?

Description:

External characters: This is a medium-sized *Linguithyris* with subpentagonal outline. The apical angle, i. e. the angle of the posterolateral margins, is around 105°. The maximum width seems to be attained at about the middle of the length. The maximum convexity of the ventral valve is placed somewhat posteriorly. The beak is strong, slightly incurved. The details of the foramen and the delthyrium can not be seen. The beak ridges are indistinct. The lateral commissure is barely seen but seems to be almost straight or gently sinuous; it turns abruptly into the unisulcate anterior commissure. The sinus is very deep but rather narrow and regularly arched. The fold in the ventral valve appear at around mid-length and becomes very marked anteriorly. The shape of the linguiform extension is the diagnostic feature of this species. It is projected anteroventrally in a degree that it goes far beyond the length of the lateral flanges. The surface of the shells is almost smooth.

Internal characters: The single ventral valve from the Pliensbachian of the Bakony did not give any information. On the other hand, *L. linguata* occurs abundantly in the Upper Sinemurian of the Bakony. A specimen from Úrkút, broken along the plane of articulation, was polished and the drawing of this cross section is shown in Fig. 105. It clearly shows the very reduced hinge plates, characteristic of *Linguithyris*, thus the attribution of the species *linguata* to this genus is approved.

Remarks:

In the heading of the original description of *L. linguata*, BÖCKH (l. c.) indicated the possible attribution of this species to "*Waldheimia*". Neither BÖCKH's figures nor his description gave any evidence (e. g. dorsal median septum, dental plates)

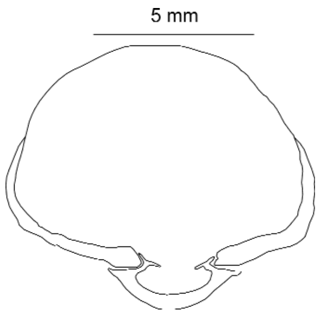


Figure 105. *Linguithyris linguata* (BÖCKH, 1874). Representative transverse section through the posterior part of a specimen from Úrkút, scree, Upper Sinemurian M 2008.528.1

supporting this idea. The figured types of BÖCKH were not encountered in the collections of the Geological Institute of Hungary, but dozens of specimens of the type series were studied; all seemed short-looped terebratulids. Nevertheless, BÖCKH's hint to "*Waldheimia*" apparently influenced the early authors, and this was the main reason why they misinterpreted the species *linguata*.

UHLIG (l. c.) mentioned that his new species "*T.*" *chrysilla* is similar to *linguata* but refused the idea of a closer relationship between the two species, because the latter was believed to belong to "*Waldheimia*". This belief became traditional and was followed by HAAS (1884), BÖSE & SCHLOSSER (1900) and DAL PIAZ (1907).

L. linguata is represented in the Pliensbachian of the Bakony only by one specimen, but it occurs abundantly in the Upper Sinemurian. The plenty of specimens of *L. linguata* from Úrkút (Bakony Mts) give a good picture of the varied morphology of this species. I have studied the "*T.*" *chrysilla* specimens described by BÖSE & SCHLOSSER (l. c.) and DAL PIAZ (l. c.), kept in the collections of the Bayerische Staatssammlung, München and the Padova University, respectively; they seem to fall within the range of morphological variation of *L. linguata*. I made serial sections through a loaned specimen of "*T.*" *chrysilla* what revealed a *Linguithyris*-like internal morphology. A diagnostic cross section across a specimen from the Sinemurian of the Bakony (Fig. 105) proved that the species *linguata* also belongs to *Linguithyris*. After all, I regard *L. chrysilla* as the junior synonym of *L. linguata*.

Misinterpretation of the species *linguata* was proceeded further by HAAS (1884, p. 25, pl. IV, fig. 5), who portrayed a true, sulcate "*Waldheimia*" under the name "*Waldheimia* (*Aulacothyris*) *linguata*" BÖCKH, 1874. This form is markedly different from BÖCKH's species and, on the basis of its subpentagonal outline, flatness and shallow but wide, angular sinus, may belong to *Antiptychina* ? *rothpletzi* (DI STEFANO, 1891).

The extremely projected and sharp linguiform extension differentiates *L. linguata* from all other known species of *Linguithyris*.

Distribution:

Sinemurian and Pliensbachian of the Southern Alps (Italy) and the Bakony Mts (Hungary). The Pliensbachian specimens of the Bakony came from the Lókút section, from the Davoei Zone (Tables 13, 14).

Genus ***Buckmanithyris*** TCHORSZHEVSKY, 1990

Buckmanithyris described by TCHORSZHEVSKY (1990) was included in the supplement volume of the "revised Treatise" (LEE et al. 2007) as classified into the superfamily Dyscolioidea as a member of an uncertain family. For me it is quite clear that this genus should belong to the Nucleatidae. According to TCHORSZHEVSKY (1990) *Buckmanithyris* is regularly unisulcate but much less expanded laterally than *Linguithyris*, and possesses well-developed, wide hinge plates, markedly curved dorsally, in contrast to the indistinct hinge plates of *Linguithyris*. Besides some new species, TCHORSZHEVSKY (1990, p. 33) listed the following, previously known species as belonging to *Buckmanithyris*: *B. nimbata* (OPPEL, 1861), *B. cornicolana* (CANAVARI, 1881), *B. nepos* (CANAVARI, 1882), *B. chrysilla* (UHLIG, 1880) and some other nominal taxa (*myrto, minor*) which were only variants of *L. aspasia*. My studies on serial sections of the species "*chrysilla*", the junior homonym of *L. linguata* (BÖCKH, 1874), revealed that it has reduced hinge plates and very low transverse band, therefore it may not belong to *Buckmanithyris.*

Buckmanithyris cornicolana (CANAVARI, 1881)
Plate XXVI: 8, 9; Figure 106.

* 1881 *Pygope cornicolana* n. f. – CANAVARI, Alcuni nuovi Brachiopodi, p. 182, pl. IX, figs. 6–8.
1883 *Terebratula (Pygope) Cornicolana,* Canav. – PARONA, Appennino centrale, p. 659, pl. III, figs. 21, 22, pl. IV, fig. 1.
v 1983 *Linguithyris cornicolana* (Canavari, 1881) – VÖRÖS, Stratigraphic distribution, p. 35.
2007 *Linguithyris cornicolana* (Canavari, 1881) – FAURÉ et al., Jebel Zaghouan, p. 482, fig. 4-C.
v 2007 *Linguithyris cornicolana* (Canavari, 1881) – VÖRÖS & DULAI, Transdanubian Range, p. 56.

Material: Four, partly incomplete, double valves.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Fenyveskút (scree)	21.33	23.12	17.20	8.30
	18.47	19.37	15.62	6.83

Description:

External characters: This is a large-sized *Buckmanithyris* of rounded subtriangular to subpentagonal outline. The apical angle is around 100°. The maximum width is attained between the middle and the anterior third of the length. The valves are very strongly convex; the maximum convexity lies at around the middle of the length. The beak is rather high and massive, slightly incurved. The foramen seems to be mesothyrid. The delthyrium is poorly visible but seems to be low triangular. The beak ridges are blunt. In lateral view, the lateral commissures are gently sinuous, almost straight; they join with an abrupt bend to the unisulcate anterior commissure. The sinus is uniformly arched and very wide, it occupies nearly the four-fifths of the width of the shell. Definite dorsal sulcus or ventral fold are not developed. The surface of the shells is almost smooth, except fine growth lines.

Internal characters: These were not studied in detail by serial sectioning because of the paucity of the material. An incomplete double valve, broken along the plane of articulation, was polished and the drawing of this cross section is shown in Fig. 106. It clearly shows the rather wide hinge plates, bending towards the dorsal valve floor.

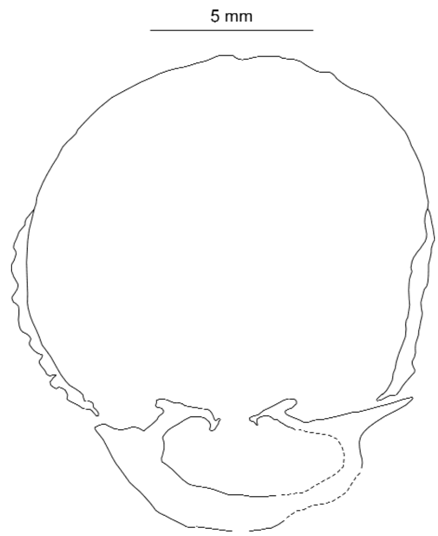


Figure 106. *Buckmanithyris cornicolana* (CANAVARI, 1881). Representative transverse section through the posterior part of a specimen from Lókút, Fenyveskút É, Pliensbachian, Margaritatus Zone. M 2008.529.1.

Remarks:

This remarkable, stout, gibbose and gently sulcate species was tentatively ascribed to *Pygope* by the early authors (CANAVARI l. c., PARONA l. c.). When I found it in the Bakony, I was astonished by the overall similarity of the specimens to the juveniles of *Linguithyris aspasia* (ZITTEL, 1869): the proportions were almost the same, but the size was four times larger. The *cornicolana* specimens looked like "giant-babies" of *L. aspasia* or, to put it more scientifically, portraying an example of paedomorphosis. Therefore, I did not hesitate to attribute *cornicolana* to *Linguithyris* in my previous papers (VÖRÖS 1983b, VÖRÖS & DULAI 2007). However, TCHORSZHEVSKY (1990) included this species to his new genus *Buckmanithyris* and the single cross section what I made through a specimen from the Bakony, showed the wide and dorsally curved hinge plates. This characteristic feature supports the attribution of the species *cornicolana* to the genus *Buckmanithyris*.

The specimen described and figured by BAEZA-CARRATALÁ (2008, p. 473, pl. XXXVII, fig. 1) as *Linguithyris* ? aff. *cornicolana* (CANAVARI, 1881) is, in fact, somewhat different from this species in having a much higher beak and a less pronounced anterior sinus, therefore BAEZA-CARRATALÁ's opinion on a mere affinity between the two forms is agreed here.

Distribution:

Pliensbachian of the Central Apennines (Italy), the Bakony Mts (Hungary) and the Atlas Mountains (Tunisia). The Pliensbachian specimens of the Bakony came from two localities, from the Margaritatus Zone (Tables 13, 14).

Family Uncertain

Genus *Papodina* VÖRÖS, 1983

In the recent systematics of the "revised Treatise" (LEE et al. 2006), *Papodina* is placed into the superfamily Dyscolioidea as a member of an uncertain family. Nevertheless I maintain my opinion, what I expressed also when I introduced this genus (VÖRÖS, 1983a), that *Papodina* would be in a better place among the Cancellothyridoidea, on the basis of its attenuated beak, partly capillate ornament and wide and short, ring-like loop.

Papodina bittneri (GEYER, 1889)
Plate XXVII: 14; Plate XXVIII: 1–4; Figures 107–109.

v * 1889 *Terebratula Bittneri* nov. sp. – GEYER, Hierlatz, p. 11, pl. II, fig. 36, pl. II, figs. 1, 2.
? 1895 *Terebratula Bittneri* Geyer. – FUCINI, Monte Pisano, p. 192, pl. VII, fig. 16.
v 1983 *Papodina bittneri* (Geyer, 1889) – VÖRÖS, Some new genera, p. 15, figs. 7–9, 16.
v 1983 *Papodina bittneri* (Geyer, 1889) – VÖRÖS, Stratigraphic distribution, p. 35.
v 2007 *Papodina bittneri* (Geyer, 1889) – VÖRÖS & DULAI, Transdanubian Range, p. 54, 56, pl. II, figs. 35, 36.
2008 *Papodina bittneri* (Geyer, 1889) – BAEZA-CARRATALÁ, Patrimonio J. de Cisneros, p. 492, pl. XXXVII, fig.

Material: 31 specimens of variable state of preservation.

Localities	*Measurements (mm)*		
	L	*W*	*T*
Kericser 11	16.14	13.94	8.92
Kericser 13	20.10	18.64	10.69
Kericser 14	14.22	12.23	6.69
Kericser 28	14.98	13.70	7.10
Kericser 29	16.98	16.46	9.10
Fenyveskút p2	26.29	24.41	14.46
	32.49	?	16.38
	27.32	24.98	14.00
	21.12	17.59	8.46
	18.01	15.12	8.43
Fenyveskút É	19.73	18.01	9.84
	13.59	12.59	5.82
	10.89	10.83	5.25
Fenyveskút D	24.73	20.71	9.80
Fenyveskút (scree)	25.44	20.57	11.32

Description:

External characters: This is a large *Papodina* with elongated oval to subtriangular outline. The lateral margins are usually straight or gently convex. The anterior margin forms an almost perfect half-circle. The apical angle varies between 70–90°. The maximum width is attained at around the anterior one-third of the length. The valves are nearly equally and gently convex; the maximum convexity lies near mid-length in juvenile specimens, while it is in the posterior one-third in adults. The beak is very high, attenuated; straight to suberect. The end of the beak is regularly broken off, therefore the position of the foramen is not seen. The delthyrium is poorly preserved; usually it forms a narrow and high triangle. The rather sharp beak ridges are restricted to the beaks. The hinge and the lateral margins meet at an obtuse angle; they form a kind of cardinal extremity. The lateral parts are gently convex and the lateral commissures usually form a little elevated crest; in some cases the lateral parts may be depressed. In lateral view, the lateral commissures are almost straight or very gently sinuous. The anterior commissure is rectimarginate. The surface of the shells is almost smooth, but irregular growth rings are common. Weak radial capillation can be observed on some specimens (Pl. XXVII, 14). The substance of the shell is somewhat fibrous or foliaceous, unusual among terebratulids.

Internal characters (Figs. 107–109): *Ventral valve*: Pedicle collar was not recorded in the serial sections. Weak deltidial plates can be seen. The delthyrial cavity is laterally elongated oval in cross section. The hinge teeth are massive; denticula are well-developed. *Dorsal valve*: Instead of cardinal process, a crenulated, concave platform is developed. The dorsal adductor muscle scars were observed on internal moulds (Pl. XXVIII, 4b); they are wide, drop-shaped, rather long and widely divergent. The outer socket ridges are rather high and slender. The inner socket ridges bend moderately over the sockets. Hinge plates are not developed; the crural bases grow directly from the inner socket ridges. Their medial surface seems to be crenulated in some specimens (Fig. 108). The crura are widely divergent; the crural processes are low, subvertical, somewhat crescentic in cross-section. The loop is wide, ring-like, with rapidly convergent descending lamellae. The transverse band is ventrally arched; it forms the most distal part of the loop. A reconstructed view of the dorsal valve interior was shown in Vörös (1983, fig. 16).

Remarks:

This is the type species of the genus *Papodina* Vörös, 1983. I repeatedly inspected the original specimens of *P. bittneri* described and figured by Geyer (l. c.) in the collection of the Geologische Bundesanstalt, Wien, and the identification of the Bakony specimens is approved. I was not fortunate in the case of the specimens figured by Fucini (l. c.) which were missing from the collection of the Pisa University, when I examined Fucini's material from Monte Pisano. Therefore this record is listed in the synonymy with a question mark.

P. erecta (Jiménez de Cisneros, 1923) stands very close to *P. bittneri* or may even be conspecific with it, because the minor differences (more attenuated beak and more slender shape), given by Baeza-Carratalá (2008) in his revision, are not fully convincing. Nevertheless Baeza-Carratalá had the possibility to compare the specimens of the two species, therefore his opinion is accepted. The serial sections published by him prove perfectly the attribution of *erecta* to *Papodina*. Another species, questionably assigned to *Papodina* in the revision by Baeza-Carratalá (2008), is *P.* ? *deitanica* (Jiménez de Cisneros, 1927). However its stratigraphical horizon is uncertain and its internal morphology is unknown. Externally it may even belong to some Middle Jurassic rhynchonellid genus, e. g. *Striirhynchia*.

A definitely Early Jurassic species, possibly assigned to *Papodina*, is "*T.*" *bimammata* Rothpletz, 1886. It was brought

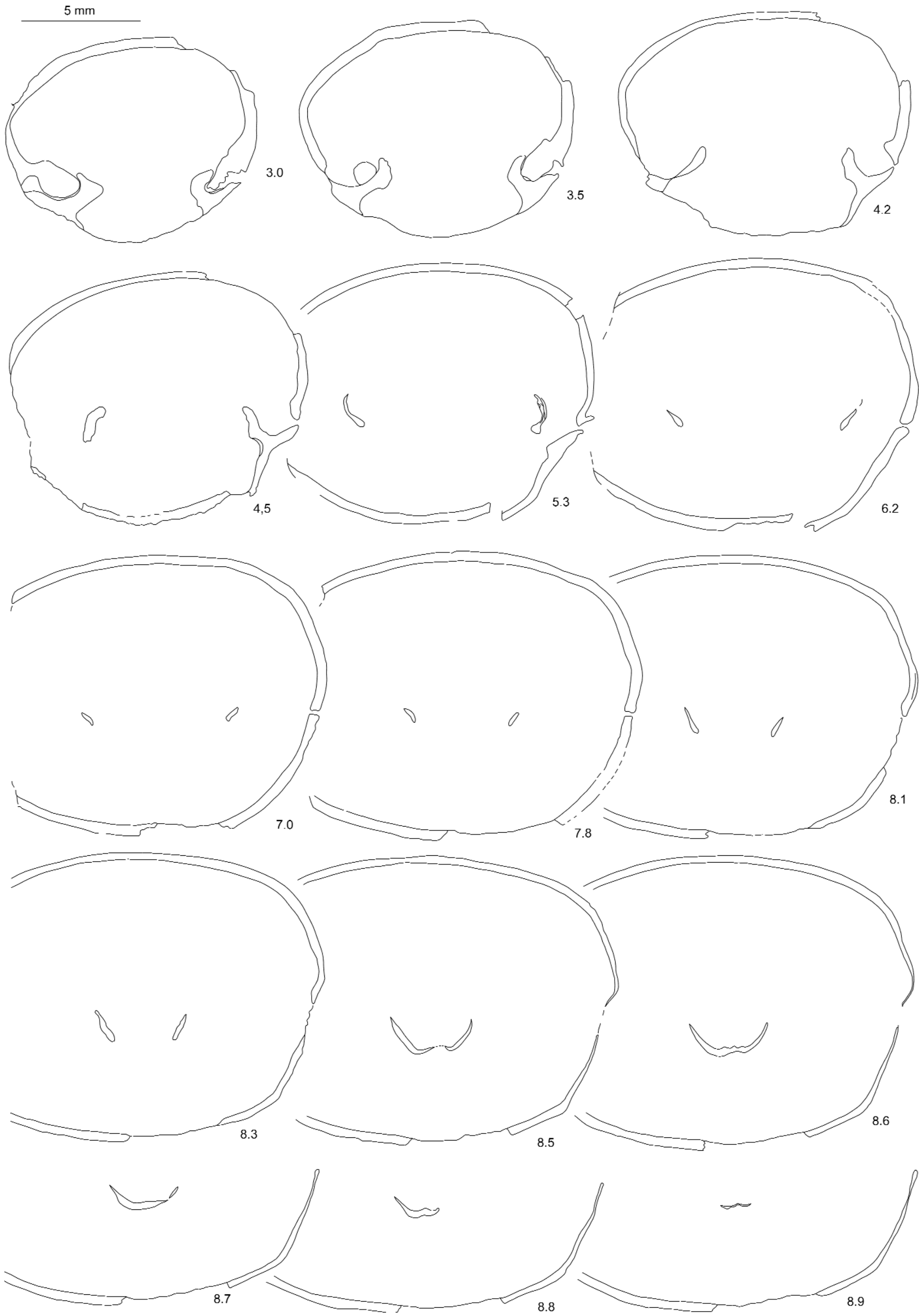


Figure 107. *Papodina bittneri* (GEYER, 1889). Fifteen transverse serial sections through the posterior part of a specimen from Lókút, Fenyveskút p2, Pliensbachian, Margaritatus Zone. J.9192. Distance from posterior end of shell is given in mm. Original length of the specimen is 31.5 mm. Partly redrawn after Fig. 8 in VÖRÖS (1983a)

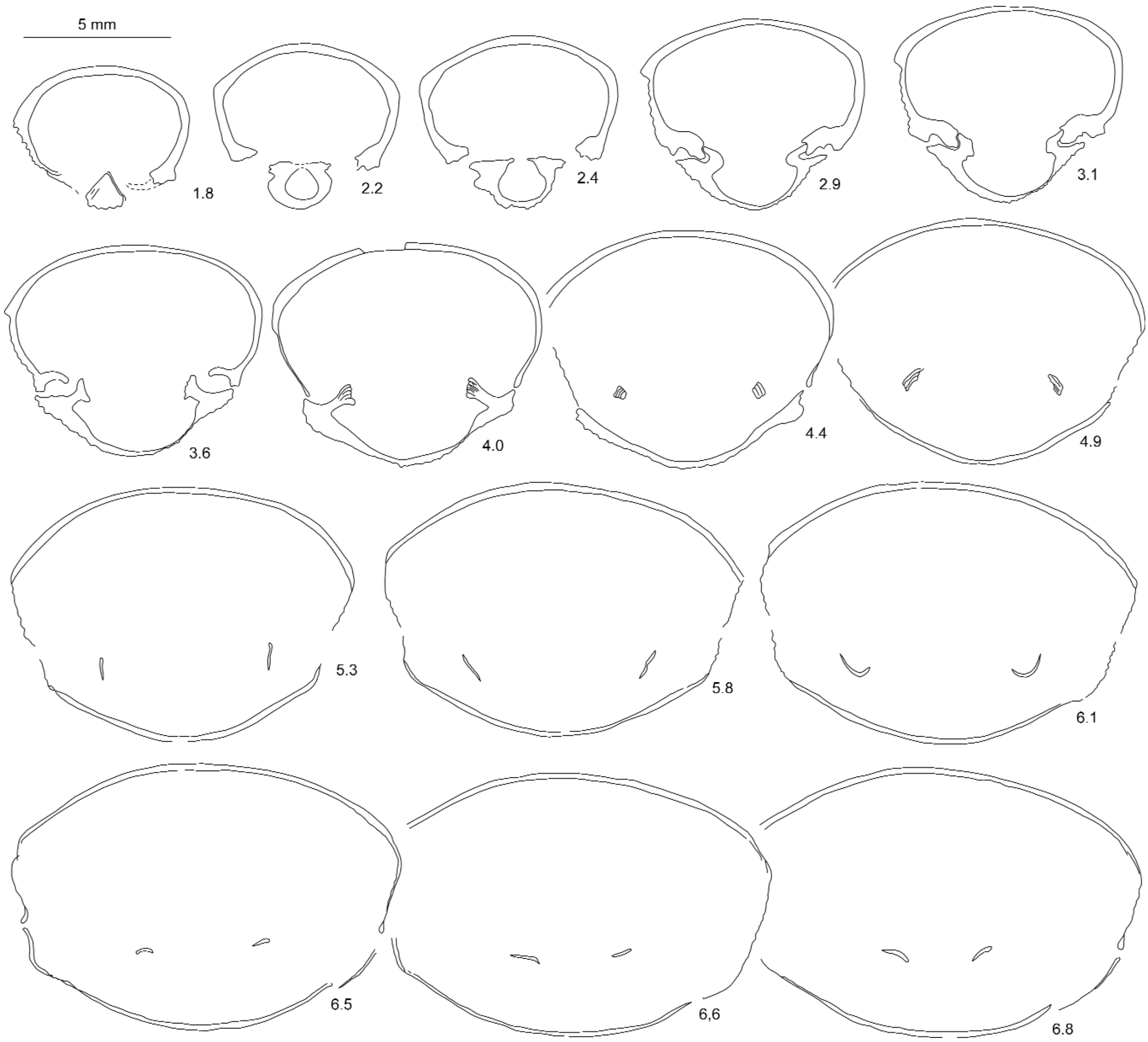


Figure 108. *Papodina bittneri* (GEYER, 1889). Fifteen transverse serial sections through the posterior part of a specimen from Lókút, Fenyveskút p2, Pliensbachian, Margaritatus Zone. J.9193. Distance from posterior end of shell is given in mm. Original length of the specimen is 21.5 mm. Partly redrawn after Fig. 9 in VÖRÖS (1983a)

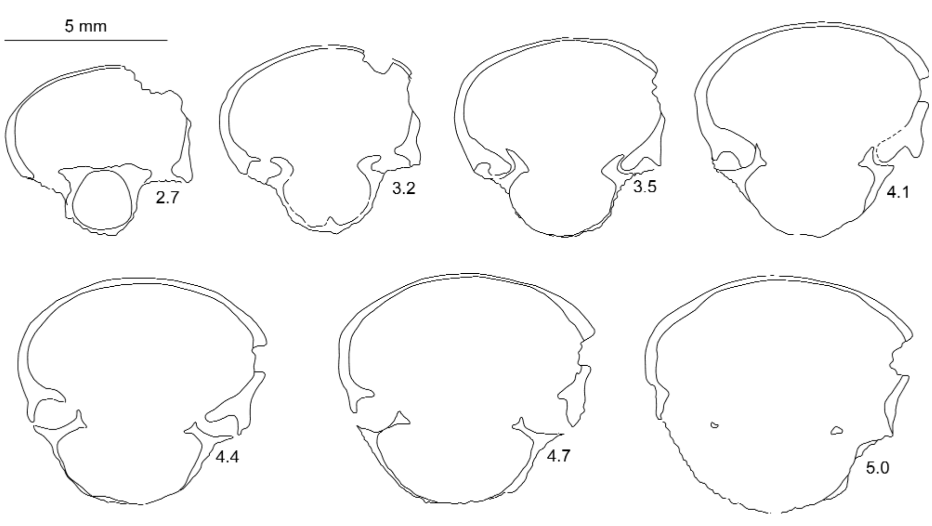


Figure 109. *Papodina bittneri* (GEYER, 1889). Seven transverse serial sections through the posterior part of a specimen from Lókút, Fenyveskút p1, Pliensbachian, Margaritatus Zone. M 2008.530.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 29.4 mm

in close relation with *P. bittneri* even by Geyer (1889) but, without detailed information on its internal morphology, its allocation to *Papodina* remains doubtful. Externally it differs from *P. bittneri* by its much wider shape and incipient dorsal sulcation.

Distribution:

Sinemurian to Pliensbachian of the Northern Calcareous Alps (Austria), the Gerecse and Bakony (Hungary), the Betic Cordilleras (Spain) and possibly the Apennines (Italy). The Pliensbachian specimens of the Bakony came from three localities, from the Ibex to the Margaritatus Zones (Tables 13, 14).

Suborder Terebratellidina Muir-Wood, 1955
Superfamily Zeillerioidea Allan, 1940
Family Zeilleriidae Allan, 1940
Subfamily Zeilleriinae Allan, 1940

Genus *Zeilleria* Bayle, 1878

Zeilleria mutabilis (Oppel, 1861)
Plate XXVIII: 5, 6; Figures 110–111.

* 1861 *Terebratula mutabilis* Opp. (Waldheimia.) – Oppel, Brachiopoden des unteren Lias, p. 538, pl. X, fig. 7.
v 1874 *Terebratula (Waldheim.)* cfr. *mutabilis* Opp. – Böckh, Südlichen Theiles des Bakony, p. 145 (partim), pl. I, figs. 7, 8 (non figs. 3–6, 9).
v 1874 *Terebratula (Waldheim.) Herendica* n. sp. – Böckh, Südlichen Theiles des Bakony, p. 147, pl. I, fig. 10.
1881 *Waldheimia Engelhardti* Opp. – Canavari, Alcuni nuovi Brachiopodi, p. 183, pl. IX, fig. 11.
1883 *Waldheimia mutabilis* Opp. var. – Canavari, Strati a Terebratula Aspasia III, p. 92 (partim), pl. X, fig. 9 (non fig. 10).
v 1889 *Waldheimia mutabilis* Opp. – Geyer, Hierlatz, p. 31 (partim), pl. II, figs. 31–33, 35 (non pl. II, figs. 34, 36 and pl. III, figs. 1–6).
v 1889 *Waldheimia Engelhardti* Opp. – Geyer, Hierlatz, p. 31 (partim), pl. IV, figs. 1, 2 (non pl. III, fig. 39).
v 1895 *Waldheimia mutabilis* Oppel. – Fucini, Monte Pisano, p. 206, pl. VII, figs. 29–31.
v ? 1907 *Waldheimia mutabilis,* Opp. – Dal Piaz, Tranze di Sospirolo, p. 48, pl. III, fig. 7.
1912 *Waldheimia (Zeilleria)* cf. *mutabilis* Oppel. – Haas, Ballino, p. 273, pl. XX, figs. 14, 15.
v 1913 *Waldheimia mutabilis* Opp. – Vadász, Liasfossilien aus Kleinasien, p. 68.
v 1918 *Waldheimia mutabilis* Opp. – Vadász, Posidonomya alpina-Schichten in Anatolien, p. 217.
1920 *Terebratula Engelhardti* Oppel – Dareste de la Chavanne, Guelma, p. 36, pl. II, fig. 8.
1926 *Z. mutabilis,* Opp. – Peterhans, Lias Préalpes médianes, p. 372, pl. I, figs. 11, 12.
? 1932 *Waldheimia mutabilis,* Oppel – Tzankov & Bončev, La faune liasique de Kalotina, p. 229, pl. I, fig. 6.
v 1936 *Waldheimia mutabilis* Opp. – Tricomi, Cozzo di Cugno, p. 5.
1943 *Waldheimia mutabilis* Opp. – Vigh, Gerecse, p. 327 (partim), pl. I, figs. 9, 10 (non figs. 11–14).
? 1949 *Zeilleria mutabilis* Opp. var. *dentata* n. var. – Nutsubidze, Dzirula Massif, p. 50, pl. III, fig. 9.
? 1956 *Zeilleria mutabilis* (Oppel) – Selli, Fossili Mesoz. Isonzo, p. 21, pl. II, fig. 1.
v ? 1961 *Waldheimia* cf. *mutabilis* Opp. – Vigh, Esquisse géol. Gerecse, p. 577.
? 1964 *Zeilleria mutabilis* (Oppel, 1861) – Siblík, Lias. Brach. Belanské Doliny, p. 165, text-fig. 2.
non 1967 *Zeilleria mutabilis* (Opp.) – Sacchi Vialli & Cantaluppi, Nuovi fossili di Gozzano, p. 108, text-fig. 29, pl. XV, fig. 10.
v 1976 *Zeilleria* ? *mutabilis* (Opp), 1861 – Vigh in Fülöp, Liassic Brach. Tata, p. 35.
v 1983 *Zeilleria mutabilis* (Oppel, 1861) – Vörös, Stratigraphic distribution, p. 35.
v 1983 *Zeilleria oenana* (Böse, 1898) ? – Vörös, Stratigraphic distribution, p. 35.
v 1987 *Z. mutabilis* (Opp.) – Vörös et al., Panormide, p. 245.
1992 *Zeilleria mutabilis* (Oppel, 1861) – Dulai, Lókút, p. 69 (partim), pl. V, fig. 1 (non pl. IV, fig. 6).
1993 *Zeilleria mutabilis* (Oppel) – Siblík, Review, p. 130 (partim), pl. I, fig. 4 (non fig. 3).
non 1993 *Zeilleria mutabilis* (Oppel, 1861) – Siblík, Steinplatte, p. 974, text-figs. 8, 9, pl. 2, fig. 3.
v 1997 *Zeilleria mutabilis* (Oppel) – Vörös, Jurassic brachiopods of Hungary, pp. 14, 16, Appendix: fig. 7.
1999 *Zeilleria mutabilis* (Oppel, 1861) – Böhm et al., Adnet, p. 202, pl. 30, fig. 8.
? 1999 *Zeilleria* aff. *mutabilis* Oppel, 1861 – I□esta, Catálogo de braquiópodos, p. 32, pl. IX, fig. 8.
2003 *Zeilleria mutabilis* (Oppel) – Siblík, Hallstatt, p. 69, pl. I, fig. 12.
v 2003 *Zeilleria mutabilis* (Oppel, 1861) – Vörös et al., Schafberg, p. 80, pl. VIII, figs. 46–48.
2003 *Zeilleria mutabilis* (Oppel, 1861) – Dulai, Hettangian and Early Sinemurian, p. 96 (partim), text-fig. 20, pl. XVI, figs. 9–17 (non figs. 5–8).
2007 *Zeilleria (Zeilleria) mutabilis* (Oppel, 1861) – Alméras et al., Algerie Occidentale, p. 121, pl. 10, figs. 9–11.
v 2007 *Zeilleria mutabilis* (Oppel, 1861) – Vörös & Dulai, Transdanubian Range, pp. 55, 56, pl. I, fig. 6.
2008 *Zeilleria mutabilis* (Oppel, 1861) – Baeza-Carratalá, Patrimonio J. de Cisneros, p. 535 (partim), text-figs. 98, 99, pl. XLII, figs. 1–4 (non fig. 5)

Material: 48, partly incomplete double valves.

Localities	*Measurements (mm)*			*Localities*	*Measurements (mm)*		
	L	*W*	*T*		*L*	*W*	*T*
Kericser 7	11.53	10.76	5.13		10.36	10.42	5.96
	13.39	14.06	6.91		10.61	11.12	6.23
	14.24	13.41	7.10		10.48	11.50	6.41
Kericser 8	11.09	10.63	5.71	Kericser 26	10.55	9.90	6.78
Kericser 13	12.31	12.32	7.62	Kericser 28	9.94	9.63	5.85
Kericser 14	11.81	12.89	7.21	Fenyveskút 5/a	10.55	10.96	4.96
Kericser 15	11.50	10.62	6.73		13.47	11.99	7.49
	11.05	11.83	6.49	Fenyveskút 5 b	10.22	10.03	5.35
	10.82	11.49	6.28		14.77	15.09	8.40
Kericser 16	13.11	13.22	7.14	Fenyveskút 5 c	13.22	13.34	7.48
Kericser 19	11.00	10.79	6.04		11.86	11.57	6.53
	9.75	10.18	5.19		13.86	14.44	7.43
Kericser 20	9.92	10.19	5.49		13.01	13.02	6.55
	9.58	9.61	5.82		15.67	15.83	8.58
Kericser 21	9.16	8.97	4.69	Fenyveskút (scree).	13.19	13.14	7.65
Kericser 24	10.04	10.00	5.52	Papod 84	10.19	9.92	5.28
Kericser 25	10.45	9.86	6.25		11.12	11.71	5.54

Description:

External characters: This is a small to medium-sized *Zeilleria* with rounded subpentagonal outline. The apical angle is about 100°. The maximum width is attained at about the middle of the length. The valves are moderately and almost equally convex; the maximum convexity lies near the middle of the length or is shifted somewhat posteriorly. The beak is rather low; not fully preserved but seems to be erect to slightly incurved. Blunt beak ridges run to the posterolateral extremities. Together with the point of the beak, the foramen is damaged but seems to be mesothyrid. The delthyrium is concealed by matrix. In lateral view, the lateral commissures are straight; their posterior part run on a low, sharp ridge. The anterior commissure is rectimarginate. The surface of the shell is smooth.

Internal characters (Figs. 110–111): *Ventral valve*: The delthyrial cavity is high trapezoidal in cross-section, with posterior callus on the ventral floor. The umbonal cavities are rounded triangular. Pedicle collar was not recorded. Narrow and disjunct deltidial plates were observed in one section. The strong dental plates are convergent ventrally. The hinge teeth are massive and somewhat crenulated; denticula are poorly developed. *Dorsal valve*: Instead of cardinal process a narrow, bifurcate trough develops in the dorsal umbo. It passes into a U-shaped septalium which widens and becomes bipartite by a low median elevation (a projection of the median septum). The shallow septalium, formed by the fused hinge plates, is connected to the dorsal median septum. The median septum is rather long, persists almost through the entire length of the crura. The outer socket ridges are massive, wide. The inner socket ridges are strong and lean moderately over the sockets. The hinge plates rise from the medial part of the inner socket ridges and are gently inclined dorsally. The crural bases emerge from the medial terminations of the hinge plates, close to, but independent from, the median septum. The vertical, blade-like crura are connected by a curious transverse band. The crural processes are crescentic in cross section; their ventral terminations seem to form a thin, ring-like structure. The loop is diploform; attains the two-third of the length of the dorsal valve. The descending branches are thin and moderately divergent. The ascending branches are moderately wide; their posterior transverse band is hood-like. Spines were recorded at the distal termination of the loop (Fig. 111).

Remarks:

This is perhaps the most frequently recorded and cited zeilleriid species of the Alpine–Mediterranean brachiopod faunas. The name "*mutabilis*" given by Oppel (1861) would suggest, that it may embrace diverse forms with various shape. Subsequent authors, especially Geyer (l. c.), went on this track and figured different (much elongated, much convex, anteriorly expanded, strangulate) specimens under the name *mutabilis*. However, Oppel (l. c.) clearly stated that this species is moderately convex and subpentagonal in outline and figured two specimens of this kind. Here I adhere to Oppel's definition and interpret *Z. mutabilis* in the above, narrower sense.

As a result of the study of the original specimens in the collection of the Geological Institute of Hungary, only two of the specimens figured by Böckh (l. c., figs. 7, 8) are considered *Z. mutabilis*. On the other hand, Böckh's *T.* (*W.*) *herendica* and the specimen figured by Canavari (1881) as "*Waldheimia Engelhardti* Opp." are regarded as conspecific with *Z. mutabilis*.

The other record by Canavari (1883) is only partly endorsed; one of his figured specimens (fig. 10) is rather globose and subcircular in outline, therefore does not belong to *Z. mutabilis*.

According to my narrow interpretation of *Z. mutabilis*, only four of the specimens figured by Geyer (l. c., pl. II, figs.

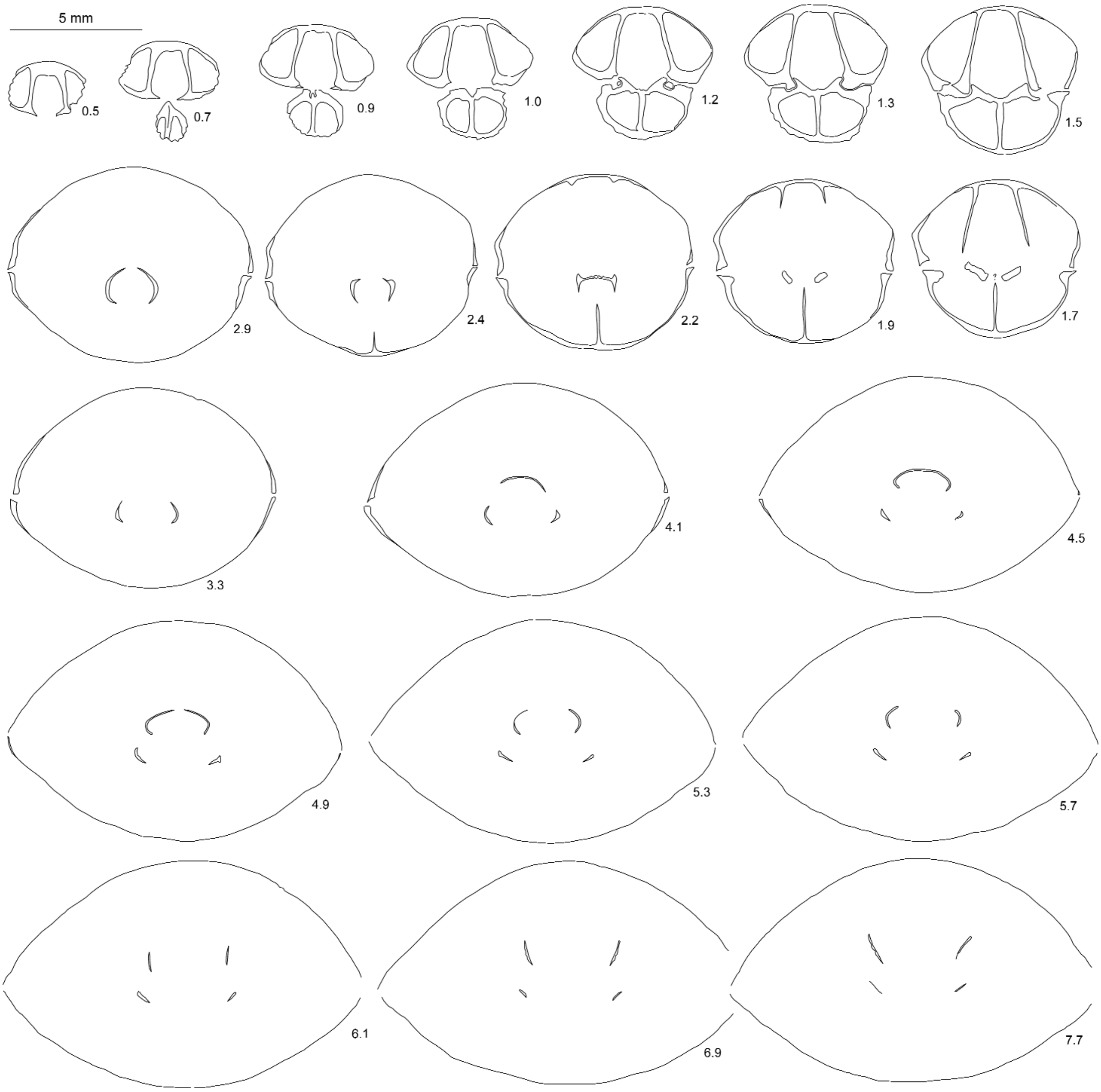


Figure 110. *Zeilleria mutabilis* (OPPEL, 1861). Twenty-one transverse serial sections through the posterior part of a specimen from Lókút, Fenyveskút 5/c, Pliensbachian, Margaritatus Zone. M 2008.531.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 15.7 mm

31–33, 35) seem to belong here. On the other hand, two specimens shown by GEYER (l. c., pl. IV, figs. 1, 2) as "*W. Engelhardti*" are less convex than the typical *Z. engelhardti* (OPPEL, 1861) and may rather belong to *Z. mutabilis*.

A part of the specimens figured by VIGH (1943, pl. I, figs. 11–14), SACCHI VIALLI & CANTALUPPI (l. c.) and SIBLÍK (1993a, pl. I, fig. 3, repeatedly figured in 1993b) are too much elongated and does not fit into *Z. mutabilis* in narrow sense.

GEYER's excessively wide interpretation of the morphological variation of *Z. mutabilis* reappeared in the recent works by DULAI (1992, 2003) and BAEZA-CARRATALÁ (2008). Besides typical representatives of *Z. mutabilis*, they also figured more convex specimens (DULAI 1992, pl. IV, fig. 6; DULAI 2003, pl. XVI, figs. 5–8; BAEZA-CARRATALÁ 2008, pl. XLII, fig. 5) which seem to be closer to *Z. engelhardti*.

In the cases of some items of the synonymy (TZANKOV & BONČEV, l. c., NUTSUBIDZE, l. c., SELLI, l. c.) the poor quality of the figures does not allow to decide if they actually represent *Z. mutabilis*. SIBLÍK's (1964) record is queried because only the serial sections of his *Z. mutabilis* are illustrated.

The specimens listed in my previous work (VÖRÖS 1983b) as *Z. oenana* (BÖSE, 1898) now regarded as belonging to *Z. mutabilis*.

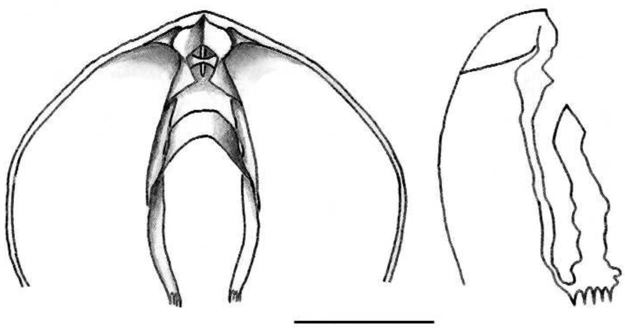


Figure 111. Zeilleria mutabilis (OPPEL, 1861). Ventral and lateral views of the dorsal valve interior. Reconstruction based on serial sections of a specimen from Lókút, Fenyveskút 5/c, Pliensbachian, Margaritatus Zone. M 2008.531.1. Scale bar = 5 mm

From among the other Alpine species of *Zeilleria*, with beak characters somewhat similar to *Z. mutabilis*, the similarly subpentagonal *Z. engelhardti* is significantly more biconvex. *Z. stapia* (OPPEL, 1861) is also rather strongly biconvex and very much elongated subtriangular in outline. *Z. choffati* (HAAS, 1884), which may perhaps be regarded as the junior synonym of *Z. perforata* (PIETTE, 1856), is rather strangulate and considerably more elongated than *Z. mutabilis*. The typically tiny *Z. alpina* (GEYER, 1889) has almost circular outline. The outline of *Z. batilla* (GEYER, 1889) is elongated subtriangular, with very anteriorly placed maximum width.

The species *mutabilis* was included into the new genus *Spinulothyris* by ANTOSTCHENKO (1973). However, this genus was synonymized with *Keratothyris* TULUWEIT, 1965 by LEE et al. (2006) and, since prominent authors (SIBLÍK, l. c., ALMÉRAS et al., l. c.) persisted on attributing the species *mutabilis* to the genus *Zeilleria*, this practice was followed here also.

Distribution:

Sinemurian and Pliensbachian of Sicily, the Central and Northern Apennines and the Southern Alps (Italy), the Western Alps (Switzerland), the Northern Calcareous Alps (Austria), the Gerecse and Bakony Mts (Hungary), the Pontides (Turkey), the Betic Cordilleras (Spain), the Atlas Mountains (Algeria) and probably of the Inner West Carpathians (Slovakia), the Balkan Mountains (Bulgaria) and the Dzirula Massif (Caucasus, Georgia). The Pliensbachian specimens of the Bakony came from three localities, from the Ibex to the Margaritatus Zones (Tables 13, 14).

