Gastropods of the Early Jurassic Hierlatz Limestone Formation; part 1: a revision of type collections from Austrian and Hungarian localities

by
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Abstract — As first part of a planned series, the major collections of gastropods, published from the Early Jurassic Hierlatz Limestone Formation has been revised taxonomically, and as a result, an up-to-date systematical arrangement is presented below. The revision aims to restore the correct species composition of the type collections first of all, but some suggestions for modifications were also necessary on the levels of different higher categories. Another intention is to gather as much reliable data on the known gastropods from the Hierlatz Limestone into a single publication as possible to provide a better base to continue the exploration of the world of these not really well-known components of the Jurassic biota. The taxonomical errors of the early publications caused also many derived mistakes and uncertainties. Their corrections in this publication will hopefully help to reach more reliable evaluation of these gastropods in different fields of general palaeontology.

The number of the distinguished species is 113; most of them belong to formerly known ones, but many new species are established mainly for misidentified or misinterpreted specimens. Several further new species remained in the unlabelled parts of the studied collections, which will be objects of a next publication.

The preservation and the accessibility of the originally aragonitic shells are rather bad in the Hierlatz Limestone owing to the characteristically strong recrystallisation. As consequence, important morphological elements are frequently lacking therefore the recurrent use of the open nomenclature can not be avoided.

The new taxa are: *Plectotrochus* n. gen. (type species: *Trochus plectus* STOLICZKA, 1861), *Discohelix pseudornata* n. sp., *Discohelix hallstattensis* n. sp., *Discohelix sima* n. sp., *Discohelix stoliczkai* n. sp., *Discohelix lobitzeri* n. sp, *Asterohelix urkutensis* n. sp., *Ptychomphalus kericserensis* n. sp., *Wortheniopsis (Wortheniopsis) urkutensis* n. sp., *Wortheniopsis (Sisenna) hierlatzensis* n. sp., *Wortheniopsis (Sisenna) jancsii* n. sp., *Wortheniopsis (Sisenna) lokutensis* n. sp., *Pleurotomaria eplenyensis* n. sp., *Laevitomaria danii* n. sp., *Bathrotomaria martiae* n. sp., *Lewisiella stoliczkai* n. sp., *Lewisiella? turbinata* n. sp., *Crossostoma? schafbergensis* n. sp., *Anticonulus acutus* n. sp., *Epulotrochus tuberculatus* n. sp., *Eucyclus (Eucyclus) mitterseensis* n. sp., *Eucyclus (Eucyclus) sandrae* n. sp., *Eucyclus (Lokuticyclus) spinnerinensis* n. sp., *Scaevola? suissenseensis* n. sp.

Key words — Gastropoda, taxonomical revision, systematics, Early Jurassic, Hierlatz Limestone Formation.

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Introduction

The Early Jurassic Hierlatz Limestone is one of the most characteristic formations of the Mediterranean Faunal Province in the Tethyan Realm. Its deposition is closely connected to submarine heights, developed during unequal subsidence of former shallow water carbonate platforms in the earliest Jurassic. The accumulation levels may be at the feet of these submarine elevations, on their tops, slopes or in fissures of the sea-bottom at any depth levels. Sedimentation of the Hierlatz Limestone is frequently episodic and usually full of gaps; it may be also condensed but some accumulations around higher areas have considerable thickness, stratified and more or less continuous. A detailed lithological characterisation of the Hierlatz Limestone Formation is given by VÖRÖS (1991).

The palaeontological significance of the Hierlatz Limestone originates from its richness in fossil remains. Gastropods are also common in its associations; sometimes they are abundant and diverse, like in the type locality of the Hierlatz Limestone Formation at Hallstatt (Austria). In contrast, the gastropods are rare or lacking from the contemporaneous lithological types of basin origin.

The Hierlatz Limestone is known mainly from Austria and Hungary, but its localities occur also in southernmost Germany, Slovakia, North Italy and Slovenia.

It is well-known that many gastropods are good environmental indicators, and extant gastropods also show high degree of provincialism. These two empirical characteristics promise useful conclusions from a thorough study of the gastropod faunas to the reconstruction of the Mediterranean Jurassic palaeoenvironments, and to their history. However, based on the current knowledge of the systematics of the faunas, these evaluations demand many corrections, and then they should be completed with results, coming from new collections. From these, the subsequent pages first of all present the conclusions of a taxonomical revision of the earliest major contributions to the Hierlatz Limestone gastropod palaeontology (HÖRNES 1853, STOLICZKA 1861). Besides, it is necessary to accomplish also a self-revision of those species that have been identified without a possibility to compare them to the types of the preceding authors by SZABÓ (1979, 1980, 1981, 1982 and 1983) from the Bakony Mts (Hungary).

The type collections, some newly discovered museum materials and new specimens from long known and recently discovered Hierlatz Limestone localities contain many gastropod species, which have remained still unknown for science. For these new finds, other systematical publications are planned.

History

Two years after SIMONY (1850) discovered the type locality over Hallstatt, SUESS (1852) gave the name of the formation as "Hierlatz Schichten". In the same year, REUSS (1852) already published the first two gastropod species (*Euomphalus orbis* n. sp. and *Euomphalus excavatus* n. sp.) from the same outcrops. In the next year, HÖRNES (in: HAUER 1853) described 23 additional gastropod species from the fauna of the type locality; 14 of them were new and nine were thought to be identical with species that had already been known from the Jurassic sediments of the (western) European epicontinental seas. HÖRNES's (1853) contribution did not give depictions, however, several years later STOLICZKA (1861) provided most of these species with figures while sometimes also reinterpreted them.

SCHAFHÄUTL (1854) also published some of his 13 gastropod species from the Hierlatz Limestone as new ones, but most of their descriptions and figures were unsatisfactory for subsequent identifications.

Most of the Hierlatz Limestone gastropod species became well-known from STOLICZKA's (1861) paper. He studied collections not only from the Hierlatz Alpe exposures but also from the Gratzalpe (today: Kratzalm) and Schafberg localities. He raised the number of the gastropod species from the Hierlatz Limestone Formation up to 54.

After STOLICZKA's (1861) publication, only few systematic works provided new pieces of information about the gastropods from the Hierlatz Limestone Formation for more than hundred years. In this period, BÖCKH (1874) introduced the first species, "*Turbo*" *multistriatus* n. sp., from a Bakony Mts (Szentgál, Hungary) locality; VON AMMON (1892) gave new name for one of the most frequent Hierlatz Alpe species (*Eucyclomphalus hierlatzensis*) that had been misidentified by STOLICZKA (1861) as *Trochus cupido* D'ORBIGNY, 1853 (that is the type species of *Euyclomphalus* AMMON, 1892). In faunal lists, some further authors added new data also to the distribution of the gastropods in other Hierlatz Limestone localities, but without detailed taxonomical proofs.

Disregarding BÖCKH (1874) above mentioned single species description, SZABÓ (1979, 1980, 1981, 1982, 1983, 1984 and 1995) published the first detailed systematical data of the Hierlatz Limestone gastropods from the localities of the Bakony Mts (Hungary). Some small parts of the material, on which these publications are based, have been possibly listed by earlier authors, but no documentation of this relation has been found.

Localities, material

The major part of the material of this revision has been collected in the type locality of the Hierlatz Limestone Formation that can be found at the northernmost edge of the Dachstein Plateau, on the Feuerkogel, a peak of the **Hierlatz Alpe**, just over Hallstatt (Salzkammergut, Austria, see Figure 1).

In the type locality area, the Hierlatz Limestone occurs mainly as Sinemurian infilling of a complicated and extended, multi-phased fissure system of the "underlaying" Upper Triassic Dachstein Limestone.

From the Hierlatz Alpe gastropods, the material that had been available for STOLICZKA (1861) was the most important target of the present revision. He studied the collection, stored in the K. k. geologische Reichsanstalt (today Geologische Bundesanstalt, Vienna); indirect evidences suggest that HÖRNES (1853) also used the same material or its parts. This material consists of two parts: the carefully saved "originals collection" contains the "models" to the drawings, and the more abundant "background collection" that became slightly mixed probably during the Second World War rescue. It seems certain that the main part of the latter material have been also available for STOLICZKA because many specimens in both collections are marked by a code system that have probably documented the collecting points in the field (unfortunately the key for this code system has not been found). Obviously both collections contain syntypes of STOLICZKA's (1861) species, and presumably include also those of HÖRNES's (1853) species. Some boxes of undistinguished specimens in the "background" material probably, others surely (e.g. the institution name written as "Geologische Bundesanstalt" on the label) do not belong to the type collection.

The Hierlatz Limestone of the type locality is regarded as belonging to the Upper Sinemurian (Oxynotum Zone). Recent field works at the type area resulted in recognition of some lithological variations of the Hierlatz Limestone, sometimes with inferable age differences but these can not be well traced in the studied museum collections.

STOLICZKA (1861) indicated also the Hof Mineralien Cabinet (ancestor of the Naturhistorisches Museum, Vienna) as one of the depositories of the studied materials, but no information has been found if the rich Hierlatz Alpe material of this museum belonged to the type collections or not. However, this museum is the depository for the type specimens, collected in the **Schafberg** area (over St. Wolfgang, W–NW from Bad Ischl, Austria; see Figure 1). Quite exactly, in this area two rather different lithological types contained Jurassic gastropods, but only a few specimens are saved from the typical, Sinemurian Hierlatz Limestone that outcrops in large areas of the Schafberg. Most of the syntypes belong to a small collection from an Upper Pliensbachian limestone, rich in micrite (atypical for the Hierlatz Limestone) and the fossils are frequently coated with black Fe-Mn-oxide layer. STOLICZKA (1861) regarded also this lithological type as Hierlatz Limestone. While the typical Hierlatz Limestone occurs in stratified ("hillfoot" deposited) form in the Schafberg area, its atypical variety found as infilling of a huge vertical fissure

of tectonic origin along a structural line on the northern side of the Schafbergspitz.

From STOLICZKA's (1861) notices on the frequency of the species, it is inferable that a more abundant collection has been available for him also from the typical Schafberg Hierlatz Limestone than the material, which is found in the indicated depositories. Similar is the situation with the **Gratzalpe "bei Aussee"** locality; only a few specimens are in the GBa "originals collection" but the remarks in the descriptions indicate more syntypes that are not found. The reversed comma is used in this locality name because the Gratzalpe can not be found in the vicinity of Aussee (today Bad Aussee) as it is written in STOLICZKA (1861), but in the north-eastern part of the Hagengebirge, south-west from Golling, south from Salzburg (Austria; pers. information from G. MANDL, Geologische Bundesanstalt). This locality appears in the literature also as Kratzalpe, but recent maps indicate this area with the name Kratzalm (Figure 1).

The labels of the available syntypes indicate that they come from Upper Sinemurian (Obtusum Zone) strata.

The revision concerns also the materials that have been published by the writer of these lines (SZABÓ 1979, 1980, 1981, 1982, 1983, 1984, 1995) from several localities of Sinemurian and/or Pliensbachian from the **Bakony Mts** (Hungary) without a possibility to compare them to the formerly published collections. Most of these specimens are deposited in the Hungarian Geological Museum, being part of the Hungarian Geological Institute. A few specimens from recent collecting activity are housed in the Hungarian Natural History Museum, Budapest.

More about the Bakony Mts localities (see Figure 1): — **1st group**: **Lókút**, *Kericser*: Upper Sinemurian to Upper Pliensbachian, more or less typical Hierlatz Limestone of stratified development; **Lókút**, *Fenyveskút*: Upper Pliensbachian, atypical Hierlatz Limestone, being rich in micritic cement, deposited on slopes and in fissures of sea bottom; **Eplény**, *manganese ore mine* (~4 km east from the previous localities): atypical, Upper Pliensbachian Hierlatz Limestone, similar to that of the Fenyveskút occurrence, from a submarine dyke of Upper Triassic Dachstein Limestone in a subsurface mine; **Hárskút**, *Közöskúti-árok* (several km west from Lókút): lowermost Pliensbachian (Ibex Zone) limestone of submarine elevation origin, but lithologically different from the Hierlatz Limestone (type locality for *Discohelix acarinata*, found also in Hierlatz Limestone); — **2nd group**: **Úrkút**, *Csárdahegy*: massive, not bedded Lower? Sinemurian Hierlatz Limestone with generations of younger submarine dykes, exposed in abandoned manganese ore pits; the **Szentgál** artificial exposures, opened to study the *Tűzköves-hegy* Jurassic strata; uppermost Sinemurian (Raricostatum Zone) stratified Hierlatz Limestone; — **3rd group**: **Sümeg**, *Mogyorósdomb* nature and archaeological conservation area: Upper(?) Sinemurian Hierlatz Limestone from neptunian dykes in lowermost Jurassic Kardosrét Limestone contained gastropod faunulae.

Abbreviations of depository names, used in the descriptions — **GBa** = Geologische Bundesanstalt, Vienna; **NhM** = Naturhistorisches Museum, Vienna; **HGM** = Hungarian Geological Museum (part of the Hungarian Geological Institute), Budapest; **HNHM** = Hungarian Natural History Museum, Budapest.

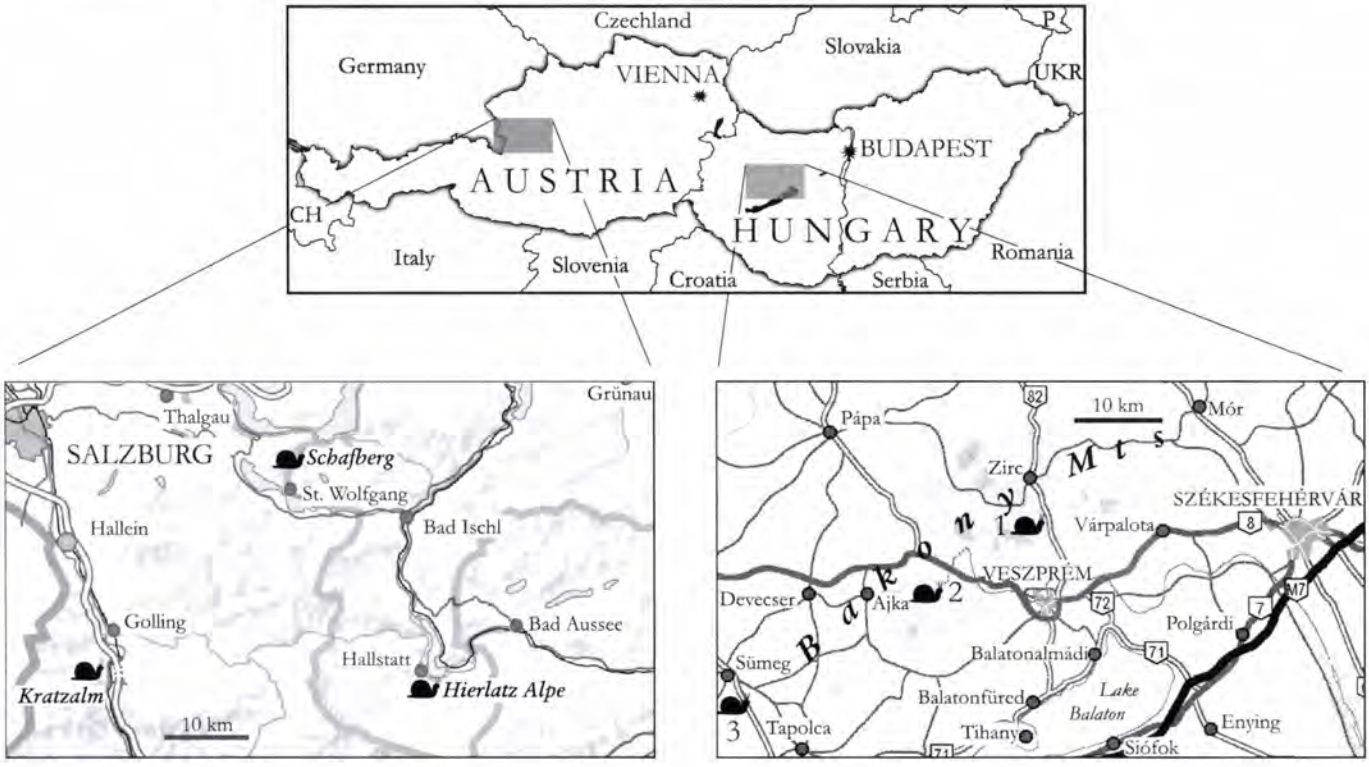

Figure 1 — Sketch maps of the Lower Jurassic Hierlatz Limestone localities from which the gastropods of this revision were collected. — **Snail pictograms** indicate nearby groups of natural outcrops or artificial exposures; — **Bakony Mts, 1st group**: Lókút, Eplény, Hárskút; **2nd group**: Úrkút, Szentgál; **3rd group**: Sümeg. — **CH**: Switzerland; **P**: Poland; **UKR**: Ukraina.

Systematics

Abbreviations to measurements in discoidal forms: **H** = total height; **H1** = height, measured just before widened peristome; **HPW** = height of penultimate whorl [measured at inner lip of (apparent) peristome]; D = maximum diameter of shell; **W** = width of peristome; **AS** = spiral angle; **AU** = umbilical angle; (linear measurements in **mm**, angles in °).

Abbreviations to measurements in trochospiral forms — **H** = total height; **HL** = height of last whorl; **HP** = height of peristome; **D** = diameter of last whorl; **W** = width of peristome; **AA** = apical angle; **AL** = coiling angle of last whorl (if different from apical angle). Asterisks indicate reconstructed measurements taken on more (**) or less (*) damaged shell parts; (linear measurements in **mm**, angles in °).

Abbreviations to measurements in cap shaped forms — **H** = total height; **HA** = height of the apex (if smaller than H); **L** = length of shell (anterior-posterior direction); **LP** = length of peristome; **W** = width of shell (perpendicular to length); (measurements in **mm**.).

Class Gastropoda CUVIER, 1797
Subclass Archaeogastropoda THIELE, 1925
Order Euomphalina DE KONINCK, 1881
Superfamily Discohelicoidea SCHRÖDER, 1995
Family Discohelicidae SCHRÖDER, 1995

Thoughts on the classification of *Discohelix* and morphologically related genera

Recently many papers discussed *Discohelix*, its relatives, and the similarly shaped (more or less discoidal), but not closely allied genera and their classification on different suprageneric levels to accommodate them. In lack of sufficient data and owing to ambivalent evaluation of the known characters, the results seem to have still been far from the best solution.

For long time *Discohelix* was placed into Euomphalidae, but MORRIS & CLEEVELY (1981) found that this superfamily contained genera of strongly different shell structures. They suggested a restricted interpretation for Euomphaloidea on an inferred shell structure of inner crossed-lamellar aragonite and an outer prismatic calcite layer. Traces of these shell layers were found in the shells of the Palaeozoic *Amphiscapha* (referring also YOCHELSON, WHITE & GORDON 1967) and *Euomphalus*. However, an unidentified Albian *Discohelix* species and some further Mesozoic genera from the previous Euomphaloidea were excluded on having nacreous inner shell layer. On these differences, they suggested a trochoidean systematic position to *Discohelix* and the other excluded genera. Unfortunately, these exclusions remained poorly documented; no identification of the studied Mesozoic species or publication of the actual shell structures supports these conclusions. Subsequently BANDEL (1988) and SCHRÖDER (1995) published similar results, based on a few studied specimens of two species with nacreous inner shell layer that they identified as *Discohelix*; the latter author erected Discohelicidae SCHRÖDER, 1995 to accommodate these forms.

BANDEL's (1988) suggestion to exclude *Discohelix* DUNKER, 1847 from Euomphaloidea is derived from study of a Valanginian shell, in which he has found the inner shell layer nacreous. He identified the shell as *Discohelix* sp., however collabral riblets crossed the outer face between the outer (abaxial) angulations of the whorls, and this kind of riblets had been lacking from the character-set of *Discohelix*. The same type of riblets ornamented the Valanginian *Discohelix bandeli* SCHRÖDER, 1995. Later KAIM (2004) identified both specimens as *Adeuomphalus bandeli* (SCHRÖDER, 1995) and this way he changed the family position of one of the conclusive species to Skeneidae (Trochoidea).

SCHRÖDER (1995) also identified another species with nacreous inner shell layer as *Discohelix* sp. However, this is also a morphologically stranger species in *Discohelix* because it has a distinctly trochospiral earliest shell (of 0.64 mm diameter) with rather rapidly expanding whorls and an asymmetrical ornament comparing the spire and the umbilical sides. Though some authors (e.g. WENDT 1968) have extended the interpretation of *Discohelix* to involve also weakly trochospiral forms (≈ *Colpomphalus* COSSMANN, 1916), SCHRÖDER's species can not be regarded as member of this genus. Just the protoconch and the earliest teleoconch whorls of the *Colpomphalus*-like forms are planispiral and the trohospiral mode of coiling develops on subsequent whorls. The ornament of the spire and umbilical side should be (nearly) symmetrical, and the expansion rate of the whorls in true *Discohelix* (and *Colpomphalus*) is fairly smaller than that of the figured specimen. It means that no verifiable *Discohelix* species has yet been published with nacreous layer in its shell.

In his survey, connected to the redescription of *Discohelix calculiformis* DUNKER, 1847, GRÜNDEL (2005) also concluded that the nacreous shell layer has not yet been confirmed in *Discohelix*. In spite of this, he applied the family name "Discohelicidae" for a group of genera, and he evaluated the modified systematical arrangement of SCHRÖDER's misidentified species ("*Discohelix*" *bandeli*) by KAIM (2004) to Skeneidae as suggesting just a trochoidean relation of the Discohelicidae.

But, does Discohelicidae exist after all? In reality, nacreous shell structure has not yet been confirmed not only in *Discohelix* but also in the group of morphologically closely related genera, which might be the further members of the possible family (see them in: GRÜNDEL 2005). It means in fact that family Discohelicidae SCHRÖDER, 1995 of the original diagnosis is empty at present.

The only specific character of Discohelicidae, the nacreous inner shell layer, should be identified first of all in

the type species (as ideal solution) or in a doubtlessly *Discohelix* species to resurrect the family by its original diagnosis. Until reliable and satisfactory knowledge will have been available about the shell structures of the euomphalomorph genera, the writer of these lines thinks better to keep *Discohelix* and the related genera in a morphologically more familiar space that is given in the Euomphalina, not in Trochina.

The shell-morphological characters are not contradictory to those of the Euomphaloidea, to which these genera were traditionally ascribed. Because NÜTZEL (2002) has demonstrated, in contrast to BANDEL & FRÝDA's (1998) opinion, that the euomphalid protoconchs do not differ substantially from the "archaeogastropod type", identifiable also in *Discohelix* and in its relatives, momentarily no verified character gives satisfactory support to exclude these genera from the "traditional" systematical environment. At the same time these authors raised the rank of the taxon, containing Euomphalus and the related genera quite high, either to subclass (BANDEL & FRÝDA 1998) or to order (NÜTZEL 2002) level. Both of these evaluations well reflect that there is a gastropod group of early appearance, which represents important phases in the gastropod evolution. It shows a rather high morphologic flexibility that might have been concomitant also with high shell structure variability along evolutionary lines towards derived groups.

This possibility is supported by NÜTZEL (2002) paper that has demonstrated a three-layered shell structure in an *Euomphalus* species. All layers are consisted of calcite but NÜTZEL states that the two inner ones have been originally aragonite, without suggestion for the crystal modification, and the outermost one has been calcite. This would apparently mean the discovery of a second, but rather different structure in a single genus after MORRIS & CLEEVELY's (1981) two layered *Euomphalus* shell. Existence of so different structures in one genus does not seem really feasible. However, appearance of more than one shell structure types in an early, major group of gastropods (like Euomphalina), that is inferably ancestral (root) for some main gastropod evolutionary lines, seems a more realistic idea. Therefore a systematic place for the "discohelicid" genera, even with verified nacreous shell, in Euomphalina seems a better solution than to force them into a foreign morphospace, like that of Trochoidea as suggested by SCHRÖDER (1995).

The trochoidean systematical place was questionably accepted by CONTI & MONARI (2002) when the nacreous shell structure in Discohelicidae had yet seemed to be verified. Their second alternative, to give superfamily rank (in Trochina) to this group of genera, would be a better solution if the nacreous shell structure was proven. However, that superfamily could belong also to the Euomphalina, in which the roots of the Trochina are recognisable. This is a really theoretical solution for a situation, not verified but the question, which family level taxon could be appropriate to house *Discohelix* and the related genera, has remained open; therefore I choose the last possibility. It is important to express, that the diagnosis of this formally not emended Discohelicidae (Discohelicoidea, Euomphalina) do not contain any constrictions on the shell structure in lack of reliable data.

Genus *Discohelix* DUNKER, 1847

Type species: *Discohelix calculiformis* DUNKER, 1847

Discohelix orbis (REUSS, 1852)

(Figure 2)

1852: *Euomphalus orbis* REUSS — REUSS, p. 114, pl. 14, fig. l.
1861: *Discohelix orbis* REUSS — STOLICZKA, p. 182, pl. 3, figs 8a–e, non 9–10.
v. 1874: *Discohelix orbis* REUSS — GEMMELLARO, G. G., p. 98.
pars, v. 1911: *Discohelix orbis* REUSS — GEMMELLARO, M., p. 218. (non: Pl. 10, figs 9–12).
1912: *Discohelix orbis* REUSS — HAAS, p. 283, pl. 20, figs 23–24.
1924: *Discohelix orbis* REUSS — MAUGERI, p. 48, pl. 1, fig 26.
? 1937: *Discohelix orbis* REUSS — PCHELINCEV, p. 26, pl. 1, fig 41.
1979: *Discohelix orbis* (REUSS, 1852) — SZABÓ, p. 20, pl. 1, figs 1–3; (text)fig. 6c.
2003: *Discohelix orbis* (REUSS, 1852) — SZABÓ in VÖRÖS et. al., p. 64.

Neotype — GBa 2008/69/32/1/1

Material — No information was found about REUSS's (1852) syntypes, they seem to be lost, therefore a neotype is suggested here from STOLICZKA's (1861) "originals", collected from the same strata as REUSS's material.

STOLICZKA's originals in the GBa, labelled as *Discohelix orbis* belong to four different species. STOLICZKA (1861) united *Euomphalus ornatus* HÖRNES, 1853 and *Euomphalus orbis* REUSS, 1852 (as *Discohelix orbis*), but provided figures to introduce both species. However, his figures about *Euomphalus ornatus* HÖRNES, 1853 are composed of specimens of two species: *D. ornata* (HÖRNES, 1853) and *D. pseudornata* n. sp. (see them below). The holotype of *Discohelix hallstattensis* n. sp. was also mixed to *D. orbis* specimens of the "background collection".

Lots of specimens (about 200 in different collections).

Measurements	H	H1	HPW	D	W	AS	AU
neotype	*10.2	-	6.6	33.8	9.8	-	142°
GBa 2008/69/32/1/2	*9.7	-	6.4	*29	*8	222°	-

S h a p e — Dextral, depressed, discoidal form with concave spire. On spiral side of almost bilaterally symmetrical shell, protoconch ("apex") slightly raises. Axial whorl section rounded in protoconch, but nearly trapezoidal with feebly convex sides on subsequent whorls. Spiral angulations, delimiting outer face, sharp and carinate throughout whole teleoconch. Peristome usually damaged. Single, probably mature, Bakony Mts fragment of 42–44 mm reconstructed diameter shows quadrangular peristome, slightly broadened in every direction, except adaxially.

S c u l p t u r e — Approximately half whorl after nucleus, spiral lines appear on protoconch and persist along about two whorls then fade away as observed in relatively well-preserved Bakony Mts specimen. No sharp boundary found between protoconch and teleoconch. From third whorl, carina visible both on spire and umbilical sides on all whorls along abaxial sutures. About two whorls after end of early lineation, spiral ornament reappears. It consists of fine, regularly spaced threads occurring on whole whorl surface. Growth-lines visible slightly earlier than reappeared spiral ones of teleoconch. On post-juvenile whorls, irregularly spaced and strengthened, but rather dense, low, collabral ridges appear on spiral and umbilical sides. With onset of visible growth-lines, carinae of outer angulations become (usually irregularly) corrugated; corrugation endures up to peristome and its strength increasing like that of collabral ridges; corrugation may become obscure on latest whorls.

R e m a r k s — *Discohelix orbis* is interpreted here by the specimens found in STOLICZKA (1861) "originals collection". The selected neotype represents the typical shell of the species. Its shape, measurements and ornament well correspond to REUSS (1852) description and figuration, excepting that REUSS's drawings show much sparser and stronger nodulae on the carinae of the outer angulations. In the studied abundant material, only two comparable specimens occurred with sparser and stronger nodosity but they also differ in the shape and the measurements. These characters distinguish them on species level (see *Discohelix pseudornata* n. sp. below). (REUSS's description and DUNKER's notice about the strong similarity to *D. calculiformis*, discussed in the next paragraph, suggest that the original drawings are probably not realistic.)

Table 1 — A comparison of *Discohelix calculiformis* DUNKER, 1847 and *Discohelix orbis* (REUSS, 1852). — The compared characters are observed on specimens of about 30 mm diameter.

character compared	*Discohelix calculiformis*	*Discohelix orbis*
spiral ornament on protoconch	absent (WENDT 1968); not visible owing to poor preservation (GRÜNDEL 2005)	found on Bakony Mts specimens (SZABÓ 1979)
number of whorls (at same diameter)	~7 (GRÜNDEL 2005)	9–10 in STOLICZKA (1861) originals
number of corrugations on carinae of outer angulations	80 (penultimate whorl of lectotype) (GRÜNDEL 2005)	180–200, when distinguishable on penultimate whorls of STOLICZKA (1861) originals
fine spiral threads on teleoconch	only at carinae of outer angulations (GRÜNDEL 2005)	dense on whole surface of whorls in STOLICZKA (1861) originals
growth lines	hardly visible (GRÜNDEL 2005)	marked in STOLICZKA (1861) originals
subregularly repeating collabral ridges	absent (GRÜNDEL 2005)	present on spire and umbilical sides in STOLICZKA (1861) originals

As editor of the Palaeontographica, DUNKER attached notices to REUSS's (1852) paper to express his opinion that *D. orbis* is probably identical with *D. calculiformis* DUNKER, 1847, the type species of the genus. Subsequently, in spite of the similarity and a rather large number of publications, dealing with these species, the distinction of *D. orbis* from *D. calculiformis* remained uncertain.