Zeilleria alpina (GEYER, 1889)
Plate XXVIII: 7; Figures 112–113.

v * 1889 *Waldheimia alpina* nov. sp. – GEYER, Hierlatz, p. 29, pl. III, figs. 33–38.
1943 *Waldheimia alpina* Gey. – VIGH, Gerecse, p. 324, text-fig. 5, pl. I, fig. 4.
1960 *Waldheimia* cfr. *alpina* Gey. – FÜLÖP et al., Vértes, p. 17, pl. I, fig. 3.
v ? 1961 *W. alpina* Opp. – VIGH, Esquisse géol. Gerecse, p. 576.
v 1983 *Zeilleria alpina* (Geyer, 1889) – VÖRÖS, Stratigraphic distribution, p. 35.
1992 *Zeilleria alpina* (Geyer, 1889) – DULAI, Lókút, p. 71, text-figs. 29, 30, pl. V, fig. 2.
1993 *Zeilleria alpina* (Geyer, 1889) – SIBLÍK, Steinplatte, p. 975, pl. 2, fig. 10.
v 2007 *Zeilleria alpina* (Geyer, 1889) – VÖRÖS & DULAI, Transdanubian Range, pp. 55, 56, pl. I, fig. 33.
v 2003 *Zeilleria alpina* (Geyer, 1889) – VÖRÖS et al., Schafberg, p. 75.
v 2003 *Zeilleria alpina* (Geyer, 1889) – DULAI, Hettangian and Early Sinemurian, p. 90, text-fig. 17, pl. XV, figs. 4–6.
2008 *Zeilleria alpina* (Geyer, 1889) – BAEZA-CARRATALÁ, Patrimonio J. de Cisneros, p. 543, pl. XLIII, figs. 4–6.

Material: 3, partly incomplete double valves.

Localities	*Measurements (mm)*		
	L	*W*	*T*
Kericser 23	11.13	11.96	5.71
	11.41	11.65	5.63

Description:

External characters: This is a small *Zeilleria* with subcircular outline. The apical angle is about 100°. The maximum width is attained at about the middle of the length or shifted a little anteriorly. The valves are moderately ventribiconvex; the maximum convexity lies near the middle of the length. The beak is moderately high; it is not fully preserved but seems to be erect. Blunt beak ridges run to the posterolateral extremities. The foramen is incomplete but seems to be mesothyrid. The delthyrium is concealed by matrix. In lateral view, the lateral commissures are straight; the anterior commissure is rectimarginate tending to be a slightly unisulcate. The surface of the shell is smooth.

Internal characters (Figs. 112–113): *Ventral valve*: The delthyrial cavity is high trapezoidal in cross-section. The umbonal cavities are rounded triangular. Pedicle collar was not recorded. The deltidial plates are disjunct. The dental plates are convergent ventrally. The hinge teeth are well-developed; denticula are poorly seen. *Dorsal valve*: The septalium, formed by the fused hinge plates, is connected to the dorsal median septum. It is narrow and V-shaped posteriorly, then

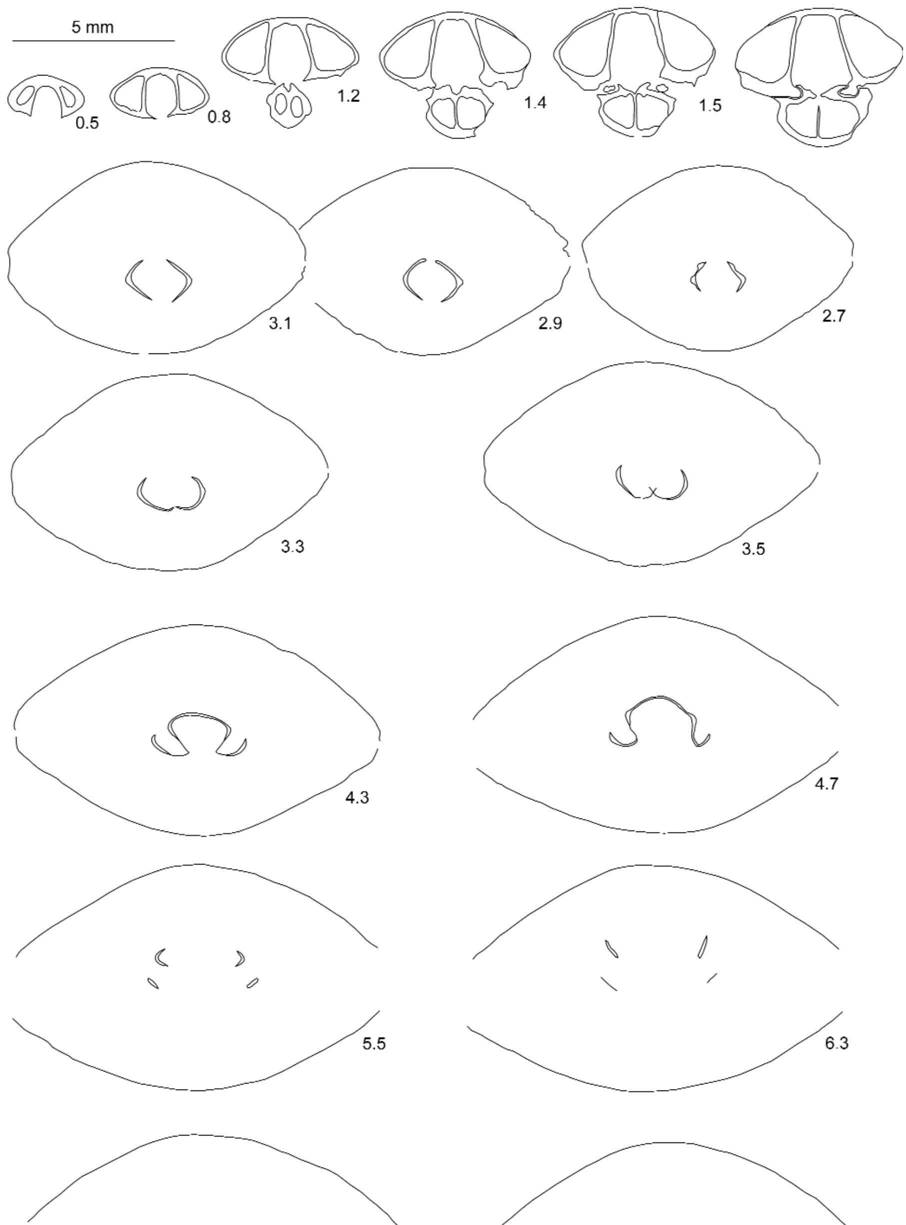


Figure 112. *Zeilleria alpina* (Geyer, 1889). Twenty-five transverse serial sections through the posterior part of a specimen from Lókút, Kericser VI, Bed 34, Pliensbachian, Ibex Zone. M 2008.532.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 13.6 mm

becomes wide and shallow. The median septum is moderately long. The outer socket ridges are poorly preserved but seem to be massive. The inner socket ridges are lean well over the sockets. The hinge plates are reduced and rise from the medial part of the inner socket ridges. They, and the posterior part of the crural bases, are thickened by secondary callus. The subvertical blades of the crura are sinuous in cross section. The crural processes are strongly crescentic in cross section; their dorsal and ventral terminations tend to form a ring-like structure. The loop is diploform; attains the 0.6 of the length of the dorsal valve. The descending branches are wide and U-shaped posteriorly, then become thin and divergent. Their attachment to the ascending branches shows an angular shape. The ascending branches are moderately wide; posteriorly they form a rather long, hood-like transverse band, fused with the descending branches (Fig. 113).

Remarks:

From other Alpine species of *Zeilleria*, with similar beak characters, *Z. alpina* differs by its regularly small size and subcircular outline. Geyer (l. c.) and Siblík (l. c.) mentioned and demonstrated an incipient sulcation as important character of *Z. alpina*; this feature occasionally appeared also in the presently studied material.

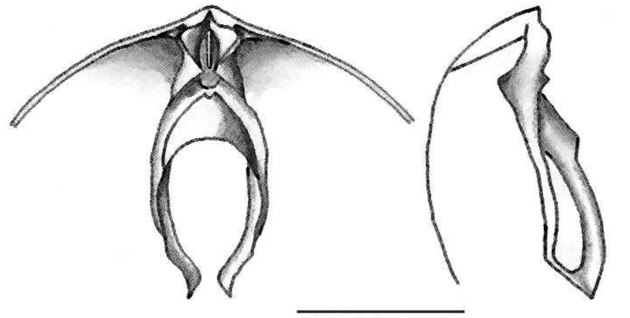


Figure 113. *Zeilleria alpina* (GEYER, 1889). Ventral and lateral views of the dorsal valve interior. Reconstruction based on serial sections of a specimen from Lókút, Kericser VI, Bed 34, Pliensbachian, Ibex Zone. M 2008.532.1. Scale bar = 5 mm

VIGH (1943, l. c.) supposed a close relationship and gradual transition between Z. *alpina* and "*Waldheimia* (?) *baconica* var. *complanata*" BÖCKH, 1874. However, the latter species is definitely not a zeilleriid, but probably belongs to *Lobothyris*, as demonstrated by DULAI (1993b, 2003). Therefore the affinity suggested by VIGH (l. c.) is refuted.

Distribution:

Sinemurian and Pliensbachian of the Northern Calcareous Alps (Austria), the Gerecse and Bakony Mts (Hungary) and the Betic Cordilleras (Spain). The Pliensbachian specimens of the Bakony came from the Kericser section, from the Ibex Zone (Tables 13, 14).

Zeilleria bicolor (BÖSE, 1898)
Plate XXVIII: 8; Figure 114.

v * 1898 *Waldheimia bicolor* nov. sp. – BÖSE, Brachiopodenfauna der östlichen Nordalpen, p. 171, pl. XIII, figs. 15, 16.
v 1983 *Zeilleria bicolor* (Böse, 1898) ? – VÖRÖS, Stratigraphic distribution, p. 35.
v 2003 *Zeilleria bicolor* (Böse, 1898) – VÖRÖS et al., Schafberg, p. 76, pl. VII, figs. 30, 31.
v 2007 *Zeilleria bicolor* (Böse, 1898) – VÖRÖS & DULAI, Transdanubian Range, pp. 55, 56.

Material: 11, partly incomplete double valves.

Localities	*Measurements (mm)*		
	L	*W*	*T*
Kericser 18	10.02	9.13	5.47
	10.97	10.41	6.19
Kericser 27	10.14	9.56	5.72
	10.61	10.53	7.15
	12.84	11.66	7.03
Kericser 33	15.16	12.52	8.89
	12.07	11.06	7.20
Kericser (scree)	7.81	6.96	4.79
Fenyveskút p1	15.97	14.08	8.59
Fenyveskút (scree)	11.93	10.27	6.04
Eplény	10.17	10.23	5.81

Description:

External characters: This is a small *Zeilleria* with slightly elongated oval outline. The apical angle is around 90°. The maximum width is attained at about the middle of the length or shifted a little anteriorly. The valves are rather strongly and almost equally convex; the maximum convexity lies near the middle of the length. The beak is rather high, erect. The moderately sharp beak ridges are long and form elevated keels giving the beak a hood-like appearance. The foramen is incomplete but seems to be mesothyrid. The delthyrium is concealed by matrix. In lateral view, the lateral commissures are straight or slightly arched ventrally. The anterior commissure is rectimarginate. The surface of the shell is smooth.

Internal characters (Fig. 114): *Ventral valve*: The delthyrial cavity is subrounded trapezoidal in cross-section with a slight trace of a myophragm on the ventral floor. The umbonal cavities are rounded triangular and partly filled by callus. Pedicle collar and deltidial plates were not observed. The dental plates are convergent ventrally and gently arched laterally. The hinge teeth are massive; denticula are poorly preserved. *Dorsal valve*: There is a rhombus-shaped notothyrial cavity. It passes into a very deep, V-shaped septalium, formed by the hinge plates and the rather low dorsal median septum. The median septum is rather short; it disappear before the crura become released. The outer socket ridges are massive, wide. The inner socket ridges are rather thin and lean moderately over the sockets. The hinge plates rise from the medial part of the inner socket ridges and are deeply inclined dorsally. The crural bases are very thin, blade-like and given off dorsally from the medial terminations of the hinge plates. The crura are somewhat angular crescentic in cross-section. The crural processes are also crescentic or rather bracket-like, and their ventral tips are almost joined. The descending branches are thin and rather widely divergent. The distal part of the loop, together with the ascending branch, is missing.

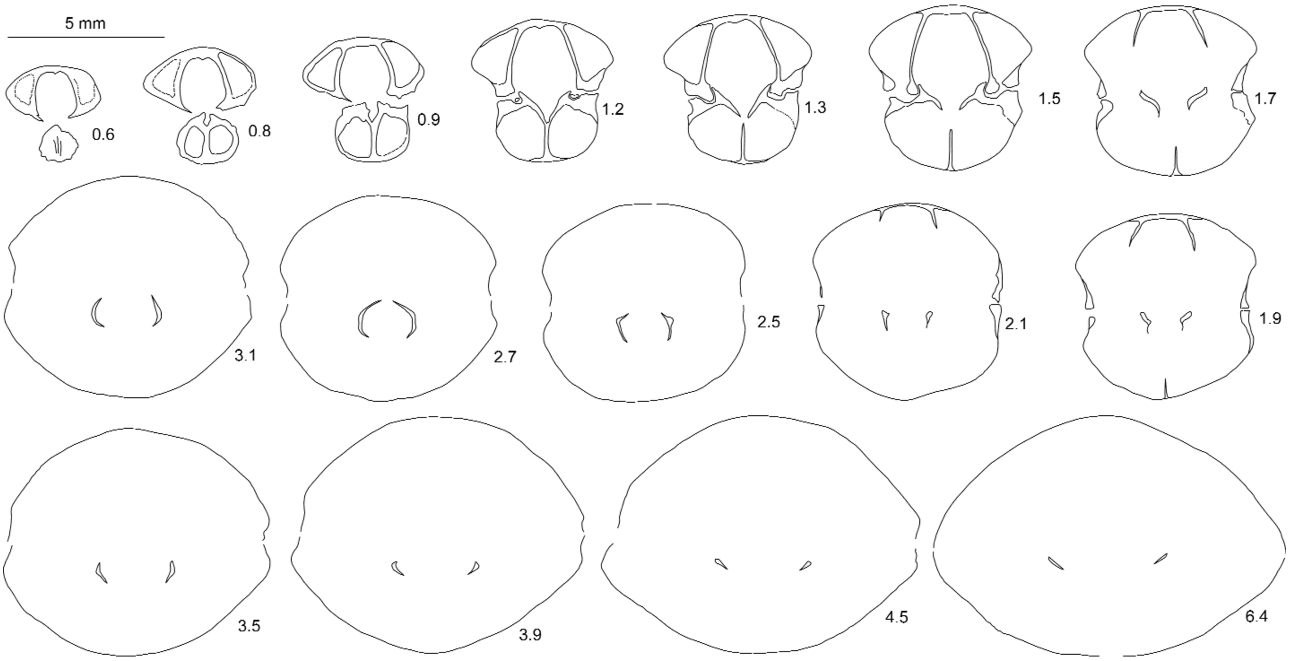


Figure 114. *Zeilleria bicolor* (Böse, 1898). Sixteen transverse serial sections through the posterior part of a specimen from Lókút, Fenyveskút 5/c, Pliensbachian, Margaritatus Zone. M 2008.533.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 12.8 mm

Remarks:

This seldom recorded species differs from other Alpine species of *Zeilleria* by its elongate oval outline and particularly by its characteristically elevated beak ridges. This curious beak, somewhat reminding a cobra's hood, makes *Z. bicolor* a unique, unmistakeable species. In the collection of the Bayerische Staatssammlung, München, I studied the original specimens of *Z. bicolor* figured by Böse (l. c.) and this way the identification of the Bakony specimens is approved.

Distribution:

Sinemurian and Pliensbachian of the Northern Calcareous Alps (Austria), and the Bakony (Hungary). The Pliensbachian specimens of the Bakony came from three localities, from the Ibex to the Margaritatus Zones (Tables 13, 14).

Zeilleria ? *aquilina* (Franceschi, 1921)
Plate XXVIII: 9, 10; Figure 115.

* 1921 *Waldheimia aquilina* n. f. – Franceschi, Appennino Centrale, p. 230, pl. I, fig. 11.
v 1983 *Zeilleria aquilina* (Franceschi, 1921) ? – Vörös, Stratigraphic distribution, p. 35.
v 2007 *Zeilleria aquilina* (Franceschi, 1921) – Vörös & Dulai, Transdanubian Range, p. 56.

Material: 22, partly incomplete, double valves.

Localities	*Measurements (mm)*		
	L	*W*	*T*
Kericser 7	13.95	13.47	7.90
Kericser 11	12.66	12.43	8.10
Kericser 12	8.74	8.47	5.39
Kericser 17	11.77	11.29	6.78
Kericser 18	11.94	11.40	6.71
Kericser 19	10.91	11.14	5.77
	12.09	12.32	6.27
Kericser 22	12.43	13.15	7.28
Kericser 23	12.84	13.86	6.84
Kericser 25	13.67	13.10	8.42
Kericser 27	11.78	11.85	7.75

Kericser 29	12.14	12.14	7.17
Kericser 30	9.26	9.55	4.88
	12.04	12.59	6.68
	13.58	12.00	7.95
Kericser I/a	11.83	11.02	6.76
Kericser I/f	12.71	13.84	7.18

Description:

External characters: This is a small to medium-sized zeilleriid with rounded subtriangular to drop-shaped outline. The apical angle varies between 65–80°. The maximum width is attained at about the anterior third of the length. The valves are rather strongly convex; the ventral valve is more strongly inflated posteriorly. The maximum convexity lies between the middle and the posterior third of the length. The beak is massive, very high, erect to slightly incurved. The beak ridges are strong but blunt. The foramen is usually incomplete but in some cases it seems to be permesothyrid. The delthyrium is covered by matrix. In lateral view, the lateral commissures are straight or gently sinuous. The anterior commissure is rectimarginate or tends to be slightly unisulcate. The surface of the shell is smooth, except a specimen with well-preserved outer layer of the shell, showing weak radial capillation (Pl. XXVIII: 10).

Internal characters (Fig. 115): *Ventral valve*: The delthyrial cavity is quadratic to trapezoidal in cross-section, with posterior callus on the ventral floor. The umbonal cavities are rounded triangular. Pedicle collar was not recorded. The deltidial plates are disjunct. The dental plates are subparallel; posteriorly they are slightly divergent, then become convergent

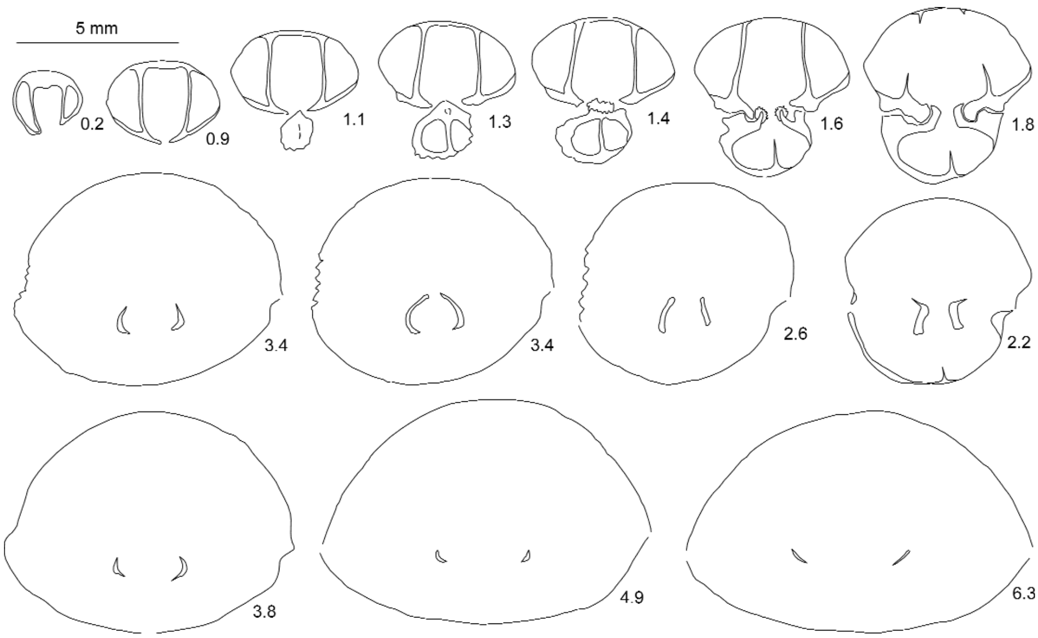


Figure 115. *Zeilleria* ? *aquilina* (Franceschi, 1921). Fourteen transverse serial sections through the posterior part of a specimen from Lókút, Kericser VI, Bed 30, Pliensbachian, Ibex Zone. M 2008.534.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 12.4 mm

ventrally. The hinge teeth are massive, inwardly oriented and closely spaced; blunt denticula are present. *Dorsal valve*: A cardinal process is formed by secondary callus which masks the septalium and covers also the posterior part of the inner socket ridges. The median septum is moderately long. The outer socket ridges are massive, wide. The inner socket ridges are strong and only slightly lean over the sockets. There are no definite hinge plates; the crural bases grow directly from the inner socket ridges. The crura are subvertical, blade-like; seemingly masked by callus. The crural processes are crescentic in cross-section, and their ventral tips are almost joined. The descending branches are triangular in cross-section and rather widely divergent. The distal part of the loop, together with the ascending branch, is missing but even the incomplete loop exceeds the half of the length of the dorsal valve.

Remarks:

This is a rare and rather atypical zeilleriid species, characterized by the high, and well incurved massive beak what is the basic feature for the identification of the Bakony specimens with Franceschi's *aquilina*.

The curious beak of the species in question reminds strongly to that of some short-looped terebratulids (e. g. *Lychnothyris*). However, *Z.* ? *aquilina* definitely belongs to the long-looped group as evidenced by the presence of the dental plates, the dorsal median septum and the long (though incomplete) loop. At the same time, its generic attribution to *Zeilleria* is doubtful, partly because of its extraordinary beak, partly because of its unusual cardinalia, lacking hinge plates and true septalium.

Distribution:

Pliensbachian of the Central Apennines and the Bakony Mts (Hungary). The Pliensbachian specimens of the Bakony came from the Kericser section, from the Ibex to the Margaritatus Zones (Tables 13, 14).

Genus *Antiptychina* Zittel, 1880

Antiptychina ? *rothpletzi* (Di Stefano, 1891)
Plate XXVIII: 11, 12; Figure 116.

1884 *Waldheimia (Aulacothyris) linguata* Böckh. 1874. – Haas, Südtyrol und Venetien, p. 25, pl. IV, fig. 5.
v * 1891 *Waldheimia Rothpletzi* Di-Stef. – Di Stefano, M. San Giuliano, p. 261, pl. IV, figs. 20–23.
? 1893 *Waldheimia Meneghini,* Par. – Parona, Revisione Gozzano, p. 44, pl. II, fig. 20.
v 1900 *Waldheimia Meneghinii* Parona. – Böse & Schlosser, Südtirol, p. 188 (partim), pl. XVII, figs. 20, 22, 23 (non fig. 12).
? 1912 *Waldheimia (Antiptychina) Meneghinii* Parona nov. variet. *elegantula* – Haas, Ballino, p. 269, pl. XX, figs. 11, 12.
1967 *Zeilleria rothpletzi* (Di Stef.) – Sacchi Vialli & Cantaluppi, Nuovi fossili di Gozzano, p. 110, text-fig. 30, pl. XV, figs. 14, 15.
v 1983 *Antiptychina* ? *rothpletzi* (Di Stefano, 1891) – Vörös, Stratigraphic distribution, p. 35.
v 1992 *Antiptychina* ? *rothpletzi* (Di Stefano, 1891) – Dulai, Lókút, p. 80, text-fig. 39, pl. VI, fig. 2.
v 2003 *Antiptychina rothpletzi* (Di Stefano, 1891) – Dulai, Hettangian and Early Sinemurian, p. 107 (partim), text-fig. 24, pl. XVIII, figs. 14–17. (? figs. 10–13).
v 2007 *Antiptychina* ? *rothpletzi* (Di Stefano, 1891) – Vörös & Dulai, Transdanubian Range, pp. 55, 56, pl. I, fig. 41, pl. II, fig. 38.
2008 *Antiptychina*? *rothpletzi* (Di Stefano, 1891) – Baeza-Carratalá, Patrimonio J. de Cisneros, p. 586, pl. XLVIII, figs. 5, 6, pl. XLIX, figs. 1, 2.

Material: 24 specimens of variable state of preservation; mostly double valves.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser 7	13.41	14.31	6.80	?
	12.68	14.59	6.34	3.17
Kericser 17	14.79	15.53	6.93	3.07
Kericser 20	12.92	13.54	7.01	3.05
Kericser 24	11.14	10.86	5.62	2.38
Kericser 25	12.58	12.57	6.80	3.02
	13.40	15.22	7.68	3.25
Kericser 29	13.40	14.29	6.60	2.95
Kericser 33	9.74	11.32	6.19	1.49
	11.55	12.80	6.01	1.81
Kericser I/a	10.97	12.38	6.00	2.38
Kericser II/k	10.89	12.92	5.58	1.76
Kericser (scree)	13.63	15.52	7.04	3.65

Description:

External characters: This is a small to medium-sized *Antiptychina* with rounded subpentagonal outline. The apical angle varies between 95–110°. The maximum width is attained at about the middle of the length or a little nearer to the anterior third. The valves are ventribiconvex and resupinate; the dorsal valve is moderately convex in longitudinal cross section, whereas it is somewhat concave in anterior view. The beak is rather high, erect to slightly incurved. The beak ridges are markedly sharp and long; they rise over the dorsal valve as a hood. The foramen is mesothyrid. The delthyrium is partly covered by matrix but seems to be narrow and rather high. In lateral view, the lateral commissures are sinuous; they join with a continuous arch to the sulcate anterior commissure. The sinus is rather shallow and wide; usually it occupies about the two-third of the width of the shell. In typical cases, the sinus has a trapezoidal shape with rounded corners, rarely it may be gently plicosulcate. Dorsal sulcus and ventral fold develop only anteriorly. The surface of the shells is almost smooth, except a fine radial capillation.

Internal characters (Fig. 116): *Ventral valve*: The delthyrial cavity is subquadratic in cross-section, with posterior callus on the ventral floor, showing a deep incision of a narrow muscle scar. The umbonal cavities are rather sharp triangu-

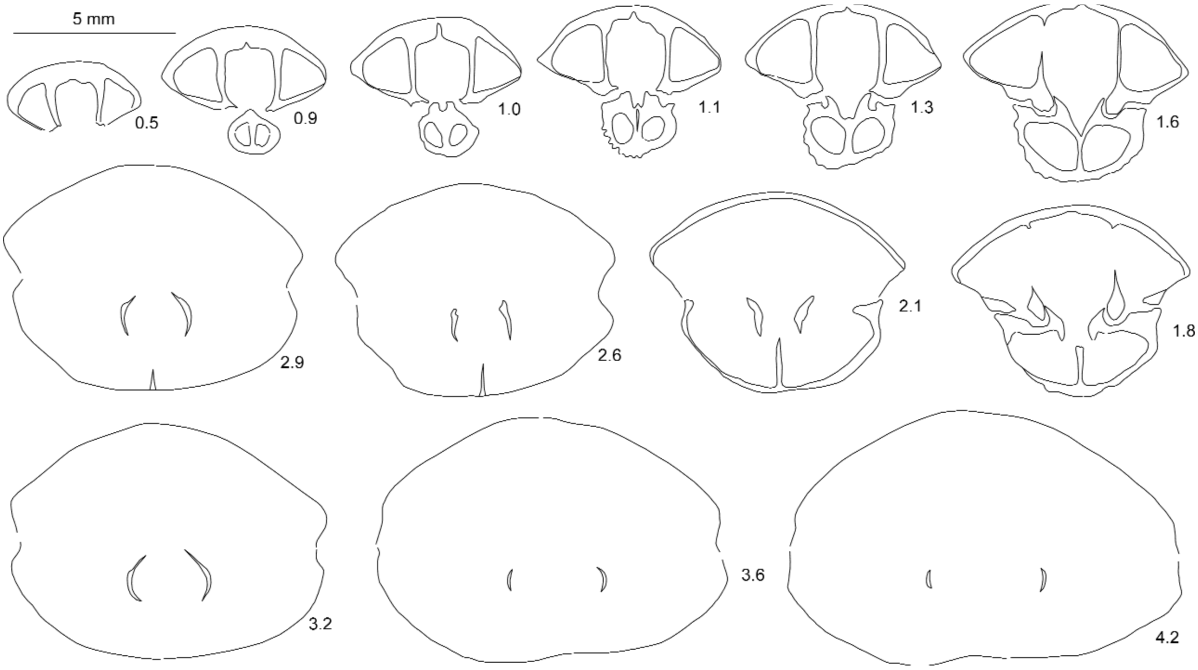


Figure 116. *Antiptychina* ? *rothpletzi* (Di Stefano, 1891). Thirteen transverse serial sections through the posterior part of a specimen from Lókút, Kericser VI, Bed 33, Pliensbachian, Ibex Zone. M 2008.535.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 14.7 mm

lar. Pedicle collar was not recorded. Traces of deltidial plates were observed. The strong dental plates are subparallel. The hinge teeth are massive and inwardly oriented; denticula are poorly preserved. *Dorsal valve*: A narrow, bifurcate trough develops in the dorsal umbo. The posterior part of the U-shaped septalium is divided by a low median elevation (a projection of the median septum). The septalium is formed by the fused hinge plates and is connected to the dorsal median septum. More anteriorly, it becomes rather deep and V-shaped. The median septum is rather long, persists to the distance of the crural processes. The outer socket ridges are rather wide and massive. The inner socket ridges are narrow and sharp, they lean only a little over the sockets. The hinge plates rise from the dorsomedial part of the inner socket ridges and are definitely inclined dorsally. The crural bases emerge from the dorsal terminations of the hinge plates, close to, but independent from, the median septum. The crura are vertical, subparallel. The crural processes are crescentic in cross section. The descending branches are thin and widely divergent. The distal part of the loop, together with the ascending branch, is missing.

Remarks:

This species was figured for the first time by Haas (1884, l. c.) under the name "*Waldheimia* (*Aulacothyris*) *linguata* Böckh, 1874". The nice figures clearly show that the specimen is markedly different from Böckh's species which is a short-looped terebratulid and is termed *Linguithyris linguata* today. The wrong identification was recognized soon by Rothpletz (1886, p. 85 and 129) who introduced a new name "*W*[*aldheimia*] *Haasi*" for this species and placed it into the relationship of *Antiptychina* Zittel, 1880 ("Bivallata-Sippe"). Di Stefano (1891, l. c.) pointed out that the binomen "*Waldheimia Haasi*" was preoccupied for a British Middle Jurassic species, and therefore introduced the valid species name "*Waldheimia Rothpletzi*".

A. rothpletzi was often mistaken for the somewhat similar *Bakonyithyris meneghinii* (Parona, 1880) (e. g.: Böse & Schlosser 1900, l. c., Haas 1912, l. c.). Sacchi Vialli & Cantaluppi (l. c.) cleared up this confusion and pointed out that even Parona (1893, l. c.) was partly wrong and misidentified some specimens of *A. rothpletzi* as *B. meneghinii*. I had the opportunity to study some of the original specimens in question in the collections of the Palermo University and the Bayerische Staatssammlung, München, and I agree with the revision made by Sacchi Vialli & Cantaluppi (l. c.), namely that *A. rothpletzi* is significantly less convex than *B. meneghinii* and shows a radial capillation in contrast to the smooth *B. meneghinii*. I may add that *A. rothpletzi* is not only flat but distinctly resupinate.

The record of "*Waldheimia* (*Antiptychina*) *Meneghinii* Parona nov. variet. *elegantula*" by Haas (1912, l. c.) is queried in the synonym list, because in this respect I relied upon the opinion of Sacchi Vialli & Cantaluppi (l. c.); in my opinion the figured specimen is too much elongated.

Although some previous authors suggested to attribute this species to *Antiptychina*, the generic position of *rothpletzi* is doubtful. According to the "revised Treatise" (Lee et al. 2006) the genus *Antiptychina* is stratigraphically restricted to the

Middle and Upper Jurassic. The Lower Jurassic *rothpletzi* would enlarge the range of the genus, but the morphological proofs of the attribution are only partial. Externally, the somewhat resupinate shape seems to support the allocation to *Antiptychina*, but internally, the knowledge of the loop characters is still deficient.

Distribution:

Sinemurian and Pliensbachian of Sicily, the Southern Alps (Italy), the Bakony (Hungary) and the Betic Cordilleras (Spain). The Pliensbachian specimens of the Bakony came from five localities, from the Ibex to the Margaritatus Zones (Tables 13, 14).

Genus *Aulacothyris* DOUVILLÉ, 1879

Aulacothyris ? cf. *fuggeri* (BÖSE, 1898)
Plate XXIX: 4.

v * 1898 *Waldheimia Fuggeri* nov. sp. – BÖSE, Brachiopodenfauna der östlichen Nordalpen, p. 179, pl. XII, figs. 38, 39.
v 1983 *Aulacothyris* ? cf. *fuggeri* (Böse, 1898) – VÖRÖS, Stratigraphic distribution, p. 35.
v 2007 *Aulacothyris* ? cf. *fuggeri* (Böse, 1898) – VÖRÖS & DULAI, Transdanubian Range, p. 56.

Material: 4, partly incomplete double valves.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser 8	9.57	8.22	6.27	1.53
Kericser 20	12.60	9.80	6.68	2.21
Kericser 27	15.17	12.54	8.85	1.95
Papod 87	9.61	8.29	5.06	1.89

Description:

External characters: This is a small *Aulacothyris* with elongated oval, rather drop-shaped outline. The apical angle is about 90°. The valves are moderately convex; the maximum convexity lies near the middle of the length; the dorsal valve is somewhat more inflated posteriorly. The beak is moderately high, suberect. The foramen seems to be mesothyrid. The delthyrium is concealed by matrix. The beak ridges are distinct but not very sharp. In lateral view, the lateral commissures are gently arched dorsally; they join with a continuous curve to the unisulcate anterior commissure. The sinus is uniformly arched; it is rather wide; it occupies more than the two-third of the width of the shell. Definite sulcus and fold are not developed. The surface of the shells is almost smooth except the numerous growth lines.

Internal characters: These were not studied by serial sectioning because of the paucity of the material.

Remarks:

This rare species is not very well-documented. The original specimens figured by BÖSE (l. c.) were found and studied in the collection of the Bayerische Staatssammlung, München, thus the identification of the Bakony specimens may be taken as approved.

A. ? *fuggeri* does not show definitely the characters of *Aulacothyris*, since its ventral valve is not really carinate and its sulcus is also not very marked. On this ground it might belong even to *Bakonyithyris*, but its elongated outline draws it nearer to *Aulacothyris*.

Distribution:

Pliensbachian of the Northern Calcareous Alps (Austria), and the Bakony (Hungary). The Pliensbachian specimens of the Bakony came from two localities, from the Ibex to the Margaritatus Zones (Tables 13, 14).

Aulacothyris ? *ballinensis* (HAAS, 1912)
Plate XXIX: 1–3; Figures 117–118.

* 1912 *Waldheimia (Aulacothyris) Ballinensis* nov. spec. – HAAS, Ballino, p. 267, pl. XX, fig. 10.
v 1983 *Aulacothyris* ? *ballinensis* (Haas, 1912) – VÖRÖS, Stratigraphic distribution, p. 35.
v 1983 *Bakonyithyris* ? n. sp., aff. *ovimontana* (Böse, 1898) – VÖRÖS, Stratigraphic distribution, p. 35.
v 1997 *Aulacothyris* ? *ballinensis* (Haas) – VÖRÖS, Jurassic brachiopods of Hungary, p. 17, Appendix: fig. 27.
v 1997 *Bakonyithyris* ? n. sp., aff. *ovimontana* (Böse) – VÖRÖS, Jurassic brachiopods of Hungary, p. 17.
v 2007 *Aulacothyris* ? *ballinensis* (Haas, 1912) – VÖRÖS & DULAI, Transdanubian Range, p. 56, pl. II, fig. 39.

Material: 14 double valves of various state of preservation.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Fenyveskút p1	11.45	10.80	7.97	5.25
Fenyveskút p2	12.19	11.16	7.72	4.52
	12.86	12.06	8.58	6.54
Fenyveskút 5/c	9.39	11.55	6.97	3.06
	11.06	10.22	8.43	5.69
Fenyveskút (scree)	11.87	11.32	7.56	4.45
	11.66	10.30	8.39	6.06
Papod 87	9.91	10.16	5.68	4.07

Description:

External characters: This is a small to medium-sized *Aulacothyris* with anteriorly expanded subtriangular outline. The lateral margins are almost straight or gently convex; the anterior margin is straight. The apical angle varies between 80–90°. The maximum width is attained near the anterior margin. The valves are rather strongly and equally convex. The dorsal valve is more inflated posteriorly. The maximum convexity lies near mid-length or a little shifted to the posterior one-third. The beak is rather low, erect to slightly incurved. The foramen is mesothyrid. The delthyrium is covered by matrix. The beak ridges are rather sharp and well-marked near the termination of the beak, but gradually disappear at the one-third of the length. The dorsal beak ridges remain sharp longer than half-length. Consequently, rather narrow, and oblique planareas develop. Within the planareas, the lateral commissures run on a sharp crest. In lateral view, the lateral commissures run obliquely and are dorsally arched. They join with a continuous curve to the unisulcate anterior commissure. The sinus is rather deep and very wide; usually it occupies almost the whole width of the shell. It has a trapezoidal shape with rounded corners. There is a definite, narrow, incipient sulcus posteriorly which widens anteriorly. Shallow and wide dorsal sulcus and ventral fold appear near the anterior margin. The surface of the shells is smooth.

Internal characters (Fig. 117–118): *Ventral valve*: The delthyrial cavity is rounded subquadratic in cross-section, with a vague trace of a median myophragm. The umbonal cavities are rather subtriangular. Pedicle collar was not recorded. The deltidial plates are well-developed, disjunct. The weak and short dental plates are arched laterally. The hinge teeth are rather tiny and inwardly oriented; denticula are poorly preserved. *Dorsal valve*: The posterior part of the septalium is shallow, U-shaped, then it becomes deep and V-shaped. The outer socket ridges are moderately wide. The inner socket ridges are narrow and sharp, they lean only a little over the sockets. The hinge plates rise from the medial part of the inner socket ridges and are inclined dorsally, forming septalial plates. After separating from the inner socket ridges, the septalial plates seem to remain connected to the dorsal median septum (though this attachment is masked by secondary callus). The median septum is rather massive and long, it surpasses the distance of the crural processes. The crura are very thin, closely spaced. The crural processes are crescentic in cross section and bear laterally oriented, narrow blades at their dorsal ends. They seem to be fused before releasing the descending branches of the loop. The loop is diploform and distally spinose; it attains 0.75 of the length of the dorsal valve (Pl. XXIX: 1b). The descending branches are very narrow and only slightly divergent. The ascending branches are very high and divergent ventrally; their posterior part forms a hood-like transverse band (Fig. 118).

Remarks:

This nice and characteristic species was rarely recorded so far. The search for type specimens of HAAS (l. c.), originally deposited in the collection of the Geologische Bundesanstalt, Wien, was not successful. Nevertheless, the figures published by HAAS (1912, l. c.) portray so perfectly the basic features of *A.* ? *ballinensis*, that the identification of the Bakony specimens may be taken as correct.

The species *A. anatolica* (VADÁSZ, 1913) described from Turkey by VADÁSZ (1913, p. 69, fig. 6) and AGER (1959, p. 1025, pl. 129, fig. 1) stands near to *A.* ? *ballinensis* but it is more elongated and its sulcus is significantly deeper.

The distinct, long dorsal sulcus of this species speaks in favour of its attribution to the genus *Aulacothyris*. On the other hand, the rather expanded triangular outline of *ballinensis* does not fit into the range of the European Lower Jurassic species of *Aulacothyris*, as reviewed by DELANCE (1974). Moreover, the deep septalium of our species is also unusual in *Aulacothyris*. Therefore the generic position of *A.* ? *ballinensis* is still doubtful.

In my previous papers (VÖRÖS 1983b, l. c., 1997, l. c.) a specimen of *A.* ? *ballinensis* with less obvious dorsal sulcus was listed as *Bakonyithyris* ? n. sp., aff. *ovimontana* (BÖSE, 1898).

Distribution:

Pliensbachian of the Southern Alps (Italy), and the Bakony (Hungary). The Pliensbachian specimens of the Bakony came from two localities, from the Margaritatus Zone (Tables 13, 14).

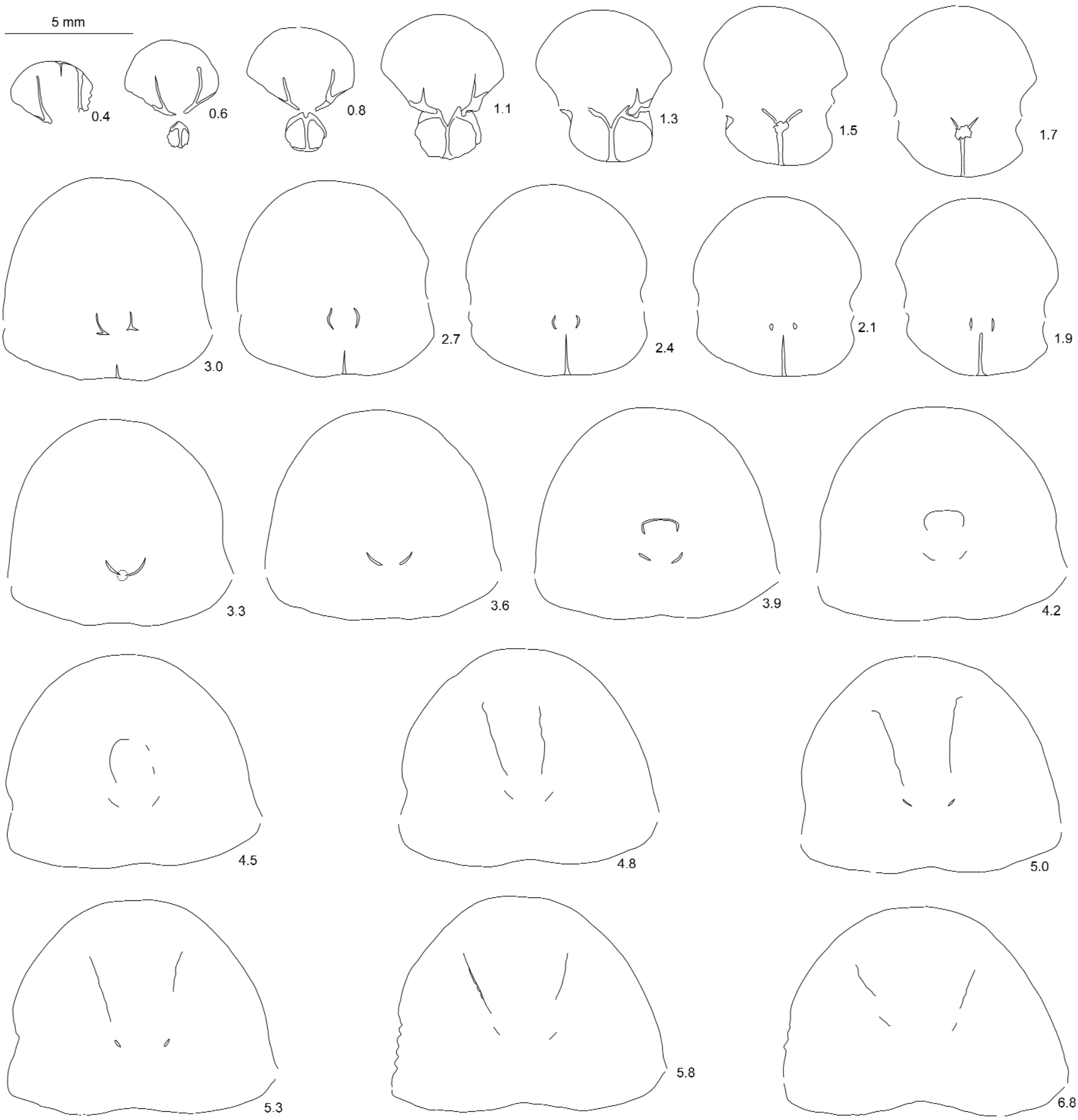


Figure 117. *Aulacothyris* ? *ballinensis* (HAAS, 1912). Twenty-two transverse serial sections through the posterior part of a specimen from Lókút, Fenyveskút, p1, Pliensbachian, Margaritatus Zone. M 2008.536.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 11.6 mm

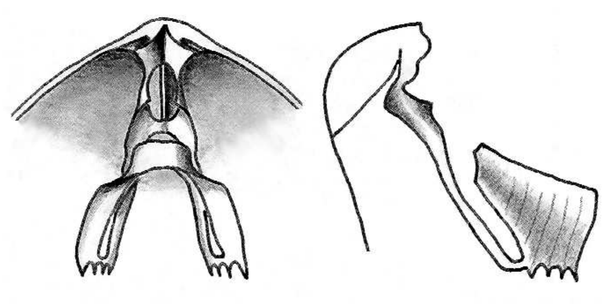


Figure 118. *Aulacothyris* ? *ballinensis* (HAAS, 1912). Ventral and lateral views of the dorsal valve interior. Reconstruction based on serial sections of a specimen from Lókút, Fenyveskút, p1, Pliensbachian, Margaritatus Zone. M 2008.536.1. Scale bar = 5 mm

Genus *Bakonyithyris* Vörös, 1983

The right spelling of the name of this genus is *Bakonyithyris*, as I introduced it (Vörös 1983a) and as was applied in the "revised Treatise" (Lee et al. 2006), since it was named after the Bakony Mountains (Hungary). Therefore, the deliberate emendation ("*Bakonithyris*") appearing in the works by Alméras et al. (2007) and Fauré et al. (2007) is regarded as unjustified.