First WENDT (1968) suggested some characters for this purpose (see Table 1) and further differences can be found in GRÜNDEL (2005) paper that provided a new description to *D. calculiformis* on the basis of the syntypes and QUENSTEDT's (1881–1884) finds. GRÜNDEL (2005) did not compare the two species, but accepted *D. orbis* by listing it with the existing further species of the genus. A comparison of the two species is necessary not only owing to the morphological similarity, but also the similar stratigraphical distribution. Both species are known from Pliensbachian strata (*D. orbis* also from Upper Sinemurian); however, their palaeobigeographical distribution seems different. *D. orbis* is an "index" species for the Pliensbachian Mediterranean Province while *D. calculiformis* has been found in "stable European" strata of a restricted area in Germany.

GRÜNDEL's (2005) re-description and photos provided much more morphological details to a comparison than all former publications. The two species are really similar to each-other but some differences support their distinction (see Table 1).

Further distinction problems to discuss arise from STOLICZKA (1861) decision about unification of *Discohelix ornata* (HÖRNES, 1853) with *Discohelix orbis* (REUSS, 1852). Because STOLICZKA's (1861) figures about *Discohelix ornata* (Tafel III. Fig. 8, Fig 9) are composed of specimens of two species, it means two necessary comparisons. Obviously, a part of the specimens must bear the original name but the

others ones belong to a new species (*Discohelix pseudornata* n. sp., see below). Both species differ from *Discohelix orbis* in their shape, the measurements and the ornaments, too. Their adult size is much smaller, and the fully-grown stage is indicated by characteristic last whorl morphology. However, the close relation to *Discohelix orbis* needs careful observation of the morphological characters in young specimens (see details below).

The specimens, figured by M. GEMMELLARO (1911) as "*Discohelix orbis* var. *ornata*" represent a new species (neither *orbis*, nor *ornata*; pers. obs.), however, the not figured part of his collection contains also true *Discohelix orbis*.

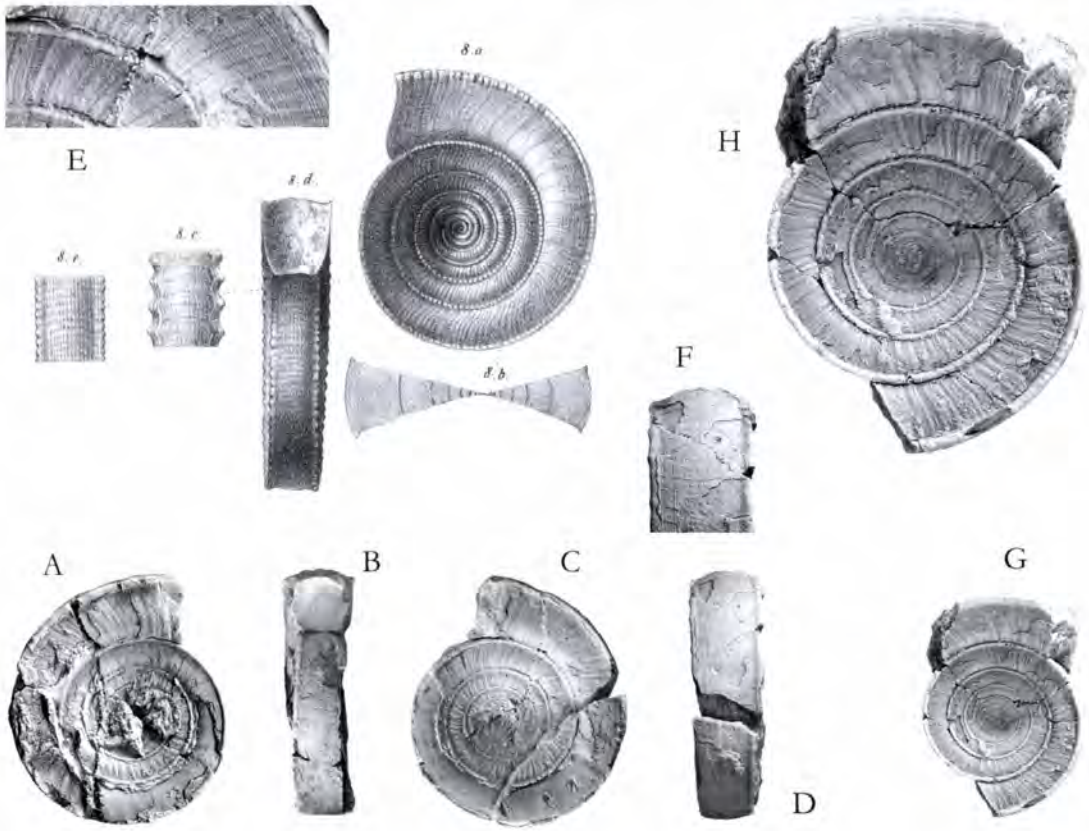

Figure 2 — *Discohelix orbis* (REUSS, 1852). — **8 a–e**: copied original figures from STOLICZKA (1861) Tafel III.; **c**: this type of corrugation has not been found in *D. orbis*, it was probably drawn from the specimen, introduced in Figure 3: A–D and M–N (below); **A–F**: neotype, one of the possible original specimens to STOLICZKA's figures in Tafel III, Fig. 8 a, b, d, e; A = spiral view, ×1, B = aperture view, ×1, C = umbilical view, ×1, D = back view, ×1, E = ornament on the umbilical side (details of C; ornament of spire is symmetrical to that), ×2, F = details of ornament on the outer side, magnified from D, ×2; **G–H**: spire side of another shell (paraneotype) from the collection of STOLICZKA (1861) figured specimens, G = ×1, H = ×2.

D i s t r i b u t i o n — *Discohelix orbis* (REUSS, 1852) is one of the most widespread and most frequent element in the latest Sinemurian to latest Pliensbachian gastropod assemblages in the Mediterranean Faunal Province of the Tethyan Realm. *D. orbis* commonly occurs in association with *Eucyclus alpinus* STOLICZKA, 1861 in the Pliensbachian. They are the gastropods, which have inhabited also the deepest water biotopes; they have been found also in lots of "Adnet" (or "Rosso Ammonitico") Limestone localities.

Northern Calcareous Alps, (Austria, Germany), Sinemurian (from Oxynotum Zone) to Upper Pliensbachian; Eastern and Western Sicily, Central Apennines (Italy), Pliensbachian; Southern Alps, Pliensbachian; Bakony and Gerecse Mts (Hungary), Upper Sinemurian to Upper Pliensbachian; ? Crimea, Caucasus, Pliensbachian.

The earliest occurrence of the species is in the Oxynotum Zone (Sinemurian) and the latest finds are known from the Stokesi Zone (uppermost Pliensbachian).

Discohelix ornata (HÖRNES, 1853)

(Figure 3: E–L)

1853: *Euomphalus ornatus* HÖRNES — HÖRNES in HAUER, p. 760.
pars 1861: *Discohelix orbis* REUSS — STOLICZKA, p. 182, pl. 3, fig. 9–10.
non (v) 1911: *Discohelix orbis* REUSS var. *ornata* Hörnes — GEMMELLARO, M., p. 218, pl. 10, figs 9–12.
non 1979: *Discohelix* cf. *ornata* (HÖRNES, 1853) — SZABÓ, p. 21, pl. 1, fig. 4.

L e c t o t y p e — GBa 2008/69/32/2/1.

M a t e r i a l — Three damaged, shelly specimens from the *Discohelix orbis* unit of the "originals collection".

Measurements	H	H1	HPW	D	W	AS	AU
lectotype	-	*6.8	4	18.9	*3.6	143°	150°
GBa 2008/69/32/2/2	-	*5.1	*4.5	*16.9	*3	-	149°

S h a p e — Sinistral or false sinistral, discoidal, fairly not bilaterally symmetrical shell. In supposing dextral shell, angle of umbilical depression ~10° smaller than that of on spiral side. Form of spiral and umbilical cavities tend to spherical shape. Protoconch seems slightly raised in deeper excavated side of shell; strong re-crystallisation covers details. Earliest part seems to consist of globular nucleus and about one rounded whorl. Axial whorl section nearly trapezoidal in teleoconch with feebly concave, flattened or feebly convex spiral and umbilical sides; outer face evenly arched convex. Angulations, delimiting outer face, sharp and carinate from second whorl along whole teleoconch. Adult (apparent) aperture quadrangular, axially elongated. Entire peristome unknown.

S c u l p t u r e — Protoconch seems smooth; spiral and umbilical sides of subsequent whorls covered by delicate growth lines and weak, collabral ridges. On earlier teleoconch whorls before penultimate whorl, ridges dense, equally strong and regularly repeating. Each ridge strengthens as distinct, collabrally elongate tubercle at crossing with carina, running along outer suture. Ridges become irregular on last whorl, just like tubercles. Concomitantly, gradually stronger, sparse and spine-like nodes develop on outer angulations of whorls. Low, wide undulation (ridge) of shell belongs to each node, both on spiral and umbilical sides. Outer face bearing fine and closely spaced spiral threads. Traces of spiral ornament on spiral and umbilical side observable only on last whorl as few (3–4) flat, obscure lines on some specimens.

R e m a r k s — STOLICZKA's (1861, Tafel III, 9–10) figures of *Discohelix ornata* (HÖRNES, 1853) are composed of morphological elements of two species. The more markedly ornamented specimens from the "*Discohelix orbis*" inventory unit are regarded here as the name bearing ones of *Discohelix ornata* (HÖRNES, 1853). The remaining shells are representatives of a new species (*Discohelix pseudornata*, see below). The two species and *Discohelix orbis* are closely related to each other therefore some hardly distinguishable forms occur amongst the juvenile forms.

All available *Discohelix ornata* specimens are strongly re-crystallized therefore the lack of ornament on the protoconch may be apparent.

The adult size of *D. ornata* is much smaller than that of *D. orbis* (e. g. the diameter of shell is 16–20 mm in the earlier but exceeding 30 mm in the latter species). The adult stage is marked in *D. ornata* by the development of the strong nodosity on the last whorl while the adult ornament does not differ substantially from the juvenile one in *D. orbis*. In the juvenile stage, *D. ornata* shows a rather regular repetition of the collabral riblets and granules on the keels but the same elements are only subregular in *D. orbis*. The tubercles may be lacking or cause only undulations of the continuous carinae in *D. orbis* but they are present every case and distinct in *D. ornata*; the carinae of the latter species seem actually to be composed of series of tubercles. Sometimes the tubercles are quite regular also in juvenile *D. orbis* but at the same time they have also dense spiral lineation; no lineation is observable on spiral and umbilical side of juvenile *D. ornata*.

Present revision of the *Discohelix* species shows that the poorly preserved specimen, figured by SZABÓ (1979) as *Discohelix* cf. *ornata* (HÖRNES, 1853) from Sümeg (Bakony Mts, Hungary), is a fragment of a *Discohelix orbis* (because it has obscure traces of spiral threads also on spiral and umbilical sides). However, another fragment of this locality represents *Discohelix ornata* in the gastropod fauna.

The nodosed *Discohelix* from the Pliensbachian of Sicily, figured by M. GEMMELLARO (1911) who has interpreted *D. orbis* like STOLICZKA (1861), is also comparable but it belongs to a new species, needing description. Its nodes are more widely spaced and the specimens have significantly larger adult size than *Discohelix ornata*; other measurements are also considerably different.

Discohelix ferox VON GÜMBEL, 1861 is also a nodosed species of comparable morphology and size, but the ratios of the shell and the details of the ornament are different. The whorls are more rapidly increasing therefore the number of whorls is much lower (6) than in *D. ornata* (10) by the same diameter.

Another new, coarsely nodosed member of the "*Discohelix orbis*" group is *Discohelix hallstattensis* n. sp.; see for its distinction from *D. ornata* below.

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Hierlatz Limestone, Upper Sinemurian (Oxynotum Zone); Bakony Mts: Sümeg, Upper(?) Sinemurian.

Discohelix aff. *ornata* (HÖRNES, 1853)

(Figure 15: M–O)

pars 1861: *Discohelix reussi* HÖRNES — STOLICZKA, p. 184, pl. 3, fig. 14 d.

M a t e r i a l — Single whorl fragment (2008/69/35/2/1) from the collection of STOLICZKA's (1861) figured specimens, identified as "*Discohelix reussi* HÖRNES, 1853" [see *Pentagonodiscus reussii* (HÖRNES, 1853) below].

Measurements	H	H1	HPW	D	W	AS	AU
GBa 2008/69/35/2/1	+10/6.6	-	-	-	-	-	-

+ = on pair of nodes/in interspace

S h a p e — Shell fragment belongs to normally (not pentagonally) coiled shell of nearly bilateral symmetry. Two pairs of heavy nodes visible on outer angulations of short outermost (last?) whorl fragment, being fairly higher than wide.

S c u l p t u r e — Mainly fine, and many subregularly repeating, riblet-like, strong growth-lines visible on spiral and umbilical sides, crossed by dense, thin spiral threads. Marked growth-lines and stronger spiral threads of nearly equal density result network ornament on outer side.

R e m a r k s — The node-pairs of the outer angulations are much nearer to each-other than those of *Pentagonodiscus reussii* (HÖRNES, 1853) and their morphology is also different, similarly to the collabral and spiral ornamental elements. Therefore, the shell fragment can not be identified as *P. reussii*.

The most similar morphology is visible on the last whorl of the available *Discohelix ornata* specimens; however, the reconstructed diameter of the fragment seems to belong to the last whorl of a shell with at least one whorl larger than the available, largest *D. ornata* specimens. There are the possibilities that the whorl fragment either shows the morphology of the latest growth phase in *D. ornata* that has not yet been observed in a more complete specimen, or it may be indicative of an unknown *Discohelix* species.

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Hierlatz Limestone, Upper Sinemurian (Oxynotum Zone).

Discohelix pseudornata n. sp.

(Figure 3: A–D, M–N)

?pars 1853: *Enomphalus ornatus* HÖRNES — HÖRNES in HAUER, p. 760.
pars 1861: *Discohelix orbis* REUSS — STOLICZKA, p. 182, pl. 3, fig. 9–10.

H o l o t y p e — GBa 2008/69/32/3/1.

T y p e l o c a l i t y — Hallstatt, Hierlatz Alpe.

T y p e s t r a t a — Sinemurian (Oxynotum Zone) Hierlatz Limestone.

N a m e — Referring the similarity to *D. ornata* (HÖRNES, 1853)

D i a g n o s i s — Medium size *Discohelix* species with trumpet-like peristome; strong carinae on both angulations, having rather sparse granules on the juvenile shell; granules strengthen as spiny nodes, becoming spirally elongated on last whorl; outer side concave along carinae but convex between concave belts.

M a t e r i a l — Two specimens from "*Discohelix orbis*" inventory unit in STOLICZKA's (1861) "originals collection".