Bakonyithyris pedemontana (Parona, 1893)
Plate XXIX: 11–14; Figures 119, 120.

v 1874 *Waldheimia Ewaldi,* Oppel. – Gemmellaro, Zona con Terebratula Aspasia, p. 69, pl. XI, figs. 7, 8.
1880 *Waldheimia* cfr. *Ewaldi* Opp.– Parona, Gozzano, p. 200, pl. II, fig. 3.
v 1891 *Waldheimia Ewaldi* Opp. – Di Stefano, M. San Giuliano, p. 259.
* 1893 *Waldheimia pedemontana,* n. f. – Parona, Revisione Gozzano, p. 49, pl. II, fig. 26.
1900 *Waldheimia ampezzana* n. sp. – Böse & Schlosser, Südtirol, p. 189, pl. XVII, figs. 21, 24.
? 1936 *Waldheimia ampezzana* Böse – Ramaccioni, Monte Cucco, p. 183, pl. VII, fig. 17.
v 1961 *W.* cf. *pedemontana* Par. – Vigh, Esquisse géol. Gerecse, p. 577.
v 1976 *"Waldheimia" ampezzana* Schlosser – Vigh in Fülöp, Liassic Brach. Tata, p. 34.
v 1983 *Bakonyithyris pedemontana* (Parona) – Vörös, Some new genera, p. 19, figs. 17, 18, 20.
v 1983 *Bakonyithyris pedemontana* (Parona, 1893) – Vörös, Stratigraphic distribution, p. 35.
v 1997 *Bakonyithyris pedemontana* (Parona) – Vörös, Jurassic brachiopods of Hungary, p. 17, Appendix: fig. 26.
v 2007 *Bakonyithyris pedemontana* (Parona, 1893) – Vörös & Dulai, Transdanubian Range, pp. 55, 56.

Material: 100 double valves of various state of preservation.

Localities	*Measurements (mm)*				*Localities*	*Measurements (mm)*			
	L	*W*	*T*	*Ch*		*L*	*W*	*T*	*Ch*
Kericser 7	7.84	8.22	6.24	4.16		8.04	8.67	4.72	3.63
	9.43	10.03	6.90	3.83		8.34	9.32	5.40	3.13
Kericser 8	8.53	9.62	6.11	3.63		9.21	9.57	6.34	4.31
Kericser 9	8.33	9.76	6.01	3.73		9.19	10.04	6.16	4.48
Kericser 11	8.58	8.73	6.31	4.37		9.28	8.93	6.50	4.38
	8.74	10.14	5.75	4.27		9.15	10.44	6.18	4.68
	9.01	10.14	7.13	4.49		11.14	11.32	8.32	4.86
Kericser 12	8.40	8.76	5.85	3.62	Kericser 26	8.05	8.58	4.97	4.05
	8.57	9.10	5.51	3.10		8.85	9.26	5.97	3.43
	8.41	9.20	5.94	3.29		9.20	9.20	6.75	4.73
	8.93	9.81	6.26	4.36		9.19	10.28	6.65	5.73
Kericser 13	9.40	10.27	6.54	3.50		10.68	11.76	7.77	4.65
	9.68	10.30	7.64	4.55	Kericser 27	8.33	9.14	5.69	3.36
	8.58	10.58	6.73	3.64		9.13	9.81	7.04	3.93
	8.75	9.21	6.56	4.66	Kericser 33	8.86	9.69	6.50	4.50
	9.40	10.00	6.64	4.14	Kericser I/f	9.09	9.53	5.71	4.90
	10.00	11.61	7.74	4.66		10.57	9.99	7.57	4.51
Kericser 14	10.05	11.84	7.79	4.58	Kericser (scree)	9.10	9.21	6.12	5.23
Kericser 15	9.32	10.22	6.00	3.36		10.03	9.55	6.98	4.51
Kericser 16	8.78	9.48	6.54	4.62		9.32	9.89	6.30	4.76
	10.18	11.35	8.91	7.14	Fenyveskút p1	9.74	8.94	7.07	3.70
Kericser 19	7.56	7.90	5.23	4.04		10.06	10.33	6.70	3.26
	8.71	10.46	6.59	3.96		10.11	10.53	6.33	3.94
	9.48	10.73	6.31	4.25		9.93	10.26	7.42	4.83
Kericser 20	9.21	10.01	6.43	5.11		11.74	12.55	7.19	4.42
Kericser 22	9.02	10.91	6.56	4.79	Fenyveskút p2	10.03	10.92	6.50	3.37
Kericser 24	8.99	10.01	6.03	4.02	Fenyveskút (scree)	7.37	8.21	4.55	2.41
	9.09	9.97	6.49	4.30		10.81	10.56	7.54	4.01
	9.40	9.87	5.83	4.15	Mohoskő 85	8.66	10.09	6.12	3.57
Kericser 25	7.43	8.41	4.69	3.42	Kőris-hegy A/1	9.56	10.72	6.92	6.06
	7.54	8.25	4.54	2.46	Kávástető A/4	10.97	10.32	8.32	5.35

Description:

External characters: This is a small *Bakonyithyris* with subpentagonal to rounded subtriangular and somewhat bilobate outline. The apical angle varies between 85–110°. The maximum width is attained at about the middle of the length. The valves are nearly equally convex; the dorsal valve is somewhat more inflated posteriorly. The maximum convexity can be measured at around mid-length or a little more posteriorly. The beak is small, pointed, slightly incurved. The foramen is very small, mesothyrid. The delthyrium is usually concealed by matrix but seems to be very low. The beak ridges are rather sharp and well-marked along the beak, but gradually disappear at mid-length. Within the moderately defined planareas, the lateral commissures run on a sharp crest. The dorsal umbo is very prominent. In lateral view, the gently sinuous lateral commissures run obliquely and are dorsally arched. They join with a continuous curve to the unisulcate anterior commissure. The sinus is uniformly arched, very deep and rather wide; usually it occupies more than two-third of the width of the shell. The shallow and wide dorsal sulcus and ventral fold start to develop only in the anterior half of the valves. The surface of the shells is smooth.

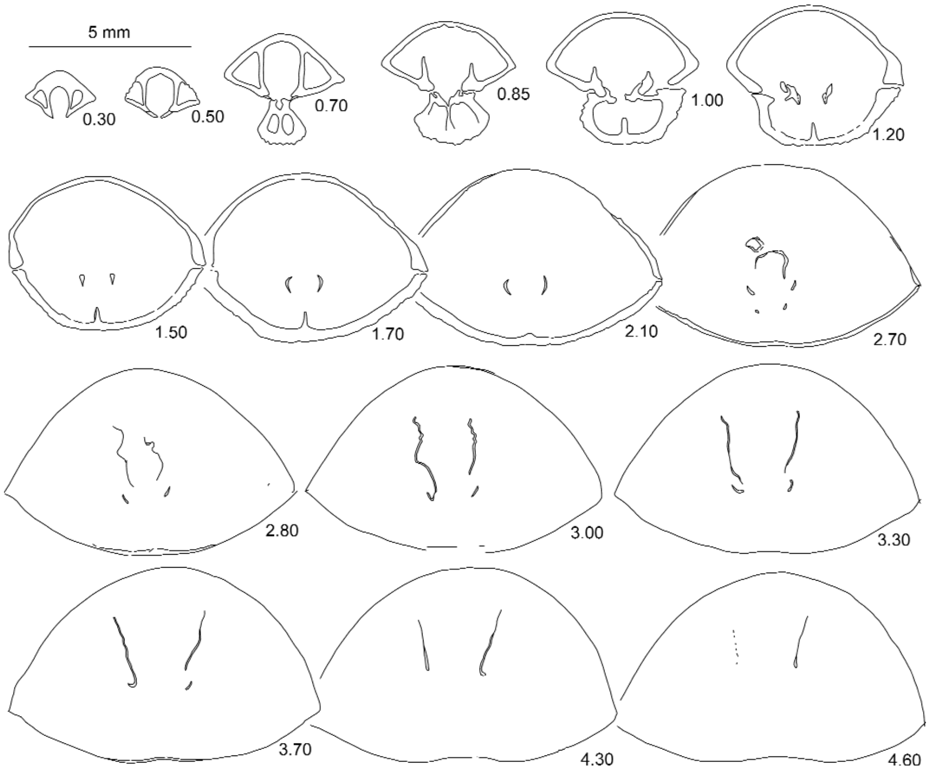


Figure 119. *Bakonyithyris pedemontana* (PARONA, 1893). Sixteen transverse serial sections through the posterior part of a specimen from Tés / Isztimér, Hamuháza, Bed 16, Pliensbachian, Ibex Zone. J. 9194. Distance from posterior end of shell is given in mm. Original length of the specimen is 7.9 mm

Internal characters (Figs. 119, 120): *Ventral valve*: The delthyrial cavity is subquadrate to hexagonal in cross-section, with posterior callus (Fig. 119), or a slight trace of a myophragm (Fig. 120) on the ventral floor. The umbonal cavities are rather sharply triangular. Pedicle collar was not recorded. The deltidial plates are thin, disjunct. The dental plates are strong and subparallel. The hinge teeth are moderately strong; vertically oriented; denticula are poorly seen. *Dorsal valve*: The notothyrial cavity is narrow, lanceolate in cross section. It passes into a moderately deep, V-shaped septalium, formed by the hinge plates attached to the dorsal median septum. The median septum is rather long, it reaches the distance of the crural processes. The outer socket ridges are very wide and massive. The inner socket ridges are moderately thick, they lean only a little over the sockets. The hinge plates rise from the dorsomedial part of the inner socket ridges and are slightly inclined dorsally. The crural bases emerge from the medial thickenings of the hinge plates, close to, but independent from, the median septum. The crura are vertical, subparallel. The crural processes are low and slightly crescentic in cross section. The loop is diploform; it attains 0.6 of the length of the dorsal valve. The descending branches are thin and only a little divergent. The ascending branches are very high, ventrally divergent and irregularly ruffled; their posterior transverse band is hood-like. Spines were recorded at the distal termination of the loop. A reconstructed view of the dorsal valve interior was shown in VÖRÖS (1983, fig. 20).

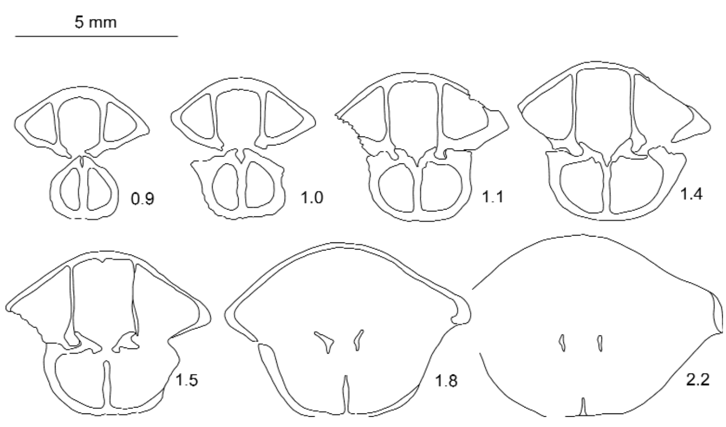


Figure 120. *Bakonyithyris pedemontana* (PARONA, 1893). Seven transverse serial sections through the posterior part of a specimen from Lókút, Fenyveskút, p2, Pliensbachian, Margaritatus Zone. J. 9195. Distance from posterior end of shell is given in mm. Original length of the specimen is 10.1 mm

Remarks:

This is the type species of the genus *Bakonyithyris* Vörös, 1983. It was wrongly identified with *B. ewaldi* (Oppel, 1861) by some early authors, including Parona (1880, l. c.). The records by Gemmellaro (1874, l. c.) and Di Stefano (1891) were checked in the collection of the Palermo University. In his revision of the Gozzano fauna, Parona (1893, l. c.) introduced the new speies name *pedemontana* for the specimen he previously described as *ewaldi*. As it is clear from the figures by Oppel (1861, pl. XI, fig. 1) and Geyer (1889, pl. IV, figs. 3–7), *B. ewaldi* is a distinct species deviating from *pedemontana* by its significantly shallower sinus and rather more elongated shape.

As I previously suggested (Vörös 1983a, p. 22) and as it was later accepted (Alméras et al. 2007, p. 133), the species "*Waldheimia ampezzana*" described by Schlosser in Böse & Schlosser (1900) can be regarded as a junior synonym of *B. pedemontana*. In fact, they share all important morphological features.

The figures given by Ramaccioni (l. c.) are not informative enough to decide if the respective specimens, named as "*Waldheimia ampezzana* Böse" belong to *B. pedemontana*. The records by Vigh (1961, l. c., inventory number J. 232) and Vigh in Fülöp (1976, l. c.) have been confirmed in the collection of the Geological Institute of Hungary.

From among other species of *Bakonyithyris*, standing rather close to our species, *B. apenninica* (Zittel, 1869) is not as stout as *pedemontana* and bears a shallower sinus, whereas *B. ovimontana* differs in having much broader sinus and an incipient sulcus on the posterior part of its dorsal valve.

Distribution:

Pliensbachian of Sicily, the Central Apennines and the Southern Alps (Italy) and the Gerecse and Bakony (Hungary). The Pliensbachian specimens of the Bakony came from ten localities, from the Ibex to the Margaritatus Zones (Tables 13, 14).

Bakonyithyris apenninica (Zittel, 1869)
Plate XXIX: 5–8; Figures 121–124.

* 1869 *Terebratula (Waldheimia) Apenninica.* Zitt. – Zittel, Central-Appenninen, p. 127, pl. XIV, fig. 9.
v 1889 *Waldheimia Apenninica* v. Zittel. – Geyer, Hierlatz, p. 33, pl. IV, figs. 8-12.
1893 *Waldheimia apenninica,* Zitt. – Parona, Revisione Gozzano, p. 49, pl. II, fig. 27.
v non 1898 *Waldheimia apeninica* Zittel. – Böse, Brachiopodenfauna der östlichen Nordalpen, p. 177, pl. XII, fig. 37.
v non 1924 *Waldheimia apenninica* Zittel. – Maugeri Patané, S. Teresa in Riva, p. 33, pl. I, fig. 10.
1967 *Zeilleria apenninica* (Zitt.) – Sacchi Vialli & Cantaluppi, Nuovi fossili di Gozzano, p. 103, text-fig. 26, pl. XV, fig. 6.
v 1983 *Bakonyithyris apenninica* (Zittel, 1869) – Vörös, Stratigraphic distribution, p. 35.
2003 *Bakonyithyris apenninica* (Zittel, 1869) – Siblík, Adnet, p. 76, text-fig. 2, text-fig. 3, 3a-c.
2007 *Bakonithyris* cf. *apenninica* (Zittel, 1869) – Alméras et al., Algerie Occidentale, p. 133, pl. 10, figs. 22, 23.
? 2007 *Bakonithyris apenninica* (Zittel, 1869) – Fauré et al., Jebel Zaghouan, p. 482, fig. 4D.
v 2007 *Bakonyithyris apenninica* (Zittel, 1869) – Vörös & Dulai, Transdanubian Range, pp. 55, 56, pl. II, fig. 37.

Material: 109 double valves of various state of preservation.

Localities	*Measurements (mm)*				*Localities*	*Measurements (mm)*			
	L	*W*	*T*	*Ch*		*L*	*W*	*T*	*Ch*
Kericser 7	12.34	12.26	7.08	3.63	Kericser 16	10.57	10.48	5.58	2.27
Kericser 8	8.02	7.78	4.32	1.71		10.99	10.46	6.14	3.89
	8.27	9.06	5.95	3.24		9.36	10.12	5.63	2.79
	11.32	10.94	6.50	3.74		11.39	11.75	7.21	4.07
	11.58	12.21	6.81	4.31		11.22	11.80	6.91	5.18
	12.07	12.94	6.91	3.57		11.45	11.44	6.93	4.00
Kericser 10	10.72	10.88	6.44	3.15		11.94	12.12	7.26	4.33
Kericser 11	10.61	11.10	6.80	3.28		14.65	15.54	7.83	2.18
	11.83	12.40	6.96	4.73	Kericser 17	9.93	9.51	5.54	2.29
Kericser 13	10.97	11.65	7.01	3.99		10.34	10.71	6.29	4.12
	11.64	12.25	7.35	3.90		10.26	10.27	6.50	4.39
Kericser 14	8.99	9.60	5.41	2.52	Kericser 18	10.88	10.88	6.44	3.92
	9.37	10.39	5.57	2.35	Kericser 19	11.32	11.35	6.83	3.64
	10.06	10.26	5.88	2.85		11.60	11.49	6.98	4.42
Kericser 15	11.62	10.81	7.35	3.28		12.15	13.19	7.74	4.54
	10.09	10.62	6.34	3.45		11.60	13.66	7.99	6.44
	12.72	13.77	7.98	5.61	Kericser 20	11.66	10.68	6.45	4.08

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
	12.39	11.58	7.80	4.85
Kericser 22	10.70	10.60	6.06	3.10
	12.79	12.23	7.73	2.96
	12.17	12.34	7.38	3.44
Kericser 23	12.27	11.71	7.18	3.06
Kericser 24	11.61	11.03	6.66	3.02
Kericser 25	10.51	10.58	5.47	1.92
	12.00	11.85	6.83	2.83
	13.11	13.22	7.66	3.48
	13.08	13.35	8.52	5.09
	14.14	14.15	8.45	4.89
	15.19	15.34	9.80	5.10
Kericser 26	10.90	10.61	6.51	2.10
Kericser 34	13.13	13.30	7.77	4.58
Kericser II/a	10.01	9.54	5.83	1.48
	10.87	10.85	5.82	1.82
	12.43	12.07	7.83	3.14
Kericser II/k	10.20	9.93	6.23	3.72

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
	9.79	10.98	5.98	2.84
	11.26	10.69	6.54	3.30
	10.81	11.84	6.46	3.17
	11.04	10.96	6.80	4.55
	10.74	11.53	6.53	4.64
	11.04	11.63	5.92	2.48
	11.55	11.55	6.97	4.26
	12.41	11.98	6.90	3.96
	12.51	11.91	7.85	5.07
Kericser (scree)	11.03	10.66	6.39	3.22
	13.18	12.83	8.14	4.00
Fenyveskút 5/c	11.50	11.92	6.46	3.16
Fenyveskút (scree)	12.29	13.00	7.15	2.78
	13.18	12.79	6.95	2.62
Mohoskő 85	11.40	12.05	6.70	2.15
Közöskút 21	11.49	11.41	6.30	3.04
Szentgál T-II/22	13.22	12.04	6.92	4.32

Description:

External characters: This is a medium-sized *Bakonyithyris* with rounded subpentagonal outline. The apical angle varies between 100–115°. The maximum width is attained at around the middle of the length. The valves are nearly equally convex; the dorsal valve is a little more inflated posteriorly. The maximum convexity can be measured somewhat posteriorly from mid-length. The beak is rather small, erect. The foramen is usually incomplete but seems to be mesothyrid. The delthyrium is wide and low triangular. The beak ridges are moderately sharp along the beak, and gradually disappear at mid-length. There are poorly defined, narrow planareas, where the lateral commissures run on a low crest. The dorsal umbo is moderately prominent. In lateral view, the lateral commissures are nearly straight and run obliquely in dorsal direction. They join with a continuous curve to the unisulcate anterior commissure. The anterior sinus is uniformly arched, moderately deep and wide; usually it occupies a little less than two-third of the width of the shell. Asymmetric growth of the anterior region occurs (Pl. XXIX: 8). The shallow dorsal sulcus and ventral fold develop only in the anterior half of the valves. The surface of the shells is smooth, except some fine growth lines.

Internal characters (Figs. 121, 122): *Ventral valve*: The delthyrial cavity is subquadrate to hexagonal in cross-section, with a slight trace of a myophragm on the ventral floor. The

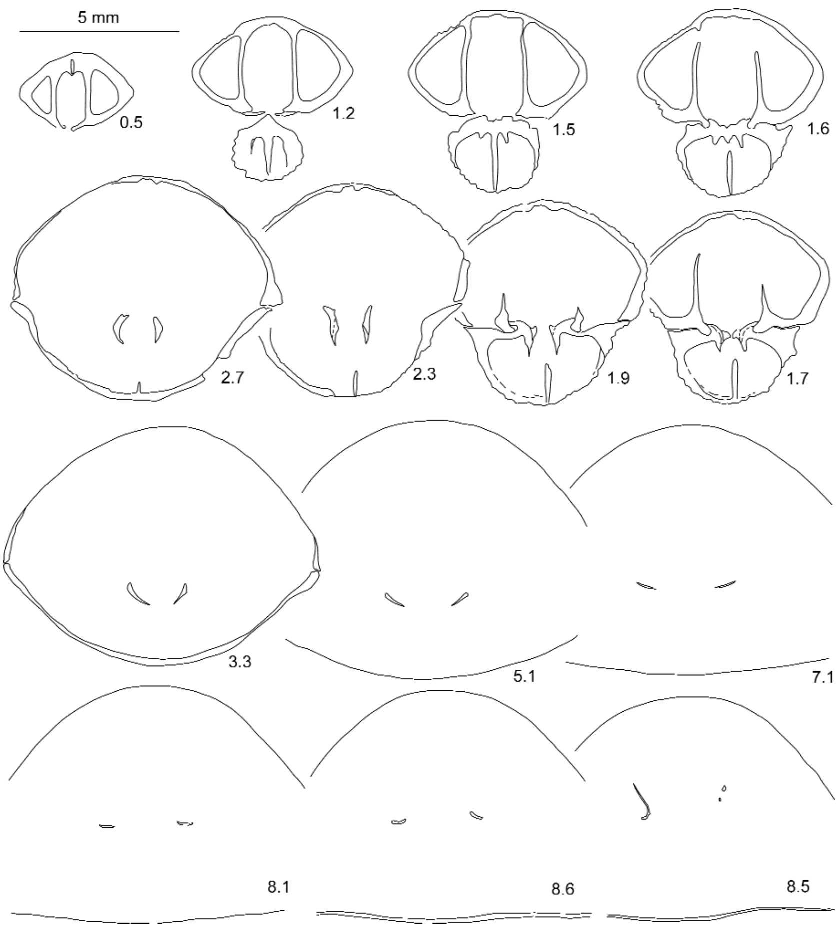


Figure 121. *Bakonyithyris apenninica* (Zittel, 1869). Fourteen transverse serial sections through the posterior part of a specimen from Lókút, Fenyveskút, É, Pliensbachian, Margaritatus Zone. M 2008.537.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 13.3 mm

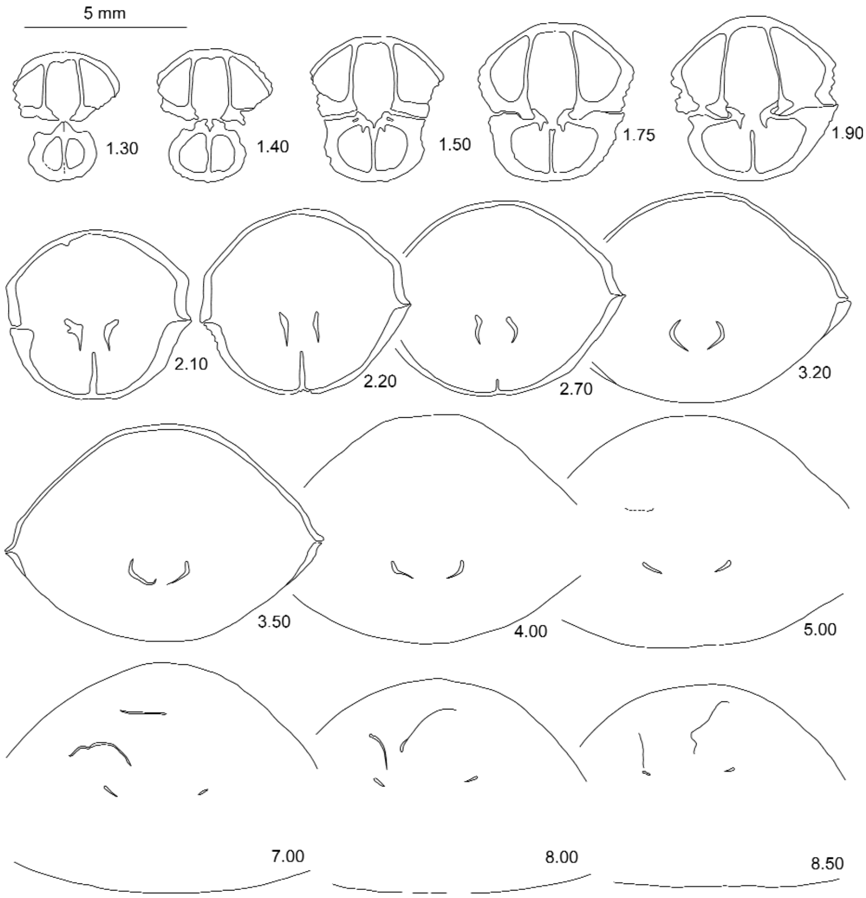


Figure 122. *Bakonyithyris apenninica* (Zittel, 1869). Fifteen transverse serial sections through the posterior part of a specimen from Lókút, Kericser VI, Bed 8, Pliensbachian, Margaritatus Zone. M 2008.538.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 11.3 mm

umbonal cavities are rounded triangular. Pedicle collar was not recorded. The deltidial plates are dorsally convex, thin, disjunct. The dental plates are strong, subparallel to slightly convergent ventrally. The hinge teeth are rather strong, inwardly oriented; denticula are poorly preserved. *Dorsal valve*: There is a narrow spear-shaped notothyrial cavity which passes into a moderately deep, V-shaped septalium formed by the inner hinge plates attached to the dorsal median septum. The median septum is moderately long, it does not surpass the distance of the crural processes. The outer socket ridges are very wide and massive. The inner socket ridges are rather thin and lean moderately over the sockets. The outer hinge plates are very narrow, they rise from the dorsal part of the inner socket ridges. The crural bases are given off dorsally and are independent from the median septum. The crura are vertical, subparallel. The cardinalia, from the septalium to the crura, is largely masked by secondary callus. The crural processes are crescentic in cross section; their dorsal ends come very close before releasing the descending branches of the loop. The loop is incompletely known but seems to be diploform. The descending branches are very narrow and moderately divergent. Their attachment to the ascending branches shows traces of spinosity. The remnants of the ascending branches (Fig. 122) seem to be wide and partly ruffled.

Remarks:

This is the earliest described species of *Bakonyithyris* and it was recorded frequently, from many localities of the Alpine–Mediterranean region. *B. apenninica* is an average form representing the main common characters of its genus. Therefore there are some other species of *Bakonyithyris*, standing rather close to *B. apenninica*. From those, *B. ovimontana* (Böse, 1898) differs in having much broader sinus and an incipient sulcus on the posterior part of its dorsal valve; whereas in *B. meneghinii* (Parona, 1880) the sinus is wider and angular (trapezoidal).

The morphological difference between *B. apenninica* and *B. pedemontana* (Parona, 1893) was analysed by evaluation of the principal measurements of a great number of specimens of the two species. The scatter diagram of the ratios of the length and the thickness (Fig. 123) shows that *B. pedemontana* is significant-

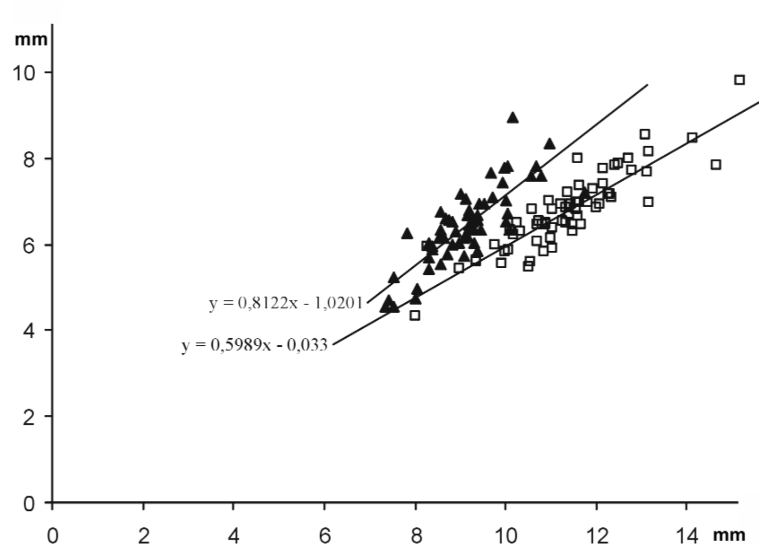


Figure 123. Scatter diagram showing the ratios of the length (horizontal axis) and the thickness (vertical axis) of 65 measured specimens of *Bakonyithyris apenninica* (open squares) and 58 specimens of *Bakonyithyris pedemontana* (solid triangles) from the Pliensbachian of the Bakony

ly more stout than *B. apenninica* and its rate of longitudinal growth is definitely lower. The other diagram (Fig. 124) shows that the depth of the sinus, as related to the length, is significantly greater in *B. pedemontana* than in *B. apenninica*, though the scatters somewhat overlap.

Some items of the synonym list need annotations.

In the Bayerische Staatssammlung, München, I examined the specimens figured by BÖSE (l. c.) and in my opinion they do not belong to *B. apenninica*, but stand nearer to *B. ovimontana* on the basis of their shallower and wider sinus.

MAUGERI PATANÉ's (l. c.) specimen were checked in the collection of the Catania University. It is a juvenile individual and across the transparent shell, it shows double plates (brachidium support ?) instead of median septum in the dorsal valve, therefore it must not be a zeilleriid.

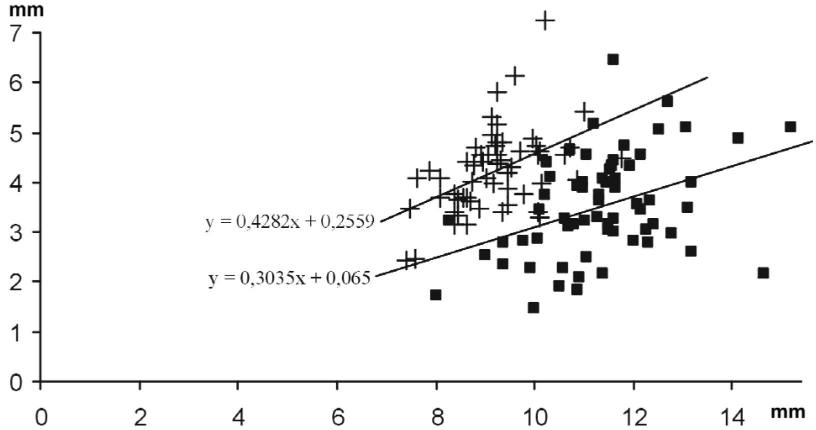


Figure 124. Scatter diagram showing the ratios of the length (horizontal axis) and the depth of the sinus (vertical axis) of 65 measured specimens of *Bakonyithyris apenninica* (solid squares) and 58 specimens of *Bakonyithyris pedemontana* (crosses) from the Pliensbachian of the Bakony

SACCHI VIALLI & CANTALUPPI (l. c.) figured a good specimen of *B. apenninica* and gave a proper illustration of the loop. At the same time, in their synonymy, although with query, they listed the items of "*Terebratula rheumatica* var. *depressa*" CANAVARI, 1883. This latter is, however, a short-looped terebratulid belonging perhaps to *Phymatothyris*, or *Eplenyithyris* and this casts some doubt on the interpretation of *B. apenninica* by SACCHI VIALLI & CANTALUPPI.

The specimen figured by FAURÉ et al. (l. c.) from Tunisia seems to be too much convex with only feeble sinus, therefore their attribution to *B. apenninica* is doubtful.

Distribution:

Sinemurian and Pliensbachian of the Central Apennines and the Southern Alps (Italy), the Northern Calcareous Alps (Austria), the Gerecse and Bakony Mts (Hungary) and the Atlas Mountains (Algeria, Tunisia). The Pliensbachian specimens of the Bakony came from six localities, from the Ibex to the Margaritatus Zones (Tables 13, 14).

Bakonyithyris avicula (UHLIG, 1880)
Plate XXIX: 9, 10; Figure 125.

v * 1880 *Waldheimia avicula* n. f. – UHLIG, Sospirolo, p. 25, pl. II, figs. 7, 8.
v 1907 *Waldheimia avicula,* Uhl. – DAL PIAZ, Tranze di Sospirolo, p. 51, pl. III, fig. 4.
v 1911 *Waldheimia Dalpiazi,* n. f. – DE TONI, Vedana (Belluno), p. 25, pl. I, fig. 9.
v 1911 *Waldheimia plavensis,* n. f. – DE TONI, Vedana (Belluno), p. 26, pl. I, fig. 10.
v 1983 *Bakonyithyris avicula* (Uhlig, 1880) – VÖRÖS, Stratigraphic distribution, p. 35.
v 2007 *Bakonyithyris avicula* (Uhlig, 1879) – VÖRÖS & DULAI, Transdanubian Range, p. 56.

Material: 19 double valves of various state of preservation.

Localities		*Measurements (mm)*			*Localities*		*Measurements (mm)*		
	L	*W*	*T*	*Ch*		*L*	*W*	*T*	*Ch*
Kericser 12	13.24	12.23	7.70	1.55	Kericser 22	11.15	9.78	6.10	2.02
Kericser 14	13.30	12.16	7.37	2.80	Kericser 23	13.46	13.05	8.64	2.54
Kericser 17	14.34	12.25	8.65	2.58	Kericser 25	14.92	13.26	8.67	2.22
Kericser 19	14.68	13.43	8.30	3.30	Kericser 28	14.27	13.23	8.63	3.53
Kericser 20	13.22	12.28	7.61	3.28	Kericser I/f	15.38	13.61	8.59	2.98
	13.24	12.63	7.98	2.58	Kericser II/k	14.19	12.58	7.80	2.89
	16.35	15.58	9.21	2.22	Kisnyerges 6	11.75	10.20	6.57	2.61
Kericser 21	13.86	12.60	8.34	2.73	Kisnyerges (scree)	16.04	14.26	9.02	4.17

Description:

External characters: This is a large *Bakonyithyris* with subpentagonal to oval outline. The apical angle varies between 90–95°. The maximum width is attained at about the middle of the length. The valves are moderately and nearly equally convex; the dorsal valve is a little more inflated posteriorly. The maximum convexity lies between the middle and the posterior third of the length. The beak is very high, erect to slightly incurved. The beak ridges are moderately sharp. The foramen is usually incomplete but seems to be mesothyrid. The delthyrium is usually covered by matrix but seems to be rather wide triangular. The lateral commissures run on a low crest. The dorsal umbo is rather prominent. In lateral view, the lateral commissures are gently sinuous. They are a little dorsally arched and pass gradually to the unisulcate anterior commissure. The anterior sinus is very wide, shallow and trapezoidal. Dorsal sulcus and ventral fold are not at all developed, instead, the anteromedial portion of the dorsal valve is somewhat convex. This is a peculiar contrasting phenomenon, considering the well-developed anterior sinus.

Internal characters (Fig. 125): *Ventral valve*: The delthyrial cavity is trapezoidal to quadratic in cross-section, with trace of a myophragm on the ventral floor. The umbonal cavities are rounded triangular. Pedicle collar was not recorded. The disjunct deltidial plates are rather massive and convex dorsally. The dental plates are subparallel; posteriorly they are slightly divergent ventrally, then become subparallel. The hinge teeth are massive, inwardly oriented; denticula are partly pre-

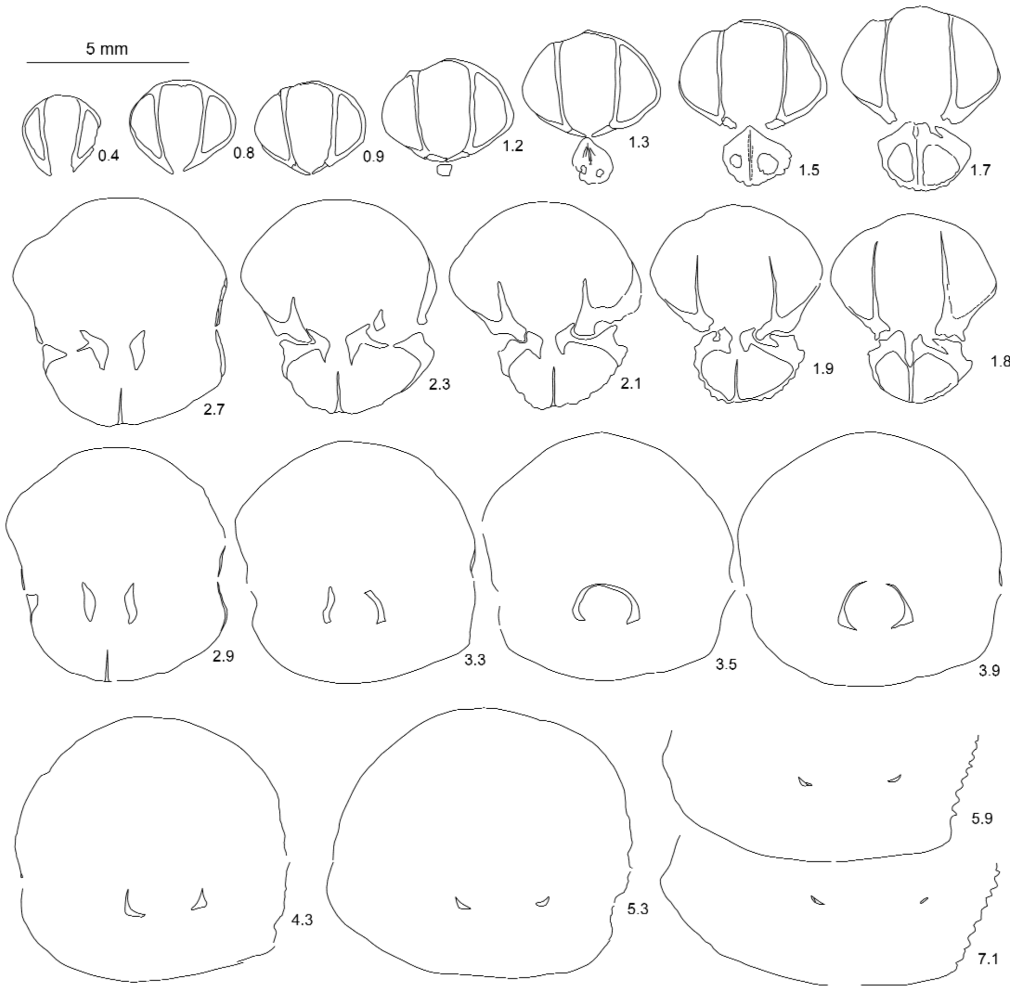


Figure 125. *Bakonyithyris avicula* (Uhlig, 1880). Twenty transverse serial sections through the posterior part of a specimen from Lókút / Gyulafirátót, Kávás-hegy I, Bed 85, Sinemurian, Raricostatum Zone. M 2008.539.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 14.0 mm

served. *Dorsal valve*: The notothyrial cavity is very narrow and deep, lanceolate in cross section. It passes into a very deep septalium of similar shape, formed by very thin inner hinge plates attached to the dorsal median septum. The median septum is rather weak and short, it does not reach the distance of the crural processes. The outer socket ridges are rather wide and massive. The inner socket ridges are thin and lean only a little over the sockets. The outer hinge plates are rudimentary, they attach to the dorsal part of the inner socket ridges. The crural bases are given off dorsally independently from the median septum and are very closely spaced. The crura are vertical, subparallel. The crural processes are crescentic in cross section; their ventral ends form a transverse band. The cardinalia, from the inner socket ridges to the crural processes, is largely masked by secondary callus. The descending branches of the loop are very narrow and rapidly divergent. The distal part of the loop, together with the ascending branch, is missing.

Remarks:

This is a rare species known only from the Belluno area and the Bakony. In the collection of the Padova University I examined the types of *B. avicula* figured by Uhlig (l. c.) and Dal Piaz (l. c.) and by this way the identification of the Bakony specimens may be taken as approved. In the same collection I had the possibility to look at the specimens figured by De Toni (l. c.) as "*Waldheimia Dalpiazi*" and "*Waldheimia plavensis*", new species. They all show the anteromedial convexity of the dorsal valve, the characteristic of this species; in my opinion, both forms may well be fit into the range of variation of *B. avicula*. The beak of the single exemplar of *dalpiazi* is extremely inflated, but, when examining the specimen, I had the impression that this might even be a pathological phenomenon.

Distribution:

Sinemurian and Pliensbachian of the Southern Alps (Italy) and the Bakony (Hungary). The Pliensbachian specimens of the Bakony came from two localities, from the Ibex to the Davoei Zones (Tables 13, 14).

Bakonyithyris meneghinii (Parona, 1880)
Plate XXIX: 18; Figures 126, 127.

*	1880 *Terebratula Meneghinii* n. sp. – Parona, Gozzano, p. 194, pl. I, fig. 5.
v	1880 *Terebratula (W?) Meneghinii Parona,* ms. – Canavari, Strati a Terebratula Aspasia I, p. 346, pl. II, fig. 12.
?	1893 *Waldheim*[i]*a* f. ind. – Parona, Revisione Gozzano, p. 45, pl. II, fig. 21.
non	1893 *Waldheimia Meneghini,* Par. – Parona, Revisione Gozzano, p. 44, pl. II, fig. 20.
v non	1900 *Waldheimia Meneghinii* Parona – Böse & Schlosser, Südtirol, p. 188, pl. XVII, figs. 12, 20, 22, 23.
v	1911 *Waldheimia Meneghinii,* Par. – De Toni, Vedana (Belluno), p. 24, pl. I, fig. 8.
non	1912 *Waldheimia* (*Antiptychina* ?) cf. *Meneghinii* Parona. – Haas, Ballino, p. 272, pl. XX, fig. 13.
?	1936 *Waldheimia Meneghinii* Parona – Ramaccioni, Monte Cucco, p. 179, pl. VII, figs. 11, 12.
	1967 *Zeilleria* (?) *meneghinii* (Par.) – Sacchi Vialli & Cantaluppi, Nuovi fossili di Gozzano, p. 107, pl. XV, fig. 13.
v	1983 *Bakonyithyris meneghinii* (Parona, 1880) – Vörös, Stratigraphic distribution, p. 35.
v	2007 *Bakonyithyris meneghinii* (Parona, 1880) – Vörös & Dulai, Transdanubian Range, p. 56.

Material: 3, partly incomplete, double valves.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Fenyveskút (scree)	10.5	10.78	7.23	4.15

Description:

External characters: This is a small to medium-sized *Bakonyithyris* with rounded subpentagonal to subtriangular outline. The apical angle is about 90°. The maximum width is attained in the anterior third of the length. The valves are moderately and nearly equally convex. The maximum convexity can be measured somewhat posteriorly from mid-length. The beak is moderately high and pointed, erect. The foramen is usually incomplete but seems to be mesothyrid. The delthyrium is concealed by matrix. The beak ridges are rather ill-defined and disappear at mid-length. There are no true planareas. The lateral commissures run on a low crest. The dorsal umbo is rather prominent. In lateral view, the lateral commissures are dorsally arched and run obliquely in dorsal direction. They join with a continuous curve to the unisulcate anterior commissure. The anterior sinus is trapezoidal, rather deep and very wide; it occupies more than two-third of the width of the shell. The shallow dorsal sulcus and ventral fold develop only in the anterior half of the valves. The surface of the shells is smooth.

Internal characters (Figs. 126, 127): *Ventral valve*: The delthyrial cavity is high subquadratic in cross-section, with posterior callus and trace of myophragm on the ventral floor. The umbonal cavities are rounded triangular. Pedicle collar was not recorded. The dental plates are rather short and slightly arched laterally. The hinge teeth are rather narrow; denticula are developed. *Dorsal valve*: There is a moderately deep, V-shaped septalium formed by the inner hinge plates, attached to the dorsal median septum. The median septum is stout and partly lanceolate in cross section near the plane of articulation; it is moderately long and does not surpass the distance of the crural processes. The outer socket ridges are rather narrow. The inner socket ridges are poorly developed and lean only slightly over the sockets. The outer hinge plates are undifferentiated from the inner socket ridges. The crural bases are given off dorsally and are independent from the median septum. The crura are vertical, subparallel. The crural processes are crescentic in cross section. The loop is diploform; it attains 0.65 of the length of the dorsal valve. The descending branches are very thin and only slightly divergent. The ascending branches are rather wide and strongly divergent ventrally; at their posterior end there is a hood-like transverse band. Long spines were recorded at the distal termination of the loop (Fig. 127).

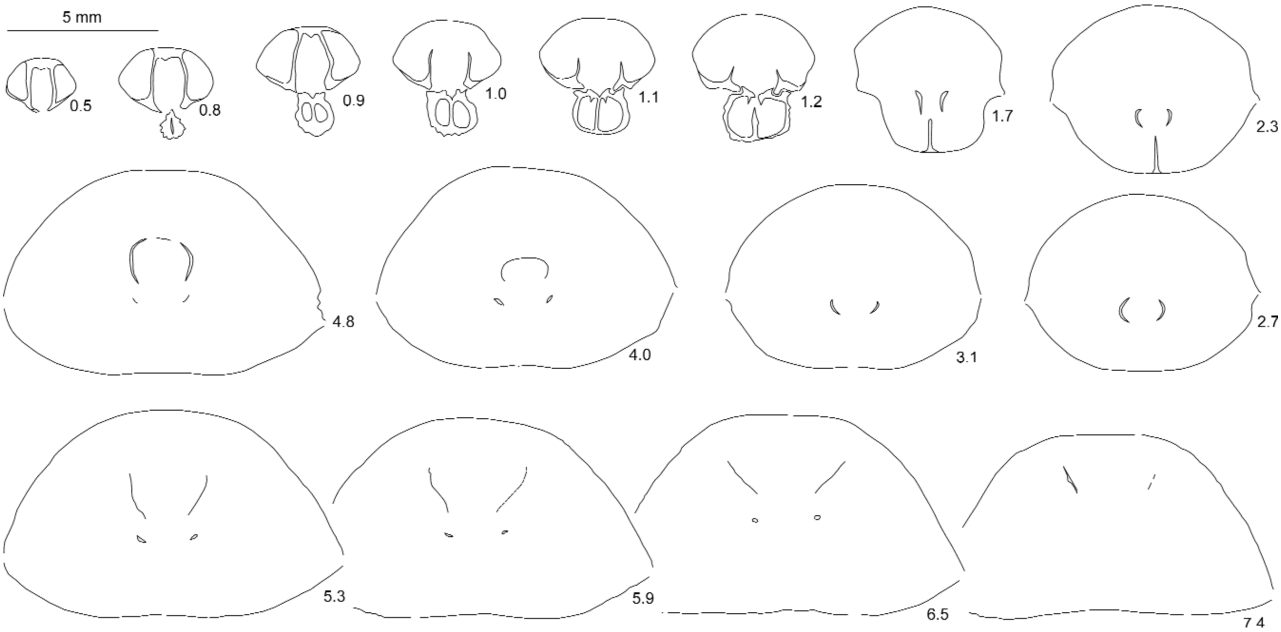


Figure 126. *Bakonyithyris meneghinii* (Parona, 1880). Sixteen transverse serial sections through the posterior part of a specimen from Lókút, Kericser VI, Bed 36, Pliensbachian, Ibex Zone. M 2008.540.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 11.2 mm

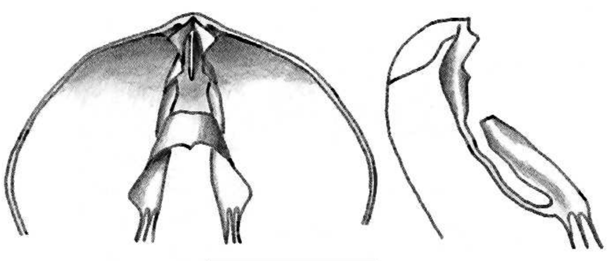


Figure 127. *Bakonyithyris meneghinii* (Parona, 1880). Ventral and lateral views of the dorsal valve interior. Reconstruction based on serial sections of a specimen from Lókút, Kericser VI, Bed 36, Pliensbachian, Ibex Zone. M 2008.540.1. Scale bar = 5 mm

Remarks:

This species was often confused with *Antiptychina rothpletzi* (Di Stefano, 1891) until Sacchi Vialli & Cantaluppi (1967, l. c.) cleared up the question. I agree with their opinion, i. e. that the two species share the trapezoidal sinus on the anterior commissure, but *B. meneghinii* is significantly more convex than *A. rothpletzi* and, I may add, the latter has a peculiar, somewhat resupinate shape. Following this concept, the records of *B. meneghinii* by Parona (1893, l. c.) and Böse & Schlosser (l. c.) should be transferred to *A. rothpletzi*. From his synonym list it is clear, that Ramaccioni (l. c.) considered *meneghini* and *rothpletzi* as conspecific and kept the first name as senior synonym, but the published figures are not informative enough to decide if they represent *meneghini* or *rothpletzi*. The specimen figured by Haas (l. c.) as *B. meneghinii* has rather oval outline and shallow, not trapezoidal sinus, therefore it may not belong to this species.