Measurements	H	H1	HPW	D	W	AS	AU
holotype	-	-	-	*21.2	*7	208°	154°

S h a p e — Dextral (?), depressed discoidal, nearly bilaterally symmetrical shell. Axial whorl section with feebly convex spiral, umbilical and outer sides; however, narrow concave belts also visible along both sides of marked carinae, running on outer angulations. Last whorl and adult aperture axially flattened (wider than high); aperture moderately broadened in all possible directions but remains quadrangular (traces observed on internal mould of last whorl). Peristome not preserved but outward tapering as shown by impression.

S c u l p t u r e — Protoconch unknown; shell fragment of holotype on spiral (?) side show delicate growth lines and weak, subregularly repeating collabral ridges (second specimen show similar ornament on umbilical side, too). Carinae bear granules of density similar to that of ridges. Nodes become stronger, sparser and spirally elongated on last whorl. Undulating, fine spiral threads found only on, and close to carinae.

R e m a r k s — The adult size of *D. pseudornata* is much smaller than that of *D. orbis* (e. g. the diameter of shell is 18–24 mm in the earlier but exceeding 30 mm in the latter species). Quite exactly: the adult stage is marked in *D. pseudornata* n. sp. by the development of the enlarged (trumpet like but angular) peristome on the last whorl. Feebly enlarged (probably mature) peristome was observable only on a fragment of a single specimen of *D. orbis*, having 42–44 mm reconstructed diameter.

Dense, fine, spiral threads ornament *D. orbis* on the whole visible surface of the whorls but lacking from the spiral and umbilical sides of *D. pseudornata* n. sp., except the carinae of the outer angulations; they are present also on the outer side but only on, and closely alongside the keels.

In *Discohelix pseudornata* n. sp., the carinae are sparsely granulated on the juvenile shell part but densely and subregularly undulating in *D. orbis*. The strong, sparse and spirally elongate nodes of the adult shell of *D. pseudornata* n. sp. never appear in *D. orbis* at similar diameter.

In the arrangement of the spiral lines and the sparsity of the granulation on the juvenile keels, *D. pseudornata* n. sp. is similar to *D. calculiformis* DUNKER, 1847, but this latter species has significantly larger shells without any trace of comparable peristome modification and the coarser nodes of the adult *D. pseudornata* n. sp.

Most important difference from *D. ornata* is in the geometry of the whorl cross-section. It is elongate parallel to the coiling axis in *D. ornata,* but flattened in the same direction in *D. pseudornata* n. sp. The carinae of the outer angulations limit an evenly arched, convex outer side in *D. ornata*, but a concave belt accompanies both carinae on the outer side in *D. pseudornata* n. sp. with a narrow convex belt between them. The strong nodes of the last whorl are restricted onto the carinae in *D. pseudornata* n. sp. but they extend as weakening ridges towards the coiling axis in *D. ornata*. *D. pseudornata* n. sp. seems to be

dextrally coiled, but the position of the less concave side in *Discohelix ornata* specimens suggest false or true sinistral coiling of the species.

The nodosed Pliensbachian Sicily *Discohelix*, published by M. GEMMELLARO (1911), who has interpreted *D. orbis* similarly to STOLICZKA (1861), and *Discohelix ferox* VON GÜMBEL, 1861 are also comparable species but their nodosity are much stronger, sparser and of different morphology, their measurements are also significantly different.

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone).

Figure 3 — *Discohelix pseudornata* n. sp. (A–D, M–N) and *Discohelix ornata* (HÖRNES, 1853) (E–L). — **9, 10**: copies from STOLICZKA's (1861) Tafel III; figures of "*Discohelix ornata*", composed of morphological elements from the two species, visible in the photos; **A–D**: *Discohelix pseudornata* n. sp. holotype; spiral (?) (A), apertural (B), umbilical (?) (C) and dorsal (D) view, ×1; **E–G**: *Discohelix ornata* (HÖRNES, 1853), lectotype, umbilical (?) (E), back (F) and spiral (?) (G) view; ×1; **H–J**: *Discohelix ornata* (HÖRNES, 1853), a paralectotype (GBa 2008/69/32/2/2) showing more distinctly a less excavated spire (?) side (H) and asymmetrical "peristomal" (I) and back view (J), suggesting also possibility of sinistral coiling, ×1; **K–L**: magnified views of the lectotype of *Discohelix ornata* (HÖRNES, 1853) to show details of the ornament, ×2.5; **M–N**: magnified views of *Discohelix pseudornata* n. sp. holotype to show details of the ornament, ×2.5.

Discohelix hallstattensis n. sp.

(Figure 4)

H o l o t y p e — GBa 2008/69/32/4/1.

T y p e l o c a l i t y — Hallstatt, Hierlatz Alpe.

T y p e s t r a t a — Upper Sinemurian (Oxynotum Zone) Hierlatz Limestone.

N a m e — From town Hallstatt, lying at the feet of Hierlatz Alpe.

D i a g n o s i s — Axially depressed, (false) sinistral shell; spire concave; regularly corrugated carinae on outer angulations of juvenile whorls; strong, collabrally elongated, subregularly repeating nodes on angulations of body whorl.

M a t e r i a l — A single specimen from a *Discohelix orbis* box of STOLICZKA's "background collection".

M e a s u r e m e n t s	H	H1	HPW	D	W	AS	AU
holotype	**10.5	-	*5.5	*34.5	*7	+220°	+153°

+ supposing false sinistral (dextral) coiling

S h a p e — Depressed discoidal specimen, sinistral or (more probably) false left-handed. Whorls flat on spiral and umbilical side, feebly, evenly convex on outer face. Peristome not preserved.

S c u l p t u r e — Carinae of outer angulations prominent along preserved early whorls (protoconch, nucleus and ~1st whorl, dissolved during fossilization). On second half of penultimate whorl, carinae become flattened then

disappear but angulations remain marked. Juvenile whorls covered by dense, sub-periodically repeating, weak growth ridges, corrugating also carinae. Ridges become flattened and more irregular both in strength and space on penultimate whorl, where carinae disappear; all changes gradual. At same growth stage, subregularly repeating nodes develop on outer angulations. Their strength, and distance between their pairs increasing with growth. Strong ridges connect nodes to adaxial suture more or less collabrally. Obscure spiral lines appear irregularly on all sides of last whorl.

R e m a r k s — The protoconch has dissolved therefore the exact nature of the sinistral coiling remains uncertain. If we regard the less concave side as spire, as it is done traditionally, this would be a sinistral species. The earliest visible whorl, which is probably the second one after the nucleus, seems slightly elevated in the deeper side therefore the false sinistral coiling is more probable.

First of all, the only specimen of *Discohelix hallstattensis* n. sp. has to be compared to *Discohelix ornata* (HÖRNES, 1853), being similarly aged. The main differences are: the adult shell of *Discohelix hallstattensis* n. sp. has 1.5–2 times bigger diameter than *Discohelix ornata*, and the adult, nodosed last whorl develops in *Discohelix hallstattensis* n. sp. two whorls later than in *Discohelix ornata*; the form and arrangement of the nodes are also different; the nodes of *Discohelix ornata* are sitting on the carinae of the angulations while carinae are absent from the last whorl of *Discohelix hallstattensis* n. sp.

GEMMELLARO (1911) published the most similar *Discohelix* specimens under the name "*D. orbis*", however, the Sicily (Galati) finds represent another (new) species (pers. obs.). These specimens have significantly different measurements from that of *D. hallstattensis* n. sp., wider, therefore lower number of whorls (11 in *D. hallstattensis* n. sp. and 7 in GEMMELLARO's specimens with the same diameter).

This species is also comparable to *Discohelix ferox* VON GÜMBEL, 1861 owing to the presence of nodosity but the adult size and number of whorls in *D. hallstattensis* n. sp. are larger. The same differences exist also in comparison with *Discohelix lorioli* GEMMELLARO, 1874.

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone).

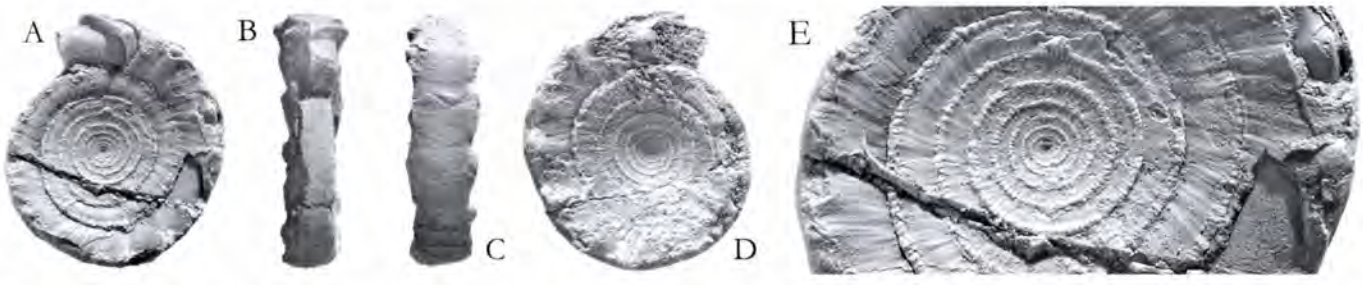

Figure 4 — *Discohelix hallstattensis* n. sp., holotype. — **A**: less concave (spire?) side; **B**: "aperture" view; **C**: outer side view; **D**: more concave (umbilical?) side; all are in natural size; **E**: details of the ornament, ×2.5.

Discohelix excavata (REUSS, 1852)

(Figure 5)

1852: *Euomphalus excavatus* REUSS — REUSS, p. 115, pl. 14, fig. 2.
1861: *Discohelix excavata* REUSS — STOLICZKA, p. 184, pl. 3, fig. 12.
1911: *Discohelix excavata* REUSS — M. GEMMELLARO, p. 216, pl. 9, fig. 13.
1912: *Discohelix excavata* REUSS — TONI, p. 39, pl. 2, fig. 5.
? 1920: *Discohelix excavata* REUSS — DARESTE DE LA CHAVANNE, p. 54, pl. 4, fig. 5.
1979: *Discohelix excavata* (REUSS, 1852) — SZABÓ, p. 22., pl. 1, fig. 5, (text)fig. 6d.

N e o t y p e — GBa 2008/69/34/1/1.

M a t e r i a l — The type specimens of *Euomphalus excavatus* REUSS, 1852 seem to be lost just like those of *Euomphalus orbis* REUSS, 1852, published at the same time. To fix the species interpretation, selection of a neotype is necessary. STOLICZKA's (1861) specimens fulfil all criteria (same locality, same strata and age), therefore provide a good occasion to accomplish this act. The need of fixation is well demonstrated by the fact that specimens of two different species have been also mixed to the content of boxes, labelled as *Discohelix excavata* in STOLICZKA's (1861) collections (see *Discohelix sima* n. sp. and *Discohelix stoliczkai* n. sp. below).

The number of the studied specimens exceeds 100.

M e a s u r e m e n t s	H	H1	HPW	D	W	AS	AU
neotype	9.5	-	6.8	22.4	-	263°	116°
GBa 2008/69/34/1/2	**10	-	8	22.7	*8	262°	-

S h a p e — Dextral, discoidal, biconcave forms with deeper umbilical side. Nucleus and first whorl slightly raised on spiral side. Protoconch size can only be estimated as about 2 whorls without sculpture. Surface of whorls nearly flat on spiral and umbilical, but strongly convex on outer side. Angulations distinct and carinated from second whorl. Peristome seems not modified.

S c u l p t u r e — Protoconch completely smooth;

angulations with carinae appear on second whorl, collabral ornament visible from third whorl, and consisting of narrow, posteriorly dipping, suture to suture collabral riblets, following each other like roof-tiles. Abaxial end of single riblet strengthens into small knob on keel, then dying out rapidly outward. Riblets divided by extremely fine growth-lines. These collabral elements of ornament regularly repeating up to last whorl, where substituted by marked growth-lines, and carinae of angulations become less distinct. Strong growth-lines appear firstly in bundles that strengthen into low ridges subsequently. In last growth phase, gradually increasing nodes of angulations accompany ridges. Outer side shows only fine growth-lines, with few faded spiral lines.

R e m a r k s — The available stratigraphically oldest (Late Sinemurian) and youngest (Davoei Zone) specimens show significant differences that mean refinement and weakening of the sculpture. Arriving in Davoei times, the collabral riblets become narrower and attain 2 or 3 times bigger number per whorls. The ridges and the nodes of the last whorl are less marked and appear rather as weak undulations. There are also differences between the contemporaneous (Late Sinemurian) North Alpine and Bakony Mts specimens: the earlier ones have weaker collabral riblets than those from the latter area.

From the further published *D. excavata* occurrences, the East Atlas one, described by DARESTE DE LA CHAVANNE (1920), significantly differs from the others. In the North African forms the strong nodes on the angulations appear much (1 or 2 whorls) earlier that may result also in a taxonomical conclusion.

The identification of the adult specimens does not present difficulties. This species, having a characteristic, strongly nodosed sculpture on the last whorl, is easily distinguishable from the similarly sized other species.

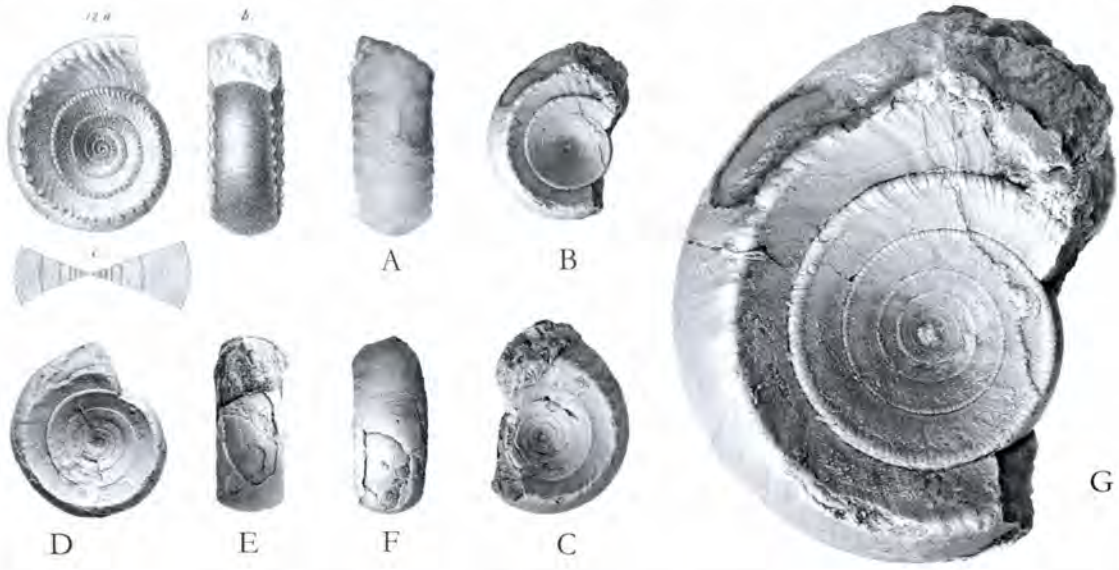

Figure 5 — *Discohelix excavata* (REUSS, 1852). — **12 a–c**: STOLICZKA's (1861) figures from Tafel III; **A–C**: ×1 dorsal (A), spire (B) and umbilical (C) view of the neotype; **D–F**: spire (D), "aperture" (E) and dorsal (F) view of GBa 2008/69/34/1/2 (paraneotype) specimen; **G**: magnified (×3) spire view of the neotype to show details of the ornament.

On the last two whorls of *Discohelix miocarinata* SZABÓ, 1979 the angulations become rounded, and no nodes are present. On the other hand, juvenile specimens are rather hard to distinguish. The measurements provide the most reliable tool to do it; ratio of height to the diameter is significantly smaller in *D. miocarinata*.

The adult specimens differ from the similarly shaped, Aalenian *D. levis* WENDT, 1968, because this latter has angulations without nodes on its last whorls and a peristome, which is reinforced outward by a varix. In this comparison, the distinction of the stratigraphically younger, juvenile *D. excavata* specimens, having almost as delicate bars as growth lines of *D. levis*, is problematic.

Distinction from *Discohelix sima* n. sp.: see below.

The small adult specimens of *D. acarinata* SZABÓ, 1979 with their rounded angulations without carinae can be easily distinguished from juvenile *D. excavata*.

D i s t r i b u t i o n — Northern Calcareous Alps, Upper Sinemurian; Vedana (Southern Alps), Pliensbachian; East Sicily (Galati), Upper Pliensbachian; East Atlas, Pliensbachian; Bakony Mts, Upper(?) Sinemurian to Lower Pliensbachian (Davoei Zone).

Discohelix sima n. sp.

(Figure 6)

H o l o t y p e — GBa 2008/69/34/2/1.
T y p e l o c a l i t y — Hallstadt, Hierlatz Alpe.
T y p e s t r a t a — Sinemurian (Oxynotum Zone) Hierlatz Limestone.
N a m e — Sima (Hung.) = smooth.

D i a g n o s i s — Dextral species with biconcave shell; weak, not corrugated carinae on outer angulations of teleoconch; smooth shell with extremely fine growth lines.

M a t e r i a l — A shelly specimen (holotype) and an internal mould with shell fragments (paratype, GBa 2008/69/34/2/2), found amongst *Discohelix excavata* specimens in the "background" material.

Measurements	H	H1	HPW	D	W	AS	AU
holotype	*5	-	-	*16.8	*5	210°	*140°
paratype	-	-	-	*18	-	-	*145°

S h a p e — Biconcave species with umbilicus slightly deeper than spire. Protoconch somewhat elevated (its other characters uncertain because of strong re-crystallization). Number of whorls ~7. Spiral and umbilical side of whorls flat, except last one where feebly concave; outer side moderately convex. Outer angulations of teleoconch rather sharp and bearing weak carinae, being not corrugated.

S c u l p t u r e — Shell smooth with extremely fine growth lines (visible only by strong magnification).

R e m a r k s — A similar species is the Aalenian to Early Bajocian *Discohelix levis* WENDT, 1968, having also no ornament and a comparable shape. However, the morphology and the measurements are clearly different. Adult *D. levis* specimens have strongly thickened outer lip, but the available *Discohelix sima* n. sp. specimens do not show any trace of this peristome modification.

Discohelix sima n. sp. is comparable also to *D. inornata* SZABÓ, 1979 of similar stratigraphical occurrence that may have also no more ornament over growth-lines. However, in the latter species, the carinae of the outer angulations are lacking; the whorls are convex in all growth stages; the adult size is much bigger and the number of whorls in this stage is 9–10); the measurements are also significantly different. An adult *Discohelix inornata* specimen has trumpet like peristome while the available *Discohelix sima* n. sp. specimens do not show any trace of an enlarged peristome/aperture.

See distinction from *Discohelix stoliczkai* n. sp. below.

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone).

Figure 6 — *Discohelix sima* n. sp., holotype. — **A**: spire view; **B**: dorsal view; **C**: "aperture" view; **D**: umbilical view; A–D = ×1; **E**: magnified (×3) view to show details of the shape and the ornament.

Discohelix stoliczkai n. sp.

(Figure 7)

H o l o t y p e — GBa 2008/69/34/3/1; paratype: NhM 2007/0101/0007.

T y p e l o c a l i t y — Hallstatt, Hierlatz Alpe.

T y p e s t r a t a — Sinemurian (Oxynotum Zone) Hierlatz Limestone.

N a m e — Dedicated to Ferdinand STOLICZKA.

D i a g n o s i s — Biconcave, dextral species, consisting of narrow whorls with flat umbilical and spiral side; outer side strongly convex, angulations without carinae; last whorl expanding and its cross-section tends to change into circular; ornament consisting of very fine growth-lines only.

M a t e r i a l — Four specimens, one (paratype) from the NhM, three ones from the "background" material in GBa, found in a *Discohelix excavata* box.

Measurements	H	H1	HPW	D	W	AS	AU
holotype	*5.5	-	*4.9	*15.5	*3.5	*227°	128°
paratype	*6	-	-	*16.8	*4.4	-	127°

S h a p e — Biconcave shells with somewhat uncertain dextral coiling direction; strongly re-crystallised and partly covered, badly visible protoconch in holotype seems feebly raised in (5°) deeper side of shell that may mean false sinistral (feebly ultra-dextral) coiling. Axial part of paratype (largest specimen) has poorly preserved central region, it seems wrongly cleaned from matrix, (therefore) showing "giant" nucleus of probably artificial origin (Figure 7: D, F).

Whorls narrow, therefore rather numerous: 9 in holotype, being subadult specimen. Paratype has additional expanded half whorl with strongly convex outer side and strongly rounded outer angulations. Near (apparent?) peristome of paratype, last whorl section from suture to suture across outer side tending to change into circular outline. Earlier whorls have less, but clearly convex outer side. Outer angulations more distinct on spire whorls but no keels visible on most of them, except earliest juvenile teleoconch whorls. Suture does not coincide with top of angulations therefore feebly (asymmetrically) impressed. Spiral and umbilical sides of whorls flattened, sometimes feebly concave.

S c u l p t u r e — Smooth shell with fine growth lines (visible by magnification). Their shape indicates almost tangential peristome, consisting of strongly opisthocline-prosocyrt spiral and umbilical, and strongly opisthocyrt outer side components.

R e m a r k s — The holotype shows a peculiar phenomenon: on the inferable spire side (dextral case), the outer angulation is somewhat sharper than that of the opposite side of the whorl. This is uncommon, because these morphological elements usually develop equally in the other almost bilaterally symmetrical species. These shell parts are not comparable in the other available specimens.

In the studied material, one of the similar species is *Discohelix sima* n. sp. (see above), having also growth-lines as the only ornament. However its shape is considerably different because all teleoconch whorls are weakly carinate and sharp along the outer angulations while uncarinate and blunt in *Discohelix stoliczkai* n. sp.

Discohelix stoliczkai n. sp. is comparable also to the Late(?) Sinemurian *Discohelix inornata* SZABÓ, 1979 (see below) that may have also only growth-lines as ornament. However, the adult diameter in the latter species is much larger; the shell is more flattened (spiral angle smaller, umbilical angle wider), number of whorls is similar (9–10 in *D. inornata*) but their width is larger; the outer side of the whorls are less convex in all growth stages than in *Discohelix stoliczkai* n. sp. The sutures in *D. inornata* just overlap angulations of previous whorl (≈ flush) but do not coincide with angulations (= impressed) in *Discohelix stoliczkai* n. sp. An adult *D. inornata* specimen has trumpet like peristome while the available *Discohelix stoliczkai* n. sp. specimens do not show any trace of this character.

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone).

Figure 7 — *Discohelix stoliczkai* n. sp. — **A–B**: umbilical side of holotype, ×1 and ×1.7; **C**: spiral side of holotype, ×1.7; **D–G**: paratype, umbilical and outer side views; ×1 (D– E) and ×1.7 (F–G).

Discohelix lobitzeri n. sp.

(Figure 8)

H o l o t y p e — NhM 2007/0101/0006, paratype: NhM 2007/0101/0005

T y p e l o c a l i t y — Hallstatt, Hierlatz Alpe.

T y p e s t r a t a — Upper Sinemurian (Oxynotum Zone) Hierlatz Limestone.

N a m e — Dedicated to Harald LOBITZER, geologist of the Geologische Bundesanstalt.

D i a g n o s i s — Depressed, biconcave shell of rather narrow whorls. Angulations distinct along all teleoconch whorls but carinae present only on early juvenile shell. Periodically repeating, flat, ribbon-like, posteriorly sloping, suture to suture/outer angulation belts follow each-other "telescopically" on spire and umbilical side, and then rapidly fade away on outer side along angulations. Anterior edge of belts riblet-like; these riblets regularly corrugate outer angulations on spire whorls but become wide, sparse and irregularly repeating ribbons on last whorl.

M a t e r i a l — Two fragmentary specimens with shell pieces; the better preserved sides of theirs are visible in Figure 8.

M e a s u r e m e n t s	H	H1	HPW	D	W	AS	AU
holotype	*6.5	-	-	*19	*4.4	+*210°	++-
paratype	-	-	-	*20	-	+*215°	++-

+ AS values valid if *Discohelix lobitzeri* n. sp. was dextral; ++ or the complementary angles of AS must be regarded as AU in sinistral case.

S h a p e — Nearly bilaterally symmetrical, medium size species in *Discohelix*. Visible post-protoconch whorls of available specimens have less steeply sloping walls then subsequent ones, this way indicating probable elevated side of protoconch, and spiral side at the same time. This way dextral coiling seems more feasible but identification of spiral and umbilical sides remains still somewhat uncertain because earliest shell parts covered by not removable matrix pieces in both specimens. Poorly preserved protoconch of paratype visible in rather deeply sunken position that suggests possibility of sinistral nature, but leaving also question of coiling direction uncertain.

Whorls narrow, their number relatively large (9–10); spiral and umbilical side of whorls flat, excepting last whorl where feebly concave. Outer angulations distinct on full length of teleoconch; carinae present on angulations of early spire whorls, lacking from last ~3 whorls; outer side rather convex. Last whorl expanding, cross-section of holotype on damaged terminal shell part shows thickening at outer side, (inferably) near outer lip of last peristome. Suture weakly impressed (asymmetrically).

S c u l p t u r e — Spiral and umbilical side ornamented by regularly repeating, narrow, collabral belts, following each-other as roof tiles. These appear on juvenile shell as weak corrugation of keels on outer angulations and gradually extend to adaxial sutures but remain

obscure along full length of shell (dislike e.g. in *D. acarinata*, see below); these belts lack from outer side. From penultimate whorl, regularity decreases, belts become wide, sparse and irregularly repeating ribbons. Growth-lines very fine, their shape strongly opisthocline on spiral and umbilical sides but slightly opisthocyrt on outer side. Evenly spaced, obscure spiral lines cover outer side; obscurity may be caused by fossilisation.

R e m a r k s — As a whole, the shell form remind first of all *D. excavata*, however, *Discohelix lobitzeri* n. sp. has a much smaller adult diameter (two-thirds). At equal diameter, *D. excavata* has fewer whorls and more than 1.5 times higher shells than *Discohelix lobitzeri* n. sp. Other measurements and ratios are also strongly different. *D. excavata* has true nodes on the carinae of the last whorl while carinae are absent in *Discohelix lobitzeri* n. sp. and the corresponding angulation parts are splitted by low, wide, collabral ribbons.

Discohelix acarinata (see below) has a comparable ornament, but it is much more marked, and *Discohelix lobitzeri* n. sp. has axially more flattened shells that is well reflecting in the measurements (e.g. spiral angle varies around 250° in *D. acarinata* but 210-215° in *D. lobitzeri* n. sp.). Angulations of *D. acarinata* are without carinae after the third whorl, while *D. lobitzeri* n. sp. has them also on about three additional whorls. In *D. acarinata*, regularity of the collabral belts is observable on the whole teleoconch, and no trace of formation of widening is observable even on the last whorl of the specimens, having similar diameter to *Discohelix lobitzeri* n. sp. Rudimentary kind of this ornament has been found also on the pre-adult whorls of the holotype of *D. inornata* (see below) but the differences in the last whorl ornament and the shapes distinguish the two species.

GEMMELLARO (1874) identified some similar specimens, named as *D. excavata* from the Sicily Pliensbachian, but another revision shall decide about the question of their specific identity.

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone).

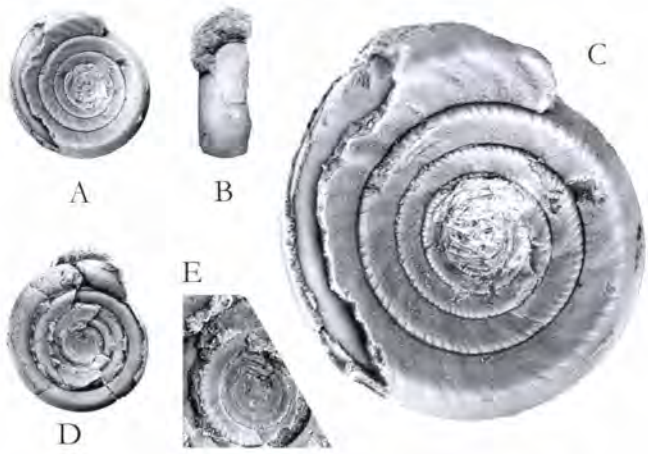

Figure 8 — *Discohelix lobitzeri* n. sp. — **A–B**: holotype; spire(?) and "aperture" view, ×1; **C**: magnified view of the holotype, shown also in A, ×2.5; **D**: paratype; spire(?) view, ×1; **E**: juvenile whorls of the paratype, ×3.5.

Discohelix miocarinata SZABÓ, 1979

(Figure 9)

1979: *Discohelix miocarinata* sp. n. — SZABÓ, p. 23, pl. 1, figs 8–9; (text)fig. 6b.
1994: *Discohelix miocarinata* SZABÓ — CONTI & MONARI, p. 200, pl. 1, figs 1–2.

M a t e r i a l — Three specimens from the Bakony Mts (holotype: HGM J 9592).

Measurements	H	H1	HPW	D	W	AS	AU
holotype	*7.9	-	-	*19.8	*5.1	229°	131°

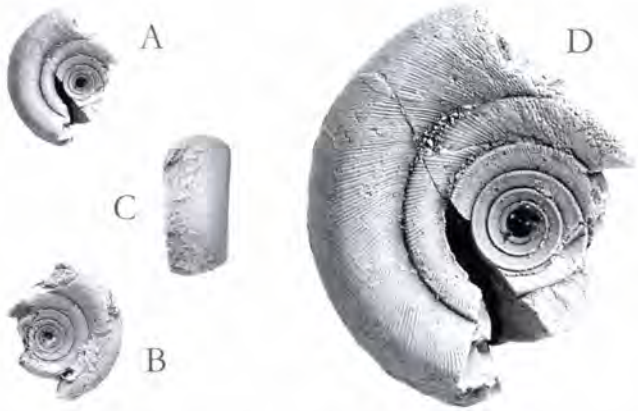

Figure 9 — Refiguration of *Discohelix miocarinata* SZABÓ, 1979 holotype. — **A**: spire; **B**: umbilicus; **C**: outer side; the upper edge of the image shows arch of the outer side, opposite edge is broken; A–D = ×1; **D**: magnified view of the spiral side, ×3.