From other, morphologically somewhat similar, species of the genus *Bakonyithyris,* e. g. *B. pedemontana* (Parona, 1893), *B. apenninica* (Zittel, 1869), *B. ovimontana* (Böse, 1898), *B. meneghinii* differs markedly by its wide, trapezoidal anterior sinus.

Distribution:

Pliensbachian of the Central Apennines and the Southern Alps (Italy) and the Bakony (Hungary). The Pliensbachian specimens of the Bakony came from three localities, from the Ibex to the Margaritatus Zones (Tables 13, 14).

Bakonyithyris ovimontana (Böse, 1898)

Plate XXIX: 15–17; Figures 128–130.

v * 1898 *Waldheimia ovimontana* nov. sp. – Böse, Brachiopodenfauna der östlichen Nordalpen, p. 178, pl. XIII, figs. 11, 12.

v 1983 *Bakonyithyris ovimontana* (Böse, 1898) – Vörös, Stratigraphic distribution, p. 35.

v 2003 *Bakonyithyris ovimontana* (Böse, 1898) – Vörös et al., Schafberg, p. 80, pl. VIII, figs. 43–45.

v 2007 *Bakonyithyris ovimontana* (Böse, 1898) – Vörös & Dulai, Transdanubian Range, p. 56.

Material: 158 double valves of various state of preservation.

Localities	*Measurements (mm)*				*Localities*	*Measurements (mm)*			
	L	*W*	*T*	*Ch*		*L*	*W*	*T*	*Ch*
Kericser 8	9.29	9.78	6.44	2.23	Kericser 28	11.91	12.35	8.08	3.09
	10.89	10.41	7.52	3.28	Kericser 32	12.27	13.07	7.38	3.64
	11.43	11.41	7.08	3.86	Kericser 33	11.06	10.49	6.91	3.12
	11.01	11.07	7.75	2.79		11.44	11.76	7.93	3.12
Kericser 12	10.99	11.63	7.88	3.32		12.22	11.57	7.25	3.26
Kericser 13	9.31	8.87	6.43	3.51		11.97	11.89	8.02	2.99
	9.57	10.09	6.11	2.69		12.54	12.20	7.80	3.77
	9.92	10.26	6.93	2.18	Kericser I/f	10.06	10.50	6.49	2.58
	10.25	10.53	7.28	2.56		12.74	11.81	7.36	2.52
	10.02	11.63	7.22	3.18	Kericser II/k	10.83	10.82	6.94	3.12
	11.04	11.78	7.11	3.40		10.23	10.86	7.89	3.80
Kericser 14	9.98	10.48	6.17	2.53		10.50	10.26	6.90	2.18
	9.84	10.45	6.11	2.36		10.38	11.39	7.09	2.90
	11.25	11.93	8.09	2.66		11.30	11.59	7.04	2.90
	12.01	11.93	8.02	3.26		10.68	10.73	7.07	2.76
Kericser 15	9.28	8.57	5.91	1.89		11.92	10.90	7.68	3.53
	9.44	9.33	5.63	1.73	Fenyveskút 5/c	9.52	10.89	5.67	1.67
	10.27	9.99	6.72	2.16		9.91	10.06	6.71	2.59
	10.48	10.55	6.29	2.39		10.22	10.47	7.70	4.28
	9.56	10.47	6.39	1.72		11.44	10.62	8.29	4.60
	10.57	9.87	7.26	2.95		11.46	11.42	7.86	3.07
	11.32	11.67	7.68	2.60		11.02	11.48	7.34	2.78
	11.34	10.96	7.51	3.32		10.66	11.31	7.45	2.82
Kericser 16	10.00	10.66	6.66	2.93		11.65	11.26	7.76	3.93
	10.45	10.65	7.28	3.25		11.99	11.78	7.77	2.59
	9.69	11.03	6.22	3.29		11.07	12.51	7.75	2.48
	11.12	9.88	7.02	2.47		10.89	10.64	6.74	2.37
	10.50	10.96	7.41	3.75		10.63	11.51	7.31	2.63
	11.58	12.45	7.73	3.03		10.36	10.31	7.44	2.82
	11.18	12.00	7.42	3.47		10.98	11.11	8.24	2.40
	12.16	12.73	7.53	2.95		10.44	11.31	6.60	2.77
Kericser 18	10.50	9.86	6.57	2.85		11.21	11.73	7.79	2.89
Kericser 19	11.09	9.50	6.98	3.91		12.32	12.06	7.83	2.16
	11.01	10.80	7.36	3.28	Fenyveskút 5/b	11.30	10.95	7.87	3.42
	10.98	11.65	6.75	2.58	Fenyveskút (scree)	11.23	11.02	6.91	3.97
	9.97	10.40	6.97	2.96		11.34	10.57	7.20	3.89
	10.94	9.83	7.13	3.17		12.11	12.17	8.48	4.38
	10.72	10.01	7.01	2.50		11.48	11.27	8.75	2.51
	10.30	10.05	6.78	3.28		11.68	13.29	8.28	3.83
	10.64	10.61	6.73	2.82		13.66	14.6	8.19	3.53
	12.18	11.31	8.21	2.87		14.44	14.98	9.17	4.11
	11.45	12.59	8.02	3.36	Lókút 464	10.60	10.29	6.59	2.32
	12.07	11.99	8.84	4.07	Lókút 465	11.94	11.27	7.42	?
	12.07	12.91	8.42	3.47		11.10	10.26	6.82	2.09
	12.17	11.69	7.77	4.13	Eplény	11.42	12.1	7.39	3.28
Kericser 27	11.68	11.24	8.00	4.53		12.21	11.83	7.09	3.91

Description:

External characters: This is a medium-sized to large *Bakonyithyris* with rounded subtriangular to subpentagonal outline. The apical angle varies between 105–115°. The maximum width is attained in the anterior third of the length. The valves are moderately and nearly equally convex. The maximum convexity can be measured somewhat posteriorly from mid-length. The beak is rather low, erect to slightly incurved. The foramen is usually incomplete but seems to be mesothyrid. The delthyrium is moderately high triangular. The beak ridges are rather sharp along the beak, and gradually disappear at mid-length. There are poorly defined, narrow planareas, where the lateral commissures run on a markedly elevated crest.

The dorsal umbo is rather prominent. In lateral view, the lateral commissures are almost straight, somewhat dorsally arched and run obliquely in dorsal direction. They join with a continuous curve to the unisulcate anterior commissure. The anterior sinus is more or less uniformly arched, very wide and rather shallow. There is a slight, incipient sulcus posteriorly which changes into a wide, shallow sulcus very anteriorly. A corresponding, low and wide fold appears anteriorly in the ventral valve. The surface of the shells is smooth, except weak radial capillation on certain specimens (Pl. XXIX: 16).

Internal characters (Figs. 128, 129): *Ventral valve*: The delthyrial cavity is high subquadratic to trapezoidal in cross-section, with posterior callus and trace of myophragm on the ventral floor. The umbonal cavities have the shape of half-circles. Pedicle collar was not recorded. The thin deltidial plates are disjunct. The subparallel dental plates tend to be

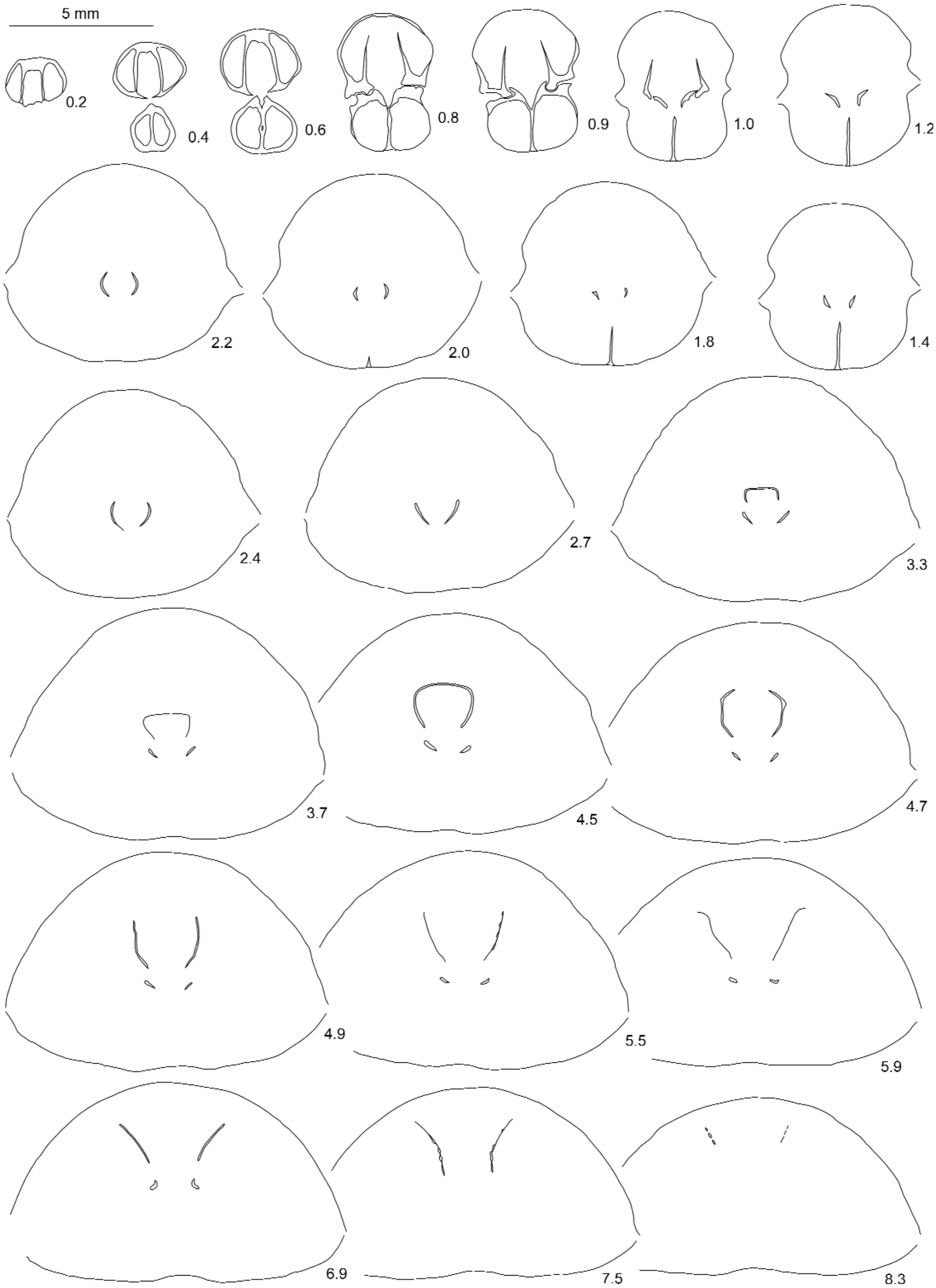


Figure 128. *Bakonyithyris ovimontana* (Böse, 1898). Twenty-three transverse serial sections through the posterior part of a specimen from Eplény, Pliensbachian, Margaritatus Zone. M 2008.541.1. Distance from posterior end of shell is given in mm. Original length of the specimen is 11.8 mm

convergent ventrally. The hinge teeth are massive; denticula are poorly preserved. *Dorsal valve*: The notothyrial cavity is very narrow and deep. It passes into a deep, V-shaped septalium, formed by thin inner hinge plates attached to the dorsal median septum. The median septum is massive and bears a thickening near the middle of its height; it is moderately long and does not surpass the distance of the crural processes. The outer socket ridges are rather massive and wide. The inner socket ridges are rather narrow and lean slightly over the sockets. The outer hinge plates grow from the dorsomedial part of the inner socket ridges. The crural bases are given off dorsally and are independent from the median septum. The narrow, blade-like crura dip diagonally and converge dorsally. The crural processes are high and crescentic in cross section. The loop is diploform; it attains 0.7 of the length of the dorsal valve. The descending branches are very narrow and only very slightly divergent. The ascending branches are rather wide and strongly divergent ventrally; at their posterior end the transverse band forms a hood-like structure of angular cross-section. The distal termination of the loop bears spines and approaches the floor of the ventral valve (Fig. 129).

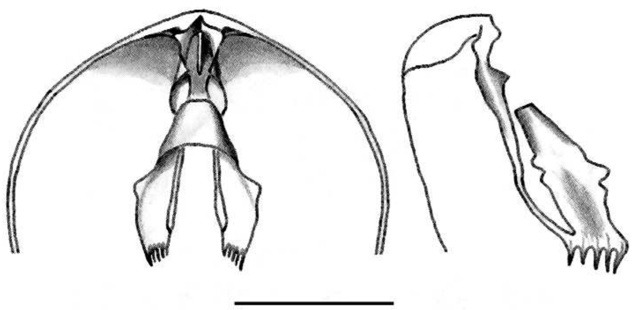


Figure 129. *Bakonyithyris ovimontana* (Böse, 1898). Ventral and lateral views of the dorsal valve interior. Reconstruction based on serial sections of a specimen from Eplény, Pliensbachian, Margaritatus Zone. M 2008.541.1. Scale bar = 5 mm

Remarks:

This is a rare species known only from the Northern Calcareous Alps (Schafberg area) and the Bakony. In the collection of the Bayerische Staatssammlung, München, I examined the types of *B. ovimontana* figured by Böse (l. c.). The type specimens clearly show the diagnostic feature of this species: the incipient posterior sulcus and by this way the identification of the Bakony specimens may be taken as approved.

From other species of *Bakonyithyris*, standing rather close to *B. ovimontana*, *B. apenninica* (Zittel, 1869) does not show incipient sulcus on the posterior part of its dorsal valve and its sinus is much narrower; in *B. meneghinii* (Parona, 1880) the sinus is markedly angular (trapezoidal); *B. pedemontana* (Parona, 1893) is much more stout and its beak is more massive and gibbose. The morphological difference between *B. ovimontana* and *B. pedemontana* was analysed by evaluation of the principal measurements of a great number of specimens of the two species. The scatter diagram of the ratios of the length and the sinus depth (Fig. 130) shows that the depth of the sinus, as related to the length, is significantly greater in *B. pedemontana* than in *B. apenninica*, though the scatters somewhat overlap.

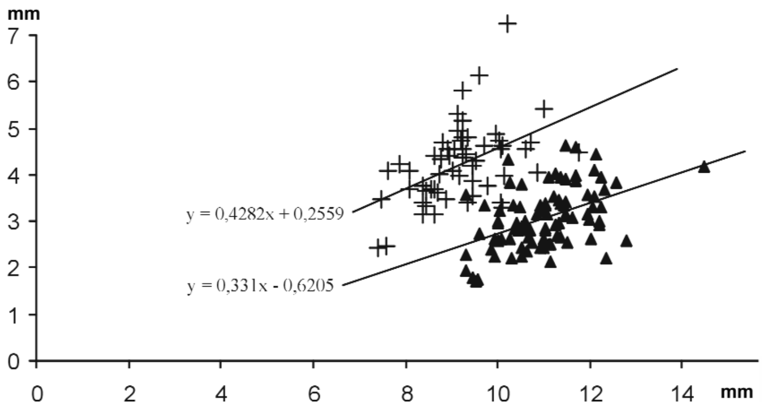


Figure 130. Scatter diagram showing the ratios of the length (horizontal axis) and the depth of the sinus (vertical axis) of 89 measured specimens of *Bakonyithyris ovimontana* (solid triangles) and 58 specimens of *Bakonyithyris pedemontana* (crosses) from the Pliensbachian of the Bakony

Distribution:

Pliensbachian of the Northern Calcareous Alps (Austria), and the Bakony Mts (Hungary). The Pliensbachian specimens of the Bakony came from four localities, from the Ibex to the Margaritatus Zones (Tables 13, 14).

Bakonyithyris ? aff. *gastaldii* (Parona, 1880)
Plate XXIX: 19.

v ? 1889 *Waldheimia* sp. indet. – Geyer, Hierlatz, p. 35, pl. IV, fig. 15.
v 1983 *Antiptychina* ? n. sp., aff. *gastaldii* (Parona, 1880) – Vörös, Stratigraphic distribution, p. 35.
v 2007 *Antiptychina* ? aff. *gastaldii* (Parona, 1893) – Vörös & Dulai, Transdanubian Range, p. 56.
2008 *Bakonyithyris* aff. *gastaldii* (Parona, 1880) – Baeza-Carratalá, Patrimonio J. de Cisneros, p. 509, pl. XL, figs. 3–5.

Material: 4, partly incomplete, double valves.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser 7	9.22	10.07	6.71	1.62
	11.31	12.37	7.45	2.66

Description:

External characters: This is a medium-sized sulcate zeilleriid with anteriorly expanded subtriangular outline. The lateral margins are gently convex; the anterior margin is straight. The apical angle is about 90°. The maximum width is attained near the anterior margin. The valves are moderately and nearly equally convex. The maximum convexity lies near mid-length. The beak is rather high, erect. The foramen is usually incomplete but seems to be mesothyrid. The delthyrium is largely covered by matrix but seems to be rather high triangular. The beak ridges are very sharp along the beak, and, with gradually decreasing strength, persist to the anterolateral extremities. There are well-defined, narrow planareas, where the lateral commissures run on an elevated, sharp crest. The dorsal umbo is prominent, pointed. In lateral view, the lateral commissures are dorsally arched. The anterior commissure is gently sulcate. The sinus is shallow and very wide; usually it occupies almost the whole width of the shell. There is no incipient posterior sulcus. Dorsal sulcus and ventral fold are not present. The surface of the shells is smooth.

Internal characters: These were not studied by regular serial sectioning because of the paucity of the material. In the very early phase of this research (end of 1960's) a double valve was ground by hand, and the dental plates, the septalium and the dorsal median septum were revealed.

Remarks:

This rather curious form definitely deserves the status of a new species, but the Bakony material is insufficient to make a proper description. Some basic characters of this species (e. g. the expanded triangular outline, the elongated planareas and the slight anterior sinus) can be recognized on the specimen figured by GEYER (l. c.) as "*Waldheimia* sp. indet." but it is significantly less convex. On the other hand, the figured exemplars of BAEZA-CARRATALÁ (l. c., especially that on pl. XL, fig. 4) perfectly fit with the Bakony specimens.

Previously (VÖRÖS 1983b, l. c., VÖRÖS & DULAI 2007, l. c.) I brought this species into the relationship of "*Waldheimia*" *gastaldii* PARONA, 1880, primarily on the basis of the close similarity of their lateral parts, with narrow planareas and lateral commissures running on a crest. However, *gastaldii* does not show the characteristic subtriangular outline and its anterior commissure is rectimarginate. Moreover, SULSER & FURRER (2005, p. 43) synonymized *gastaldii* with *Zeilleria waterhousi* (DAVIDSON, 1851). There is another PARONA's species "*Waldheimia*" *cusiana* PARONA, 1893 (as figured by PARONA 1893, pl. II, fig. 25 and SACCHI VIALLI & CANTALUPPI 1967, pl. XV, fig. 9) which shares the features of the lateral parts and also the gently unisulcate anterior commissure of our new species but its outline is subpentagonal. Therefore it does not seem to be reasonable to change the indication of the relationship of this new species and here I keep it in the form "aff. *gastaldii*".

The generic position of this new species is also problematical. Previously (VÖRÖS 1983b, l. c., VÖRÖS & DULAI 2007, l. c.) I suggested to include it into the genus *Antiptychina* on the basis of the triangular outline. However, the simple, wide sinus contradicts to this and may speak rather in favour of the attribution to *Bakonyithyris* what was preferred by BAEZA-CARRATALÁ (l. c.). But even this solution may not be regarded as satisfactory, because the expanded triangular outline and the particular features of the lateral part of this new species fall much beyond the morphological range of *Bakonyithyris*. Therefore here I left open the question of the generic attribution of this species.

Distribution:

Pliensbachian of the Bakony Mts (Hungary), the Betic Cordilleras (Spain) and probably of the Northern Calcareous Alps (Austria). The Pliensbachian specimens of the Bakony came from the Kericser section, from the Margaritatus Zone (Tables 13, 14).

Genus *Securina* VÖRÖS, 1983

Securina hierlatzica (OPPEL, 1861)
Plate XXIX: 20.

* 1861 *Terebratula Hierlatzica* – OPPEL, Brachiopoden des unteren Lias, p. 539.
v 1889 *Waldheimia Hierlatzica* Opp. – GEYER, Hierlatz, p. 26 (partim), pl. III, figs. 27–29 (non fig. 30).
? 1895 *Waldheimia Hierlatzica* Oppel. – FUCINI, Monte Pisano, p. 198, pl. VII, fig. 21.
non 1935 *Z. Hierlatzica* Opp. – JIMÉNEZ DE CISNEROS, Cerro de la Cruz, p. 22, pl. I, fig. 2.
? 1960 *Zeilleria hierlatzica* Oppel – GOURION, Brach. Lias. Ouest de l'Algérie, p. 127, pl. IV, fig. 9.
v 1983 *Securina hierlatzica* (Oppel, 1861) – VÖRÖS, Stratigraphic distribution, p. 35.

v 1987 *Securina hierlatzica* (Opp.) – VÖRÖS et al., Panormide, p. 245.
1993 *Propygope* nov. sp. – ALMÉRAS et al., Evolution du genre Prionorhynchia, p. 66 (partim), pl. 2, fig. 3 (non pl. 1, fig. 14).
v 1997 *Securina hierlatzica* (Oppel) – VÖRÖS, Jurassic brachiopods of Hungary, p. 14, Appendix: fig. 8.
2007 *Securina hierlatzica* (Oppel, 1861) – ALMÉRAS et al., Algerie Occidentale, p. 134, pl. 11, fig. 17.
v 2007 *Securina hierlatzica* (Oppel, 1861) – VÖRÖS & DULAI, Transdanubian Range, pp. 55, 56, pl. I, figs. 38, 39.
2008 *Securina partschi* (Oppel, 1861) – BAEZA-CARRATALÁ, Patrimonio J. de Cisneros, p. 563 (partim), text-fig. 106, pl. XLV, fig. 5, pl. XLVI, fig. 1. (non pl. XLV, figs, 3, 4).

Material: One incomplete double valve.

Localities	*Measurements (mm)*			
	L	*W*	*T*	*Ch*
Kericser 8	20.47	18.63	12.33	?

Description:

External characters: This is a large *Securina* with anteriorly expanded subtriangular (“axiniform”) outline. The major part of the lateral margins and the anterior margin are straight. The apical angle is about 55°. The maximum width is attained at the anterior margin. The valves are rather strongly and nearly equally convex. The maximum convexity lies near mid-length. The beak is massive and high, slightly incurved. The foramen is partly incomplete but seems to be permesothyrid. The delthyrium is covered by matrix. The beak ridges are angular but blunt along the beak, then become sharper and persist to the anterolateral extremities. There are well-defined, wide, somewhat concave planareas. The lateral commissures run along the deepest line, in the middle of the planareas. In lateral view, the lateral commissures are straight and run in the middle of the planareas. The anterior commissure is poorly preserved but seems to be rectimarginate. The surface of the shells is smooth.

Internal characters: These were not studied by serial sectioning because of the paucity of the material (single specimen).

Remarks:

This nice species was introduced by OPPEL (l. c.) in a footnote to the description of *S. partschi* (OPPEL, 1861), with the differential diagnosis that *S. hierlatzica* bears long beak ridges running down to the anterolateral points and the lateral commissures cross the middle of the concave planareas. GEYER (l. c.) gave informative figures portraying well these differences between the two species. Some of the subsequent authors, including myself, followed this line (FUCINI, 1895, DULAI 1992, VÖRÖS 1997), whereas DULAI (2003, p. 107) and BAEZA-CARRATALÁ (2008, l. c.) preferred to include *hierlatzica* to *partschi*.

One of the specimens figured by GEYER (l. c., fig. 30) as “*hierlatzica* var. *plicata*” is regarded as representing a separate species.

The figure (only dorsal view) given by JIMÉNEZ DE CISNEROS (l. c.) is not informative enough to decide if the specimen belongs to *S. hierlatzica*. BAEZA-CARRATALÁ (2008, p. 571) qualified it as *S. securiformis* (GEMMELLARO, 1874), this opinion is accepted here.

GOURION (l. c.) published only dorsal view of his specimen identified as “*Zeilleria hierlatzica*”, without mentioning if the lateral commissure is straight or arched. Therefore, in this case even the generic attribution is doubtful.

ALMÉRAS et al. (1993, l. c.) figured two specimens of *Securina*, surprisingly identified as *Propygope*, a totally different Late Triassic genus. One of them (pl. 2, fig. 3) seems to be a typical *S. hierlatzica* with marked and long beak ridges, the other (pl. 1, fig. 14) seems to stand closer to *S. partschi*. Recently, ALMÉRAS et al. (2007, l. c.) recognized and revised the previous misidentification.

Following the above mentioned principles of separation between *S. partschi* and *S. hierlatzica*, three of the specimens (including the sectioned specimen) figured by BAEZA-CARRATALÁ (l. c., text-fig. 106, pl. XLV, fig. 5, pl. XLVI, fig. 1) are regarded here as representing *S. hierlatzica*, the others belong to *S. partschi*.

The third species of *Securina*, the type species *S. securiformis* shares the sharp beak ridges and the deep planarea of *S. hierlatzica* but differs by its sector-like outline, i. e. the uniformly arched anterior margin.

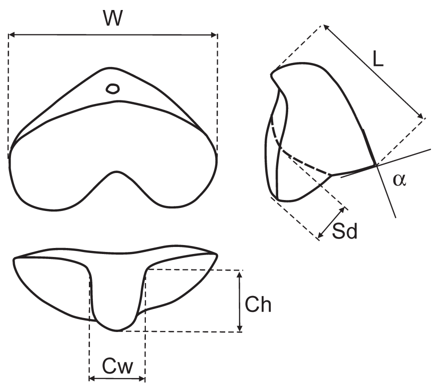
There are some other zeilleriid species with similar, “axiniform” outline and rather well-marked and concave planareas, e. g. “*Waldheimia*” *oxygonia* UHLIG, 1880 and its possible junior synonym, “*W.*” *pomatoides* DI STEFANO, 1891. However, their lateral commissures run along the dorsal rim of the planarea (instead of the mid-line), therefore they probably represent another genus, different from *Securina*.

Distribution:

Sinemurian and Pliensbachian of Sicily, and the Northern Apennines (Italy), the Northern Calcareous Alps (Austria), the Bakony (Hungary), the Betic Cordilleras (Spain), and the Atlas Mountains (Algeria). The Pliensbachian specimen of the Bakony came from the Kericser section, from the Margaritatus Zone (Tables 13, 14).

Appendix

Measurements of 595 specimens of *Linguithyris aspasia* from the Kericser section



The lines of measurements:

W = width,
L = length,
Ch = height of the deflection in the anterior commissure,
Cw = width of the deflection in the anterior commissure,
Sd = depth of the sulcus (Dimensions in millimetres),
a = angle of contact of the anterior margin (In degrees).

L. aspasia

175 specimens from the upper part of the Kericser section

Bed	Identity number	W	L	Ch	Sd
2	1/1	15.0	12.0	5.2	2.0
2	1/2	14.7	11.5	2.1	1.1
4	1/4	15.6	11.3	6.6	2.4
4	1/5	13.4	10.0	5.8	1.4
6	1/7	15.8	14.2	7.8	2.0
6	1/8	14.8	11.8	6.7	1.8
6	1/9	14.2	11.0	5.5	1.5
6	1/10	11.2	8.6	4.8	1.1
6	1/11	21.5	14.6	9.0	3.1
7	2/1	17.4	13.5	8.0	0.8
7	2/2	10.2	9.1	3.8	0.8
7	2/3	16.0	12.6	8.1	2.0
7	2/4	14.7	13.1	4.0	1.0
7	2/5	7.4	7.1	3.7	0.6
7	2/6	13.6	10.2	5.6	1.3
7	2/7	7.9	6.8	4.3	1.0
7	2/8	7.7	7.0	3.7	0.7
7	2/9	7.6	7.3	3.7	0.6
7	2/10	14.4	9.2	6.0	1.7
7	2/11	16.1	11.1	5.5	2.1
7	3/1	18.6	13.7	7.0	2.1
7	3/2	10.3	8.7	3.5	0.6
7	3/3	7.9	7.2	2.5	0.4
7	3/4	7.1	6.5	3.1	0.4
7	3/5	18.0	14.0	7.2	2.2
7	3/6	10.2	8.0	4.6	0.8
7	3/7	9.7	9.2	3.2	0.7
7	3/8	15.3	14.4	4.8	0.8
7	3/9	7.0	6.7	3.0	0.6
7	3/10	7.8	7.5	3.3	0.6
7	3/11	18.6	14.0	9.1	2.8
7	4/1	15.3	12.9	5.7	1.4
7	4/2	7.7	6.3	4.2	0.6
7	4/3	9.6	8.9	3.4	0.8
7	4/4	13.7	10.2	5.0	1.5
7	4/5	10.5	9.5	4.5	0.7
7	4/6	24.6	15.0	9.8	3.1
7	4/7	9.2	8.7	3.5	0.4
7	4/8	8.7	7.6	2.6	0.5
7	4/9	10.3	9.7	5.3	0.9
7	4/10	11.8	9.6	4.6	1.5
7	4/11	9.3	9.5	4.6	0.8
7	5/1	10.9	9.0	6.0	1.3

Bed	Identity number	W	L	Ch	Sd
7	5/2	7.5	6.9	2.7	0.6
7	5/3	8.5	8.5	3.7	0.2
7	5/4	5.5	5.3	2.5	0.3
7	5/5	7.6	7.0	4.4	0.7
7	5/7	9.4	8.8	3.2	0.7
7	5/8	8.9	9.1	5.0	0.7
7	5/9	8.7	7.6	2.7	0.6
7	5/10	9.8	9.5	4.4	1.0
7	5/11	10.2	9.2	4.7	0.9
7	6/1	6.5	7.0	4.0	0.2
7	6/2	8.7	9.0	3.8	0.8
7	6/3	7.6	6.8	3.7	0.6
7	6/4	8.4	7.6	4.2	0.8
7	6/5	8.1	7.1	4.1	1.1
7	6/6	8.5	8.4	3.3	0.5
7	6/7	8.8	8.0	3.4	0.5
8	6/9	15.4	11.7	6.2	2.1
8	6/10	14.0	9.3	5.8	1.1
8	6/11	16.5	12.4	5.9	0.8
8	7/1	15.9	13.0	6.8	1.5
8	7/2	14.9	11.9	4.1	0.7
8	7/3	12.8	10.3	6.5	1.6
8	7/4	11.3	10.4	5.6	1.2
8	7/5	8.1	7.5	4.2	1.0
8	7/6	8.8	8.2	3.4	0.5
8	7/7	17.5	12.5	6.2	1.4
8	7/8	15.5	13.1	5.0	0.7
8	7/9	13.5	11.9	4.5	0.1
8	7/10	10.1	8.8	5.5	1.1
8	7/11	14.7	12.1	5.1	0.5
8	8/1	14.3	11.9	5.9	1.0
8	8/2	10.7	9.5	4.4	1.3
8	8/3	9.9	8.7	3.0	0.8
8	8/5	11.3	9.6	5.8	1.2
8	8/6	11.0	9.3	5.9	1.0
8	8/7	11.0	9.0	5.0	1.1
8	8/8	15.0	11.1	4.7	2.0
8	8/9	11.9	10.8	5.4	1.2
8	8/10	12.2	10.9	5.0	0.4
8	8/11	8.5	7.6	2.8	0.9
8	9/1	7.8	7.0	4.2	0.7
8	9/2	10.3	8.0	4.3	1.1
8	9/3	12.1	10.9	3.2	0.3

Bed	Identity number	W	L	Ch	Sd
8	9/4	9.5	9.0	4.1	0.6
8	9/5	9.8	8.9	4.5	0.8
8	9/6	13.8	10.2	6.2	1.5
8	9/7	10.4	8.3	4.7	1.2
8	9/8	11.1	10.3	5.9	1.1
8	9/9	9.5	8.8	3.6	1.0
8	9/10	14.6	10.3	5.7	1.7
8	9/11	8.5	6.7	2.7	0.9
8	10/1	7.1	7.2	3.8	0.7
8	10/2	8.8	8.6	3.2	0.5
8	10/3	9.8	9.3	3.7	0.8
8	10/4	7.3	6.6	3.3	0.4
8	10/5	9.3	8.6	4.4	0.7
8	10/6	7.3	7.3	4.7	0.4
8	10/7	15.4	11.7	6.8	2.0
8	10/8	10.3	9.7	4.6	0.8
8	10/9	9.2	8.6	4.5	0.7
8	10/10	12.7	8.6	3.4	1.3
8	10/11	7.8	7.1	3.3	0.7
8	11/1	7.2	7.0	4.5	0.6
8	11/2	9.7	8.7	3.6	0.8
8	11/3	9.4	8.5	3.8	0.8
8	11/4	8.2	7.9	3.8	0.6
8	11/5	7.8	7.5	4.3	0.9
8	11/6	8.2	8.5	3.5	0.4
8	11/7	9.5	8.3	3.4	0.2
8	11/8	7.7	7.6	4.7	0.6
8	11/9	13.5	12.0	5.7	0.8
8	11/10	10.4	9.5	4.9	0.9
8	11/11	10.0	6.8	3.2	1.0
8	12/1	9.2	8.0	4.2	0.7
8	12/2	9.3	8.0	3.9	1.0
8	12/3	10.9	9.3	5.2	1.3
8	12/4	11.6	9.4	4.7	0.9
9	12/6	15.2	12.1	4.3	0.3
9	12/7	18.4	11.0	6.1	2.5
9	12/8	10.7	8.7	4.4	1.0
9	12/9	6.6	6.6	2.7	0.2
9	12/10	10.8	9.5	4.3	0.8
9	12/11	11.2	9.0	4.0	1.1
9	13/1	8.9	8.1	4.7	0.7
9	13/2	7.7	7.5	3.4	0.7
9	13/3	7.9	7.5	3.7	0.7
9	13/5	9.5	8.6	4.1	0.6
9	13/6	17.5	11.0	5.5	2.3

Bed	Identity number	W	L	Ch	Sd
9	13/7	12.6	9.2	4.1	1.1
9	13/8	11.5	9.5	5.2	1.3
9	13/9	8.5	7.7	4.2	0.7
9	13/10	7.4	6.3	3.5	0.7
9	13/11	8.5	7.0	3.8	1.1
9	14/1	10.9	9.7	4.8	1.1
9	14/2	7.5	7.0	3.4	0.7
10	14/4	11.0	8.8	5.0	1.4
10	14/5	8.9	8.5	4.2	0.5
10	14/6	10.6	8.6	4.3	0.8
10	14/7	9.5	8.9	4.7	0.9
10	14/8	9.0	7.7	5.4	0.8
10	14/9	10.2	8.8	4.5	0.9
10	14/10	16.6	9.5	6.4	2.6
11	15/1	15.8	11.0	6.7	1.9
11	15/3	6.1	6.2	2.4	0.2
11	15/4	6.8	6.6	3.0	0.4
11	15/5	7.7	6.2	3.5	0.7
11	15/6	7.8	6.2	3.3	0.7
11	15/7	7.5	6.8	3.8	0.7
11	15/8	7.2	6.4	3.2	0.7
11	15/9	14.6	9.3	3.9	1.2
11	15/10	15.5	10.0	X	1.9
11	15/11	7.0	6.4	3.8	0.5
11	16/2	7.8	6.7	4.0	1.0
11	16/4	10.9	8.7	5.4	0.7
11	16/5	7.4	5.8	3.5	0.7
11	16/6	7.1	6.5	2.8	0.6
11	16/8	12.2	8.9	4.7	1.2
12	16/10	18.0	11.7	5.5	2.4
12	17/1	8.0	6.9	5.7	1.0
12	17/2	13.0	9.6	4.5	1.2
12	17/3	10.6	9.2	4.7	1.0
12	17/4	8.5	7.2	3.3	0.5
12	17/5	7.2	6.5	2.8	0.3
12	17/6	7.9	7.0	4.0	0.8
12	17/7	7.2	5.9	3.7	0.7
12	17/8	6.4	5.9	3.5	0.3
12	17/9	7.0	6.5	4.6	0.5
12	17/10	10.6	9.7	5.5	0.8
12	18/1	9.6	9.1	4.6	1.0
12	18/2	7.0	5.8	3.1	0.5
12	18/3	6.9	6.6	3.1	0.3
12	18/4	7.5	6.6	2.6	0.7
12	18/5	6.4	6.6	3.3	0.3

L. aspasia

420 specimens from the lower part of the Kericser section

Bed	Identity number	W	L	Ch	Cw	Sd	α°
13	18/7	11.2	7.5	1.9	5.3	0.8	70.0
13	18/8	14.5	10.6	5.9	5.7	1.5	106.0
13	18/10	17.7	11.6	7.7	5.7	2.1	106.0
13	18/11	14.7	10.5	4.5	4.6	1.9	90.0
13	19/3	13.3	9.0	5.3	6	1.7	98.0
13	19/4	11.0	9.3	5.2	3.8	1.3	97.0
13	19/5	10.7	9.7	4.5	4.8	0.7	105.0
13	19/6	15.1	9.5	6.5	4.2	1.7	110.0
13	19/7	15.0	12.8	6.0	7.8	0.5	120.0
13	19/8	12.8	8.2	5.0	3.6	1.6	104.0
13	19/9	14.2	10.8	5.3	5.4	1.4	103.0
13	19/10	6.4	6.2	2.5	3.8	0.4	102.0
13	19/11	7.0	6.1	3.3	3.5	0.5	101.0
13	20/2	7.0	6.3	3.6	4.4	0.6	100.0
13	20/3	13.3	8.9	4.9	4.5	1.3	111.0
13	20/4	10.6	8.9	4.4	4.8	1.1	96.0
13	20/5	11.0	8.9	3.9	5.8	1.0	108.0
13	20/6	6.5	6.2	2.7	3.8	0.3	98.0
14	20/8	8.1	7.2	4.0	5	0.8	94.0
14	20/9	14.6	12.2	5.2	7.7	0.6	X
14	20/10	15.0	11.3	6.7	5.5	2.0	93.0
14	21/1	8.6	7.8	5.2	4.6	1.2	102.0
14	21/2	15.5	11.2	7.7	4.8	2.0	93.0
14	21/3	17.0	13.4	6.5	8.4	0.8	112.0
14	21/4	14.0	12.6	7.3	7.8	1.2	106.0
14	21/5	12.6	10.5	5.7	5.7	1.5	103.0
14	21/7	7.1	7.0	3.2	3.9	0.5	98.0
14	21/8	7.8	7.8	4.5	4.6	0.6	99.0
15	21/10	14.7	9.8	6.4	4.7	1.9	105.0
15	21/11	15.2	9.5	5.7	5.3	1.5	104.0
15	22/1	15.6	10.9	6.0	4.9	2.3	89.0
15	22/2	13.7	11.0	6.2	5.8	1.5	111.0
15	22/4	14.5	10.4	5.2	5.2	1.4	94.0
15	22/5	13.8	11.5	5.0	7.4	1.2	100.0
15	22/6	16.6	11.8	6.8	6.2	1.7	101.0
15	22/7	13.8	12.2	5.5	6.3	1.2	99.0
15	22/8	14.6	11.4	5.3	7	1.5	90.0
15	22/9	14.0	11.4	5.9	6.8	1.3	102.0
15	22/10	11.0	8.2	2.3	5.2	0.4	81.0
15	22/11	13.0	12.0	5.4	7.2	0.8	98.0
15	23/1	11.2	10.5	5.5	6.4	0.7	99.0
15	23/2	7.3	7.2	5.0	4.4	0.7	X
15	23/3	11.2	9.5	4.1	6.9	0.8	92.0
15	23/4	7.1	6.6	3.6	4.0	0.8	91.0

Bed	Identity number	W	L	Ch	Cw	Sd	α°
15	23/5	14.5	11.3	6.0	8.0	1.6	88.0
15	23/6	13.7	11.2	6.3	6.3	1.4	96.0
15	23/7	7.7	6.4	4.1	4.1	1.1	88.0
15	23/8	7.9	7.0	4.2	4.4	0.7	99.0
15	23/9	8.4	8.3	4.5	5.1	0.7	X
15	23/10	13.5	10.0	5.3	5.2	1.5	88.0
15	23/11	14.0	12.5	6.5	5.6	0.8	X
15	24/1	13.5	9.2	5.0	6.0	1.4	101.0
15	24/2	14.2	10.0	5.9	5.0	1.7	94.0
15	24/3	12.2	9.8	3.7	6.8	0.6	96.0
15	24/4	12.0	9.6	3.2	5.1	0.7	89.0
15	24/5	11.2	9.1	3.6	5.7	0.4	94.0
15	24/6	6.2	5.6	1.9	4.1	0.3	86.0
15	24/7	13.9	10.8	5.0	7.4	1.2	91.0
15	24/8	14.2	12.2	5.9	7.7	1.4	X
16	24/10	7.7	7.3	4.7	4.3	0.8	102.0
16	24/11	13.5	10.4	5.7	5.8	2.5	98.0
16	25/1	14.3	10.5	6.3	X	X	83.0
16	25/2	13.2	10.7	6.0	6.7	1.7	85.0
16	25/3	12.7	10.8	6.2	6.0	1.4	92.0
16	25/4	13.6	11.3	6.0	7.0	1.0	114.0
16	25/5	13.4	10.6	6.6	6.4	1.3	105.0
16	25/6	12.0	9.5	5.7	5.0	1.4	93.0
16	25/7	14.7	X	X	7.3	1.2	X
16	25/8	11.7	10.2	6.3	5.6	1.0	100.0
16	25/9	13.9	11.0	6.7	5.2	1.4	85.0
16	25/10	12.8	X	4.4	5.1	1.2	X
16	25/11	13.1	10.5	6.3	5.4	1.7	94.0
16	26/1	12.1	10.6	4.5	X	1.1	100.0
16	26/2	13.8	10.0	6.0	5.0	1.6	89.0
16	26/5	14.6	12.4	4.8	5.8	1.0	81.0
16	26/6	12.0	10.1	5.0	7.0	1.1	91.0
16	26/7	11.6	10.6	5.4	5.7	1.4	97.0
16	26/8	11.8	9.2	4.5	6.0	0.7	98.0
16	26/9	12.2	10.7	4.7	6.3	1.0	94.0
16	26/10	13.1	X	X	6.4	1.5	X
16	26/11	12.2	10.2	5.0	5.7	0.7	99.0
16	27/2	12.6	10.5	6.1	6.4	1.3	95.0
16	27/3	12.9	1.0	4.0	6.5	1.3	91.0
16	27/4	8.2	7.7	4.7	5.4	0.8	95.0
16	27/5	14.1	10.4	5.2	4.8	1.1	94.0
17	27/7	14.8	11.7	5.9	7.9	0.7	101.0
17	27/8	14.6	11.4	5.4	7.3	0.8	107.0
17	27/9	18.2	12.1	7.2	6.4	2.3	97.0
17	27/10	17.2	11.6	5.9	5.5	2.1	89.0
17	27/11	19.0	11.0	7.4	5.2	3.0	102.0
17	28/1	10.5	8.1	1.7	4.2	0.3	82.0
17	28/2	17.0	12.7	6.5	7.0	0.8	113.0

Bed	Identity number	W	L	Ch	Cw	Sd	α°
17	28/3	14.2	11.8	6.5	6.5	1.0	X
17	28/4	17.8	11.7	7.4	5.5	2.0	92.0
17	28/5	17.8	11.9	8.2	6.6	2.8	84.0
17	28/6	15.5	13.1	6.6	7.4	1.0	120.0
17	28/7	13.4	11.5	4.5	5.7	0.5	122.0
17	28/8	18.6	12.5	6.5	6.4	2.3	89.0
17	28/9	14.0	11.7	5.4	6.8	0.7	111.0
17	28/10	16.1	9.8	5.6	4.7	2.1	99.0
17	28/11	19.0	12.0	7.3	6.0	2.6	X
17	29/1	14.5	11.5	4.4	7.7	0.8	114.0
17	29/2	9.2	8.0	4.1	4.8	1.0	93.0
17	29/3	7.4	7.4	3.8	4.3	1.0	92.0
17	29/4	16.6	12.2	6.8	7.2	1.2	127.0
17	29/5	8.2	7.7	3.8	4.8	1.0	95.0
17	29/6	6.6	6.4	3.5	4.2	0.7	92.0
17	29/7	7.5	7.3	3.4	4.1	0.6	91.0
17	29/8	7.4	7.5	4.3	4.0	0.7	91.0
17	29/9	16.8	10.5	7.5	5.2	2.5	92.0
17	29/10	17.4	10.5	5	X	2.6	94.0
17	30/1	14.0	9.3	4.1	5.4	1.3	94.0
17	30/2	16.8	12.5	7.6	5.8	2.4	X
17	30/3	16.8	11.2	7.5	6.4	2.6	108.0
17	30/4	7.5	7.3	3.8	4.1	0.7	92.0
17	30/5	7.4	7.1	3.9	4.8	0.4	88.0
17	30/6	10.5	9.0	4.6	4.9	1.0	95.0
18	30/8	20.5	13.4	9.0	X	3.1	X
18	30/9	14.0	10.2	4.8	X	1.0	89.0
18	30/10	18.7	11.8	5.1	5.2	2.1	99.0
18	31/1	21.0	12.9	8.8	5.5	3.1	103.0
18	31/2	14.4	10.8	4.2	6.9	0.8	112.0
18	31/3	20.9	13.1	9.0	5.6	3.3	106.0
18	31/4	14.5	11.3	6.0	X	X	97.0
18	31/5	14.4	11.4	7.4	6.6	1.5	98.0
18	31/6	15.0	12.0	6.6	7.0	1.8	X
18	31/7	17.5	11.8	7.0	5.2	2.5	96.0
18	31/8	21.2	12.0	6.8	5.5	2.4	112.0
18	31/9	17.5	12.4	6.5	4.9	2.0	98.0
18	31/10	18.5	12.0	8.8	5.4	2.7	94.0
18	32/1	8.8	7.8	5.2	4.8	1.0	92.0
18	32/2	18.5	12.5	7.6	5.6	2.3	X
18	32/3	18.6	12.6	9.5	5.6	3.2	114.0
18	32/4	20.9	12.8	8.9	5.7	3.6	88.0
18	32/5	13.1	10.3	3.7	5.3	1.0	88.0
18	32/6	12.9	11.0	5.8	6.8	0.3	108.0
18	32/7	13.0	10.7	4.0	7.5	0.9	110.0
18	32/8	16.1	11.5	7.0	6.0	1.8	89.0
18	32/9	10.7	10.3	5.5	6.4	0.6	97.0
18	32/10	19.5	12.0	6.6	6.0	2.7	92.0

Bed	Identity number	W	L	Ch	Cw	Sd	α°
18	33/1	16.7	10.8	7.0	6.5	2.7	89.0
18	33/2	13.3	10.0	4.3	6.7	0.5	114.0
18	33/3	13.9	9.4	5.3	5.5	1.6	102.0
18	33/4	11.4	9.5	5.0	6.0	1.0	91.0
18	33/5	12.0	10.5	6.2	7.4	1.0	92.0
18	33/6	7.5	7.0	4.0	4.6	0.8	89.0
18	33/7	6.7	6.8	4.1	4.7	0.5	92.0
18	33/8	13.0	10.0	4.3	6.2	1.0	87.0
18	33/9	14.6	10.3	6.7	5.4	1.6	108.0
18	33/10	14.0	10.8	4.6	6.3	0.9	102.0
18	34/1	18.0	12.0	8.0	7.2	2.5	89.0
18	34/2	12.5	11.1	3.9	6.6	0.8	99.0
18	34/3	7.7	7.3	4.3	4.7	0.7	98.0
18	34/4	7.9	7.4	4.0	4.4	1.0	94.0
18	34/5	7.1	7.1	3.9	4.2	1.0	85.0
18	34/6	8.5	8.1	5.0	5.2	1.0	89.0
18	34/7	11.4	8.4	4.6	4.5	1.5	91.0
18	34/8	11.8	10.0	3.1	6.9	0.2	118.0
18	34/9	11.8	10.1	5.3	7.4	0.5	X
18	34/10	12.1	10.0	4.6	6.8	0.4	115.0
18	35/1	13.1	9.2	3.3	3.6	1.8	94.0
18	35/2	8.2	7.5	3.9	5.0	0.7	92.0
18	35/3	8.1	7.1	4.1	5.6	0.4	90.0
18	35/4	8.2	7.4	4.5	4.6	1.1	89.0
18	35/5	8.8	8.0	4.4	4.5	1.1	94.0
18	35/6	7.2	7.0	3.8	4.2	0.7	X
18	35/7	8.0	7.2	4.3	4.7	0.7	89.0
18	35/8	8.4	7.1	4.4	4.4	0.8	102.0
18	35/9	7.8	7.0	4.2	4.7	0.7	X
18	35/10	18.0	10.7	5.4	5.6	2.3	96.0
18	36/1	16.5	12.1	7.8	6.6	2.1	92.0
18	36/2	16.1	10.9	4.9	5.6	1.9	93.0
18	36/3	10.9	9.0	2.4	5.8	0.3	97.0
18	36/4	13.8	8.8	5.0	5.5	1.3	98.0
18	36/5	11.7	10.0	4.5	5.5	1.0	98.0
19	36/7	14.3	11.0	X	X	1.0	X
19	36/8	12.0	10.3	5.0	6.1	1.4	104.0
19	36/9	12.6	10.1	5.3	5.9	1.6	107.0
19	36/10	13.5	10.4	4.8	5.9	1.1	96.0
19	37/1	14.1	12.1	5.9	7.3	1.2	100.0
19	37/2	12.3	10.0	3.8	6.8	1.1	97.0
19	37/3	11.4	9.4	5.2	5.2	1.3	99.0
19	37/4	14.7	10.7	5.9	6.6	1.7	101.0
19	37/6	13.8	11.7	7.3	7.4	1.1	X
19	37/7	15.2	X	4.5	X	0.8	X
19	37/8	10.9	9.2	4.2	5.3	0.8	97.0
19	37/9	12.8	10.6	5.3	6.3	1.4	88.0
19	37/10	14.3	10.7	4.3	6.6	1.3	103.0

Bed	Identity number	W	L	Ch	Cw	Sd	α°
19	38/2	12.0	10.5	5.2	6.4	1.0	X
19	38/3	14.5	9.8	5.0	5.2	1.4	93.0
19	38/4	12.5	10.6	5.2	6.2	1.2	93.0
19	38/6	13.7	10.4	5.7	6.6	1.7	91.0
19	38/7	7.5	7.0	3.3	4.3	0.5	103.0
19	38/8	13.4	10.4	5.8	7.0	1.0	96.0
19	38/9	11.9	9.7	4.3	6.4	1.0	101.0
19	39/1	12.3	9.8	5.5	6.4	1.1	108.0
19	39/2	12.2	10.2	4.5	5.9	1.5	105.0
19	39/3	13.8	10.9	6.0	5.9	1.4	108.0
19	39/4	13.4	11.0	6.2	6.8	1.1	92.0
19	39/6	12.0	9.2	4.5	7.0	1.0	98.0
19	39/7	11.9	9.7	5.2	6.4	0.6	109.0
19	39/8	12.9	10.4	6.0	7.2	1.4	96.0
19	39/9	14.6	10.9	6.2	6.3	1.5	99.0
19	39/10	12.3	10.7	5.1	5.6	1.0	103.0
19	40/1	12.3	10.1	5.3	6.5	1.4	102.0
19	40/2	13.1	10.8	5.3	8.6	1.0	96.0
19	40/3	12.4	10.7	5.0	6.8	1.0	107.0
19	40/4	13.5	X	X	5.4	1.5	X
19	40/5	12.8	11.4	5.5	6.8	1.5	107.0
19	40/6	14.2	9.7	6.1	5.8	2.1	99.0
19	40/7	12.1	10.4	5.3	6.4	1.8	94.0
19	40/8	12.9	11.0	5.3	X	1.0	93.0
19	40/9	10.5	8.8	3.6	6.6	0.7	98.0
19	40/10	9.8	8.6	2.5	6.1	0.6	87.0
19	41/1	10.2	9.4	4.6	6.1	1.2	93.0
19	41/2	8.8	7.9	4.7	X	1.2	X
19	41/3	12.9	11.0	6.8	7.0	1.1	102.0
19	41/4	12.2	10.3	5.8	7.5	1.3	91.0
19	41/5	12.2	10.4	4.6	6.4	1.3	102.0
19	41/6	11.9	10.3	5.3	6.0	1.2	102.0
19	41/7	12.2	10.2	4.8	6.5	1.0	101.0
19	41/8	10.3	9.0	4.4	6.0	0.7	110.0
19	41/9	13.1	10.8	5.0	7.0	0.7	103.0
19	41/10	13.1	10.0	3.9	8.2	0.6	89.0
19	42/1	14.3	10.5	4.8	7.1	1.5	87.0
19	42/3	14.2	10.0	5.0	6.9	1.3	97.0
19	42/4	12.4	10.0	6.0	6.8	1.2	94.0
19	42/5	12.4	10.1	5.0	7.0	1.3	X
19	42/6	7.8	7.7	3.1	4.9	0.6	85.0
19	42/7	13.5	9.8	4.0	6.1	0.8	98.0
19	42/8	10.8	9.2	3.5	6.2	0.8	89.0
19	42/9	12.5	10.0	4.4	6.5	1.1	98.0
20	43/1	18.7	11.8	8.0	6.5	3.2	111.0
20	43/2	15.2	12.0	4.0	8.6	0.3	116.0
20	43/3	19.0	12.0	7.7	8.0	3.1	95.0
20	43/4	19.5	13.0	7.0	9.5	1.3	114.0

Bed	Identity number	W	L	Ch	Cw	Sd	α°
20	43/5	16.0	11.0	6.0	7.3	1.4	98.0
20	43/6	17.0	11.5	5.6	8.2	1.3	116.0
20	43/7	10.3	8.9	4.8	5.8	1.1	101.0
20	43/8	15.0	11.2	4.8	8.7	1.1	103.0
20	43/9	17.8	X	6.2	7.0	2.4	96.0
20	43/10	17.0	11.7	6.2	6.0	2.4	107.0
20	44/1	15.2	18.3	7.0	8.5	0.8	X
20	44/3	14.8	11.5	6.9	7.5	1.1	118.0
20	44/4	14.0	11.8	6.6	9.2	0.2	110.0
20	44/5	17.4	13.1	8.3	9.3	1.0	122.0
20	44/6	18.0	13.8	6.1	8.0	2.3	X
20	44/7	17.3	12.5	6.2	6.4	2.5	87.0
20	44/8	20.4	X	8.3	7.2	3.1	X
20	44/9	15.0	10.4	4.4	8.0	1.0	117.0
20	44/10	16.8	11.9	7.0	8.3	2.0	103
20	45/1	17.0	10.9	4.5	7.9	1.5	88.0
20	45/2	8.5	8.0	4.9	4.1	1.1	102.0
20	45/3	6.6	6.4	3.7	4.1	0.5	94.0
20	45/4	18.6	12.0	7.4	8.3	2.5	109.0
20	45/5	18.6	11.0	4.8	6.8	3.0	86.0
20	45/6	10.5	8.5	4.3	5.0	1.1	97.0
20	45/7	13.3	10.0	5.6	6.2	1.3	110.0
20	45/8	12.6	9.7	4.5	7.4	0.5	105.0
20	45/9	11.1	9.8	5.7	6.1	1.0	94.0
20	45/10	10.1	9.2	3.5	5.7	1.0	90.0
20	46/1	14.9	10.6	6.8	7.0	0.8	111.0
20	46/2	13.8	X	6.7	6.5	0.6	128.0
20	46/3	17.3	11.3	6.6	6.5	2.6	92.0
20	46/4	20.6	10.8	6.2	6.7	3.2	X
20	46/6	11.5	8.9	3.8	6.0	1.0	98.0
20	46/7	15.4	12.0	4.6	8.3	1.0	103.0
21	46/9	16.7	X	X	5.3	2.4	X
21	46/10	16.7	9.8	4.0	5.9	2.1	90.0
21	47/1	14.2	10.5	5.8	6.0	1.0	123.0
21	47/2	17.9	12.8	7.0	7.5	2.3	88.0
21	47/3	15.8	11.3	5.9	8.3	1.0	124.0
21	47/4	11.0	8.8	2.2	6.8	0.3	88.0
21	47/5	16.2	10.7	5.0	4.8	2.8	97.0
21	47/6	15.9	11.0	4.3	6.4	1.7	95.0
21	47/7	20.3	13.6	6.8	6.2	3.0	96.0
21	47/8	13.1	10.3	5.7	6.7	1.2	120.0
21	47/9	19.4	X	X	7.9	2.1	X
21	47/10	15.2	11.3	5.6	7.4	0.8	114.0
21	48/1	16.5	X	X	X	1.0	X
21	48/2	15.0	11.2	4.1	7.6	0.6	116.0
21	48/3	13.2	10.3	4.0	7.1	0.6	123
21	48/4	17.0	10.4	7.0	6.1	2.1	123.0
21	48/5	15.7	12.2	4.5	8.4	0.2	119

Bed	Identity number	W	L	Ch	Cw	Sd	α°
21	48/6	20.9	12.4	9.0	7.5	3.1	93.0
22	48/8	14.8	X	3.9	5.2	2.7	X
22	48/9	21.0	12.4	7.0	7.7	3.5	98.0
22	48/10	20.7	13.2	8.0	7.2	2.5	95.0
22	49/1	15.4	11.3	5.0	9.6	0.3	107.0
22	49/2	17.6	11.8	5.4	6.4	2.0	89.0
22	49/3	16.0	12.0	6.2	7.0	1.2	112.0
22	49/4	8.0	7.8	4.5	4.5	0.8	98.0
22	49/5	13.7	11.0	5.4	7.0	0.7	125.0
22	49/6	16.8	11.9	3.5	6.8	1.5	79.0
22	49/7	14.5	10.2	4.4	6.9	1.4	106.0
22	49/8	17.5	11.6	6.6	7.0	1.2	125.0
22	49/9	18.4	14.0	8.0	6.7	2.4	87.0
22	49/10	16.0	10	6.0	6.6	1.7	116.0
22	50/1	15.4	12.0	5.0	7.8	1.0	117.0
22	50/2	12.6	10.8	4.4	6.7	0.7	100.0
22	50/3	14.2	11.0	4.6	7.5	0.7	115.0
22	50/4	8.5	7.4	4.5	4.9	0.8	98.0
22	50/5	13.5	10.5	4.4	6.4	0.7	119.0
22	50/6	10.3	8.3	4.7	6.7	1.3	94.0
22	50/7	7.5	7.6	4.4	4.9	0.6	95.0
22	50/8	16.5	11	4.1	7.9	2.1	90.0
22	50/10	13.7	10.0	6.6	6.5	1.8	110.0
22	51/1	20.3	11.5	7.8	6.5	3.5	86.0
22	51/2	8.2	7.5	4.2	4.1	1.0	102.0
22	51/3	7.8	6.8	3.0	3.6	0.8	94.0
22	51/4	8.7	7.8	5.5	5.0	1.2	91.0
22	51/5	17.3	10.9	4.6	2.8	2.4	87.0
22	51/6	9.0	7.9	4.5	5.5	1.1	99.0
22	51/7	9.0	7.3	4.4	4.8	0.8	95.0
22	51/8	8.6	7.2	4.4	5.4	1.0	89.0
22	51/9	19.0	11.3	6.9	7.3	2.6	101.0
22	51/10	21.6	13.0	8.0	6.9	3.7	90.0
22	52/1	16.1	12.2	5.3	8.6	0.4	117.0
22	52/2	10.8	8.2	2.4	5.4	0.5	99.0
23	52/4	7.7	6.6	4.3	4.9	0.8	97.0
23	52/5	8.6	7.1	3.5	4.7	1.1	97.0
23	52/6	7.9	7.1	4.6	4.4	1.0	104.0
23	52/7	12.8	10.1	4.2	6.5	0.8	105.0
23	52/8	19.5	12	7.1	7.7	3.4	92.0
23	52/9	14.8	11.2	6.8	7.0	0.9	111.0
23	52/10	18.0	11	6.8	X	X	88.0
23	53/1	19.7	12.4	7.5	7.6	2.4	88.0
23	53/2	8.6	7.6	3.5	4.4	0.7	91.0
23	53/3	15.1	10.8	5.7	6.4	0.9	110.0
23	53/4	7.4	7.2	4.0	4.7	0.7	92.0
23	53/5	18.4	12.5	8.4	6.5	3.7	94.0
23	53/6	8.1	7.2	4.9	5.0	0.7	92.0

Bed	Identity number	W	L	Ch	Cw	Sd	α°
23	53/7	9.5	8.8	6.0	5.4	1.2	97.0
23	53/8	14.7	9.7	3.3	6.0	1.5	91.0
23	53/9	7.9	6.8	3.0	4.4	0.7	91.0
24	54/1	9.0	7.5	4.1	5.2	1.1	100.0
24	54/2	18.2	11.5	6.8	7.7	2.5	89.0
24	54/3	14.0	10.5	2.7	8.0	0.6	97.0
24	54/5	8.5	7.5	3.0	4.7	1.0	86.0
24	54/6	15.2	11.7	5.6	7.5	1.0	126.0
24	54/7	15.4	11.3	5.7	6.7	1.3	122.0
24	54/8	19.3	12.4	8.5	5.3	4.2	113.0
24	54/9	19.8	11.1	6.6	7.8	3.2	91.0
24	54/10	18.7	11.3	6.7	6.8	3.0	95.0
24	55/1	14.8	10.8	7.0	5.8	1.6	120.0
24	55/2	11.7	10.2	4.5	7.4	0.3	112.0
24	55/3	12.8	9.2	2.6	6.4	0.5	93.0
24	55/5	8.5	7.5	3.7	5.0	1.0	93.0
25	55/7	21.1	X	X	6.9	3.2	X
25	55/8	19.7	14.2	7.1	6.4	3.0	102.0
25	55/9	17.2	12.4	6.5	6.8	2.2	90.0
25	55/10	16.7	11.2	6.0	7.6	2.3	93.0
25	56/1	17.1	12.1	6.9	6.8	1.4	X
25	56/2	18.2	10.6	5.2	5.4	2.7	98.0
25	56/3	20.0	11.8	7.3	8.0	3.2	93.0
25	56/4	16.6	12.3	7.5	8.7	1.2	111.0
25	56/5	21.4	14.8	7.8	X	3.1	83.0
25	56/6	9.0	7.1	3.3	5.3	1.2	87.0
25	56/7	9.2	7.9	3.7	4.9	0.7	106.0
25	56/8	9.0	7.9	3.9	4.8	0.8	97.0
25	56/9	8.7	7.7	5.0	X	0.8	X
25	56/10	17.6	13.3	8.4	7.4	2.5	80.0
25	57/1	15.7	11.2	6.0	5.6	1.5	90.0
25	57/3	10.5	8.4	5.0	5.5	1.1	89.0
25	57/4	7.4	7.5	4.7	4.6	0.3	95.0
25	57/5	8.4	7.7	4.3	5.0	0.8	90.0
25	57/6	13.0	9.7	5.3	5.3	0.8	122.0
25	57/7	8.6	6.8	2.0	5.1	0.5	86.0
25	57/8	7.7	7.6	3.7	4.2	0.7	99.0
25	57/9	9.8	8.0	3.6	4.6	0.9	88.0
25	57/10	20.0	12.7	7.8	6.8	3.2	99.0
25	58/1	20.0	12.9	7.7	7.6	3.2	97.0
25	58/2	19.6	11.9	8.5	7.2	2.5	95.0
25	58/3	9.8	8.5	5.3	5.7	1.4	107.0
25	58/4	8.6	7.9	4.7	4.6	1.1	89.0
25	58/6	9.1	7.8	4.7	5.0	1.1	100.0
25	58/7	16.3	12.6	6.6	7.6	0.9	127.0
25	58/8	18.7	11.3	7.8	6.4	2.7	106.0
25	58/9	14.2	10.2	4.0	6.4	0.7	110.0
25	58/10	16.0	11.9	8.3	7.8	1.1	112.0

Bed	Identity number	W	L	Ch	Cw	Sd	α°
26	59/1	24.5	15.5	10.3	7.9	3.3	97.0
26	59/2	20.0	12.2	5.5	7.9	3.5	92.0
26	59/3	20.3	12.8	9.2	7.5	3.2	102.0
26	59/4	18.2	11.2	6.6	7.7	1.6	101.0
26	59/5	18.3	11.1	7.5	7.5	2.5	X
26	59/6	22.1	15.0	8.5	8.6	3.4	88.0
26	59/7	8.5	7.7	4.5	4.7	1.0	109.0
26	59/8	8.3	7.3	4.1	4.7	0.8	101.0
26	59/9	14.3	9.4	3.0	7.0	1.3	90.0
26	59/10	19.8	12.7	7.2	7.2	3.1	92.0
26	60/1	16.9	9.7	6.2	6.3	2.5	106.0
26	60/4	15.0	9.8	3.8	6.0	1.4	115.0
26	60/5	16.8	X	X	X	1.6	X
26	60/6	18.0	10.8	5.5	6.1	1.9	101.0
26	60/7	16.2	12.5	6.4	7.8	1.1	112.0
26	60/8	19.1	13.1	8.4	6.8	2.3	X
26	60/9	20.8	11.5	6.5	7.1	3.1	117.0
26	60/10	17.7	12.4	6.4	5.9	3.1	104.0
27	61/1	26.4	14.5	8.6	7.1	4.9	X
27	61/2	14.1	11.4	5.5	6.5	0.7	X
27	61/3	13.3	11.4	5.0	5.8	0.8	108.0
27	61/4	14.0	11	6.5	6.4	1.1	119.0
27	61/5	12.2	10.1	5.1	6.2	0.8	109.0
27	61/6	13.4	10.7	4.1	6.5	0.4	108.0
27	62/1	11.3	8.7	2.1	5.7	0.6	87.0
28	62/3	16.2	11.9	5.4	6.4	1.1	112.0
28	62/4	18.7	12.6	7.8	6.4	3.4	87.0
28	62/5	12.6	9.7	5.1	5.6	0.8	106.0
29	63/1	7.3	6.8	4.1	4.2	1.0	96.0
29	63/2	15.4	11.4	6.6	6.8	1.5	89.0
29	63/3	10.0	8.3	4.8	4.8	0.7	113.0
29	63/4	18.9	12.1	8.2	8.0	2.4	99.0
29	63/5	18.2	13.8	9.3	6.3	3.0	92.0
29	63/6	19.4	13.1	7.6	7.6	3.1	96.0
29	64/1	18.6	11.8	7.8	X	3.6	X
29	64/2	12.2	9.5	5.6	6.2	1.2	99.0
31	64/4	13.2	9.2	3.5	5.1	1.6	89.0
32	64/6	11.8	9.4	4.0	6.0	1.1	108.0
35	65/2	12.5	11.6	3.4	7.4	0.5	100.0

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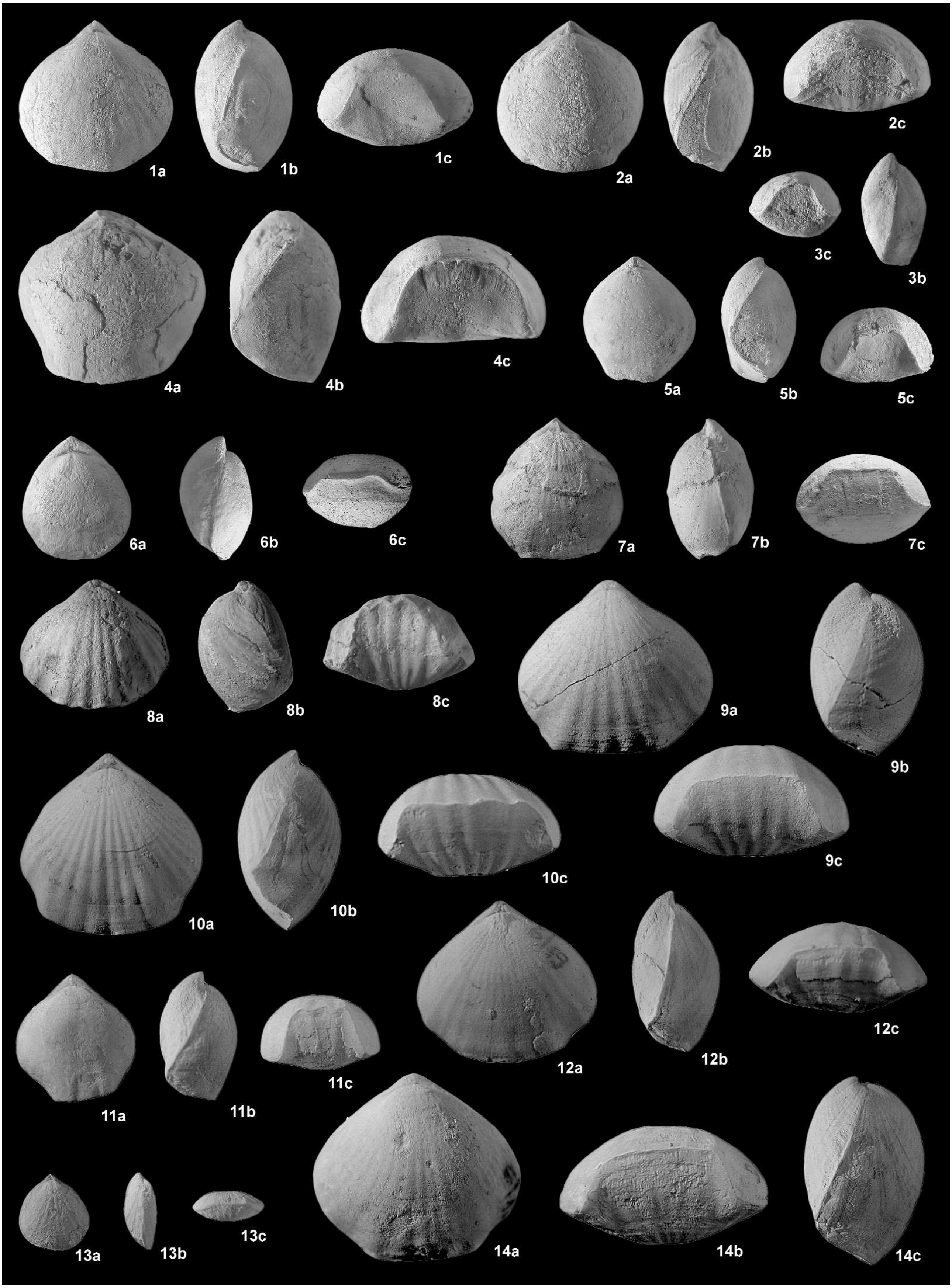
Plates

Plate I

All figures are magnified twice unless otherwise indicated. Specimens have been coated with ammonium chloride before photography. Specimens are deposited in the collection of the Geological and Paleontological Department, Hungarian Natural History Museum, under the inventory numbers prefixed by M.

1. *Apringia piccininii* (Zittel, 1869) – M.2007.116.1., Lókút, Kericser VI, Bed 26, Ibex Zone; a: dorsal view, b: lateral view, c: anterior view.
2. *Apringia piccininii* (Zittel, 1869) – M.2007.117.1., Lókút, Kericser VI, scree from the lower part of the section, Ibex Zone(?); a: dorsal view, b: lateral view, c: anterior view.
3. *Apringia piccininii* (Zittel, 1869) – M.2007.118.1., Lókút, Kericser VI, scree, Ibex(?) to Spinatum(?) Zone; b: lateral view, c: anterior view.
4. *Apringia piccininii* (Zittel, 1869) – M.2007.119.1., Lókút, Kericser VI, Bed 6, Spinatum Zone; very large specimen, previously attributed to "*A. aptyga* (Canavari)" a: dorsal view, b: lateral view, c: anterior view.
5. *Apringia piccininii* (Zittel, 1869) – M.2007.120.1., Lókút, Fenyveskút 5/a, Margaritatus(?) Zone; a: dorsal view, b: lateral view, c: anterior view.
6. *Apringia barnabasi* n. sp.; holotype – M.2007.121.1., Lókút, Kericser VI, Bed 26, Ibex Zone; a: dorsal view, b: lateral view, c: anterior view.
7. *Apringia barnabasi* n. sp.; paratype – M.2007.122.1., Lókút, Kericser VI, Bed 16, Davoei Zone; a: dorsal view, b: lateral view, c: anterior view.
8. *Apringia paolii* (Canavari, 1880) – M.2007.123.1., Lókút, Papod A/82, probably Carixian; coarsely ribbed variant; a: dorsal view, b: lateral view, c: anterior view.
9. *Apringia paolii* (Canavari, 1880) – M.2007.124.1., Lókút, Kericser VI, Bed 27, Ibex Zone; a: dorsal view, b: lateral view, c: anterior view.
10. *Apringia paolii* (Canavari, 1880) – M.2007.125.1., Lókút, Kericser VI, Bed 27, Ibex Zone; a: dorsal view, b: lateral view, c: anterior view.
11. *Apringia paolii* (Canavari, 1880) – M.2007.126.1., Lókút, Kericser VI, Bed 27, Ibex Zone; a: dorsal view, b: lateral view, c: anterior view.
12. *Apringia paolii* (Canavari, 1880) – M.2007.127.1., Lókút, Kericser VI, Bed 19, Davoei Zone; a: dorsal view, b: lateral view, c: anterior view.
13. *Apringia paolii* (Canavari, 1880) – M.2007.128.1., Lókút, Kericser VI, Bed 19, Davoei Zone; a: dorsal view, b: lateral view, c: anterior view.
14. *Apringia paolii* (Canavari, 1880) – M.2007.129.1., Lókút, Kericser VI, Bed 15, Davoei Zone; a: dorsal view, b: lateral view, c: anterior view.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11c
12a
12b
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13a
13b
13c
14a
14b
14c

Plate II

All figures are magnified twice unless otherwise indicated. Specimens have been coated with ammonium chloride before photography. Specimens are deposited in the collection of the Geological and Paleontological Department, Hungarian Natural History Museum, under the inventory numbers prefixed by M.

1. *Apringia paolii* (Canavari, 1880) – M.2007.130.1., Lókút, Fenyveskút, scree, Margaritatus(?) Zone; almost smooth variant; a: dorsal view, b: lateral view, c: anterior view.
2. *Apringia paolii* (Canavari, 1880) – M.2007.131.1., Lókút, Kericser VI, Bed 10, Margaritatus Zone (Stokesi Subzone); a: dorsal view, b: lateral view, c: anterior view.
3. *Apringia paolii* (Canavari, 1880) – M.2007.132.1., Lókút, Kericser VI, Bed 18, Davoei Zone; a: dorsal view, b: lateral view, c: anterior view.
4. *Apringia paolii* (Canavari, 1880) – M.2007.133.1., Lókút, Kericser VI, Bed 25, Ibex Zone; a: dorsal view, b: lateral view, c: anterior view.
5. *Apringia paolii* (Canavari, 1880) – M.2007.134.1., Lókút, Kericser VI, Bed 13, Davoei Zone; a: dorsal view, b: lateral view, c: anterior view.
6 *Apringia paolii* (Canavari, 1880) – M.2007.135.1., Lókút, Kericser VI, Bed 13, Davoei Zone; a: dorsal view, b: lateral view, c: anterior view.
7. *Apringia paolii* (Canavari, 1880) – M.2007.136.1., Lókút, Kericser VI, Bed 8, Margaritatus Zone (Stokesi Subzone); coarsely ribbed variant; a: dorsal view, b: lateral view, c: anterior view.
8. *Apringia diptycha* (Böse, 1898) – M.2007.137.1., Lókút, Kericser VI, Bed 16, Davoei Zone; uniplicate variant; a: dorsal view, b: lateral view, c: anterior view.
9. *Apringia diptycha* (Böse, 1898) – M.2007.138.1., Lókút, Kericser VI, Bed 16, Davoei Zone; a: dorsal view, b: lateral view, c: anterior view.
10. *Apringia diptycha* (Böse, 1898) – M.2007.139.1., Lókút, Kericser VI, Bed 16, Davoei Zone; a: dorsal view, b: lateral view, c: anterior view.
11. *Apringia diptycha* (Böse, 1898) – M.2007.140.1., Lókút, Kericser VI, Bed 22, Ibex Zone; a: dorsal view, b: lateral view, c: anterior view.
12. *Apringia diptycha* (Böse, 1898) – M.2007.141.1., Lókút, Fenyveskút 5/c, Margaritatus(?) Zone; variant with incipient sulciplicate folding; a: dorsal view, b: lateral view, c: anterior view.
13. *Apringia diptycha* (Böse, 1898) – M.2007.142.1., Lókút, Kericser VI, Bed 18, Davoei Zone; aberrant specimen with an asymmetric third deflection in the plica; a: dorsal view, b: lateral view, c: anterior view.
14. *Apringia diptycha* (Böse, 1898) – M.2007.143.1., Lókút, Papod C/87, probably Domerian; variant with deflection in the lateral commissure; a: dorsal view, b: lateral view, c: anterior view.


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2c
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5c
6c
7b
8a
7a
8b
7c
8c

Plate III

All figures are magnified twice unless otherwise indicated. Specimens have been coated with ammonium chloride before photography. Specimens are deposited in the collection of the Geological and Paleontological Department, Hungarian Natural History Museum, under the inventory numbers prefixed by M.

1. *Serratapringia fraudatrix* (Böse, 1898) – M.2007.144.1., Lókút, Fenyveskút, scree, Margaritatus(?) Zone; a: dorsal view, b: lateral view, c: anterior view.
2. *Serratapringia fraudatrix* (Böse, 1898) – M.2007.145.1., Bakonybél, Kőris-hegy A/3, probably Domerian; a: dorsal view, b: lateral view, c: anterior view.
3. *Apringia deltoidea* (Canavari, 1880) – M.2007.146.1., Lókút, Kericser VI, Bed 25, Ibex Zone; a: dorsal view, b: lateral view, c: anterior view.
4. *Apringia deltoidea* (Canavari, 1880) – M.2007.147.1., Lókút, Kericser VI, Bed 12, Davoei Zone; a: dorsal view, b: lateral view, c: anterior view.
5. *Megapringia stoppanii* (Parona, 1880) – M.2007.148.1., Lókút, Fenyveskút p2, Margaritatus(?) Zone; variant close to *M. altesinuata* (Böse, 1898); a: dorsal view, b: lateral view, c: anterior view.
6. *Megapringia stoppanii* (Parona, 1880) – M.2007.149.1., Lókút, Fenyveskút p2, Margaritatus(?) Zone; a: dorsal view, b: lateral view, c: anterior view.
7. *Megapringia stoppanii* (Parona, 1880) – M.2007.150.1., Lókút, Fenyveskút p2, Margaritatus(?) Zone; a: dorsal view, b: lateral view, c: anterior view.
8. *Megapringia stoppanii* (Parona, 1880) – M.2007.151.1., Lókút, Kericser VI, Bed 6, Spinatum Zone; a: dorsal view, b: lateral view, c: anterior view.


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5c
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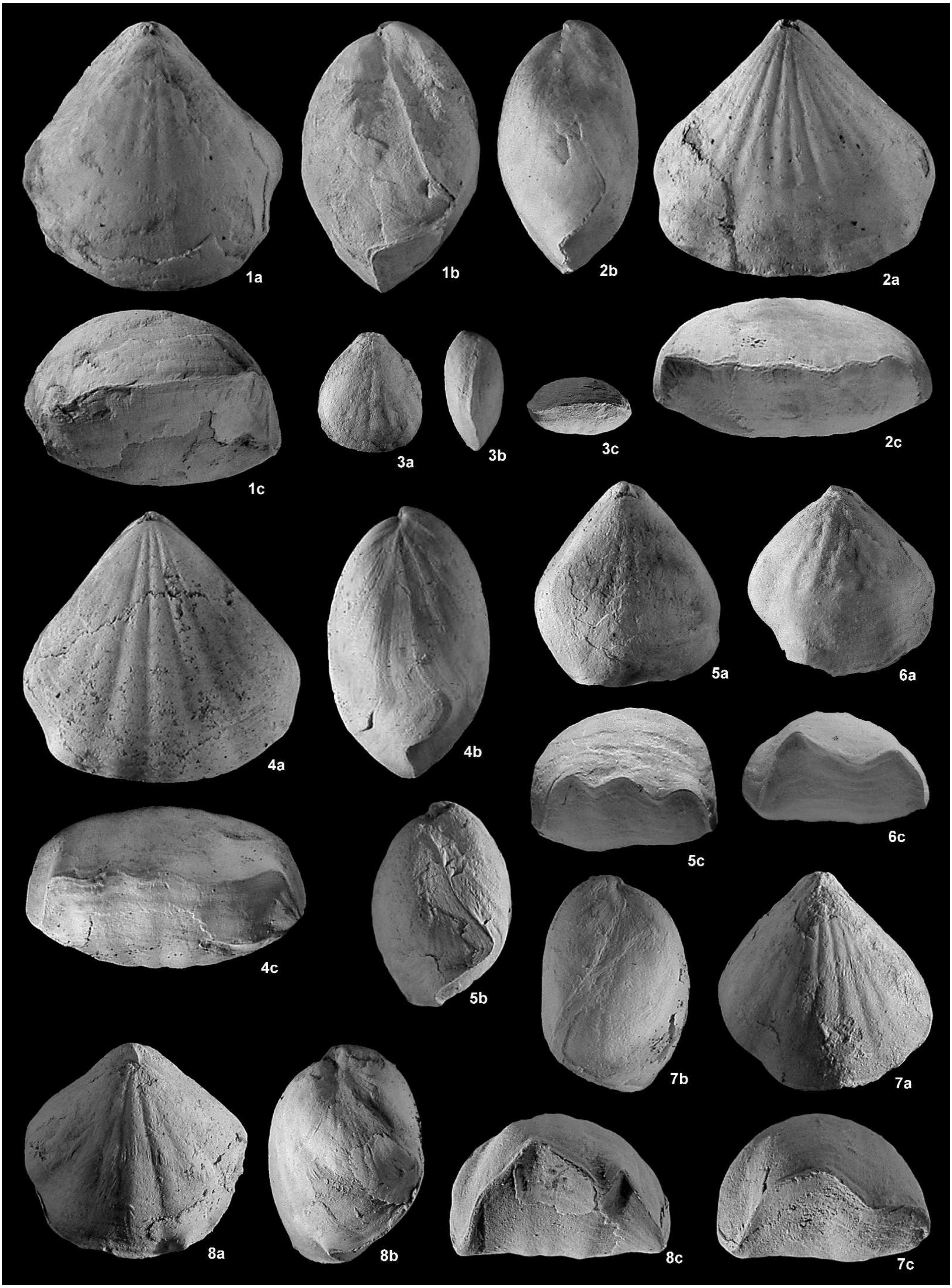
8a
7a
8b
7c
8c

Plate IV

All figures are magnified twice unless otherwise indicated. Specimens have been coated with ammonium chloride before photography. Specimens are deposited in the collection of the Geological and Paleontological Department, Hungarian Natural History Museum, under the inventory numbers prefixed by M.

1. *Megapringia stoppanii* (PARONA, 1880) – M.2007.152.1., Lókút, Fenyveskút, scree, Margaritatus(?) Zone; a: dorsal view, b: lateral view, c: anterior view.
2. *Megapringia stoppanii* (PARONA, 1880) – M.2007.153.1., Lókút, Fenyveskút, scree, Margaritatus(?) Zone; average (typical) variant; a: dorsal view, b: lateral view, c: anterior view.
3. *Megapringia stoppanii* (PARONA, 1880) – M.2007.154.1., Lókút, Fenyveskút, scree, Margaritatus(?) Zone; immature specimen; a: dorsal view, b: lateral view, c: anterior view.
4. *Megapringia stoppanii* (PARONA, 1880) – M.2007.155.1., Lókút, Fenyveskút, scree, Margaritatus(?) Zone; average (typical) variant; a: dorsal view, b: lateral view, c: anterior view.
5. *Megapringia altesinuata* (BÖSE, 1898) – M.2007.156.1., Lókút, Fenyveskút 5/c, Margaritatus(?) Zone; variant close to *M. stoppanii* (PARONA, 1880); a: dorsal view, b: lateral view, c: anterior view.
6. *Megapringia altesinuata* (BÖSE, 1898) – M.2007.157.1., Lókút, Fenyveskút 5/c, Margaritatus(?) Zone; average (typical) variant; a: dorsal view, c: anterior view.
7. *Megapringia altesinuata* (BÖSE, 1898) – M.2007.158.1., Lókút, Fenyveskút 5/c, Margaritatus(?) Zone; a: dorsal view, b: lateral view, c: anterior view.
8. *Megapringia altesinuata* (BÖSE, 1898) – M.2007.159.1., Lókút, Fenyveskút 5/c, Margaritatus(?) Zone; average (typical) variant; a: dorsal view, b: lateral view, c: anterior view.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7a
8a
8b
8c
7c

Plate V

All figures are magnified twice unless otherwise indicated. Specimens have been coated with ammonium chloride before photography. Specimens are deposited in the collection of the Geological and Paleontological Department, Hungarian Natural History Museum, under the inventory numbers prefixed by M.

1. *Megapringia altesinuata* (Böse, 1898) – M.2007.160.1., Lókút, Fenyveskút, scree, Margaritatus(?) Zone; multiplicate variant; a: dorsal view, b: lateral view, c: anterior view.
2. *Megapringia altesinuata* (Böse, 1898) – M.2007.161.1., Lókút, Fenyveskút, scree, Margaritatus(?) Zone; stout variant; a: dorsal view, b: lateral view, c: anterior view.
3. *Megapringia altesinuata* (Böse, 1898) – M.2007.162.1., Lókút, Fenyveskút, scree, Margaritatus(?) Zone; average (typical) variant; a: dorsal view, b: lateral view, c: anterior view.
4. *Megapringia altesinuata* (Böse, 1898) – M.2007.163.1., Lókút, Fenyveskút, scree, Margaritatus(?) Zone; average (typical) variant; a: dorsal view, b: lateral view, c: anterior view.
5. *Megapringia altesinuata* (Böse, 1898) – M.2007.164.1., Lókút, Fenyveskút 5/c, Margaritatus(?) Zone; variant close to *M. stoppanii* (Parona, 1880); a: dorsal view, b: lateral view, c: anterior view.
6. *Megapringia altesinuata* (Böse, 1898) – M.2007.165.1., Eplény, Margaritatus(?) Zone; multiplicate variant; a: dorsal view, b: lateral view, c: anterior view.
7. *Megapringia altesinuata* (Böse, 1898) – M.2007.166.1., Lókút, Kericser VI, Bed 12, Davoei Zone; a: dorsal view, b: lateral view, c: anterior view.
8. *Megapringia altesinuata* (Böse, 1898) – M.2007.167.1., Lókút, Fenyveskút 5/a, Margaritatus(?) Zone; variant close to *M. stoppanii* (Parona, 1880); a: dorsal view, b: lateral view, c: anterior view.


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6b
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7c

Plate VI

All figures are magnified twice unless otherwise indicated. Specimens have been coated with ammonium chloride before photography. Specimens are deposited in the collection of the Geological and Paleontological Department, Hungarian Natural History Museum, under the inventory numbers prefixed by M.

1. *Megapringia altesinuata* (Böse, 1898) – M.2007.168.1., Kericser VI, Bed 7, Margaritatus Zone (Stokesi Subzone); multiplicate variant; a: dorsal view, b: lateral view, c: anterior view.
2. *Megapringia altesinuata* (Böse, 1898) – M.2007.169.1., Lókút, Fenyveskút p1, Margaritatus(?) Zone; multiplicate variant; a: dorsal view, b: lateral view, c: anterior view.
3. *Megapringia altesinuata* (Böse, 1898) – M.2007.170.1., Lókút, Fenyveskút p1, Margaritatus(?) Zone; average (typical) variant; a: dorsal view, b: lateral view, c: anterior view.
4. *Megapringia* ? *atlaeformis* (Böse, 1898) – M.2007.171.1., Lókút, Fenyveskút p2, Margaritatus(?) Zone; a: dorsal view, b: lateral view, c: anterior view.
5. *Serratapringia* ? *suetii* (Haas, 1884) – M.2007.172.1., Lókút, Fenyveskút, scree, Margaritatus(?) Zone; a: dorsal view.
6. *Serratapringia* ? *suetii* (Haas, 1884) – M.2007.173.1., Lókút, Fenyveskút 5/c, Margaritatus(?) Zone; a: dorsal view, b: lateral view, c: anterior view.
7. *Serratapringia* ? *suetii* (Haas, 1884) – plaster cast of the sectioned specimen M.2007.273.1., Lókút, Fenyveskút, scree, Margaritatus(?) Zone; a: dorsal view, c: anterior view.