S h a p e — Dextral form with spire less concave than umbilicus. Protoconch smooth, angulations appear one whorl after nucleus. Spiral and umbilical side of juvenile whorls flat, but slightly convex on last two whorls; outer side moderately arched on whole shell. From penultimate whorl, after gradual transition, angulations become rounded. Peristome unknown. (Protoconch morphology of holotype had been observed before it fell out and lost.)

S c u l p t u r e — Spiral ornament consists of carinae on angulations of juvenile whorls and some faint spiral lines on outer face. Collabral sculpture appears from third whorl on spiral and umbilical sides as tiny, dense growth riblets. On juvenile whorls each of these bars are accompanied by granules on carinae. Riblets fade out rapidly on outer side, along angulations.

R e m a r k s — The adult specimens can be easily distinguished from the similarly-sized *D. excavata*, because in this latter, a marked sculpture appears on the last whorl. In

D. excavata strong nodes develop, and strong, widely spaced ridges replace the bars in the sculpture. The juvenile whorls are probably distinguishable on their dimensions but this procedure needs larger material of *D. miocarinata*. *D. acarinata* is distinguishable on the smaller size and on absence of carinae on the angulations after the earliest juvenile shell.

D i s t r i b u t i o n — Bakony Mts: Lókút, Kericser, beds with mixed Obtusum to Ibex Zone fauna; traces of re-deposition, perhaps older than Ibex Zone; Central Italy, Monte Cimitelle and Sasso di Pale, both Pliensbachian.

Discohelix inornata SZABÓ, 1979

(Figure 10)

1979: *Discohelix inornata* sp. n. — SZABÓ, p. 23, pl. 1, figs. 6–7; (text)fig. 6c.

M a t e r i a l — Three damaged specimens (HGM).

M e a s u r e m e n t s	H	H1	HPW	D	W	AS	AU
holotype (HGM J 9591)	7.2	-	-	*29.1	6.8	216°	144°
paratype	*5.6	-	-	-	*3.5	224°	-

S h a p e — Flattened, dextral form with concave spire and nearly bilateral symmetry. Protoconch whorls, studied in sections, show slight rise on spiral side. Angulations, being somewhat sharper on juvenile whorls, bear no carinae. Surface of whorls slightly convex, but less convex on spiral and umbilical side than on outer face. Last whorl expanding, adult peristome tapering and remnants suggest trumpet shape but no trace of thickening found.

S c u l p t u r e — Fine growth-lines visible on all shells; recently cleaned umbilical side of holotype preserved traces of sub-periodically repeating very weak riblets (typically developed in *D. acarinata*) on juvenile whorls but disappearing on penultimate whorl. Paratype shows no traces of the rudimentary riblets.

R e m a r k s — The characteristic, axially depressed shell form and the dimensions make this species well distinguishable from the other smooth shelled species (*D. levis* WENDT, 1968, *Discohelix sima* n. sp. and *Discohelix stoliczkai* n. sp.). Beside these, the first two mentioned species have carinate angulations on the teleoconch.

D i s t r i b u t i o n — Bakony Mountains: Sümeg, ?Upper Sinemurian.

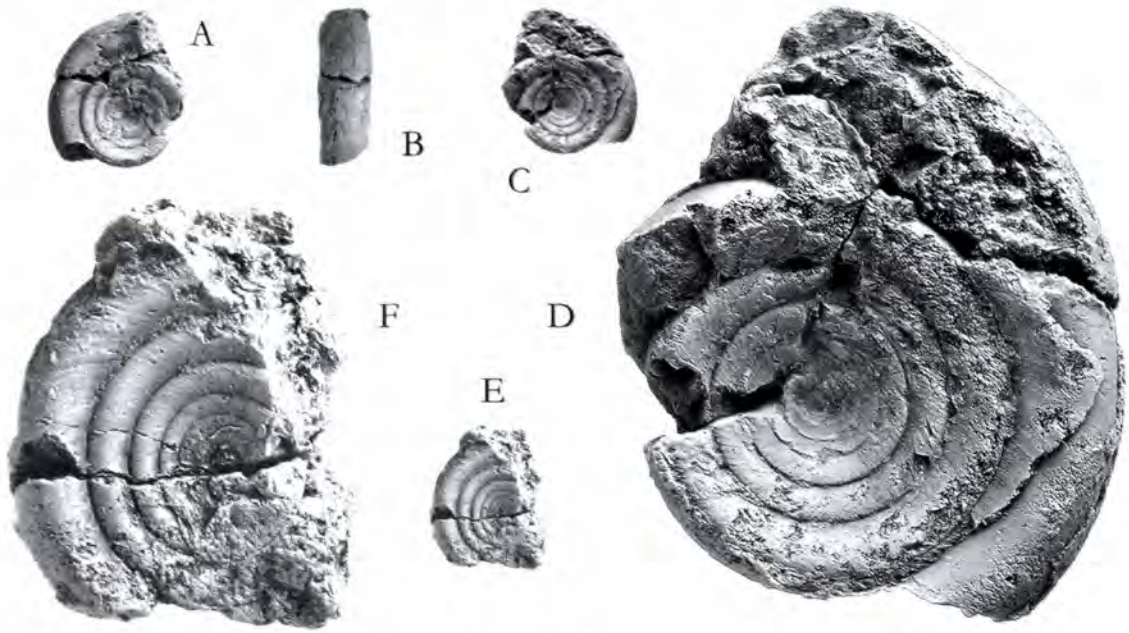

Figure 10 — *Discohelix inornata* SZABÓ, 1979; refiguration of the holotype and a paratype (HGM). — **A–C**: holotype in spiral (A), outer side (B) and umbilical (C) views, ×1; **D**: magnified view of the recently cleaned umbilical side of the holotype to show weak traces of the ornament type, consisting of periodically repeating riblets, following each-other roof-tile like (not visible on the paratypes), ×4; **E–F**: images of one of the paratypes (spiral view), ×1 and ×3.

Discohelix acarinata SZABÓ, 1979

(Figure 11)

1979: *Discohelix acarinata* sp. n. — SZABÓ, p. 24, pl. 1, fig. 10; pl. 2, fig. 12, (text)fig. 6a.
cf. 1994: *Discohelix* cf. *acarinata* SZABÓ — CONTI & MONARI, p. 200, pl. 1, fig. 6.

M a t e r i a l — Thirteen specimens from two Bakony Mts localities (HGM, holotype J 9593).

Measurements	H	H1	HPW	D	W	AS	AU
holotype	*6.6	-	*4.8	*14.6	*3.8	235°	131°

S h a p e — Dextral, discoidal form, with spire less concave than umbilicus. Protoconch slightly raised in beginning (nucleus and one whorl). Whorl surface convex on outer, but flat on spiral and umbilical sides. Angulations sharp and carinate on second and third whorls, but rounded and without keels on subsequent whorls. No modification found on preserved peristome fragments.

S c u l p t u r e — No ornament visible on protoconch. Spiral sculpture appears only with magnification on outer side. It comprises random fragments of spiral threads. Spiral and umbilical sides covered by periodically appearing roof-tile-like, tiny collabral bars, which fade out on outer side immediately after angulations. Bars divided by extremely fine growth-lines. Somewhat stronger growth-lines as only collabral ornament visible on outer side.

R e m a r k s — The best preserved specimen shows a peculiar sculpture under magnification. From periodically repeated, spot-like depressions along the suture, fine, prorsiradiate and virgatotom bundles of slightly opisthocyrt lines arise, which arrive to the outer angulations almost tangentially. The origin of these lines is unknown. Perhaps these are traces of a former organic outer layer and/or ornament.

On the basis of angulations without carinae after the earliest teleoconch whorls *D. acarinata* is distinguishable from the similarly sized, juvenile *D. miocarinata* and *D. excavata* specimens, having yet carinae in that growth stages. Their adult specimens are much larger and have markedly different ornament on the last whorl. *D. inornata* has also shells without keels but differs in its sculpture and dimensions.

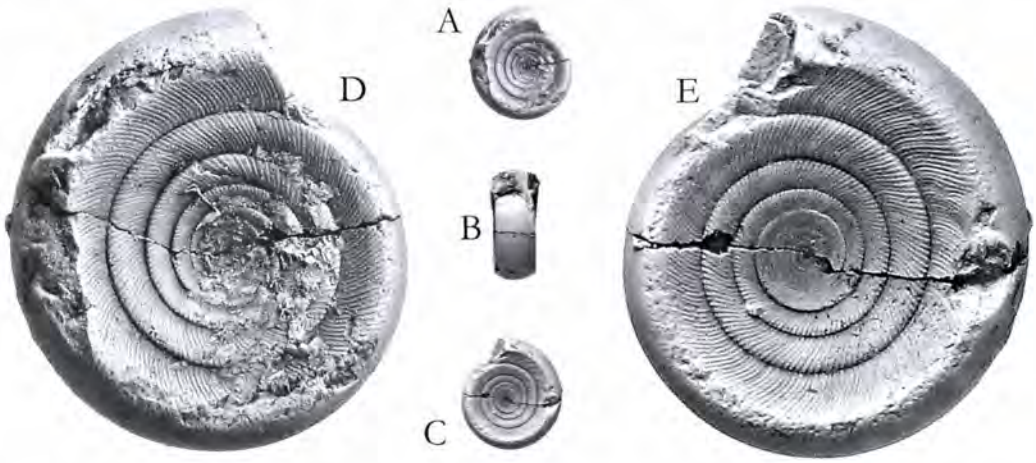

Figure 11 — *Discohelix acarinata* SZABÓ, 1979; refiguration of the holotype. — A–C: spiral, "apertural" and umbilical view, ×1; **D–E**: magnified view of the spiral and the somewhat deeper umbilical side to show the ornament (×4).

The similarly shaped forms figured by G. G. GEMMELLARO (1874) as *D. excavata* do not belong to *D. acarinata* (neither to *D. excavata*). Though the carinae are lacking, the characteristic bars of the sculpture are present and the dimensions are not too different, the Sicily specimens have different dimensions and spiral lineation on the juvenile whorls (pers. obs.) therefore their belonging to another (new) species is rather likely.

D i s t r i b u t i o n — Lókút, Kericser (Bakony Mts), beds with mixed Obtusum to Ibex fauna and Davoei Zone; Közöskúti-árok, Ibex Zone and a bed with mixed Ibex Zone and Lower Toarcian fauna (Bakony Mts).

Discohelix reticulata STOLICZKA, 1861

(Figure 12)

1861: *Discohelix reticulata* STOL. — STOLICZKA, p. 183, pl. 3, fig. 11.
2003: *Discohelix reticulata* STOLICZKA, 1861 — SZABÓ in: VÖRÖS et. al., p. 64, pl. V: 25.

L e c t o t y p e — GBa 2008/69/33/1; paralectotype: NhM 1861/0034/0026.

M a t e r i a l — Three specimens, one in the GBa (seems adult), selected as lectotype, showing also parts of the umbilical side; another in NhM (subadult, only spire side visible); third one from Úrkút (recently collected, HNHM).

Measurements	H	H1	HPW	D	W	AS	AU
lectotype	2.3	-	-	13.2	3	195°	**~160°
paralectotype	-	-	-	*10.1	*1.8	190°	**~165°

S h a p e — Flattened (coin-shaped), dextrally coiled shell of feebly concave, almost plane spiral and weakly concave umbilical side. Whorls axially flattened, much wider than high. Angulations distinct on teleoconch, and carinate between protoconch and end of penultimate whorl; feebly concave belt of whorl surface accompany

carinae both on spiral and umbilical sides. Outer face strongly convex on last whorl but flattened on earlier ones. Peristome not preserved.

Protoconch somewhat raised on spiral side; it consists of rounded nucleus and about one whorl. Angulations appear on first half of second whorl and carinae develop on third whorl.

S c u l p t u r e — Carinae present on outer angulations of teleoconch except last whorl. Collabral ornament on spiral and umbilical side of whorls consists of marked, riblet-like, suture to suture growth-lines, corrugating carinae of angulations. Intermediate riblets, which do not reach outer angulation, may also appear on penultimate and last whorls. No ornament observable on earliest whorls (? because of preservation), but whole visible surface of post-juvenile whorls of lectotype covered by spiral threads, being more marked near carinae (or outer angulations) and on outer side.

R e m a r k s — It is remarkable, that the protoconch morphology is similar to that of *Asterohelix* but the spiral and umbilical sides are prominently asymmetrical in this genus.

The Úrkút (Bakony Mts) specimen has marked spiral lineation on longer shell part and in wider whorl surface belt than the Hierlatz and, especially, the Schafberg one. On the latter specimen, the practically total lack of lineation is caused probably by the much stronger re-crystallisation that frequently fades away delicate ornament from the shells.

Discohelix reticulata belongs to the group of the sparsest species in the genus therefore has not yet been really well known, however, the morphology suggests belonging to *Discohelix* as an independent species. Most similar shells are those of juvenile *Discohelix orbis* or *Discohelix ornata* but the collabral riblets are more distinct and arched in *Discohelix reticulata* than in the other two species. Beside these, marked differences are in the ratio of whorl width to height.

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Sinemurian (Oxynotum Zone); Schafberg (St. Wolfgang), Sinemurian; Úrkút (Bakony Mts), Lower(?) Sinemurian.

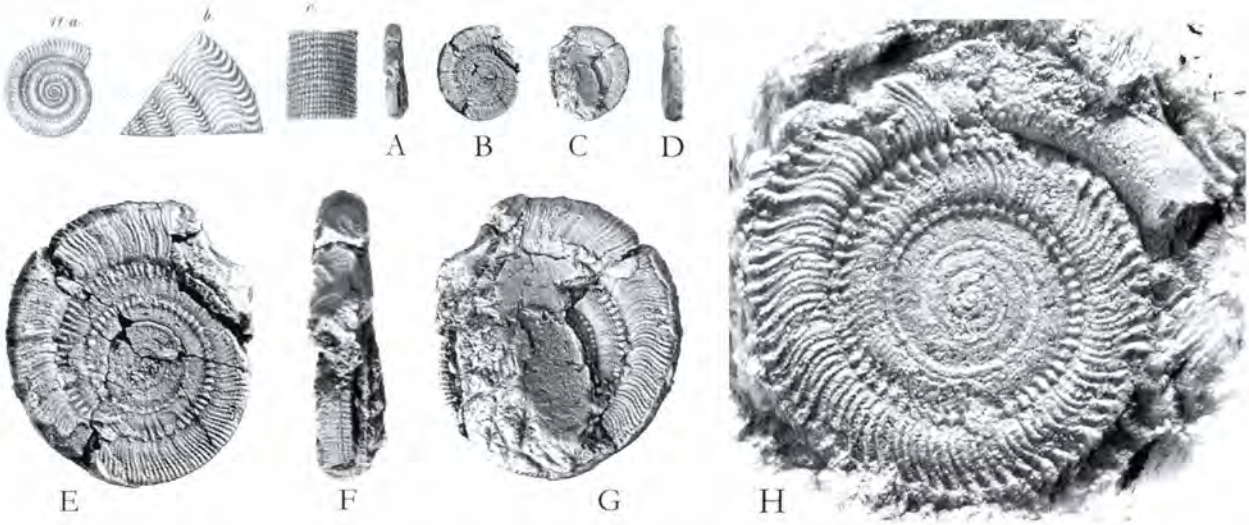

Figure 12 — *Discohelix reticulata* STOLICZKA, 1861. — 11 a–c: copy of original figures from STOLICZKA (1861) Tafel III; **A–D**: the lectotype, ×1; **E–G**: magnified views of the lectotype to show details of the ornament, ×3; **A**, **F** = aperture view, **B**, **E** = spire side, **C**, **G** = umbilical side; **D**: dorsal side of the lectotype; **H**: paralectotype (NhM), ×5.