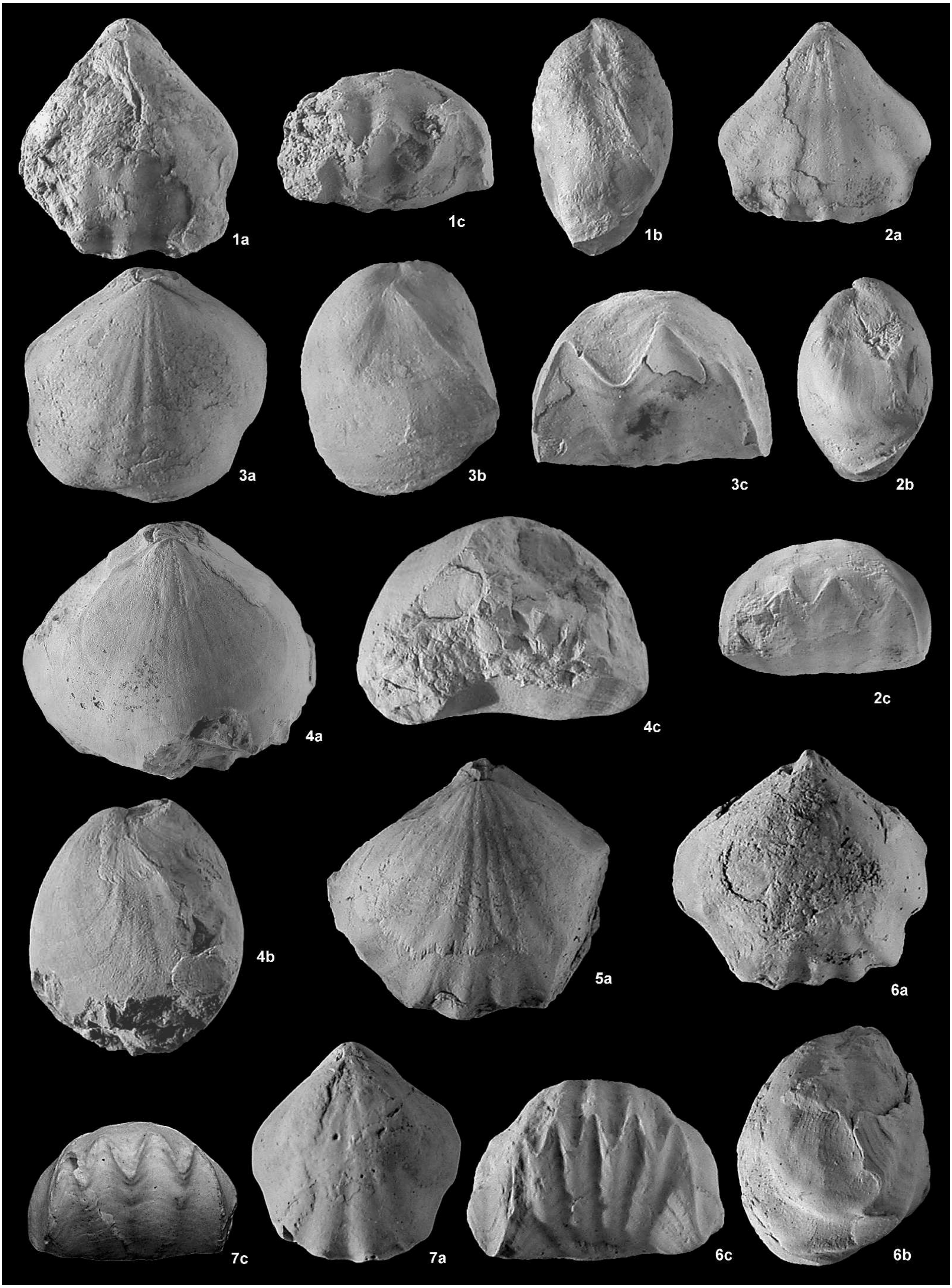
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Plate VII

All figures are magnified twice unless otherwise indicated. Specimens have been coated with ammonium chloride before photography. Specimens are deposited in the collection of the Geological and Paleontological Department, Hungarian Natural History Museum, under the inventory numbers prefixed by M. and in the Museum of the Geological Institute of Hungary, under the inventory number prefixed by J.

1. *Lokutella liasina* (PRINCIPI, 1910) – M.2007.174.1., Lókút, Fenyveskút 5/c, Margaritatus(?) Zone; a: dorsal view, b: lateral view, c: anterior view.
2. *Lokutella liasina* (PRINCIPI, 1910) – M.2007.175.1., Lókút, Kericser VI, Bed 14, Davoei Zone; a: dorsal view, b: right lateral view, c: anterior view, d: left lateral view.
3. *Lokutella liasina* (PRINCIPI, 1910) – M.2007.176.1., Lókút, Kericser VI, Bed 12, Davoei Zone; a: dorsal view, b: lateral view, c: anterior view.
4. *Lokutella liasina* (PRINCIPI, 1910) – M.2007.177.1., Lókút, Kericser VI, Bed 7, Margaritatus Zone (Stokesi Subzone); a: dorsal view, b: lateral view, c: anterior view.
5. *Lokutella liasina* (PRINCIPI, 1910) – M.2007.178.1., Szentgál, Tűzköves-hegy T-I, Bed 12, Jamesoni(?) or Ibex Zone; a: dorsal view, b: lateral view, c: anterior view.
6. *Lokutella palmaeformis* (HAAS, 1912) – M.2007.179.1., Lókút, Kericser VI, scree from the upper part of the section, Davoei or Margaritatus(?) Zone; a: dorsal view, b: lateral view, c: anterior view.
7. *Lokutella palmaeformis* (HAAS, 1912) – M.2007.180.1., Lókút, Kericser VI, scree from the upper part of the section, Davoei or Margaritatus(?) Zone; variant with few costae; a: dorsal view, b: lateral view, c: anterior view.
8. *Lokutella palmaeformis* (HAAS, 1912) – M.2007.181.1., Lókút, Kericser VI, Bed 20, Davoei Zone; average (typical) variant; a: dorsal view, b: lateral view, c: anterior view.
9. *Lokutella palmaeformis* (HAAS, 1912) – M.2007.182.1., Lókút, Kericser VI, Bed 18, Davoei Zone; densely ribbed variant; a: dorsal view, c: anterior view.
10. *Lokutella palmaeformis* (HAAS, 1912) – M.2007.183.1., Lókút, Kericser VI, scree from the upper part of the section, Davoei or Margaritatus(?) Zone; average (typical) variant; a: dorsal view, b: lateral view, c: anterior view.
11. *Lokutella palmaeformis* (HAAS, 1912) – M.2007.184.1., Bakonyszűcs, Kőris-hegy B/5, Davoei(?) Zone; coarsely ribbed variant; a: dorsal view, b: lateral view, c: anterior view.
12. *Lokutella palmaeformis* (HAAS, 1912) – M.2007.185.1., Lókút, Kericser VI, Bed 6, Spinatum Zone; specimen with irregularly bifurcate ribbing; a: ventral view, b: lateral view, c: anterior view.
13. *Lokutella palmaeformis* (HAAS, 1912) – M.2007.186.1., Lókút, Kericser VI, Bed 20, Davoei Zone; a: dorsal view, b: lateral view, c: anterior view.
14. *Lokutella kondai* VÖRÖS, 1983 – M.2007.187.1., Bakonyszűcs, Kőris-hegy B/5, Davoei(?) Zone; a: dorsal view, b: lateral view, c: anterior view.
15. *Lokutella kondai* VÖRÖS, 1983; refigured paratype – J.9186., Lókút, Kericser VI, Bed 14, Davoei Zone; a: dorsal view, b: lateral view, c: anterior view.

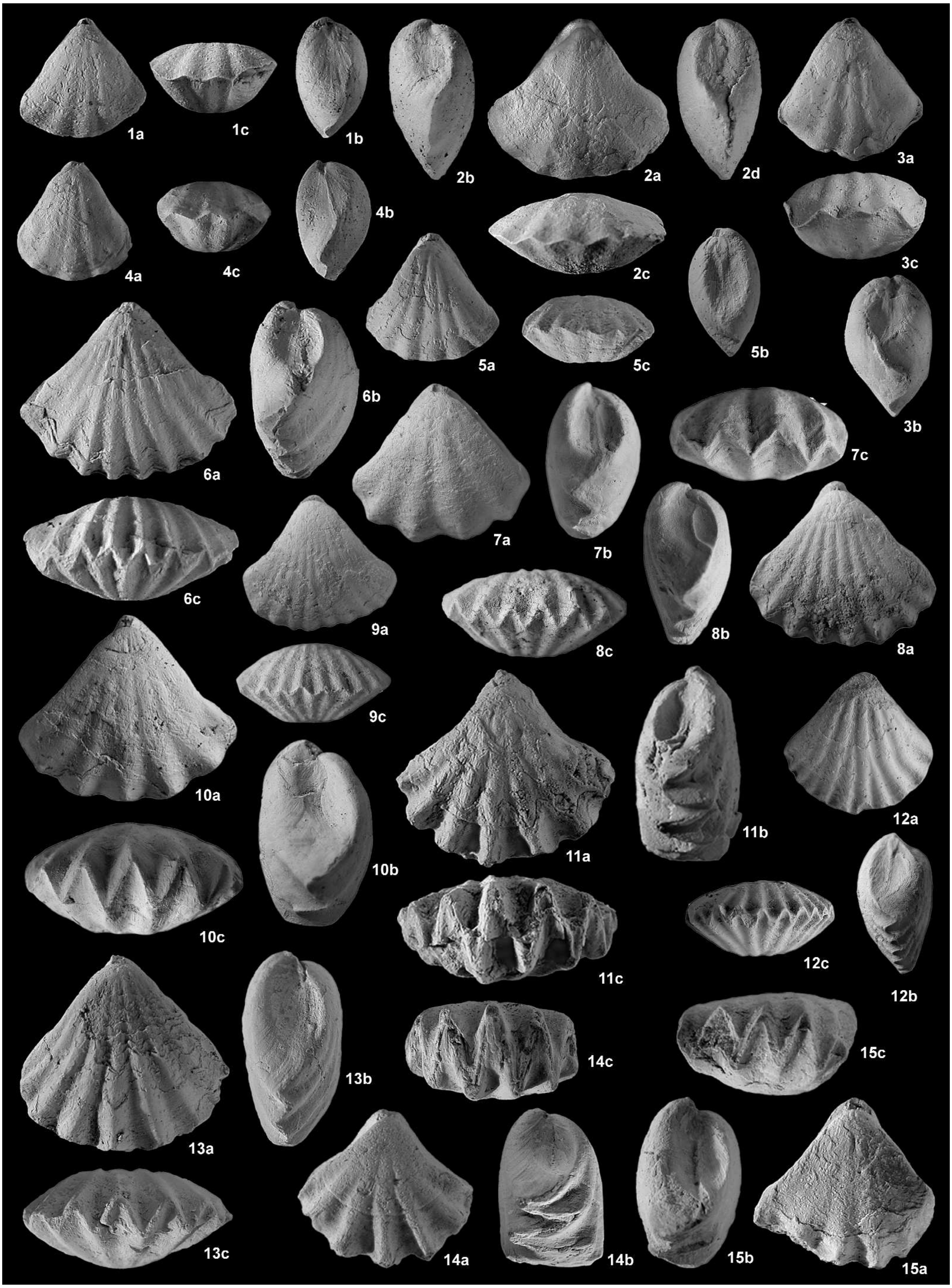
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Plate VIII

All figures are magnified twice unless otherwise indicated. Specimens have been coated with ammonium chloride before photography. Specimens are deposited in the collection of the Geological and Paleontological Department, Hungarian Natural History Museum, under the inventory numbers prefixed by M.

1. *Lokutella kondai* VÖRÖS, 1983; refigured holotype – M.82.1., Bakonyszűcs, Kőris-hegy B/5, Davoei(?) Zone; a: dorsal view, b: lateral view, c: anterior view.
2. *Lokutella kondai* VÖRÖS, 1983 – M.2007.188.1., Bakonyszűcs, Kőris-hegy B/5, Davoei(?) Zone; large specimen with irregularly bifurcate ribbing near the anterior margin; a: dorsal view, b: lateral view, c: anterior view.
3. *Prionorhynchia polyptycha* (OPPEL, 1861) – M.2007.189.1., Lókút, Kericser VI, Bed 34, Ibex(?) Zone; a: dorsal view, b: lateral view, c: anterior view.
4. *Prionorhynchia* aff. *greppini* (OPPEL, 1861) – M.2007.190.1., Lókút, Kericser VI, Bed 31, Ibex(?) Zone; a: dorsal view, b: lateral view, c: anterior view, d: uncoated lateral view to show the shape of the lateral commissure.
5. *Prionorhynchia* ? *flabellum* (GEMMELLARO, 1874) – M.2007.191.1., Lókút, Kericser VI, Bed 11, Davoei Zone; a: dorsal view, b: lateral view, c: anterior view.
6. *Prionorhynchia* ? *catharinae* n. sp.; holotype – M.2007.192.1., Lókút, Fenyveskút D, Margaritatus(?) Zone; a: dorsal view, b: lateral view, c: anterior view.
7. *Prionorhynchia* ? *hagaviensis* (BÖSE, 1898) – M.2007.193.1., Lókút, Fenyveskút p1, Margaritatus(?) Zone; a: dorsal view, b: lateral view, c: anterior view.
8. *Prionorhynchia* ? *hagaviensis* (BÖSE, 1898) – M.2007.194.1., Lókút, Fenyveskút, scree, Margaritatus(?) Zone; a: dorsal view, b: lateral view, c: anterior view.
9. *Cirpa* ? *subcostellata* (GEMMELLARO, 1878) – M.2007.195.1., Lókút, Kericser VI, Bed 35, Ibex(?) Zone; a: dorsal view, b: lateral view, c: anterior view.
10. *Cirpa* ? *subfurcillata* (BÖSE, 1898) – M.2007.196.1., Lókút, Fenyveskút, scree, Margaritatus(?) Zone; a: dorsal view, b: lateral view, c: anterior view.
11. *Calcirhynchia* ? *hungarica* (BÖCKH, 1874) – M.2007.197.1., Lókút, Kericser VI, Bed 33, Ibex(?) Zone; a: dorsal view, b: lateral view, c: anterior view.
12. *Jakubirhynchia* ? cf. *fascicostata* (UHLIG, 1880) – M.2007.198.1., Lókút, Kericser VI, Bed 15, Davoei Zone; small specimen; a: dorsal view, b: lateral view, c: anterior view.
13. *Jakubirhynchia* ? cf. *fascicostata* (UHLIG, 1880) – M.2007.199.1., Lókút, Kericser VI, Bed 15, Davoei Zone; a: dorsal view, b: lateral view, c: anterior view.

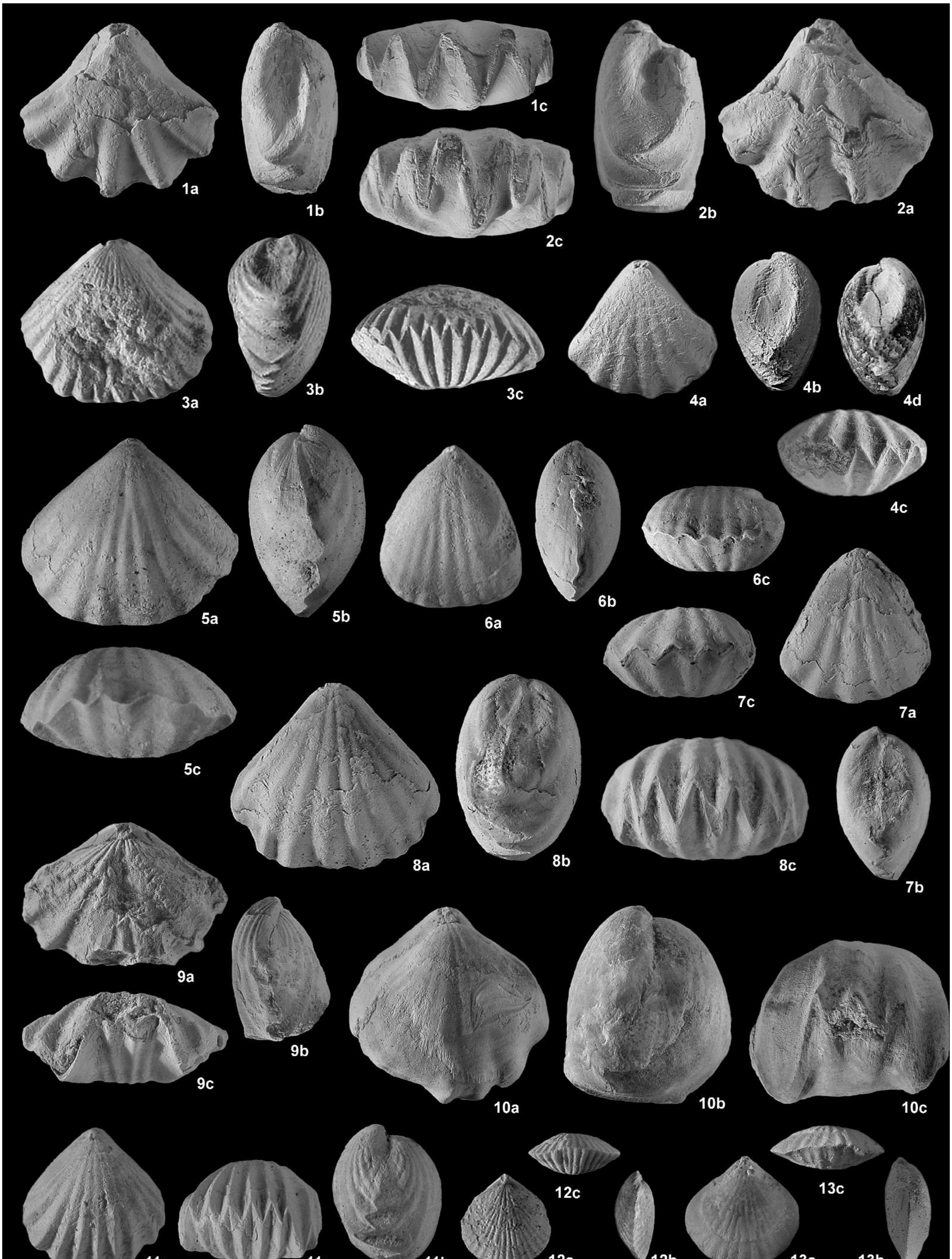
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Plate IX

All figures are magnified twice unless otherwise indicated. Specimens have been coated with ammonium chloride before photography. Specimens are deposited in the collection of the Geological and Paleontological Department, Hungarian Natural History Museum, under the inventory numbers prefixed by M.

1. *Jakubirhynchia* ? aff. *laevicosta* (Geyer, 1889) – M.2007.200.1., Lókút, Kericser VI, Bed 12, Davoei Zone; a: dorsal view, b: lateral view, c: anterior view.
2. *Jakubirhynchia* ? aff. *laevicosta* (Geyer, 1889) – M.2007.201.1., Lókút, Kericser VI, Bed 19, Davoei Zone; a: dorsal view, b: lateral view, c: anterior view.
3. *Jakubirhynchia* ? aff. *laevicosta* (Geyer, 1889) – M.2007.202.1., Lókút, Kericser VI, scree from the lower part of the section, Ibex(?) Zone; a: dorsal view, b: lateral view, c: anterior view.
4. *Jakubirhynchia* ? aff. *laevicosta* (Geyer, 1889) – M.2007.203.1., Lókút, Kericser VI, Bed 18, Davoei Zone; a: dorsal view, b: lateral view, c: anterior view.
5. *Homoeorhynchia* cf. *acuta* (Sowerby, 1816) – M.2007.204.1., Lókút, Kericser VI, Bed 7, Margaritatus Zone (Stokesi Subzone); single specimen with asymmetric fold; a: dorsal view, b: lateral view, c: anterior view.
6. *Homoeorhynchia* ? *ptinoides* (Di Stefano, 1891) – M.2007.205.1., Lókút, Kericser VI, Bed 30, Ibex Zone; a: dorsal view, b: lateral view, c: anterior view.
7. *Homoeorhynchia* ? *lubrica* (Uhlig, 1879) – M.2007.206.1., Lókút, Kericser VI, Bed 26, Ibex Zone; a: dorsal view, b: lateral view, c: anterior view.
8. *Cuneirhynchia cf. rastuensis* Benigni, 1983 – M.2007.207.1., Bakonyszűcs, Kőris-hegy B/5, Davoei(?) Zone; incomplete ventral valve; ventral view.
9. *Pisirhynchia pisoides* (Zittel, 1869) – M.2007.208.1., Lókút, Kericser VI, Bed 5, Spinatum Zone; a: dorsal view, b: lateral view, c: anterior view.
10. *Pisirhynchia pisoides* (Zittel, 1869) – M.2007.209.1., Lókút, Fenyveskút 5/c, Margaritatus(?) Zone; a: dorsal view, b: lateral view, c: anterior view.
11. *Pisirhynchia pisoides* (Zittel, 1869) – M.98.2., Lókút, Kericser VI, Bed 8, Margaritatus Zone (Stokesi Subzone); a: dorsal view, b: lateral view, c: anterior view.
12. *Pisirhynchia pisoides* (Zittel, 1869) – M.2007.210.1., Lókút, Kericser VI, Bed 7, Margaritatus Zone (Stokesi Subzone); a: dorsal view, b: lateral view, c: anterior view.
13. *Pisirhynchia retroplicata* (Zittel, 1869) – M.2007.211.1., Lókút, Kericser VI, Bed 12, Davoei Zone; a: dorsal view, b: lateral view, c: anterior view.
14. *Pisirhynchia retroplicata* (Zittel, 1869) – M.2007.212.1., Lókút, Kericser VI, Bed 12, Davoei Zone; variant with antidichotomous ribbing; a: dorsal view, b: lateral view, c: anterior view.
15. *Pisirhynchia retroplicata* (Zittel, 1869) – M.2007.213.1., Lókút, Kericser VI, Bed 25, Ibex Zone; a: dorsal view, b: lateral view, c: anterior view.
16. *Pisirhynchia retroplicata* (Zittel, 1869) – M.2007.214.1., Lókút, Kericser VI, Bed 15, Davoei Zone; a: dorsal view, b: lateral view, c: anterior view.
17. *Pisirhynchia retroplicata* (Zittel, 1869) – M.2007.215.1., Lókút, Kericser VI, Bed 19, Davoei Zone; a: dorsal view, b: lateral view, c: anterior view.
18. *Pisirhynchia retroplicata* (Zittel, 1869) – M.2007.216.1., Lókút, Kericser VI, scree from the upper part of the section, Davoei or Margaritatus(?) Zone; average (typical) variant; a: dorsal view, b: lateral view, c: anterior view.
19. *Pisirhynchia retroplicata* (Zittel, 1869) – M.2007.217.1., Lókút, Kericser VI, scree from the upper part of the section, Davoei or Margaritatus(?) Zone; specimen with slightly asymmetric folding; a: dorsal view, b: lateral view, c: anterior view.
20. *Pisirhynchia retroplicata* (Zittel, 1869) – M.2007.218.1., Lókút, Kericser VI, scree from the upper part of the section, Davoei or Margaritatus(?) Zone; a: dorsal view, b: lateral view, c: anterior view.
21. *Pisirhynchia retroplicata* (Zittel, 1869) – M.2007.219.1., Gyulafirátót, Mohoskő 85, probably Carixian; specimen with strongly asymmetric folding; a: dorsal view, b: lateral view, c: anterior view.
22. *Pisirhynchia retroplicata* (Zittel, 1869) – M.2007.220.1., Lókút, Kericser VI, Bed 19, Davoei Zone; specimen without ribbing; a: dorsal view, b: lateral view, c: anterior view.

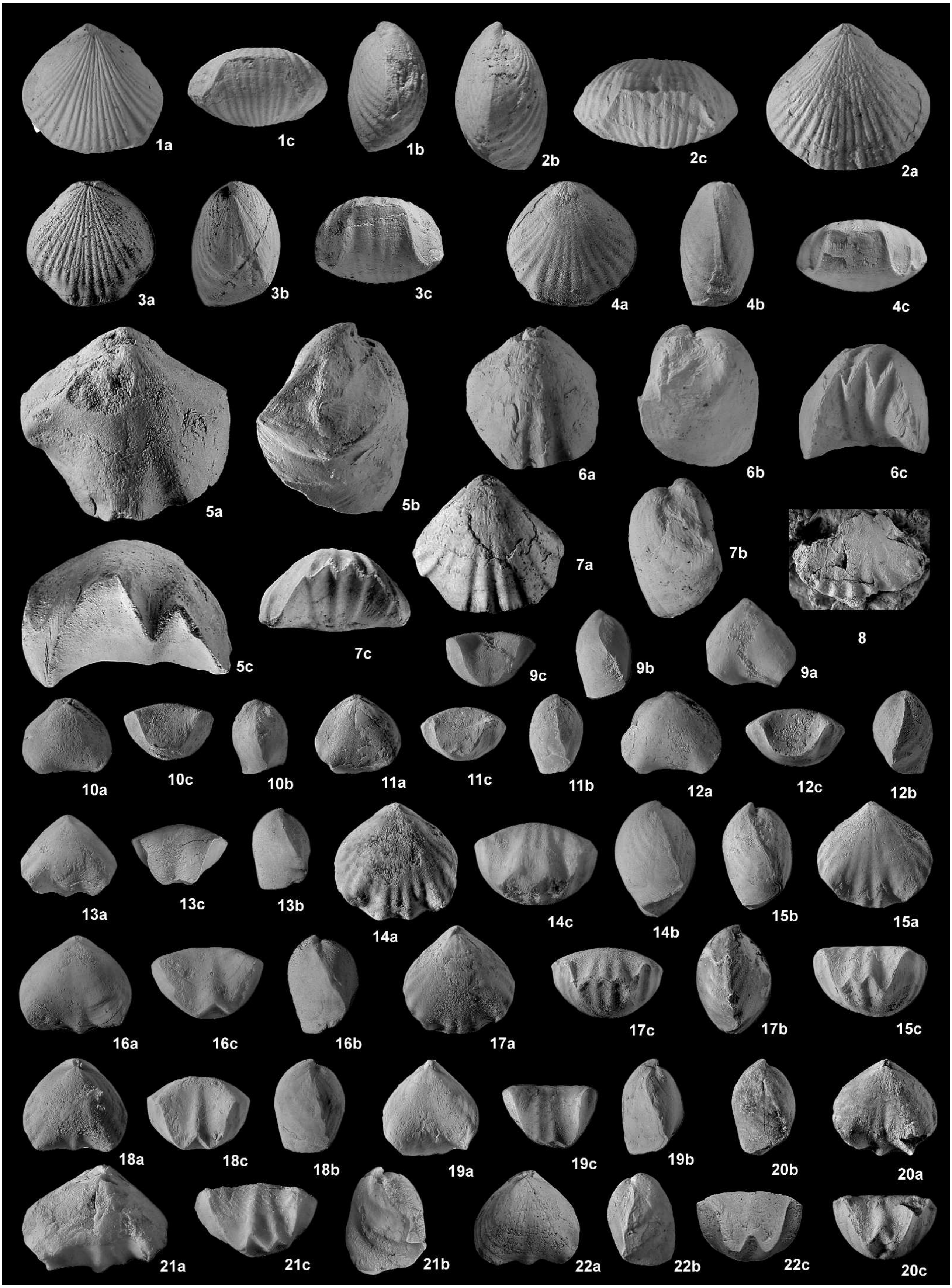
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Plate X

All figures are magnified twice unless otherwise indicated. Specimens have been coated with ammonium chloride before photography. Specimens are deposited in the collection of the Geological and Paleontological Department, Hungarian Natural History Museum, under the inventory numbers prefixed by M.

1. *Fenyveskutella vighi* n. sp.; holotype – M.2007.221.1., Lókút, Fenyveskút p1, Margaritatus(?) Zone; a: dorsal view, b: lateral view, c: anterior view.
2. *Fenyveskutella vighi* n. sp.; paratype – M.2007.222.1., Lókút, Fenyveskút É, Margaritatus(?) Zone; variant with bisulcate anterior commissure; a: dorsal view, b: lateral view, c: anterior view.
3. *Fenyveskutella vighi* n. sp. – M.2007.223.1., Lókút, Fenyveskút É, Margaritatus(?) Zone; a: dorsal view, b: lateral view, c: anterior view.
4. *Fenyveskutella vighi* n. sp. – M.2007.224.1., Lókút, Fenyveskút É, Margaritatus(?) Zone; variant with wide sinus; a: dorsal view, b: lateral view, c: anterior view.
5. *Fenyveskutella vighi* n. sp.; paratype – M.2007.225.1., Lókút, Fenyveskút É, Margaritatus(?) Zone; elongate variant with bisulcate anterior commissure; a: dorsal view, b: lateral view, c: anterior view.
6. *Fenyveskutella vighi* n. sp. – M.2007.226.1., Lókút, Fenyveskút p1, Margaritatus(?) Zone; a: dorsal view, b: lateral view, c: anterior view.
7. *Fenyveskutella vighi* n. sp. – M.2007.227.1., Eplény, Margaritatus(?) Zone; a: dorsal view, b: lateral view, c: anterior view.
8. *Fenyveskutella pseudouhligi* n. sp.; paratype – M.2007.228.1., Lókút, Kericser VI, scree, probably Carixian; a: dorsal view, b: lateral view, c: anterior view.
9. *Fenyveskutella pseudouhligi* n. sp.; holotype – M.2007.229.1., Szentgál, Gombás-puszta Fg-I ("basal layer"), Carixian; a: dorsal view, b: lateral view, c: anterior view.
10. *Fenyveskutella* aff. *vighi* n. sp. – M.2007.230.1., Lókút, Fenyveskút, scree, Margaritatus(?) Zone, a: dorsal view, b: lateral view, c: anterior view.
11. *Fenyveskutella theresiae* n. sp.; holotype – M.2007.231.1., Lókút, Fenyveskút É, Margaritatus(?) Zone; a: dorsal view, b: lateral view, c: anterior view.
12. *Kericserella inversaeformis* (Schlosser, 1900) – M.98.1., Lókút, Kericser VI, Bed 26, Ibex Zone; a: dorsal view, b: lateral view, c: anterior view.
13. *Kericserella inversaeformis* (Schlosser, 1900) – M.2007.232.1., Lókút, Kericser VI, Bed 17, Davoei Zone; a: dorsal view, b: lateral view, c: anterior view.
14. *Kericserella inversaeformis* (Schlosser, 1900) – M.2007.233.1., Lókút, Kericser VI, Bed 18, Davoei Zone; a: dorsal view, b: lateral view, c: anterior view.
15. *Paronarhynchia bulga* (Parona, 1893) – M.2007.234.1., Lókút, Fenyveskút É, Margaritatus(?) Zone; a: dorsal view, b: lateral view, c: anterior view.
16. *Paronarhynchia bulga* (Parona, 1893) – M.2007.235.1., Lókút, Fenyveskút É, Margaritatus(?) Zone; variant with concave anterior flattening; a: dorsal view, b: lateral view, c: anterior view.
17. *Paronarhynchia bulga* (Parona, 1893) – M.2007.236.1., Lókút, Fenyveskút É, Margaritatus(?) Zone; small specimen with concave anterior flattening; a: dorsal view, b: lateral view, c: anterior view.

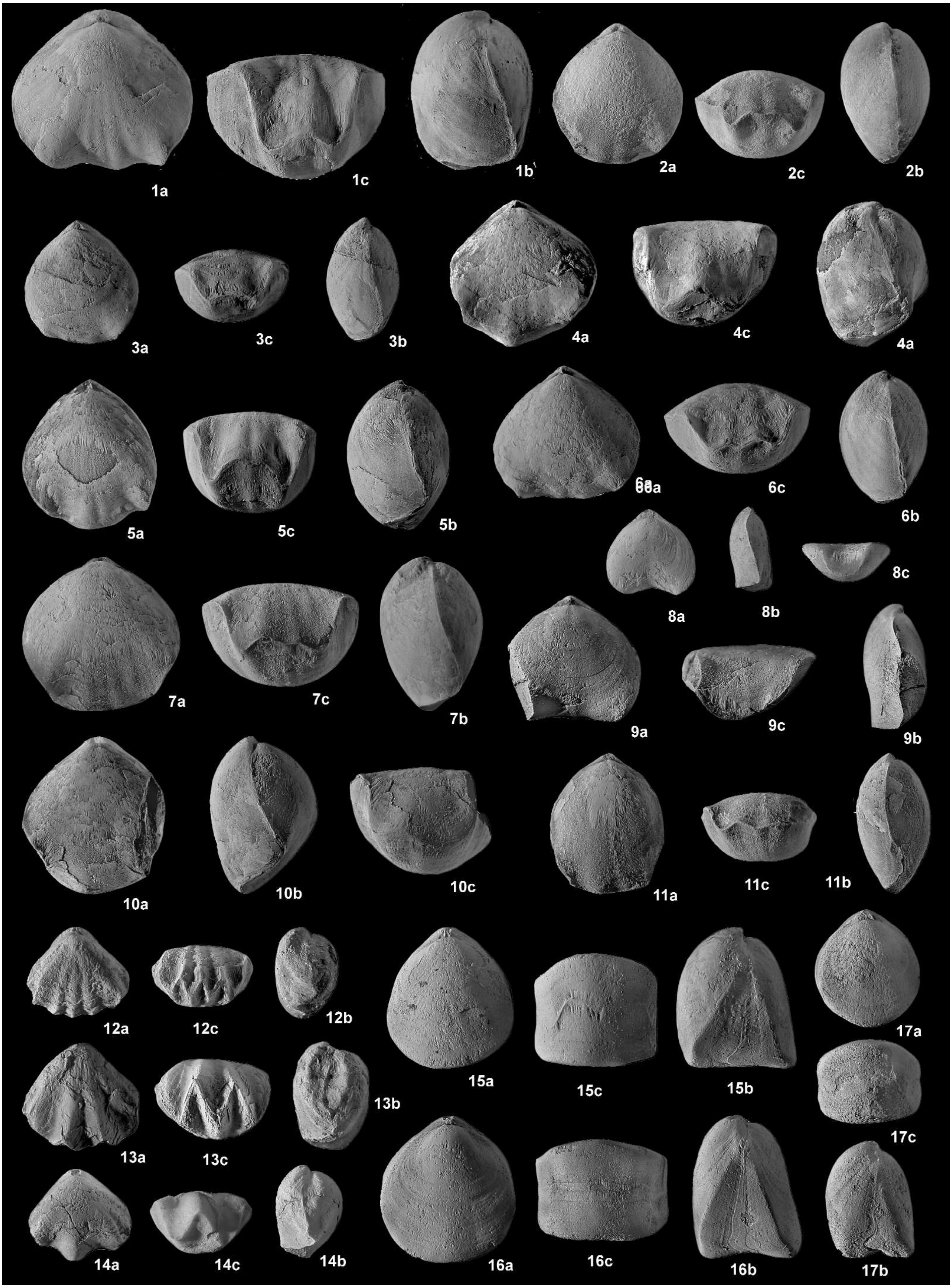

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Plate XI

All figures are magnified twice unless otherwise indicated. Specimens have been coated with ammonium chloride before photography. Specimens are deposited in the collection of the Geological and Paleontological Department, Hungarian Natural History Museum, under the inventory numbers prefixed by M.

1. *Paronarhynchia estherae* n. sp.; holotype – M.2007.237.1., Lókút, Fenyveskút p2, Margaritatus(?) Zone; a: dorsal view, b: lateral view, c: anterior view.
2. *Paronarhynchia estherae* n. sp. – M.2007.238.1., Lókút, Papod C/87, probably Domerian; a: dorsal view, b: lateral view, c: anterior view.
3. *Paronarhynchia estherae* n. sp.; paratype – M.2007.239.1., Lókút, Fenyveskút p1, Margaritatus(?) Zone; a: dorsal view, b: lateral view, c: anterior view.
4. *Paronarhynchia estherae* n. sp. – M.2007.240.1., Lókút, Fenyveskút, scree, Margaritatus(?) Zone; a: dorsal view, b: lateral view, c: anterior view.
5. *Paronarhynchia* ? cf. *verrii* (Parona, 1883) – M.2007.241.1., Lókút, Kericser VI, Bed 6, Spinatum Zone; a: dorsal view, b: lateral view.
6. *Nannirhynchia reynesi* (Gemmellaro, 1874) – M.2007.242.1., Lókút, Kericser VI, Bed 4, Spinatum Zone; a: dorsal view, b: lateral view, c: anterior view.
7. *Nannirhynchia reynesi* (Gemmellaro, 1874) – M.2007.243.1., Bakonybél, Kőris-hegy A/3, probably Domerian; a: dorsal view, b: lateral view, c: anterior view.
8. *Nannirhynchia gemmellaroi* (Parona, 1880) – M.2007.244.1., Lókút, Kericser VI, Bed 7, Margaritatus Zone (Stokesi Subzone); a: dorsal view, b: lateral view, c: anterior view.
9. *Nannirhynchia gemmellaroi* (Parona, 1880) – M.2007.245.1., Lókút, Kericser VI, Bed 7, Margaritatus Zone (Stokesi Subzone); variant with wide plica; a: dorsal view, b: lateral view, c: anterior view.
10. *Nannirhynchia gemmellaroi* (Parona, 1880) – M.2007.246.1., Lókút, Kericser VI, Bed 7, Margaritatus Zone (Stokesi Subzone); variant with incipient secondary sulcus in the plica; a: dorsal view, b: lateral view, c: anterior view.
11. *Nannirhynchia gemmellaroi* (Parona, 1880) – M.2007.247.1., Lókút, Kericser VI, Bed 10, Margaritatus Zone (Stokesi Subzone); a: dorsal view, b: lateral view, c: anterior view.
12. *Nannirhynchia gemmellaroi* (Parona, 1880) – M.2007.248.1., Lókút, Kericser VI, Bed 8, Margaritatus Zone (Stokesi Subzone); a: dorsal view, b: lateral view, c: anterior view.
13. *Nannirhynchia gemmellaroi* (Parona, 1880) – M.2007.249.1., Lókút, Kericser VI, scree from the upper part of the section, Davoei or Margaritatus(?) Zone; variant with extremely wide plica; a: dorsal view, b: lateral view, c: anterior view.
14. *Nannirhynchia sinuata* (Haas, 1912) – M.2007.250.1., Lókút, Fenyveskút É, Margaritatus Zone(?); a: dorsal view, b: lateral view, c: anterior view.
15. *Gibbirhynchia* ? cf. *urkutica* (Böckh, 1874) – M.2007.251.1., Lókút, Kericser VI, Bed 33, Ibex Zone(?); a: dorsal view, b: lateral view, c: anterior view.
16. *Gibbirhynchia* cf. *curviceps* (Quenstedt, 1858) – M.2007.252.1., Borzavár, Páskom, probably Carician; b: lateral view, c: anterior view.
17. *Gibbirhynchia* ? *orsinii* (Gemmellaro, 1874) – M.2007.253.1., Lókút, Kericser VI, Bed 28, Ibex Zone; a: dorsal view, b: lateral view, c: anterior view.
18. *Gibbirhynchia* ? *orsinii* (Gemmellaro, 1874) – M.2007.254.1., Lókút, Kericser VI, Bed 24, Ibex Zone; a: dorsal view, b: lateral view, c: anterior view.
19. *Gibbirhynchia* ? *orsinii* (Gemmellaro, 1874) – M.2007.255.1., Lókút, Kericser VI, Bed 25, Ibex Zone; a: dorsal view, b: lateral view, c: anterior view.
20. *Amphiclinodonta liasina* Bittner, 1888 – M.2007.256.1., Eplény, Margaritatus(?) Zone; ventral view.
21. *Koninckodonta fuggeri* Bittner, 1894 – M.2007.257.1., Lókút, Fenyveskút, scree, Margaritatus Zone(?); a: dorsal view, b: lateral view.
22. *Koninckodonta fuggeri* Bittner, 1894 – M.2007.258.1., Lókút, Fenyveskút p2, Margaritatus Zone(?); ventral view.
23. *Koninckodonta eberhardi* Bittner, 1888 – M.2007.259.1., Eplény, Margaritatus Zone(?); a: dorsal view, b: lateral view, c: anterior view.
24. *Koninckodonta* cf. *waehneri* (Bittner, 1894) – M.2007.260.1., Lókút, Papod B/86; probably Domerian; orbicular variant; a: dorsal view, b: lateral view, c: anterior view.
25. *Koninckodonta* cf. *waehneri* (Bittner, 1894) – M.2007.261.1., Lókút, Papod B/86; probably Domerian; a: dorsal view, b: lateral view, c: anterior view.
26. *Koninckodonta* cf. *waehneri* (Bittner, 1894) – M.2007.262.1., Lókút, Fenyveskút 5/c; Margaritatus Zone(?); elongated variant; a: dorsal view, b: anterior view.


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Plate XII

All figures are magnified twice. Specimens have been coated with ammonium chloride before photography unless otherwise stated. Specimens are deposited in the collection of the Geological and Paleontological Department, Hungarian Natural History Museum, under the inventory numbers prefixed by M.

1. *Dispiriferina* cf. *segregata* (Di Stefano, 1887) – M 2007.303.1., Bakonyszűcs, Kőris-hegy B/5, Davoei(?) Zone; dorsal valve in dorsal view.
2. *Liospiriferina alpina* (Oppel, 1861) – M 2007.301.1., Lókút, Kericser VI, scree from the upper part of the section, Davoei or Margaritatus Zone(?); a: dorsal view, b: anterior view, c: lateral view.
3. *Liospiriferina* cf. *brevirostris* (Oppel, 1861) – M 2007.299.1., Lókút, Kericser VI, Bed 7, Margaritatus Zone; a: dorsal view, b: anterior view, c: lateral view.
4. *Liospiriferina gryphoidea* (Uhlig, 1880) – M 2007.295.1., Lókút, Kericser VI, Bed 24, Ibex Zone; ventral valve; a: ventral view, b: lateral view, c: posterior view, d: posterior view, uncoated to show delthyrium.
5. *Liospiriferina gryphoidea* (Uhlig, 1880) – M 2007.296.1., Lókút, Kericser VI, Bed 21, Ibex Zone; ventral valve; a: lateral view, b: ventral view.
6. *Liospiriferina gryphoidea* (Uhlig, 1880) – M 2007.294.1., Lókút, Kericser VI, Bed 35, Ibex Zone; ventral valve; a: ventral view, b: lateral view.
7. *Liospiriferina apenninica* (Canavari, 1880) – M 2008.364.1., Lókút, Kericser VI, Bed 7, Margaritatus Zone; a: dorsal view, b: lateral view.

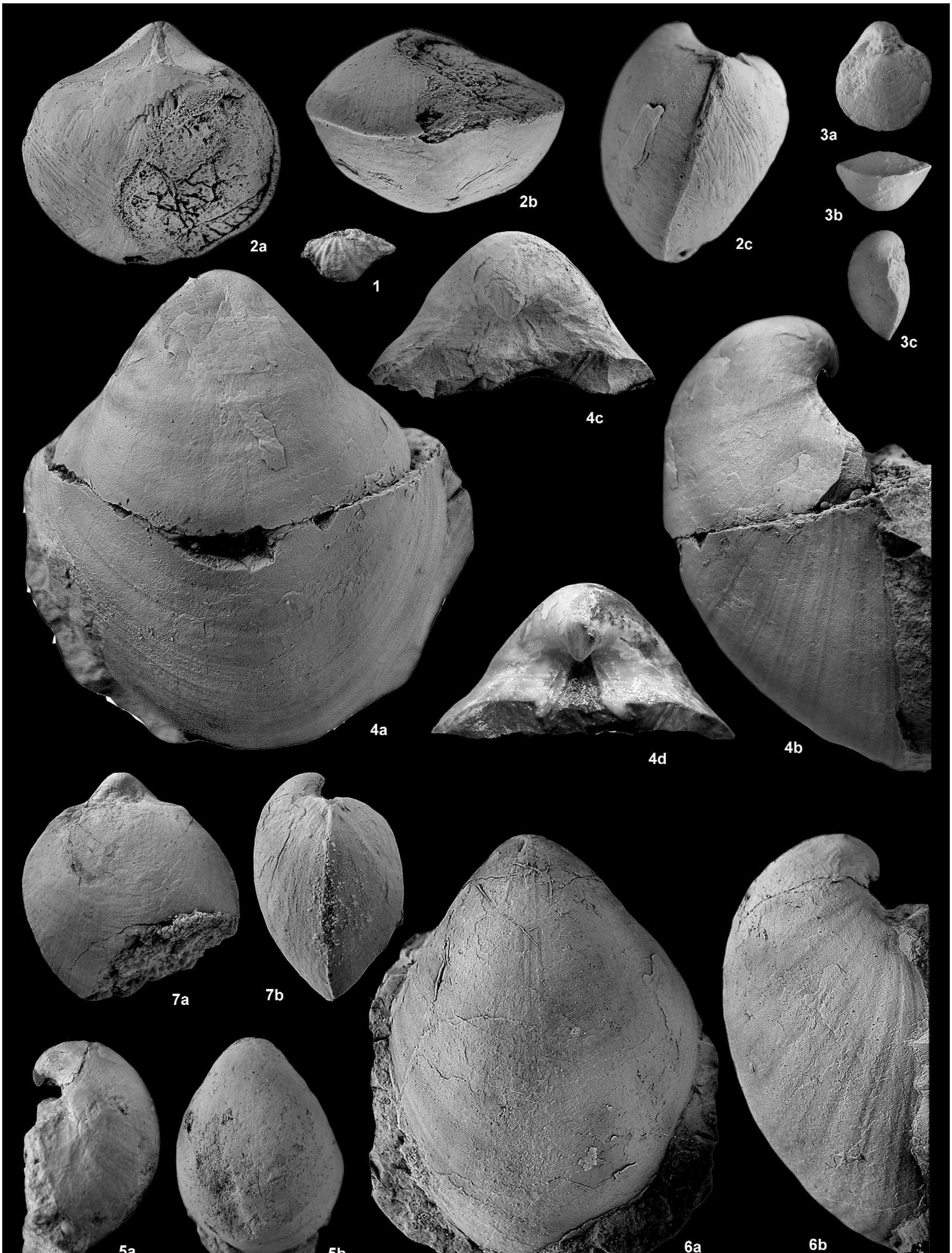
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Plate XIII

All figures are magnified twice. Specimens have been coated with ammonium chloride before photography unless otherwise stated. Specimens are deposited in the collection of the Geological and Paleontological Department, Hungarian Natural History Museum, under the inventory numbers prefixed by M.