Genus *Asterohelix* SZABÓ, 1984

T y p e s p e c i e s: *Discohelix spinicosta* STOLICZKA, 1861.

D i a g n o s i s (emended) — Dextral, small, discoidal shell with feebly convex to feebly concave spire and wide umbilicus; depressed quadrangular whorl cross-sections with somewhat convex spiral and umbilical sides, outer face flat or feebly concave; carinae present on outer angulations of juvenile shell but may be lacking from last whorl, spiral side carina stronger than basal one; shell broadly phaneromphalous, umbilical wall gradate; trace on inner mould suggest outward tapering peristome; collabral ornament composed of growth-lines, "growth-riblets" and spiny ribs that may be "parabolic" in (nearly) adult growth phases; spines of latter ornamental elements corrugate carinae, followed by impressed suture that shows asterisk line on spiral side, at least in juvenile shell; dense nodules may develop along adaxial-abapical angulation of whorls on base and within umbilicus; ribs denser on umbilical side of whorls than on spire side; strongly flattened trochospiral protoconch seems smooth.

R e m a r k s — SZABÓ (1984) identified a gastropod specimen from the Bakony Mts as *Discohelix spinicosta* STOLICZKA, 1861 without possibility to compare it to the type material. This identification seemed correct because STOLICZKA's (1861) description and figures do not provide information about the trochospiral nature of the shell, and the last whorl that has morphology different from the previous ones in the syntypes (see below).

However, these characters are species distinctive therefore the necessary corrections are given below now; the Bakony Mts (Úrkút) specimen is distinguished as *Asterohelix urkutensis* n. sp. Because the revision of STOLICZKA's (1861) originals has verified that *Discohelix spinicosta* STOLICZKA, 1861 also belong to *Asterohelix*, there is no reason to change the type species in accordance with the ICZN (1999, Article 70.3). It means at the same time, that the figures in the original designation of *Asterohelix* SZABÓ, 1984 do not refer the type species; its true images are shown here (Figure 13: A–E).

Three *Asterohelix* species from the Mediterranean Jurassic have the typical "asterisk" outline at least in juvenile stage and the other morphological details show also their close phylogenetical connections [*Asterohelix urkutensis* n. sp., Lower(?) Sinemurian; *Asterohelix spinicosta* (STOLICZKA, 1861), Late Sinemurian; and *Asterohelix mariae* (M. GEMMELLARO, 1911), Late Pliensbachian)]. Recently FISCHER (2001) and GRÜNDEL (2003a, 2003b) identified further, more or less different species as *Asterohelix* from the Arabian Peninsula and stable Europe, respectively.

Asterohelix spinicosta (STOLICZKA, 1861)

(Figure 13)

1861: *Discohelix spinicosta* STOL. — STOLICZKA, p. 185, pl. 3, fig. 15.
non 1984: *Asterohelix spinicosta* (STOLICZKA, 1861) — SZABÓ, p. 68, fig. 2.

L e c t o t y p e — GBa 2008/69/36/1
M a t e r i a l — GBa 2008/69/36/1–8 in the "originals collection".

Measurements	H	HL	HP	D	W	AA	AL
lectotype	*3	*2.8	*2.3	9	2.5	*175	159°

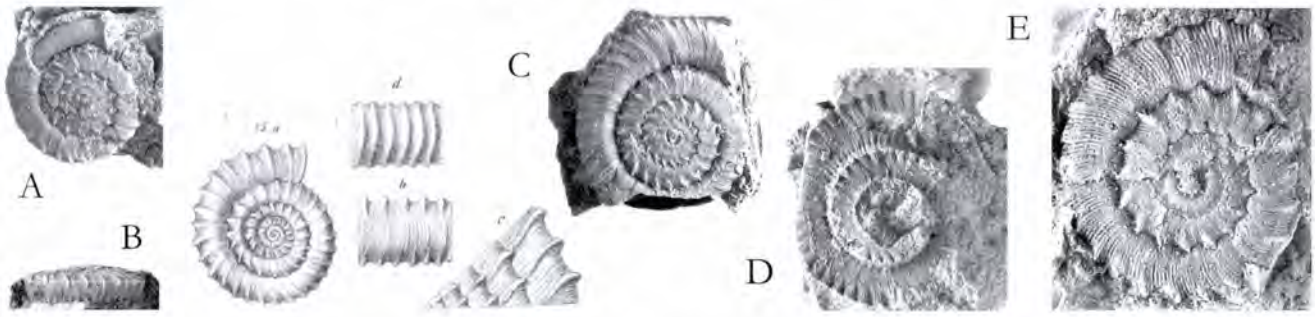

Figure 13 — *Asterohelix spinicosta* (STOLICZKA, 1861) — **15 a–c**: copy of the original figures (from STOLICZKA 1861, Tafel III); **A–B**: lectotype in apical (A) and outer side (B) views, ×2; **C**: apical view of a paralectotype, best showing the ornament and shape of the adult last whorl, ×2.5; **D**: imprint of a paralectotype, best showing the basal sculpture, ×3; **E**: spiral view of a paralectotype (juvenile shell), ×4.

S h a p e — Strongly flattened shell of feebly trochospiral coiling with cyrtoconoidal spire outline. Early spire part planispiral, but trochospiral coiling develops from third whorl. Protoconch itself poorly preserved in all specimens but visible parts suggest similar morphology to that of *Asterohelix urkutensis* n. sp. (see below). No part of umbilical side of youngest whorls known.

Whorls in umbilicus gradate, and more flattened than on spire side; outer side feebly convex and oblique to axis its adapical edge corresponds to periphery. No undamaged peristome was found; impression on inner mould shows its trumpet-like form with outward tapering lips (see Figure 13: A).

S c u l p t u r e — From third whorl, carina with sparse spinulae develop along spire side suture, being fine incision initially but gradually becoming rather deeply impressed while spinulae strengthen into prosocyrt ribs. Ribs periodically repeating, their spines become parabolic with growth on spire side (umbilical ones not observable). Keels of outer angulations gradually weaken on penultimate whorl and lacking from adult last whorl. From second half of penultimate whorl, parabolic nature of ribs vanishes, their strength and regularity decrease, but density and length increase. Ribs become suture to suture/angulation in length, and subregularly repeating collabral ridges in shape (Figure 13: A, C). Similar, but somewhat weaker and two times denser ribs developed in abaxial belt of umbilical side of last whorls. On same side, dense, short riblets terminate in nodulae, formed along adaxial angulation (Figure 13: D).

Growth-lines fine, hardly visible on early whorls then gradually strengthen into dense "growth-riblets" that run from spiral suture to umbilical suture across outer side. "Growth-riblets" became truncated at parabolic ribs. No trace of spiral ornament found.

R e m a r k s — The feebly trochospiral shells and the last whorl morphology, which is significantly different from that of the earlier whorls, distinguish *Asterohelix spinicosta* from *Asterohelix urkutensis* n. sp. (see below).

Asterohelix mariae (M. GEMMELLARO, 1911), is distinguishable by its last whorl, having neither carinae nor spines, and by its concave spire.

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe: Hierlatz Limestone; Sinemurian (Oxynotum Zone).

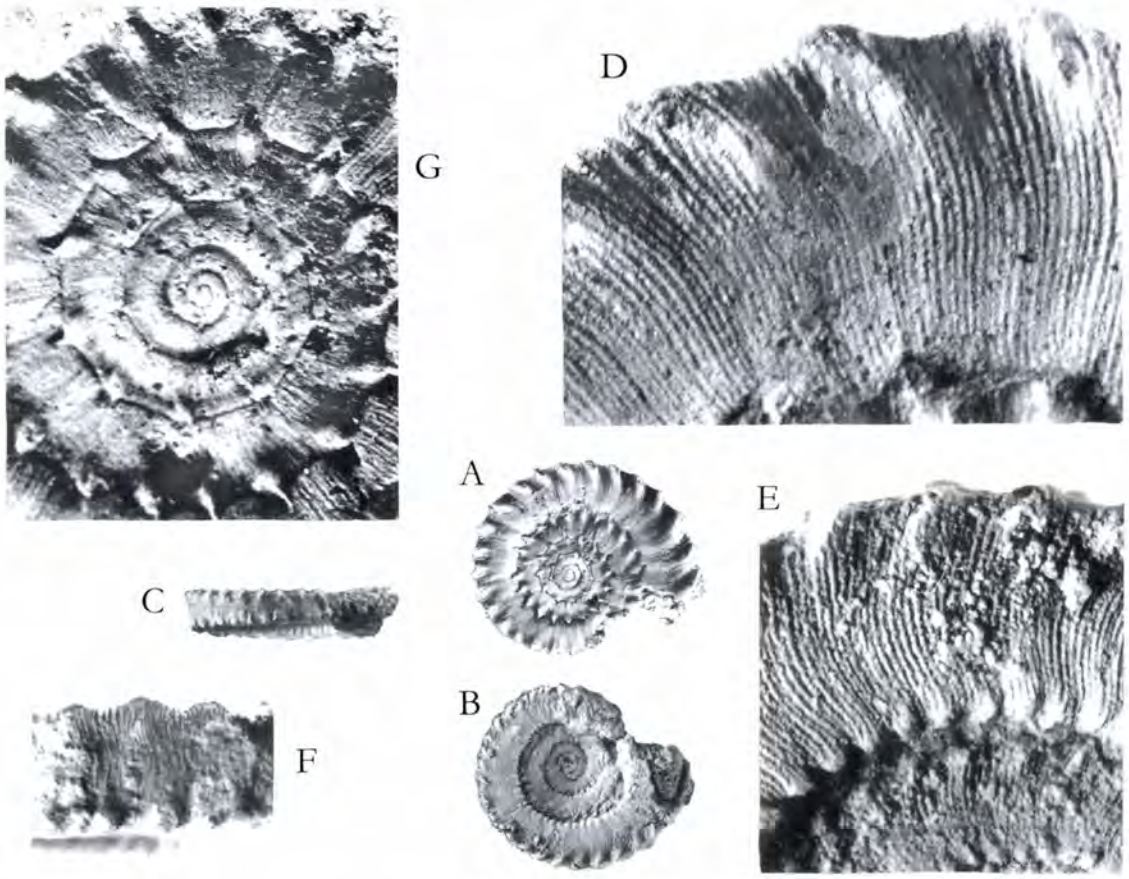

Figure 14 — *Asterohelix urkutensis* n. sp., holotype. — Refiguration of the only specimen from Úrkút (Bakony Mts) Lower(?) Sinemurian Hierlatz Limestone, misidentified with *Discohelix spinicosta* STOLICZKA, 1861 by SZABÓ (1984) when *Asterohelix* as new genus was established. Subsequent comparison to the syntypes of *D. spinicosta* revealed that the Úrkút specimen belongs to different species. The correction does not change the type species status of *D. spinicosta*, its correct figures are displayed in Figure 13. Elements of Figure 14 are copied from SZABÓ (1984), fig. 2; **A**: spiral side, ×2, **B**: umbilical view, ×2; **C**: outer side ×2; **D**: ornament of the last whorl on the spiral side, ×14; **E**: ornament of the last and the penultimate whorl on the umbilical side, ×10; **F**: ornament of the outer side, ×7.5; **G**: the earliest whorls in spiral view, ×10.

Asterohelix urkutensis n. sp.

(Figure 14)

1984: *Asterohelix spinicosta* (STOLICZKA, 1861) — SZABÓ, p. 68, fig. 2.

H o l o t y p e — HGM J 10142.
T y p e l o c a l i t y — Úrkút, Csárda-hegy, Mn-ore mine nature conservation area; Bakony Mts, Hungary.
T y p e s t r a t a — Lower(?) Sinemurian Hierlatz Limestone.
N a m e — From the name of the Úrkút village.
D i a g n o s i s — Spire feebly concave; one type of ornament on juvenile and last whorl.
M a t e r i a l — Single specimen (HGM J 10142).

M e a s u r e m e n t s	H	H1	HPW	D	W	AS	AU
holotype	2.7	-	-	11.5	*3.3	195°	127°

S h a p e — Flattened discoidal (coin-shaped) species with feebly concave spire. Carinae of outer angulations persist along full (visible) length of teleoconch. Shallow and narrow concave belt follows carinae on juvenile whorls of spire side. Whorls quadrangular and axially flattened. Sutures fine incisions, spiral one follows outline of peripheral spines along carina of outer angulation. Outer side of whorls flattened and oblique to axis; its adapical edge forms periphery of shell. No part of peristome was found. Whorls in umbilicus gradate.

Initial chamber with first and half whorls feebly elevated; it can be regarded as protoconch. Its end marked by appearance of carina and first spinula at outer angulation of spiral side. Umbilical side of protoconch unknown.

S c u l p t u r e — Both carinae bearing periodically repeating parabolic spines, connected to short ribs on last whorl. Number of ribs 26 on spiral and 31 on umbilical side of last whorl. Regular row of small, collabrally elongated tubercles rendering adaxial edge of whorls in umbilicus undulating. Low ridges start outward from each

tubercle but disappear before reaching carina of lower angulation. Growth-lines very fine, hardly visible on juvenile whorls then marked, dense "growth-riblets" develop that run from suture to suture (crossing also outer side on last whorl). "Growth-riblets" became truncated at parabolic ribs. Spiral ornament, consisting of fine, obscure lines (2–4), present only in interspaces of ribs at angulations of spiral side on two whorls following protoconch.

R e m a r k s — First time SZABÓ (1994) identified the Úrkút specimen as *Asterohelix spinicosta* (STOLICZKA, 1861). However, the change of the juvenile ornament into a different adult ornament on the last whorl, and the trochospiral coiling mode of the spire distinguish *Asterohelix spinicosta* from *Asterohelix urkutensis* n. sp., having a feebly concave spire, and the same type of ornament on the whole teleoconch. The size of the available *Asterohelix urkutensis* n. sp. specimen is bigger than that of an adult *Asterohelix spinicosta* therefore it can not be regarded as a juvenile shell of the latter species.

Another similar species of the genus, the Pliensbachian *Asterohelix mariae* (M. GEMMELLARO, 1911), is separable by its last whorl, bearing neither carinae nor spines and by the inner whorls, where the spines are fewer than in *Asterohelix urkutensis* n. sp.

D i s t r i b u t i o n — Úrkút (Bakony Mts), Lower(?) Sinemurian.