1. *Liospiriferina obtusa* (Oppel, 1861) – M 2008.365.1., Lókút, Fenyveskút, scree, Margaritatus Zone; a: dorsal view, b: anterior view, c: lateral view.
2. *Liospiriferina sicula* (Gemmellaro, 1874) – M 2008.366.1., Lókút, Kericser VI, Bed 26, Ibex Zone; a: dorsal view, b: lateral view, c: anterior view.
3. *Liospiriferina sicula* (Gemmellaro, 1874) – M 2008.367.1., Lókút, Fenyveskút 5/c, Margaritatus Zone; a: dorsal view, b: anterior view, c: lateral view.
4. *Liospiriferina sicula* (Gemmellaro, 1874) – M 2008.368.1., Lókút, Kericser VI, scree, Ibex(?) to Spinatum(?) Zone; a: dorsal view, b: anterior view, c: lateral view.
5. *Liospiriferina* aff. *handeli* (Di Stefano, 1887) – M 2008.369.1., Lókút, Kericser VI, Bed 26, Ibex Zone; a: dorsal view, b: lateral view, c: anterior view.
6. *Liospiriferina* cf. *globosa* (Böse, 1898) – M 2008.370.1., Lókút, Kericser VI, scree from the middle part of the section, Ibex to Davoei(?) Zone; a: lateral view, b: dorsal view, c: anterior view.
7. *Liospiriferina* cf. *obovata* (Principi, 1910) – M 2007.302.1., Csókakő (Vértes Mts.), probably Upper Pliensbachian; a: dorsal view, b: lateral view.


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Plate XIV

All figures are magnified twice. Specimens have been coated with ammonium chloride before photography unless otherwise stated. Specimens are deposited in the collection of the Geological and Paleontological Department, Hungarian Natural History Museum, under the inventory numbers prefixed by M.

1. *Cisnerospira darwini* (GEMMELLARO, 1878) – M 2007.300.1., Lókút, Fenyveskút 5/c, Margaritatus Zone; a: dorsal view, b: lateral view, c: anterior view.
2. *Cisnerospira meneghiniana* (CANAVARI, 1880) – M 2007.298.1., Lókút, Kericser VI, Bed 32, Ibex Zone; ventral valve; a: posterior view, b: lateral view.
3. *Cisnerospira meneghiniana* (CANAVARI, 1880) – M 2007.297.1., Lókút, Kericser VI, Bed 20, Davoei Zone; a: posterior view, b: ventral view, c: lateral view.
4. *Orthotoma apenninica* (CANAVARI, 1883) – M 2008.371.1., Lókút, Fenyveskút, scree, Margaritatus Zone; a: dorsal view, b: lateral view, c: anterior view.
5. *Orthotoma apenninica* (CANAVARI, 1883) – M 2008.372.1., Lókút, Kericser VI, Bed 7, Margaritatus Zone; a: dorsal view, b: lateral view, c: anterior view.
6. *Orthotoma* aff. *apenninica* (CANAVARI, 1883) – M 2008.373.1., Lókút, Kericser VI, Bed 35, Ibex Zone; a: dorsal view, b: lateral view.
7. *Orthotoma* aff. *apenninica* (CANAVARI, 1883) – M 2008.374.1., Lókút, Kericser VI, Bed 35, Ibex Zone; a: dorsal view, b: lateral view.
8. *Lychnothyris rotzoana* (SCHAUROTH, 1865) – M 2008.375.1., Lókút / Gyulafirátót, Kávás-hegy A, Bed 2, Davoei Zone; ventral valve; a: dorsal view, b: lateral view, c: ventral view.
9. *Lychnothyris rotzoana* (SCHAUROTH, 1865) – M 2008.376.1., Lókút, Lókúti-domb IV, Bed 465, Davoei Zone; a: dorsal view, b: lateral view, c: anterior view.
10. *Lychnothyris rotzoana* (SCHAUROTH, 1865) – M 2008.377.1., Lókút, Lókúti-domb IV, Bed 465, Davoei Zone; a: dorsal view, b: lateral view.
11. *Lychnothyris rotzoana* (SCHAUROTH, 1865) – M 2008.378.1., Lókút / Gyulafirátót, Kávás-hegy A, Bed 8, Davoei Zone; silicified shell dissolved from the limestone; a: interior of the ventral valve, b: interior of the dorsal valve showing the cardinalia and muscle scars.
12. *Merophricus* aff. *moreti* (DUBAR, 1942) – M 2008.379.1., Lókút, Lókúti-domb IV, Bed 465, Davoei Zone; a: dorsal view, b: lateral view.
13. *Hesperithyris renierii* (CATULLO, 1827) – M 2008.380.1., Tés / Isztimér, Hamuháza, Bed 8, Davoei Zone; a: dorsal view, b: anterior view, c: lateral view.

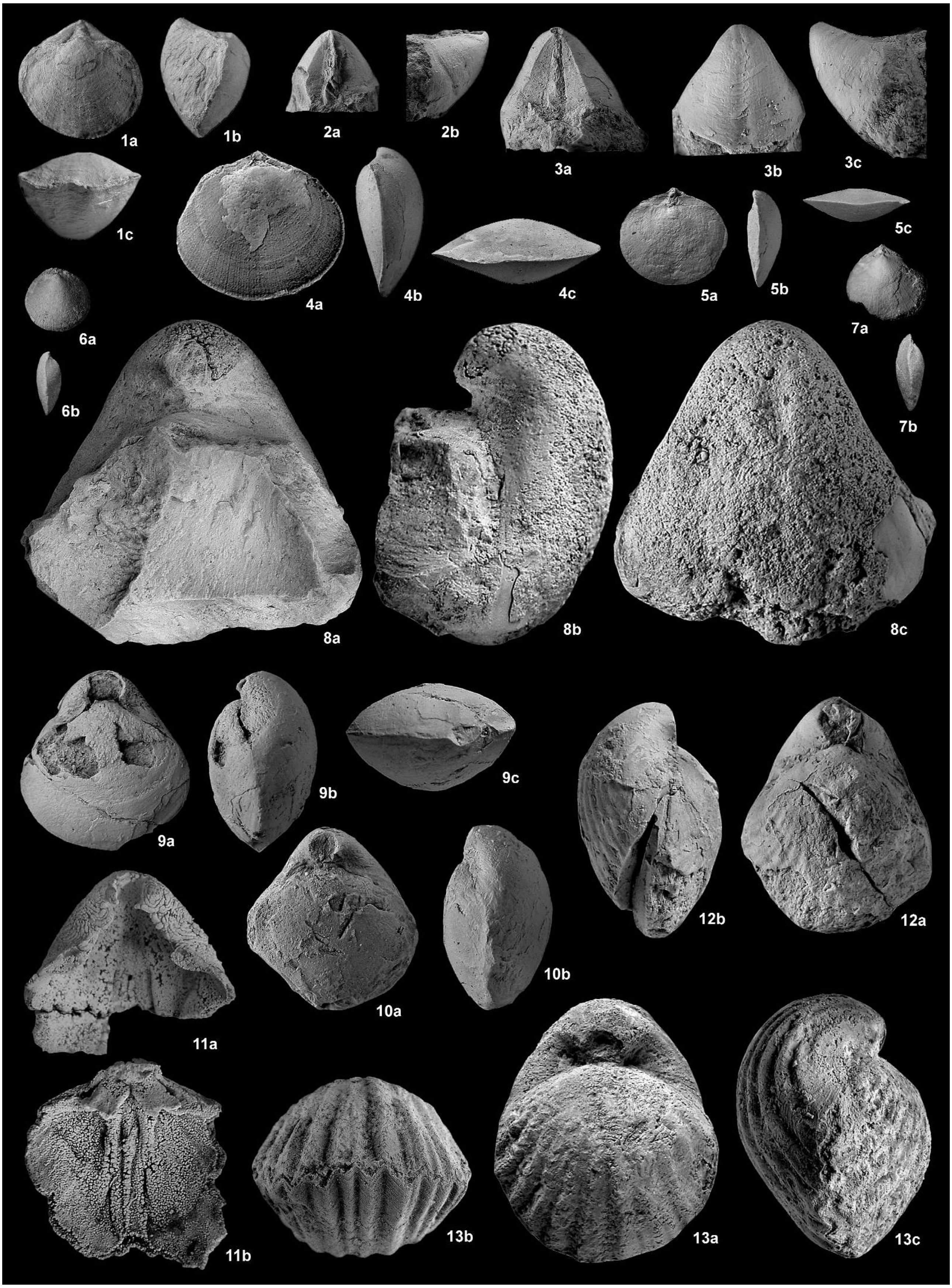
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Plate XV

All figures are magnified twice. Specimens have been coated with ammonium chloride before photography unless otherwise stated. Specimens are deposited in the collection of the Geological and Paleontological Department, Hungarian Natural History Museum, under the inventory numbers prefixed by M.

1. *Hesperithyris renierii* (CATULLO, 1827) – M 2008.381.1., Zirc, Bocskor-hegy, Bed 13, Margaritatus Zone; a: dorsal view, b: anterior view, c: lateral view.
2. *Hesperithyris renierii* (CATULLO, 1827) – M 2008.382.1., Tés / Isztimér, Hamuháza, Bed 14, Ibex Zone; a: dorsal view, b: lateral view.
3. *Merophricus* cf. *mediterraneus* (CANAVARI, 1883) – M 2008.383.1., Tés / Isztimér, Hamuháza, Bed 1, Margaritatus Zone; a: ventral view, b: lateral view.
4. *Merophricus* cf. *mediterraneus* (CANAVARI, 1883) – M 2008.384.1., Tés / Isztimér, Hamuháza, Bed 10, Davoei Zone; a: dorsal view, b: lateral view, c: ventral view.
5. *Hesperithyris* cf. *costata* (DUBAR, 1942) – M 2008.385.1., Lókút, Kericser VI, Bed 25, Ibex Zone; ventral valve; a: ventral view, b: lateral view.
6. *Lobothyris punctata* (J. SOWERBY, 1813) – M 2008.386.1., Lókút, Kericser VI, Bed 7, Margaritatus Zone; a: dorsal view, b: anterior view, c: lateral view.
7. *Rhapidothyris delorenzoi* (BÖSE, 1900) – M 2008.387.1., Lókút, Kericser VI, Bed 6, Spinatum Zone; a: dorsal view, b: anterior view, c: lateral view.

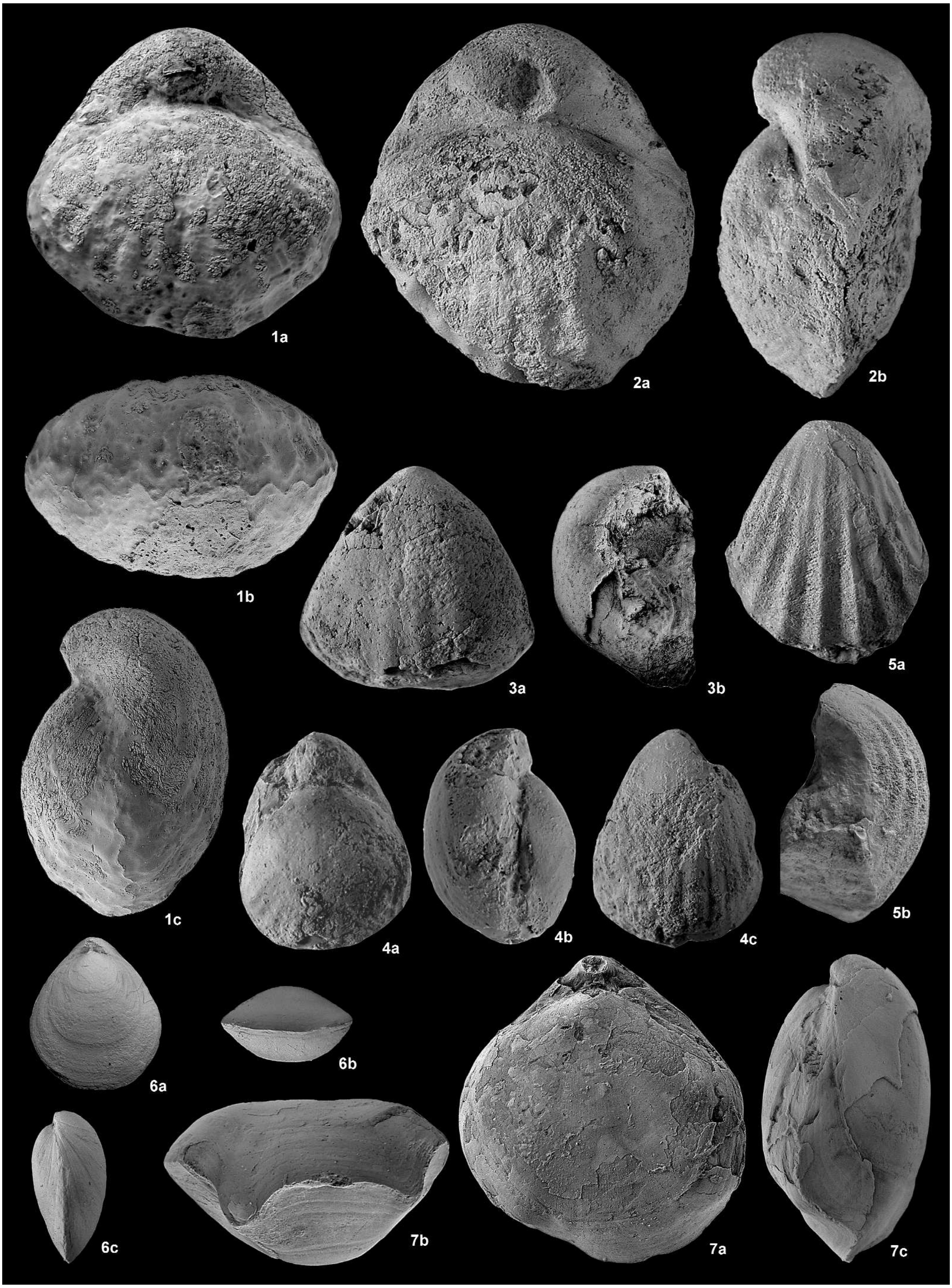
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Plate XVI

All figures are magnified twice. Specimens have been coated with ammonium chloride before photography unless otherwise stated. Specimens are deposited in the collection of the Geological and Paleontological Department, Hungarian Natural History Museum, under the inventory numbers prefixed by M, and in the Geological Museum of the Geological Institute of Hungary, under the inventory numbers prefixed by J.

1. *Rhapidothyris* cf. *ovimontana* (Böse, 1898) – M 2008.388.1., Kericser VI, scree from the middle part of the section, Ibex or Davoei Zone(?); a: dorsal view, b: anterior view, c: lateral view.
2. *Rhapidothyris beyrichi* (Oppel, 1861) – M 2008.389.1., Lókút, Kericser VI, Bed 7, Margaritatus Zone; a: dorsal view, b: anterior view, c: lateral view.
3. *Rhapidothyris lokutica* n. sp.; paratype– M 2008.390.1., Lókút / Gyulafirátót, Büdöskút X, Bed 3, Margaritatus Zone; a: dorsal view, b: lateral view, c: anterior view.
4. *Rhapidothyris lokutica* n. sp.; holotype – M 2008.391.1., Lókút, Kericser VI, Bed 8, Margaritatus Zone; a: dorsal view, b: lateral view, c: anterior view.
5. *Viallithyris gozzanensis* (Parona, 1880) – M 2008.392.1., Lókút, Kericser VI, scree from the middle part of the section, Ibex or Davoei Zone(?); a: dorsal view, b: anterior view, c: lateral view.
6. *Viallithyris gozzanensis* (Parona, 1880) – J.9179, Lókút, Kericser VI, Bed 33, Ibex Zone; a: dorsal view, b: anterior view, c: lateral view.
7. *Viallithyris gozzanensis* (Parona, 1880) – J.9181, Lókút, Kericser VI, Bed 35, Ibex Zone; a: dorsal view, b: anterior view, c: lateral view.
8. *Viallithyris gozzanensis* (Parona, 1880) – M 2008.393.1., Lókút, Kericser VI, Bed 20, Davoei Zone; Ibex Zone; a: dorsal view, b: anterior view, c: lateral view.

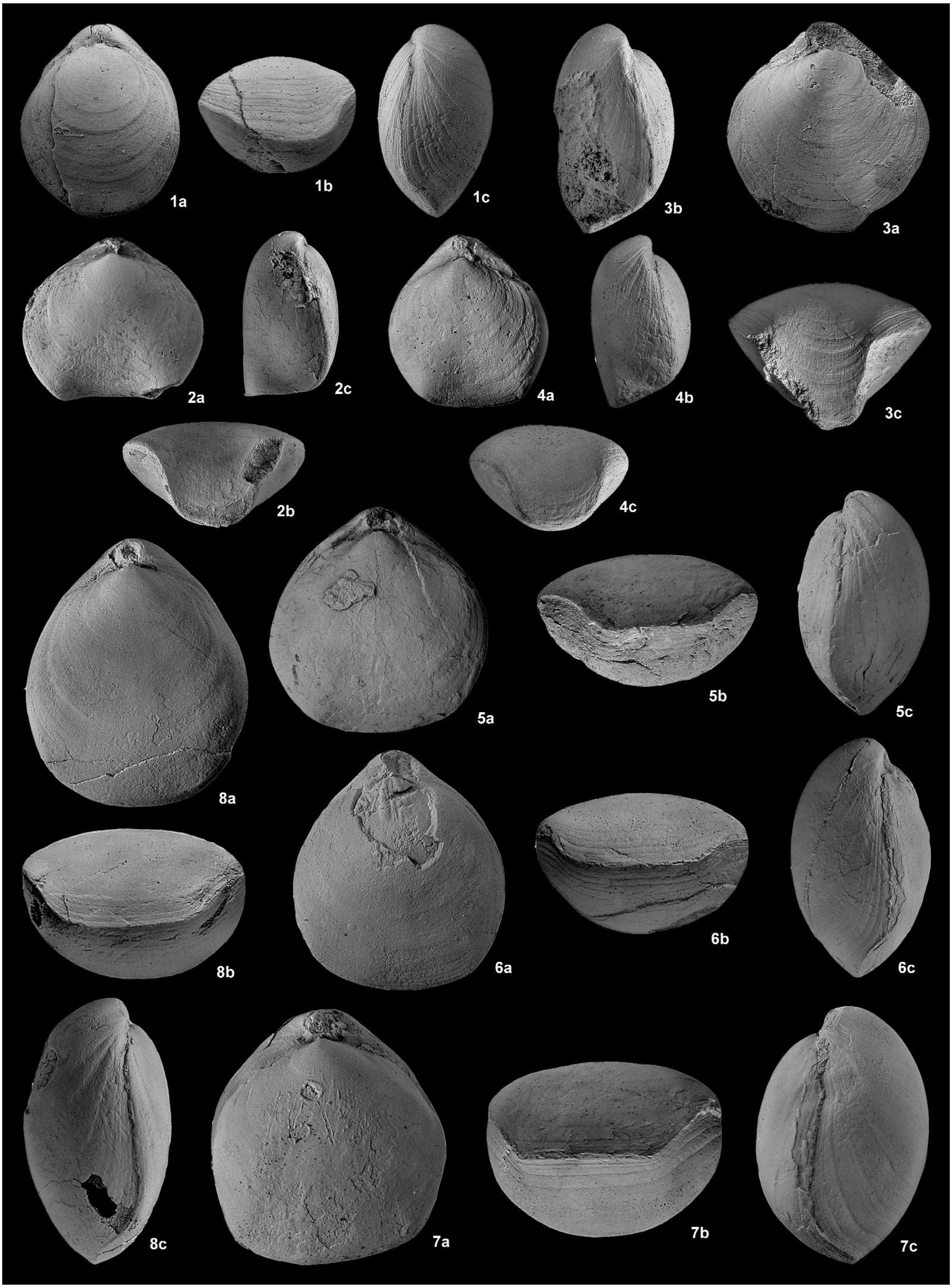
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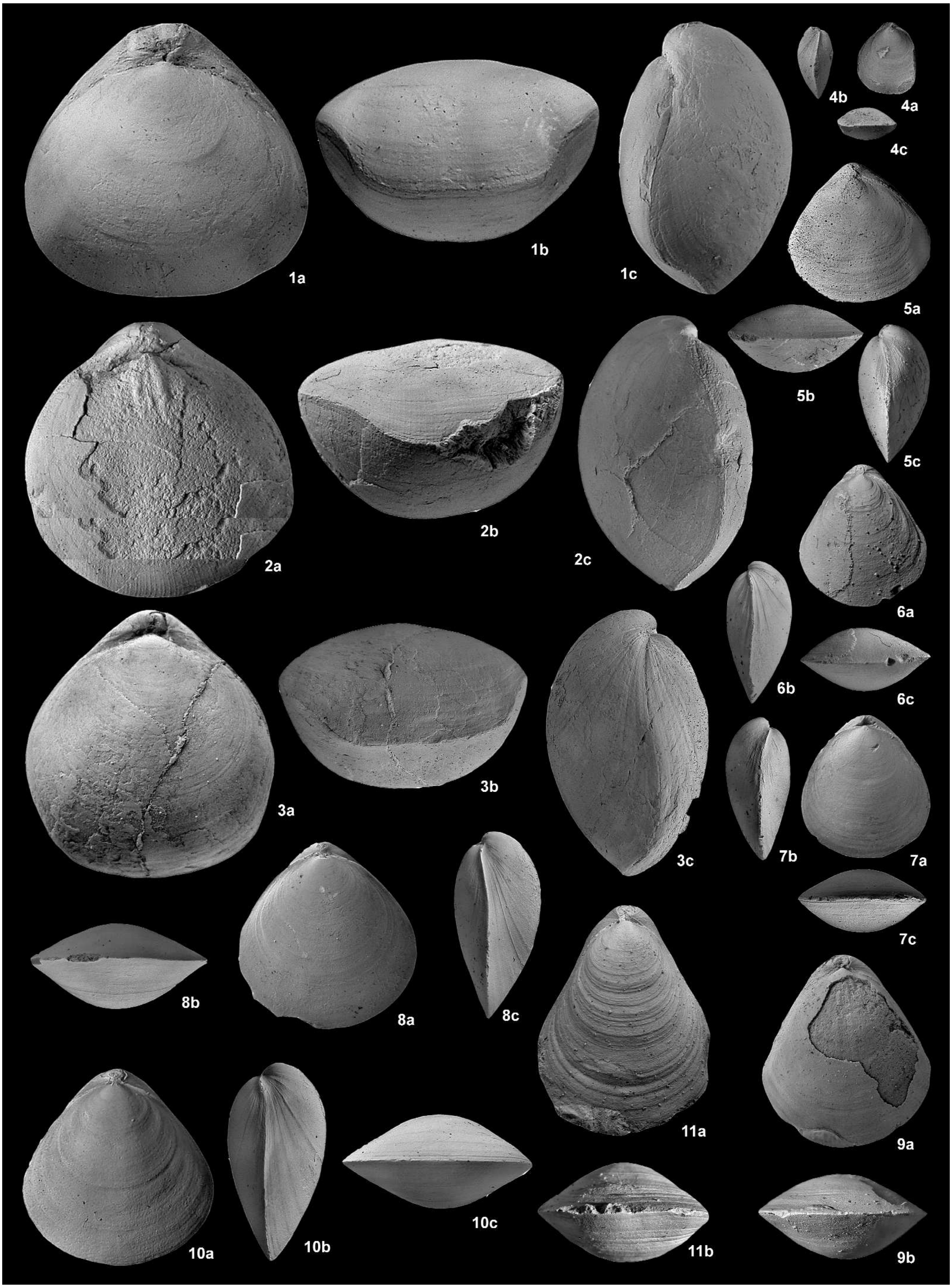
Plate XVII

All figures are magnified twice. Specimens have been coated with ammonium chloride before photography unless otherwise stated. Specimens are deposited in the collection of the Geological and Paleontological Department, Hungarian Natural History Museum, under the inventory numbers prefixed by M, and in the Geological Museum of the Geological Institute of Hungary, under the inventory numbers prefixed by J.

1. *Viallithyris gozzanensis* (Parona, 1880) – M 2008.394.1., Lókút, Kericser VI, Bed 8, Margaritatus Zone; a: dorsal view, b: anterior view, c: lateral view.
2. *Viallithyris gozzanensis* (Parona, 1880) – J.9180, Lókút, Kericser VI, Bed 25, Ibex Zone; a: dorsal view, b: anterior view, c: lateral view.
3. *Viallithyris gozzanensis* (Parona, 1880) – J.9182, Lókút, Kericser VI, scree from the middle part of the section, Ibex or Davoei Zone(?); a: dorsal view, b: anterior view, c: lateral view.
4. *Securithyris adnethensis* (Suess, 1855) – M 2008.395.1., Eplény (F), Margaritatus Zone; the smallest juvenile specimen; a: dorsal view, b: lateral view, c: anterior view.
5. *Securithyris adnethensis* (Suess, 1855) – M 2008.396.1., Lókút, Kericser VI, Bed 8, Margaritatus Zone; a: dorsal view, b: anterior view, c: lateral view.
6. *Securithyris adnethensis* (Suess, 1855) – M 2008.397.1., Lókút, Kericser VI, Bed 15, Davoei Zone; a: dorsal view, b: lateral view, c: anterior view.
7. *Securithyris adnethensis* (Suess, 1855) – M 2008.398.1., Eplény (N), Margaritatus Zone; a: dorsal view, b: lateral view, c: anterior view.
8. *Securithyris adnethensis* (Suess, 1855) – M 2008.399.1., Eplény (O), Margaritatus Zone; a: dorsal view, b: anterior view, c: lateral view.
9. *Securithyris adnethensis* (Suess, 1855) – M 2008.400.1., Lókút, Kericser VI, Bed 23, Ibex Zone; a: dorsal view, b: anterior view.
10. *Securithyris adnethensis* (Suess, 1855) – M 2008.401.1., Eplény (C), Margaritatus Zone; a: dorsal view, b: lateral view, c: anterior view.
11. *Securithyris adnethensis* (Suess, 1855) – M 2008.402.1., Lókút, Kericser VI, Bed 33, Ibex Zone; a: dorsal view, b: anterior view.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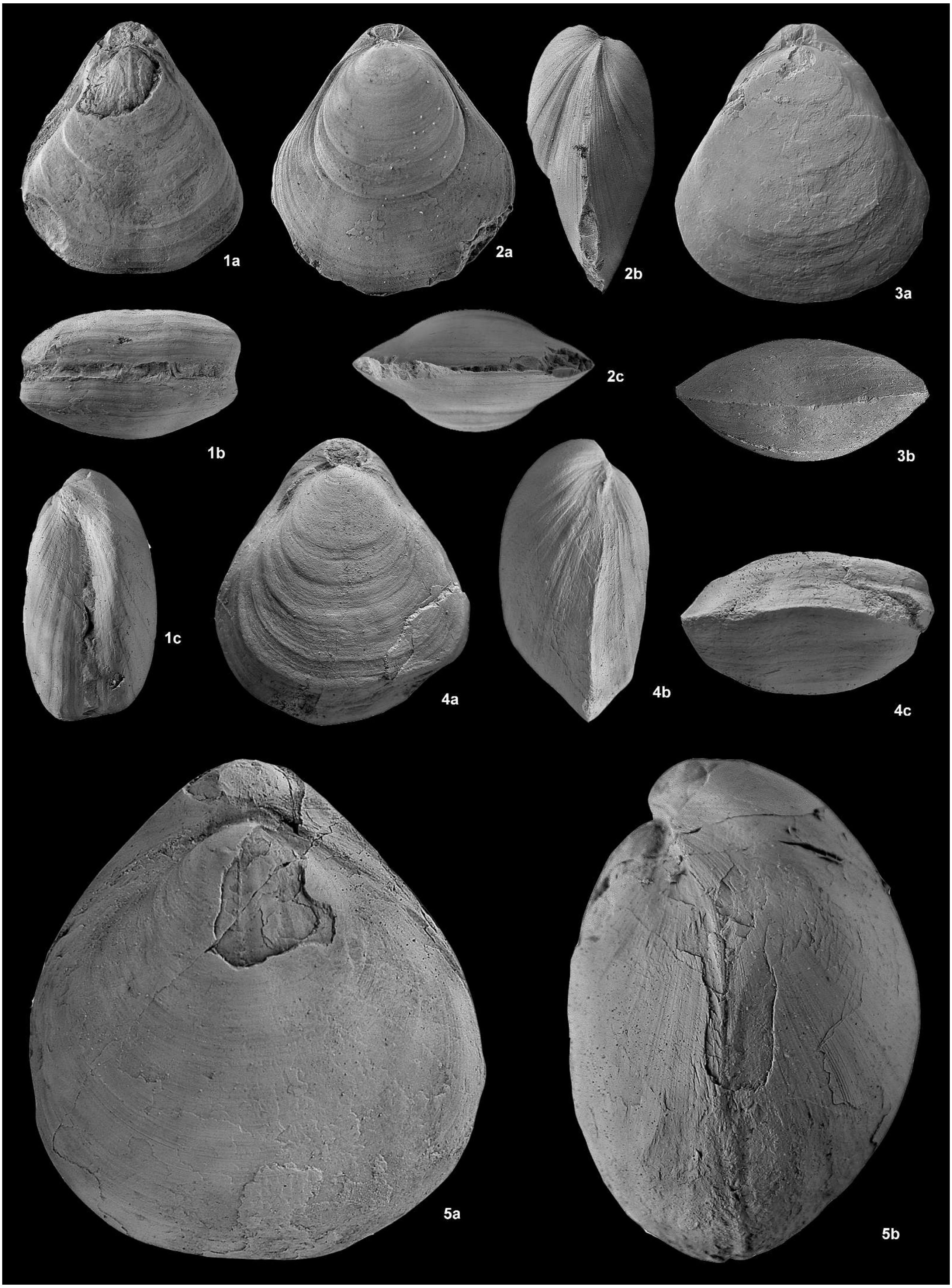
3c
7b
7a
7c
8b
8a
8c
11a
9a
10a
10b
10c
11b
9b

Plate XVIII

All figures are magnified twice. Specimens have been coated with ammonium chloride before photography unless otherwise stated. Specimens are deposited in the collection of the Geological and Paleontological Department, Hungarian Natural History Museum, under the inventory numbers prefixed by M.

1. *Securithyris adnethensis* (SUESS, 1855) – M 2008.403.1., Lókút, Kericser VI, Bed 27, Ibex Zone; specimen showing marginal flattening due to the cessation of longitudinal growth component; a: dorsal view, b: anterior view, c: lateral view.
2. *Securithyris adnethensis* (SUESS, 1855) – M 2008.404.1., Eplény (M), Margaritatus Zone; specimen showing irregular growth rings a: dorsal view, b: lateral view, c: anterior view.
3. *Securithyris adnethensis* (SUESS, 1855) – M 2008.405.1., Lókút, Kericser VI, scree from the upper part of the section, Davoei or Margaritatus Zone(?); a: dorsal view, b: anterior view.
4. *Securithyris adnethensis* (SUESS, 1855) – M 2008.406.1., Lókút, Kericser VI, Bed 20, Davoei Zone; a: dorsal view, b: lateral view, c: anterior view.
5. *Securithyris adnethensis* (SUESS, 1855) – M 2008.407.1., Eplény (J), Margaritatus Zone; one of the largest, globose specimen; a: dorsal view, b: lateral view.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2a
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3a
1b
2c
3b
1c
4a
4b
4c
5a
5b

Plate XIX

All figures are magnified twice. Specimens have been coated with ammonium chloride before photography unless otherwise stated. Specimens are deposited in the collection of the Geological and Paleontological Department, Hungarian Natural History Museum, under the inventory numbers prefixed by M.

1. *Securithyris adnethensis* (Suess, 1855) – M 2008.408.1., Tés / Isztimér, Hamuháza, Bed 4, Davoei Zone; extremely expanded "axiniform" specimen with concave lateral margins; a: dorsal view, b: lateral view.
2. *Securithyris adnethensis* (Suess, 1855) – M 2008.409.1., Lókút, Kericser VI, Bed 28, Ibex Zone; specimen of "*erbaensis*" type; a: dorsal view, b: lateral view.
3. *Securithyris adnethensis* (Suess, 1855) – M 2008.410.1., Lókút, Kericser VI, Bed 28, Ibex Zone; specimen of "*adnethensis*" type; a: dorsal view, b: lateral view; c: anterior view.
4. *Securithyris adnethensis* (Suess, 1855) – M 2008.411.1., Lókút, Kericser VI, Bed 28, Ibex Zone; specimen of "*erbaensis*" type; a: dorsal view, b: lateral view; c: anterior view.

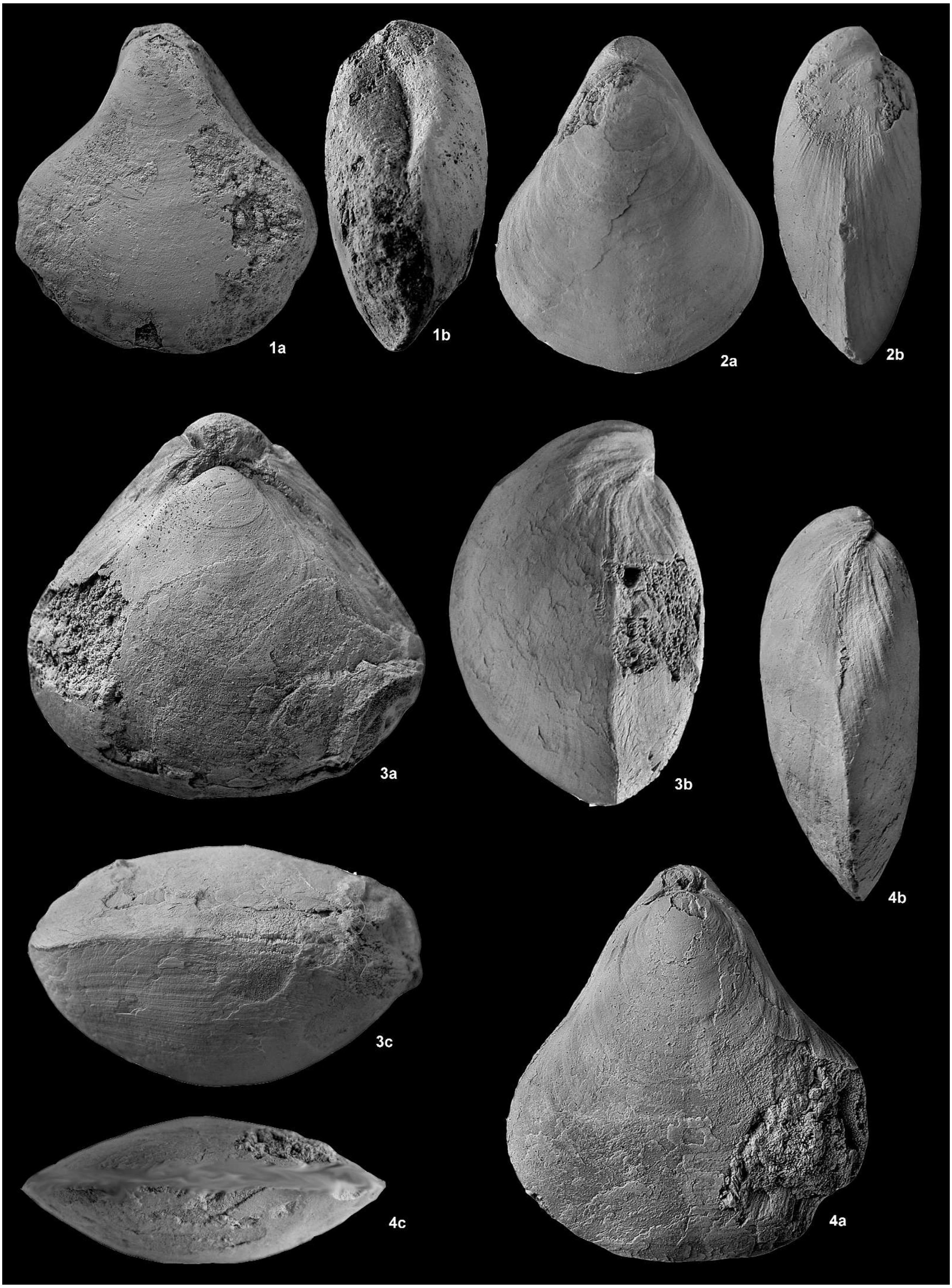
1a
1b
2a
2b
3a
3b
4b
3c
4c
4a

Plate XX

All figures are magnified twice. Specimens have been coated with ammonium chloride before photography unless otherwise stated. Specimens are deposited in the collection of the Geological and Paleontological Department, Hungarian Natural History Museum, under the inventory numbers prefixed by M.

1. *Securithyris adnethensis* (Suess, 1855) – M 2008.412.1., Tés / Isztimér, Hamuháza, Bed 4, Davoei Zone; a: dorsal view, b: lateral view.
2. *Securithyris adnethensis* (Suess, 1855) – M 2008.413.1., Lókút, Kericser VI, Bed 28, Ibex Zone; specimen of globose "*adnethensis*" type; a: dorsal view, b: lateral view c: anterior view.
3. *Securithyris adnethensis* (Suess, 1855) – M 2008.414.1., Eplény (D), Margaritatus Zone; globose specimen; a: dorsal view, b: lateral view, c: anterior view.
4. *Securithyris adnethensis* (Suess, 1855) – M 2008.415.1., Eplény (A-2), Margaritatus Zone; close up view showing the transapically resorbed permesothyrid foramen.

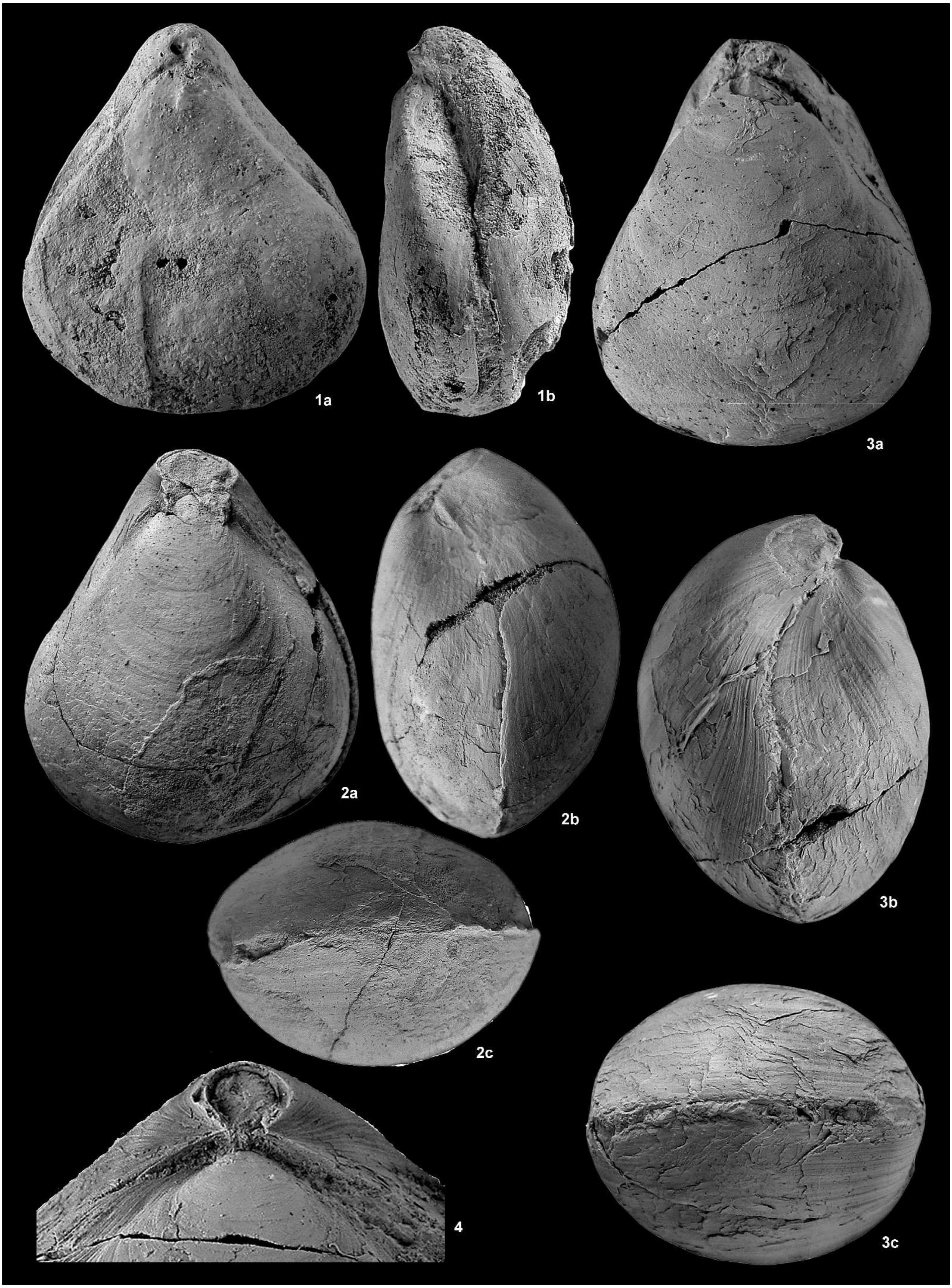
1a
1b
3a
2a
2b
3b
2c
4
3c

Plate XXI

All figures are magnified twice. Specimens have been coated with ammonium chloride before photography unless otherwise stated. Specimens are deposited in the collection of the Geological and Paleontological Department, Hungarian Natural History Museum, under the inventory numbers prefixed by M.

1. *Securithyris adnethensis* (SUESS, 1855) – M 2008.416.1., Eplény (I), Margaritatus Zone; a: dorsal view, b: lateral view, c: anterior view.
2. *Securithyris adnethensis* (SUESS, 1855) – M 2008.417.1., Lókút, Kericser VI, Bed 32, Ibex Zone; specimen of "*erbaensis*" type; a: dorsal view, b: lateral view.
3. *Securithyris adnethensis* (SUESS, 1855) – M 2008.418.1., Eplény (K), Margaritatus Zone; a: dorsal view, b: anterior view.

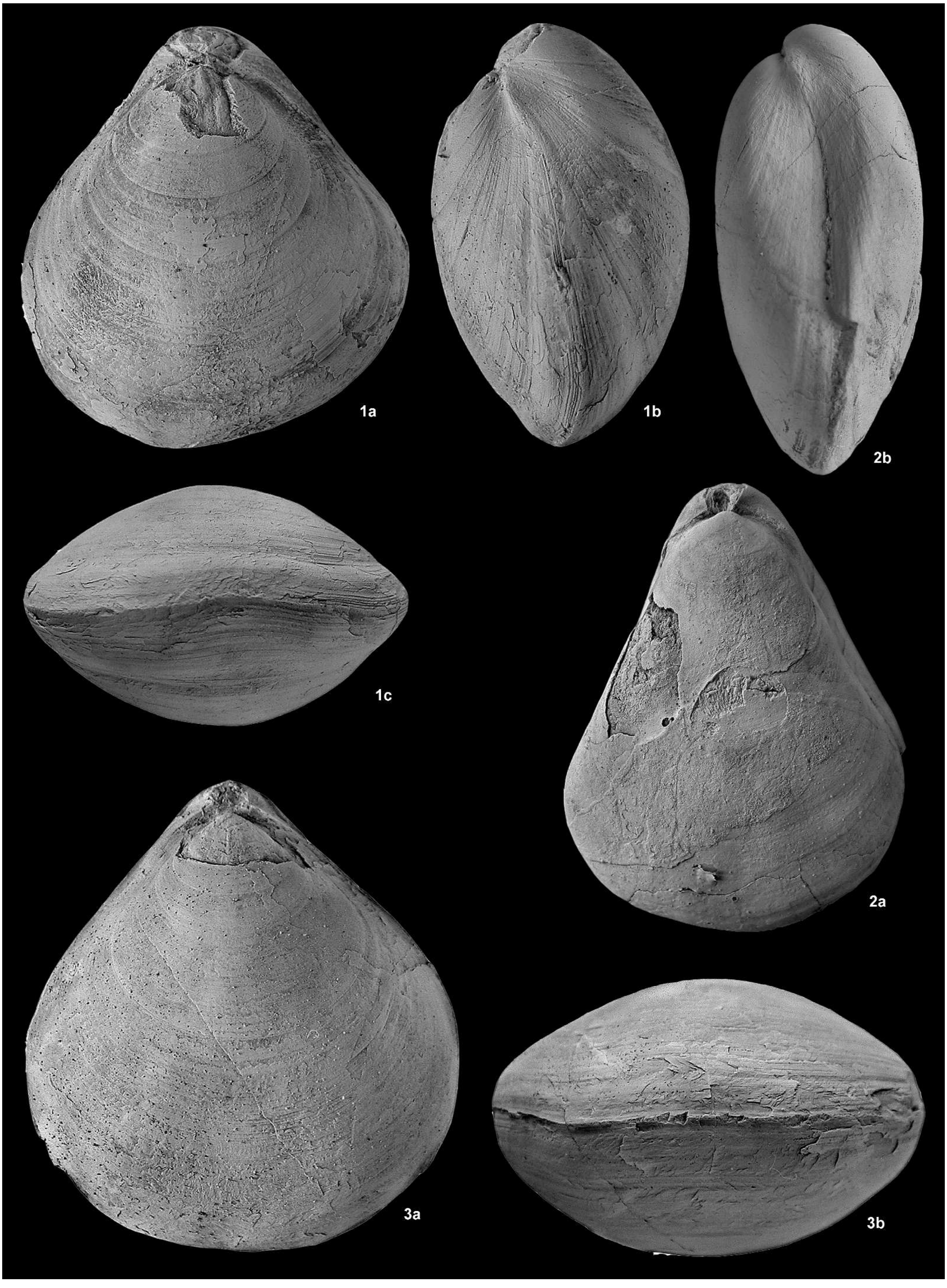
1a
1b
2b
1c
2a
3a
3b

Plate XXII

All figures are magnified twice. Specimens have been coated with ammonium chloride before photography unless otherwise stated. Specimens are deposited in the collection of the Geological and Paleontological Department, Hungarian Natural History Museum, under the inventory numbers prefixed by M.

1. *Securithyris adnethensis* (SUESS, 1855) – M 2008.419.1., Fenyveskút, scree, Margaritatus Zone; a: dorsal view, b: anterior view, c: lateral view.
2. *Securithyris adnethensis* (SUESS, 1855) – M 2008.420.1., Eplény (A-1), Margaritatus Zone; a: dorsal view, b: anterior view; c: lateral view.

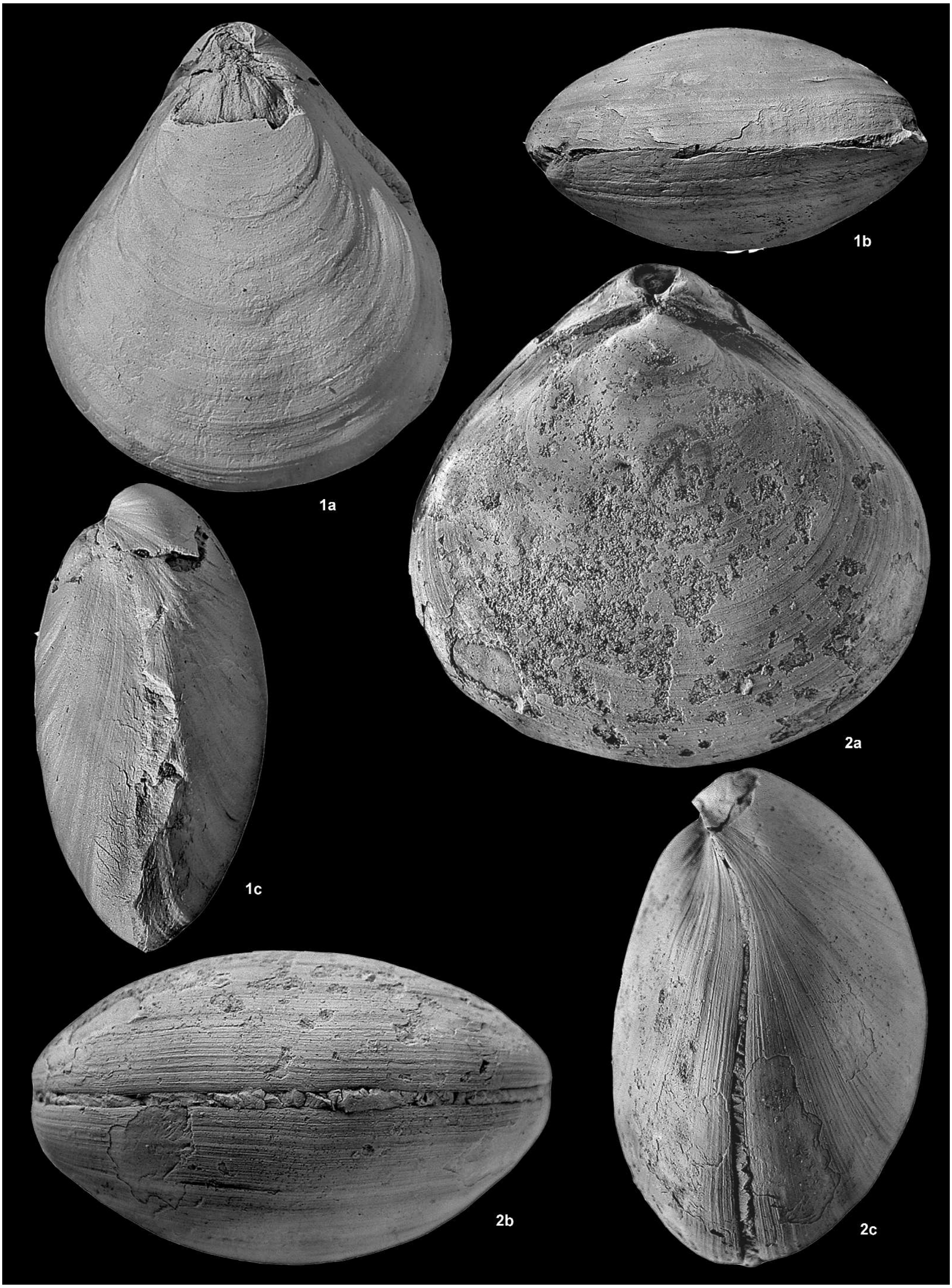
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Plate XXIII

All figures are magnified twice. Specimens have been coated with ammonium chloride before photography unless otherwise stated. Specimens are deposited in the collection of the Geological and Paleontological Department, Hungarian Natural History Museum, under the inventory numbers prefixed by M.

1. *Securithyris adnethensis* (Suess, 1855) – M 2008.421.1., Eplény (G), Margaritatus Zone; one of the most typical specimens; a: dorsal view, b: lateral view; c: anterior view.
2. *Securithyris adnethensis* (Suess, 1855) – M 2008.422.1., Fenyveskút, 5/a, Margaritatus Zone; dorsal view, showing dorsal muscle scars and mantle canal impressions.
3. *Securithyris filosa* (Canavari, 1880) – M 2008.423.1., Lókút, Kericser VI, Bed 20, Davoei Zone; a: dorsal view, b: lateral view; c: anterior view.

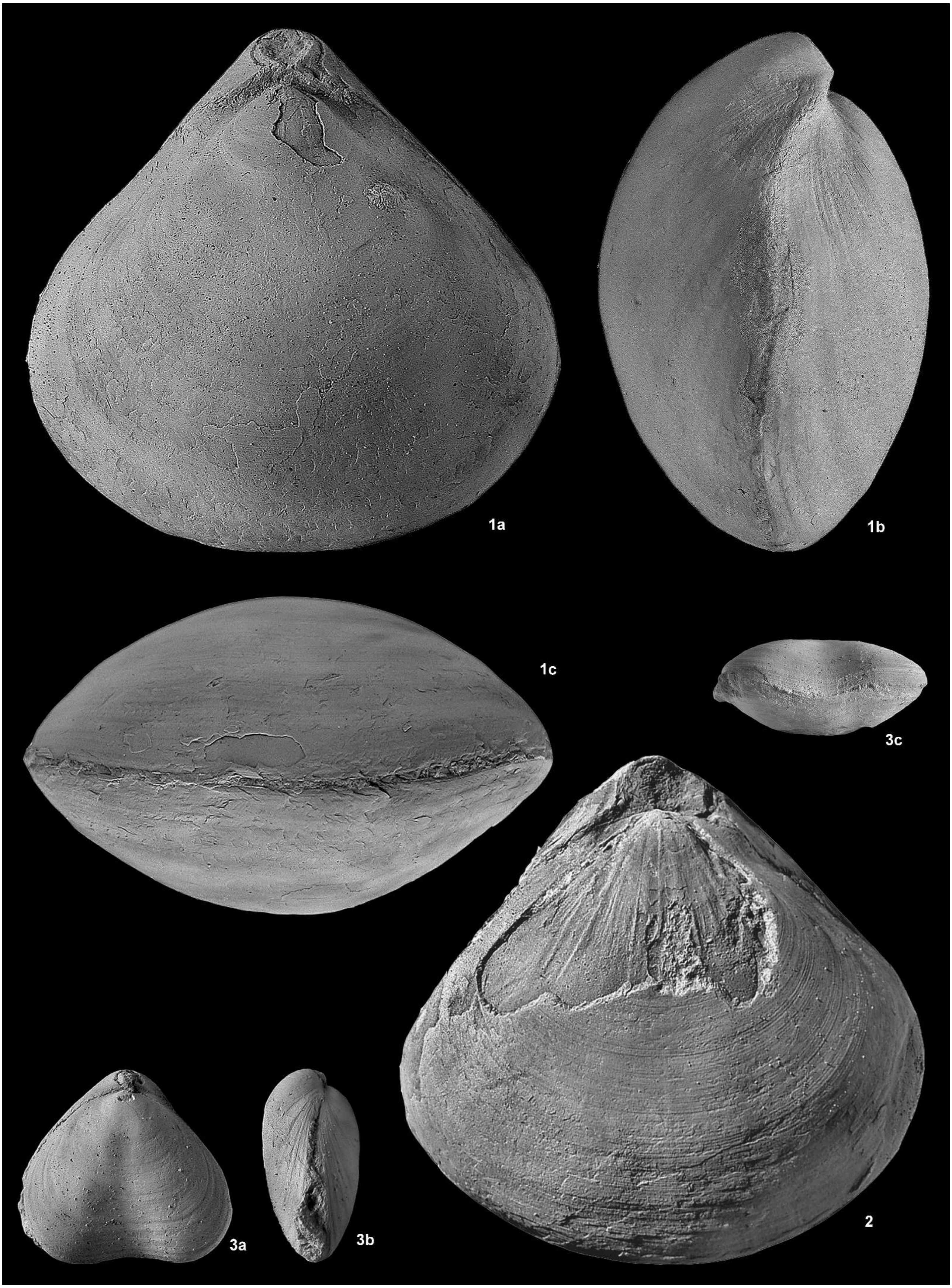
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Plate XXIV

All figures are magnified twice. Specimens have been coated with ammonium chloride before photography unless otherwise stated. Specimens are deposited in the collection of the Geological and Paleontological Department, Hungarian Natural History Museum, under the inventory numbers prefixed by M.

1. *Securithyris filosa* (CANAVARI, 1880) – M 2008.424.1., Lókút, Kericser VI, Bed 20, Davoei Zone; a: dorsal view, b: anterior view; c: lateral view.
2. *Securithyris filosa* (CANAVARI, 1880) – M 2008.425.1., Lókút, Kericser VI, Bed 27, Ibex Zone; a: dorsal view, b: anterior view; c: lateral view.
3. *Securithyris paronai* (CANAVARI, 1880) – M 2008.426.1., Lókút, Kericser VI, Bed 28, Ibex Zone; a: dorsal view, b: anterior view; c: lateral view.
4. *Securithyris paronai* (CANAVARI, 1880) – M 2008.427.1., Lókút, Kericser VI, scree from the lower part of the section, Ibex Zone(?); a: dorsal view, b: anterior view; c: lateral view.
5. *Linguithyris aspasia* (ZITTEL, 1869) – M 2008.428.1., Lókút, Kericser VI, Bed 22 (51/3), Ibex Zone; one of the smallest, juvenile specimen; a: dorsal view, b: anterior view; c: lateral view.
6. *Linguithyris aspasia* (ZITTEL, 1869) – M 2008.429.1., Lókút, Kericser VI, Bed 25 (57/1), Ibex Zone; a: dorsal view, b: anterior view; c: lateral view.
7. *Linguithyris aspasia* (ZITTEL, 1869) – M 2008.430.1., Lókút, Kericser VI, Bed 22 (51/2), Ibex Zone; small specimen with deep sulcus; a: dorsal view, b: lateral view, c: anterior view.
8. *Linguithyris aspasia* (ZITTEL, 1869) – M 2008.431.1., Lókút, Kericser VI, Bed 22 (52/2), Ibex Zone; small specimen with shallow sulcus; a: dorsal view, b: lateral view, c: anterior view.
9. *Linguithyris aspasia* (ZITTEL, 1869) – M 2008.432.1., Lókút, Kericser VI, Bed 26 (60/1), Ibex Zone; a: dorsal view, b: lateral view, c: anterior view.
10. *Linguithyris aspasia* (ZITTEL, 1869) – M 2008.433.1., Lókút, Kericser VI, Bed 20 (46/1), Davoei Zone; a: dorsal view, b: lateral view, c: anterior view.
11. *Linguithyris aspasia* (ZITTEL, 1869) – M 2008.434.1., Bakonybél, Kőris-hegy A/1, probably Domerian; relatively small sized, yet, extremely bilobate specimen; a: dorsal view, b: lateral view, c: anterior view.
12. *Linguithyris aspasia* (ZITTEL, 1869) – M 2008.435.1., Lókút, Kericser VI, Bed 20 (43/6), Davoei Zone; a: dorsal view, b: anterior view.
13. *Linguithyris aspasia* (ZITTEL, 1869) – M 2008.436.1., Lókút, Kericser VI, Bed 22 (52/5), Ibex Zone; a: dorsal view, b: lateral view, c: anterior view.

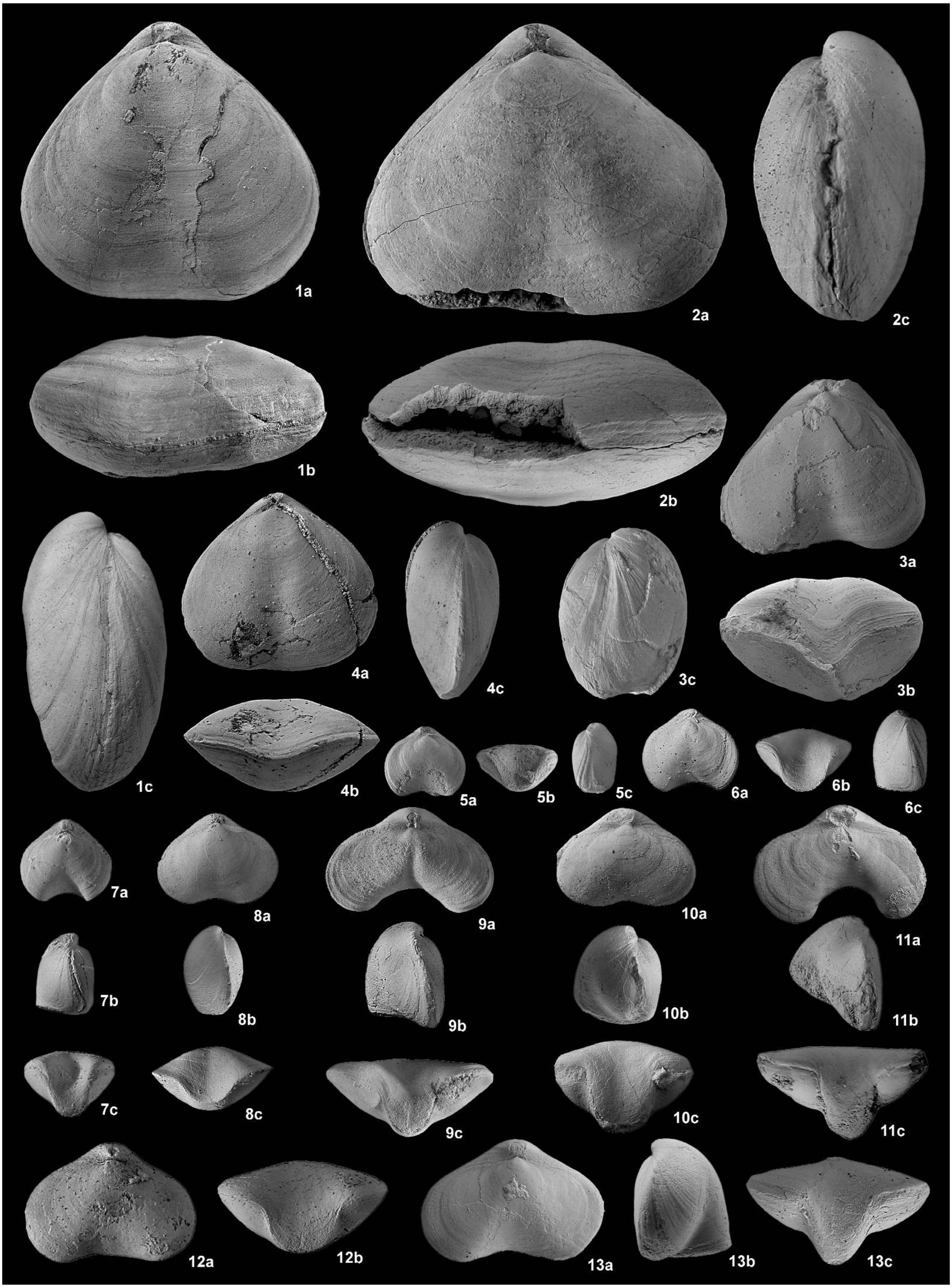
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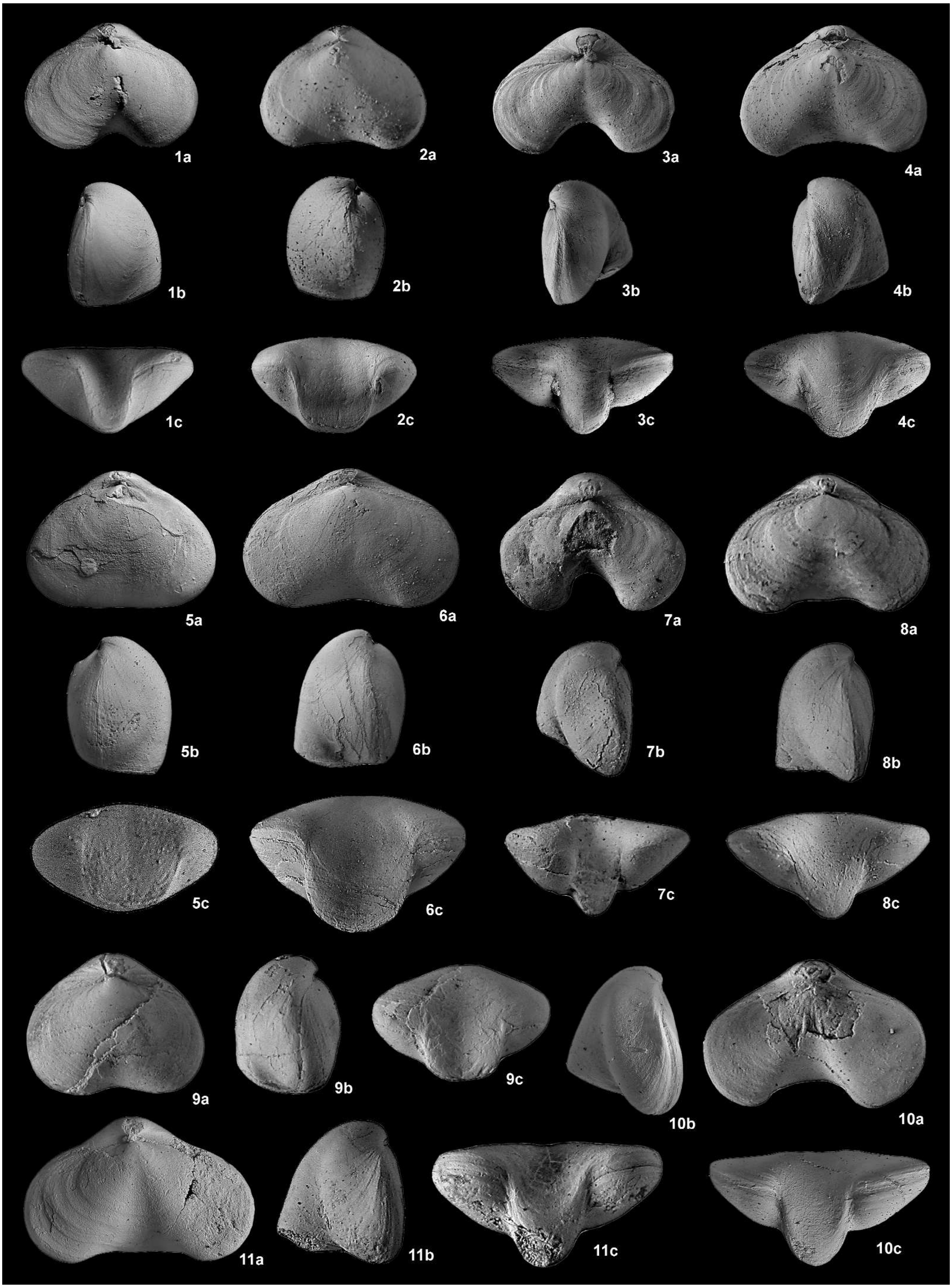
Plate XXV

All figures are magnified twice. Specimens have been coated with ammonium chloride before photography unless otherwise stated. Specimens are deposited in the collection of the Geological and Paleontological Department, Hungarian Natural History Museum, under the inventory numbers prefixed by M.

1. *Linguithyris aspasia* (ZITTEL, 1869) – M 2008.437.1., Lókút / Gyulafirátót, Mohoskő 85, probably Carixian; specimen with narrow sulcus; a: dorsal view, b: lateral view; c: anterior view.
2. *Linguithyris aspasia* (ZITTEL, 1869) – M 2008.438.1., Lókút, Kericser VI, Bed 21 (47/3), Ibex Zone; specimen with wide sulcus; a: dorsal view, b: lateral view; c: anterior view.
3. *Linguithyris aspasia* (ZITTEL, 1869) – M 2008.439.1., Lókút, Kericser VI, Bed 20 (43/1), Davoei Zone; a: dorsal view, b: lateral view, c: anterior view.
4. *Linguithyris aspasia* (ZITTEL, 1869) – M 2008.440.1., Lókút, Kericser VI, Bed 20 (44/10), Davoei Zone; a: dorsal view, b: lateral view, c: anterior view.
5. *Linguithyris aspasia* (ZITTEL, 1869) – M 2008.441.1., Lókút, Kericser VI, Bed 21 (48/5), Ibex Zone; a: dorsal view, b: lateral view, c: anterior view.
6. *Linguithyris aspasia* (ZITTEL, 1869) – M 2008.442.1., Lókút, Kericser VI, Bed 25 (56/4), Ibex Zone; a: dorsal view, b: lateral view, c: anterior view.
7. *Linguithyris aspasia* (ZITTEL, 1869) – M 2008.443.1., Lókút, Kericser VI, Bed 24 (54/8), Ibex Zone; strongly bilobate specimen; a: dorsal view, b: lateral view, c: anterior view.
8. *Linguithyris aspasia* (ZITTEL, 1869) – M 2008.444.1., Lókút, Kericser VI, Bed 21 (47/2), Davoei Zone; a: dorsal view, b: lateral view, c: anterior view.
9. *Linguithyris aspasia* (ZITTEL, 1869) – M 2008.445.1., Lókút, Kericser VI, Bed 25 (58/7), Ibex Zone; a: dorsal view, b: lateral view, c: anterior view.
10. *Linguithyris aspasia* (ZITTEL, 1869) – M 2008.446.1., Lókút, Kericser VI, Bed 18 (31/3), Davoei Zone; a: dorsal view, b: lateral view, c: anterior view.
11. *Linguithyris aspasia* (ZITTEL, 1869) – M 2008.447.1., Lókút, Kericser VI, Bed 26 (60/8), Ibex Zone; extremely laterally expanded specimen; a: dorsal view, b: lateral view, c: anterior view.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10c

Plate XXVI

All figures are magnified twice. Specimens have been coated with ammonium chloride before photography unless otherwise stated. Specimens are deposited in the collection of the Geological and Paleontological Department, Hungarian Natural History Museum, under the inventory numbers prefixed by M.

1. *Linguithyris aspasia* (Zittel, 1869) – M 2008.448.1., Hárskút, Kisnyerges, Bed 2, probably Carixian; specimen with extremely deep sulcus; a: dorsal view, b: lateral view; c: anterior view.
2. *Linguithyris aspasia* (Zittel, 1869) – M 2008.449.1., Lókút / Gyulafirátót, Büdöskút X, Bed 3, Margaritatus Zone; a: dorsal view, b: lateral view, c: anterior view.
3. *Linguithyris aspasia* (Zittel, 1869) – M 2008.450.1., Lókút, Fenyveskút, scree, Margaritatus Zone; a: dorsal view, b: lateral view, c: anterior view.
4. *Linguithyris aspasia* (Zittel, 1869) – M 2008.451.1., Szentgál, Gombás-puszta, Fg-II, Bed 25, Carixian; a: dorsal view, b: anterior view.
5. *Linguithyris aspasia* (Zittel, 1869) – M 2008.452.1., Lókút / Gyulafirátót, Büdöskút X, Bed 2, Margaritatus Zone; a: dorsal view, b: anterior view, c: detail of the uncoated specimen in dorsal view, showing the adductor muscle scars.
6. *Linguithyris aspasia* (Zittel, 1869) – M 2008.453.1., Hárskút, Kisnyerges, Bed 3, probably Carixian; very large specimen with relatively shallow sulcus; a: dorsal view, b: lateral view; c: anterior view; d: detail of the uncoated specimen in dorsal view, showing the adductor muscle scars.
7. *Linguithyris* cf. *linguata* (Böckh, 1874) – M 2008.454.1., Lókút, Lókúti-domb IV, Bed 464, Davoei Zone; ventral valve, ventral view.
8. *Buckmanithyris cornicolana* (Canavari, 1881) – M 2008.455.1., Lókút, Fenyveskút, scree (2), Margaritatus Zone; a: dorsal view, b: anterior view, c: lateral view.
9. *Buckmanithyris cornicolana* (Canavari, 1881) – M 2008.456.1., Lókút, Fenyveskút, scree (1), Margaritatus Zone; a: dorsal view, b: anterior view, c: lateral view.


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3b
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5b
5a
5c
6a
6b
6c
6d
7
8a
8b
8c
9a
9b
9c

Plate XXVII

All figures are magnified twice. Specimens have been coated with ammonium chloride before photography unless otherwise stated. Specimens are deposited in the collection of the Geological and Paleontological Department, Hungarian Natural History Museum, under the inventory numbers prefixed by M.

1. *Eplenyithyris cerasulum* (ZITTEL, 1869) – M 2008.457.1., Lókút, Fenyveskút, p1, Margaritatus Zone; a: dorsal view, b: anterior view, c: lateral view.
2. *Eplenyithyris cerasulum* (ZITTEL, 1869) – M 2008.458.1., Lókút, Fenyveskút, scree, Margaritatus Zone; a: dorsal view, b: anterior view, c: lateral view.
3. *Eplenyithyris cerasulum* (ZITTEL, 1869) – M 2008.459.1., Eplény (2), Margaritatus Zone; a: dorsal view, b: anterior view, c: lateral view.
4. *Eplenyithyris cerasulum* (ZITTEL, 1869) – M 2008.460.1., Eplény (3), Margaritatus Zone; a: dorsal view, b: anterior view, c: lateral view.
5. *Eplenyithyris cerasulum* (ZITTEL, 1869) – M 2008.461.1., Lókút, Papod C/84, probably Carixian; a: dorsal view, b: anterior view; c: lateral view.
6. *Eplenyithyris cerasulum* (ZITTEL, 1869) – M 2008.462.1., Lókút, Kericser VI, Bed 32, Ibex Zone; a: dorsal view, b: anterior view; c: lateral view.
7. *Eplenyithyris cerasulum* (ZITTEL, 1869) – M 2008.463.1., Lókút, Kericser VI, Bed 31, Ibex Zone; a: dorsal view, b: lateral view, c: anterior view.
8. *Eplenyithyris cerasulum* (ZITTEL, 1869) – M 2008.464.1., Eplény (1), Margaritatus Zone; a: dorsal view, b: lateral view, c: anterior view.
9. *Eplenyithyris cerasulum* (ZITTEL, 1869) – M 2008.465.1., Lókút, Kericser VI, scree from the middle part of the section, Ibex or Davoei Zone(?); a: dorsal view, b: lateral view, c: anterior view.
10. *Eplenyithyris cerasulum* (ZITTEL, 1869) – M 2008.466.1., Lókút, Kericser VI, Bed 20, Davoei Zone; a: dorsal view, b: lateral view, c: anterior view.
11. *Eplenyithyris cerasulum* (ZITTEL, 1869) – M 2008.467.1., Lókút, Kericser VI, Bed 21, Ibex Zone; a: dorsal view, b: lateral view, c: anterior view.
12. *Eplenyithyris cerasulum* (ZITTEL, 1869) – M 2008.468.1., Eplény, Margaritatus Zone; a: dorsal view, b: lateral view, c: anterior view.
13. *Eplenyithyris cerasulum* (ZITTEL, 1869) – M 2008.469.1., Lókút, Kericser VI, Bed 23, Ibex Zone; a: dorsal view, b: lateral view, c: anterior view.
14. *Papodina bittneri* (GEYER, 1889) – M 2008.470.1., Lókút, Fenyveskút, D, Margaritatus Zone; a: dorsal view, b: lateral view, c: anterior view.

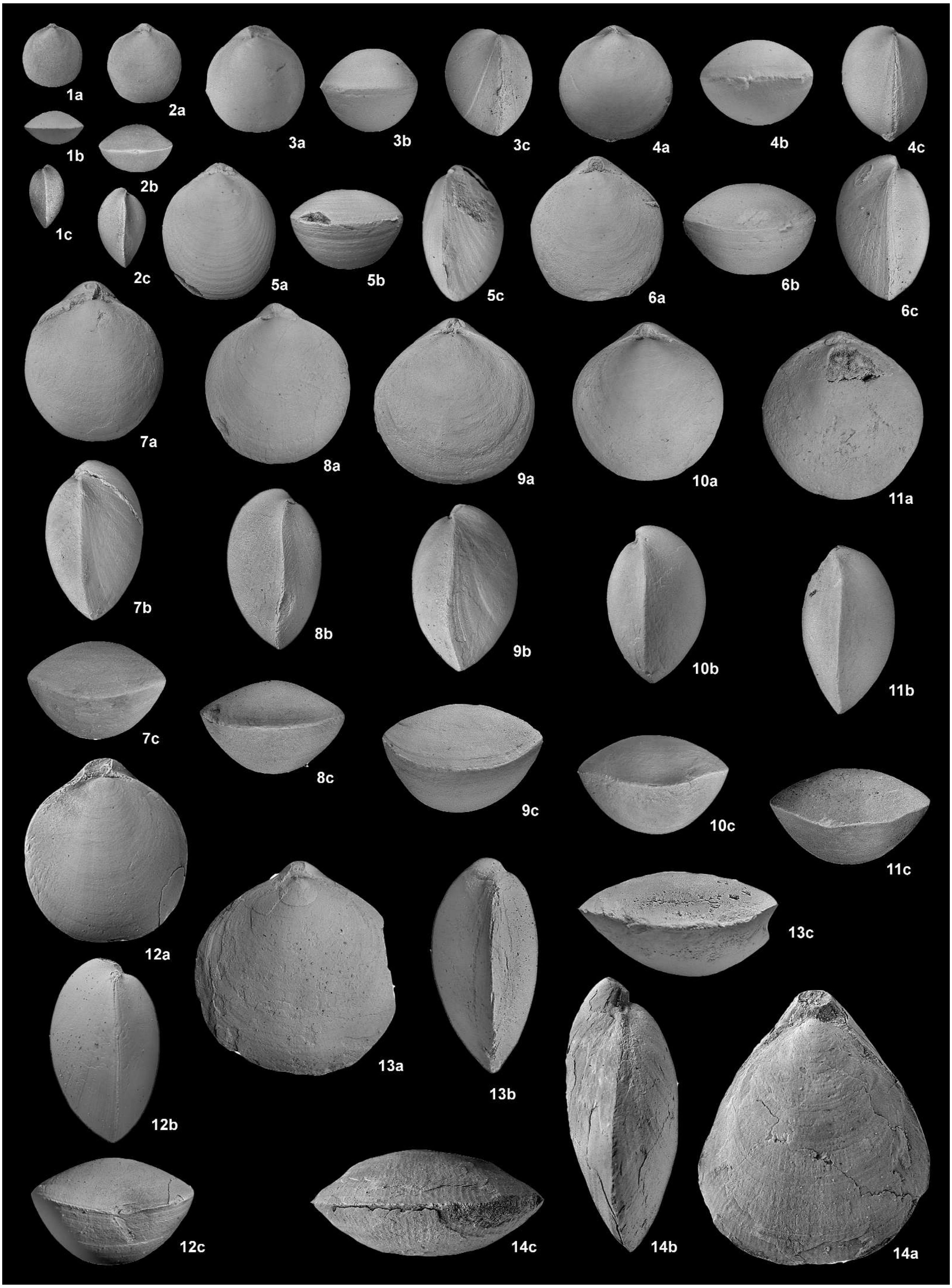
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Plate XXVIII

All figures are magnified twice. Specimens have been coated with ammonium chloride before photography unless otherwise stated. Specimens are deposited in the collection of the Geological and Paleontological Department, Hungarian Natural History Museum, under the inventory numbers prefixed by M, and in the Geological Museum of the Geological Institute of Hungary, under the inventory numbers prefixed by J.

1. *Papodina bittneri* (Geyer, 1889) – M 2008.471.1., Lókút, Fenyveskút, scree, Margaritatus Zone; a: dorsal view, b: lateral view, c: anterior view.
2. *Papodina bittneri* (Geyer, 1889) – M 2008.472.1., Lókút, Kericser VI, Bed 14, Davoei Zone; a: dorsal view, b: lateral view, c: anterior view.
3. *Papodina bittneri* (Geyer, 1889) – M 2008.473.1., Lókút, Kericser VI, Bed 29, Ibex Zone; a: dorsal view, b: anterior view; c: lateral view.
4. *Papodina bittneri* (Geyer, 1889) – J.9191, Lókút, Fenyveskút, p2, Margaritatus Zone; a: dorsal view, b: uncoated specimen in dorsal view, showing the adductor muscle scars, c: lateral view, d: anterior view.
5. *Zeilleria mutabilis* (Oppel, 1861) – M 2008.474.1., Lókút, Fenyveskút, 5/c, Margaritatus Zone; a: dorsal view, b: lateral view, c: anterior view.
6. *Zeilleria mutabilis* (Oppel, 1861) – M 2008.475.1., Lókút, Kericser VI, Bed 7, Margaritatus Zone; a: dorsal view, b: lateral view.
7. *Zeilleria alpina* (Geyer, 1889) – M 2008.476.1., Lókút, Kericser VI, Bed 23, Ibex Zone; a: dorsal view, b: anterior view, c: lateral view.
8. *Zeilleria bicolor* (Böse, 1898) – M 2008.477.1., Lókút, Kericser VI, Bed 33, Ibex Zone; a: dorsal view, b: anterior view, c: lateral view.
9. *Zeilleria* ? *aquilina* (Franceschi, 1921) – M 2008.478.1., Lókút, Kericser VI, Bed 30, Ibex Zone; a: dorsal view, b: anterior view, c: lateral view.
10. *Zeilleria* ? *aquilina* (Franceschi, 1921) – M 2008.479.1., Lókút, Kericser VI, Bed 25, Ibex Zone; a: dorsal view, b: anterior view, c: lateral view.
11. *Antiptychina* ? *rothpletzi* (Di Stefano, 1891) – M 2008.480.1., Lókút, Kericser VI, Bed 7, Margaritatus Zone; a: dorsal view, b: anterior view, c: lateral view.
12. *Antiptychina* ? *rothpletzi* (Di Stefano, 1891) – M 2008.481.1., Lókút, Kericser VI, scree, Ibex(?) to Margaritatus(?) Zone; a: dorsal view, b: anterior view, c: lateral view.

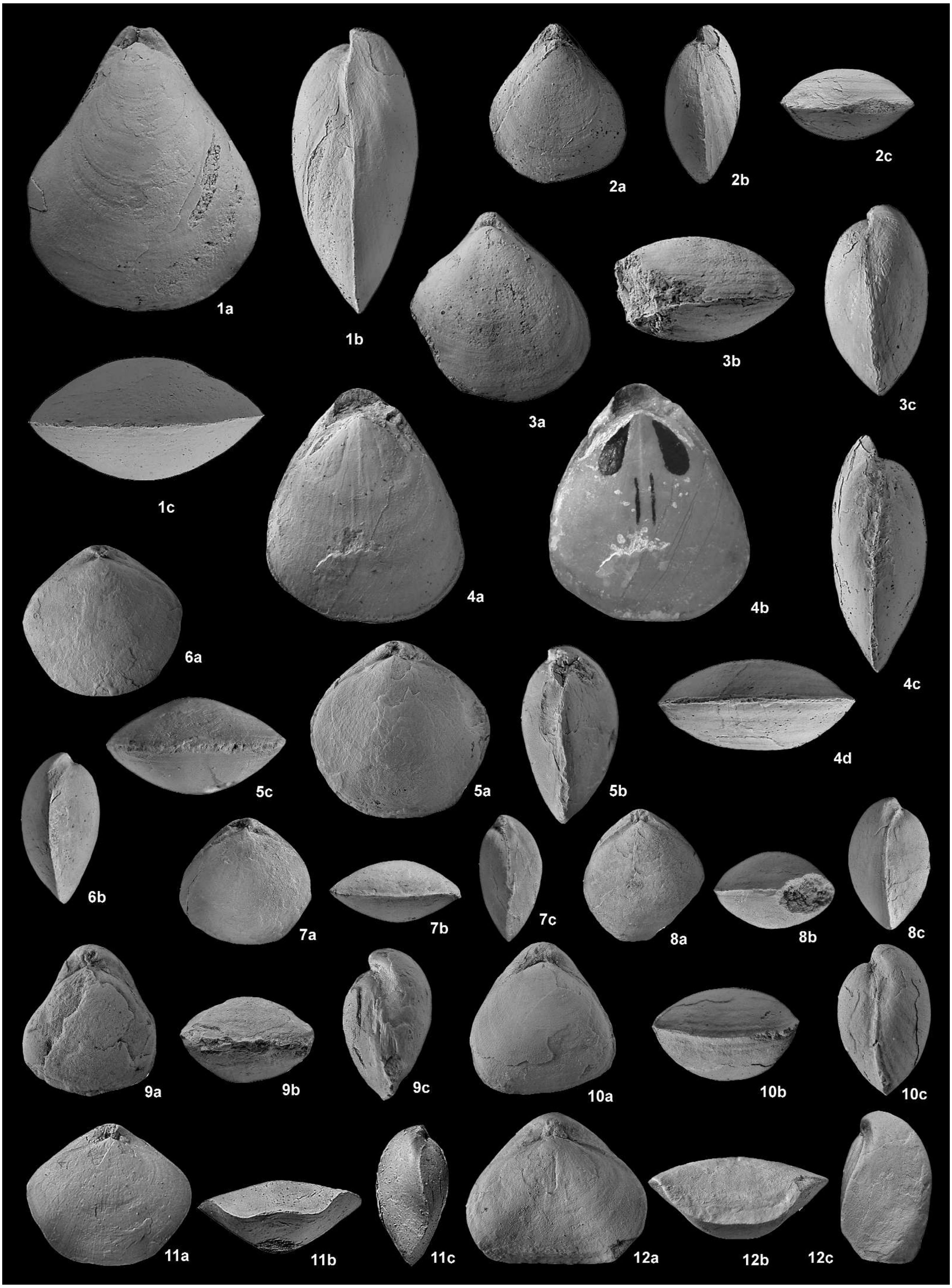
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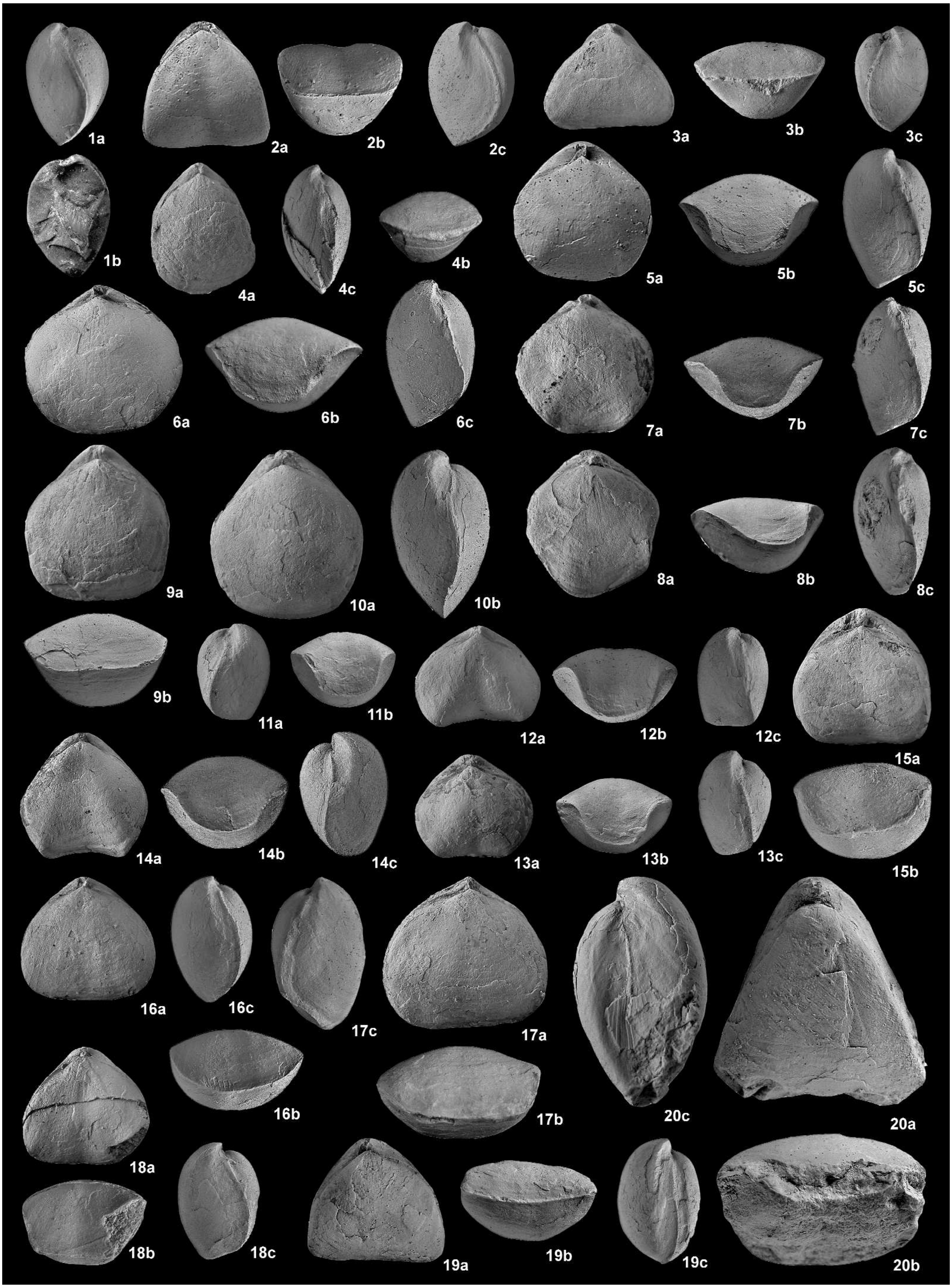
Plate XXIX

All figures are magnified twice. Specimens have been coated with ammonium chloride before photography unless otherwise stated. Specimens are deposited in the collection of the Geological and Paleontological Department, Hungarian Natural History Museum, under the inventory numbers prefixed by M.

1. *Aulacothyris* ? *ballinensis* (HAAS, 1912) – M 2008.482.1., Lókút, Fenyveskút, p1 (2), Margaritatus Zone; a: lateral view, b: uncoated, longitudinally broken specimen in lateral view, showing the ascending branch ("hood") of the loop.
2. *Aulacothyris* ? *ballinensis* (HAAS, 1912) – M 2008.483.1., Lókút, Fenyveskút, p1 (1), Margaritatus Zone; a: dorsal view, b: anterior view, c: lateral view.
3. *Aulacothyris* ? *ballinensis* (HAAS, 1912) – M 2008.484.1., Lókút, Fenyveskút, 5/c, Margaritatus Zone; a: dorsal view, b: anterior view, c: lateral view.
4. *Aulacothyris* ? cf. *fuggeri* (BÖSE, 1898) – M 2008.485.1., Lókút, Kericser VI, Bed 20, Davoei Zone; a: dorsal view, b: anterior view, c: lateral view.
5. *Bakonyithyris apenninica* (ZITTEL, 1869) – M 2008.486.1., Lókút, Kericser VI, Bed 20, Davoei Zone; a: dorsal view, b: anterior view, c: lateral view.
6. *Bakonyithyris apenninica* (ZITTEL, 1869) – M 2008.487.1., Lókút, Kericser VI, Bed 34, Ibex Zone; a: dorsal view, b: anterior view, c: lateral view.
7. *Bakonyithyris apenninica* (ZITTEL, 1869) – M 2008.488.1., Lókút, Kericser VI, scree from the middle part of the section, Ibex or Davoei Zone (?); a: dorsal view, b: anterior view, c: lateral view.
8. *Bakonyithyris apenninica* (ZITTEL, 1869) – M 2008.489.1., Szentgál, Tűzköves-hegy, T-II, Bed 22; Carixian; specimen with asymmetric anterior part; a: dorsal view, b: anterior view, c: lateral view.
9. *Bakonyithyris avicula* (UHLIG, 1880) – M 2008.490.1., Lókút, Kericser VI, Bed 21, Ibex Zone; a: dorsal view, b: anterior view.
10. *Bakonyithyris avicula* (UHLIG, 1880) – M 2008.491.1., Lókút, Kericser VI, Bed 25, Ibex Zone; a: dorsal view, b: lateral view.
11. *Bakonyithyris pedemontana* (PARONA, 1893) – M 2008.492.1., Lókút, Kericser VI, Bed 13, Davoei Zone; a: lateral view, b: anterior view.
12. *Bakonyithyris pedemontana* (PARONA, 1893) – M 2008.493.1., Lókút, Kericser VI, Bed 22, Ibex Zone; a: dorsal view, b: anterior view, c: lateral view.
13. *Bakonyithyris pedemontana* (PARONA, 1893) – M 2008.494.1., Lókút, Kericser VI, Bed 24, Ibex Zone; a: dorsal view, b: anterior view, c: lateral view.
14. *Bakonyithyris pedemontana* (PARONA, 1893) – M 2008.495.1., Lókút, Kericser VI, Bed 25, Ibex Zone; a: dorsal view, b: anterior view, c: lateral view.
15. *Bakonyithyris ovimontana* (BÖSE, 1898) – M 2008.496.1., Lókút, Kericser VI, Bed 19, Davoei Zone; a: dorsal view, b: anterior view.
16. *Bakonyithyris ovimontana* (BÖSE, 1898) – M 2008.497.1., Lókút, Kericser VI, Bed 13, Davoei Zone; a: dorsal view, b: anterior view, c: lateral view.
17. *Bakonyithyris ovimontana* (BÖSE, 1898) – M 2008.498.1., Lókút, Fenyveskút, scree, Margaritatus Zone; a: dorsal view, b: anterior view, c: lateral view.
18. *Bakonyithyris meneghinii* (PARONA, 1880) – M 2008.499.1., Lókút, Fenyveskút, scree, Margaritatus Zone; a: dorsal view, b: anterior view, c: lateral view.
19. *Bakonyithyris* ? aff. *gastaldii* (PARONA, 1880) – M 2008.500.1., Lókút, Kericser VI, Bed 7, Margaritatus Zone; a: dorsal view, b: anterior view, c: lateral view.
20. *Securina hierlatzica* (OPPEL, 1861) – M 2008.501.1., Lókút, Kericser VI, Bed 8, Margaritatus Zone; a: dorsal view, b: anterior view, c: lateral view.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Index

Names given in *italics* are synonyms or only mentioned in the text. Numbers in **bold** indicate pages on which a description and/or longer discussion is given; numbers in normal indicate pages where the name is mentioned, numbers in *italics* indicate pages where a text-figure occurs; roman plus arabic numbers indicate plate and figure numbers.