Genus *Pentagonodiscus* WENDT, 1968

T y p e s p e c i e s: *Euomphalus reussii* HÖRNES, 1853

Pentagonodiscus reussii (HÖRNES, 1853)

(Figure 15)

1853: *Euomphalus reussii* HORN. — HÖRNES, p. 760.
pars 1861: *Discohelix reussi* HÖRNES — STOLICZKA, p. 184, pl. 3, fig. 14 a–c.
1911: *Discohelix reussi* HÖRNES — M. GEMMELLARO, p. 215, pl. 9, fig. 14.
1968: *Discohelix (Pentagonodiscus) reussii* (HÖRNES, 1853) — WENDT, p. 574, pl. 110, figs. 22–24, text-figs. 2G, 3P, 5.
1979: *Pentagonodiscus reussii* (HÖRNES, 1853) — SZABÓ, p. 26, pl. 2, figs. 4–5; (text)fig. 6g.
1991: *Pentagonodiscus reussii* (HÖRNES, 1853) — CONTI & MONARI, p. 261, pl. 4, figs. 7–11, (text)fig. 12.
1994: *Pentagonodiscus* cf. *reussii* (HÖRNES, 1853) — CONTI & MONARI, p. 201, pl. 1, fig. 8.

L e c t o t y p e — GBa 2008/69/35/1 [selected by WENDT (1968)].

M a t e r i a l — Twenty specimens in the GBa and HGM collections

Measurements	H	H1	HPW	D	W	AS	AU
GBa 2008/69/35/2	6.2	-	4.3	12.5	4.3	231°	111°

S h a p e — Dextral, discoidal form, with less concave spire than umbilicus. While coiling of slightly trochospiral protoconch shows normal logarithmic spiral in "apical" view, outline of teleoconch whorls pentagonal. Spiral and umbilical side of whorls flat, but sometimes feebly concave or convex, outer side convex. Angulations sharp and persist along full length of teleoconch. Peristome internally thickened by suture-to-suture inner varix. Parietal lip slightly thickened by thin plate. Inner varices repeated periodically at intervals of somewhat less than 72°, their places marked on surface of whorls by collabral swellings both on spiral and umbilical sides and shallow successive depressions on outer side. Inner varix causes adaxial narrowing of internal space, while outer broadening shows axial expansion, thus area of whorl section remains unchanged. Rows of outer swellings, with <72° periodicity of its elements, resemble posteriorly arched spiral arms in apical or umbilical view.

S c u l p t u r e — Nucleus and roughly half whorl smooth then 3–4 fine spiral lines appear both on spiral and umbilical sides. After about two whorls, these lines disappear. Adult sculpture onsets at about end of third whorl as reappearance of spiral ornament and beginning of first visible collabral elements. Pentagonal outline develops roughly simultaneously. Spiral sculpture consists of threads, separated by narrow incisions on whole whorl-surface. Collabral sculpture consisting of suture-to-suture costellae. These riblets become stronger toward keels, corrugate them and rapidly vanish outward. Spiral and transversal sculpture results in reticulate ornament.

R e m a r k s — Significant variability is observable in the development of the spiral ornament; it changes from distinct spiral threads (Figure 15: A–D) to obscure lineation, equally on spiral, umbilical and outer side of whorls (Figure 15: E–J). The shells are usually almost bilaterally symmetrical with a less concave spiral than umbilical side, but the spire may also be almost plane (Figure 15: K).

From the earlier illustrations, those of STOLICZKA (1861 pl. 3, fig. 13., see photo in Figure 15: L) and CONTI & MONARI (1991, p. 261, pl. 4, Fig. 8) display also different specimens, having "tetragonal" outline because the deviations from the normal coiling are repeated four times in a coil, instead of five that is visible in the pentagonal specimens. In the other outer and inner shell characters, these specimens are rather near to *Pentagonodiscus reussii*, therefore they are regarded here as aberrant specimens. However, more abundant and better preserved material may result in different conclusion. Disregarding these cases, this characteristic species is easily distinguishable; however, there has been still no reliable method to

distinguish the juvenile specimens of *Pentagonodiscus reussii* and *Pentagonodiscus initiopentagonatus* SZABÓ, 1979. Probably the measurements could help but the latter species has yet been known only in two specimens of rather poor preservation.

The specimen, figured by CONTI & MONARI (1994) using open nomenclature, belongs certainly to *Pentagonodiscus reussi* because the cross section shows the characteristic inner shell morphology of the species (see also WENDT 1968, text-figs. 2G, 3P, 5). The diameter fairly exceeds that of the similarly shaped juvenile part of *Pentagonodiscus initiopentagonatus* that may have also similar inner varices (in the latter species the cross-section, perpendicular to the coiling axis, has yet been unknown).

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone); Galati (Eastern Sicily, Italy), Upper Pliensbachian; Central Apennines (Italy), Pliensbachian; Bakony Mts (Hungary), Upper(?) Sinemurian to Lower Pliensbachian (Ibex Zone); Western Pontids (Turkey), Pliensbachian.

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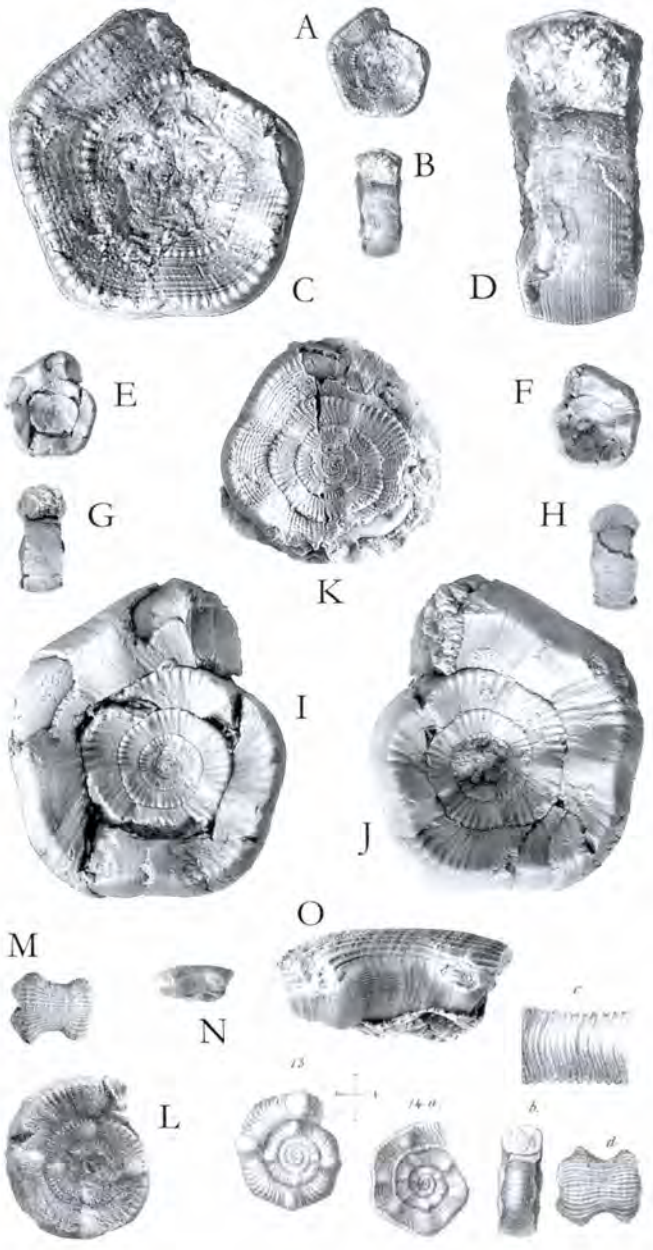

Figure 15 — *Pentagonodiscus reussii* (HÖRNES, 1853) (A–J and probably also L), and *Discohelix* aff. *ornata* (HÖRNES, 1853) (M–O that are the photos of the specimen, figured in STOLICZKA's Tafel III, 14 d); apart from "K", all figured specimens are probably syntypes of *Euomphalus reusii* HÖRNES, 1853 species, saved in STOLICZKA (1861) "originals collection" as *Discohelix reussi* HÖRNES, 1853. — **13, 14 a–d**: copy of STOLICZKA's (1861) original figures from Tafel III; **A–D**: lectotype, selected by WENDT (1968), with marked spiral ornament; spiral (A, C) and apertural (B, D) views, A–B = ×1, C–D = ×3; **E–J**: a paralectotype (GBa 2008/69/35/2) with obscure spiral ornament in spiral (E, I), umbilical (F, J), apertural (G) and dorsal (H) views, E–H = ×1, I–J = ×3; **K**: one of the Sümeg (Bakony Mts) *Pentagonodiscus reussii* specimens (HGM) with feebly concave, almost plane spire (×3); **L**: probably an aberrant shell of *Pentagonodiscus reussii* having "tetragonal" outline; **M–O**: a whorl fragment that is not *Pentagonodiscus reussii*, see above *Discohelix* aff. *ornata*; M–N = ×1, O = ×3.

Pentagonodiscus initiopentagonatus SZABÓ, 1979

(Figure 16)

1979: *Pentagonodiscus initiopentagonatus* sp. n. — SZABÓ, p. 27, pl. 2, figs. 6–7; (text)fig. 6h.
1994: *Pentagonodiscus initiopentagonatus* SZABÓ — CONTI & MONARI, p. 201, pl. 1, fig. 3.

M a t e r i a l — Single specimen with preserved juvenile and damaged adult whorls (HGM J 9594).

M e a s u r e m e n t s	H	H1	HPW	D	W	AS	AU
holotype (HGM J 9594)	*9.8	-	-	*20	*6.8	218°	-

S h a p e — Dextral, discoidal form with slightly less concave spiral than umbilical side. Coiling of protoconch follows normal logarithmic spiral, with nucleus, slightly elevated on spiral side. Juvenile whorls pentagonal in outline, but normal logarithmical coiling renewed on last two whorls. However, arrangement of sculpture on last two whorls retains pentagonal symmetry. Angulations distinct and carinate on teleoconch. Whorls flat on spiral and umbilical sides, convex on outer side. Peristome and inner morphology of shell unknown.

S c u l p t u r e — Because of strong re-crystallisation, sculpture of protoconch cannot be studied, only some uncertain portions of spiral lines are visible. From third whorl, more distinct spiral lines visible on whorl-surface. From penultimate whorl onwards, these lines arranged into pairs. Pairs 3 to 4 times more widely spaced than distance between them. On spiral and umbilical sides 6 of these paired lines appear. Outer side covered by dense, evenly spaced lineation. Simultaneously with spiral lines, tiny transverse ribs appear that slightly strengthen towards keels. On pen-

ultimate whorl, these riblets terminate in nodes at abaxial suture. Nodes become increasingly stronger and sparser. On last whorl, nodes appear independently from riblets in two strengths. Strong nodes developed at intervals of 35° to 36°, with three smaller nodes of equal strength between their pairs. Within space between two strong nodes 13 to 17 riblets visible. Nodes collabrally elongated, and fading out rapidly, especially outwards. Stronger nodes appear in points corresponding to "tips" and side bisectors of former pentagonal whorls, thus earlier pentagonal symmetry retained.

R e m a r k s — This species is known only in two incomplete specimens, one from the Bakony Mts and another from the Central Apennines, respectively. Therefore, some characters have remained unknown, like e.g. the inner shell construction that is specific in *P. reussii* (HÖRNES, 1853) and in *P.entagonodiscus angustus* (WENDT, 1968).

The juvenile (approx. 6) whorls of *P. initiopentagonatus* resemble those of *P. reussii*. The difference, on the basis of this limited material, is the stronger sculpture, the stronger divergence from the normal spiral coiling and the smaller whorl-width in *P. reussii*. The diameter of the pentagonal shell part in *P. initiopentagonatus* is 8 mm. In a diameter bigger than this, a distinction from *P. reussii* is more reliable. After this stage the specific features of *P. initiopentagonatus* develops: i.e. the loss of the pentagonal outline, the appearance of a different sculpture. In *P. reussii* the habit of the shell remains unchanged up to the adult stage (12 to 15 mm in diameter).

D i s t r i b u t i o n — Bakony Mts (Hungary): Lókút, Kericser, Pliensbachian (Davoei Zone); Central Apennines (Italy), Pliensbachian.

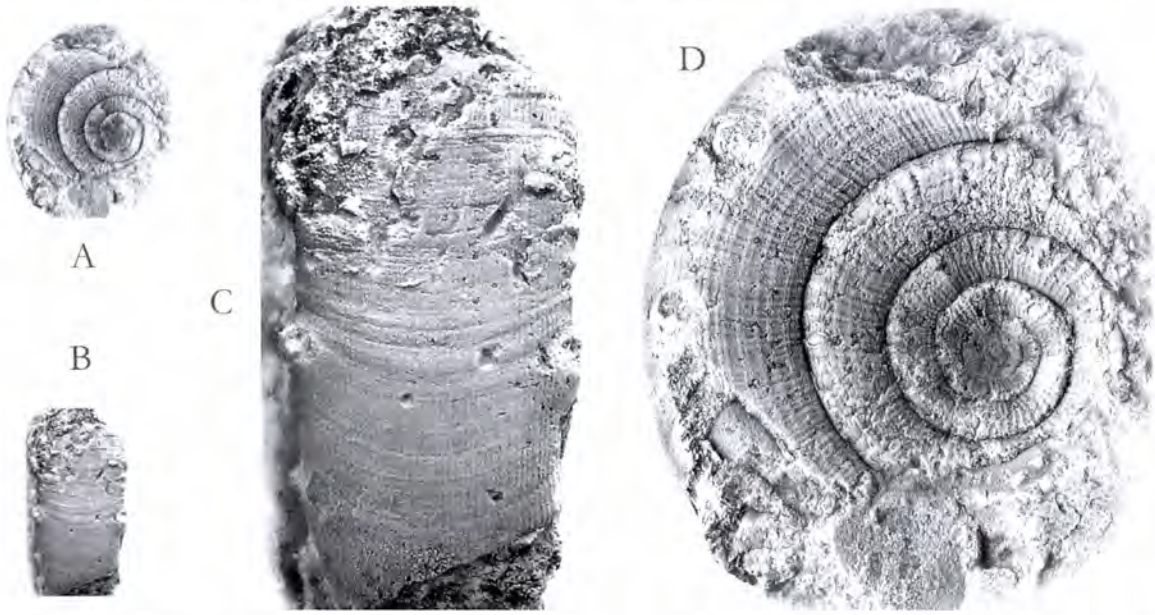

Figure 16 — *Pentagonodiscus initiopentagonatus* SZABÓ, 1979, refiguration of the holotype (HGM J 9594) — **A–D:** spiral (A, D) and outer (B, C) sides, A–B = ×1; C–D = ×3.

Order Vetigastropoda SALVINI-PLAWEN, 1980
Superfamily Pleurotomarioidea SWAINSON, 1840
Family Eotomariidae WENZ, 1938

Genus *Ptychomphalus* AGASSIZ, 1839
T y p e s p e c i e s: *Helicina compressa* J. SOWERBY, 1813

Ptychomphalus expansus (SOWERBY, 1821)
(Figure 17)

1821: *Helicina expansa* SOWERBY — SOWERBY, J., vol. 3, p. 129, pl. 273, figs 1–3.
1830: *Helicina expansa* SOWERBY — ZIETEN, p. 43, pl. 33, fig. 5.
pars 1844: *Rotella expansa* SOWERBY — MÜNSTER in: GOLDFUSS, p.102, pl. 195, figs 8–9.
? 1849: *Pleurotomaria suturalis* — J. A. EUDES-DESLONGCHAMPS, p. 147, pl. 17, figs 3 a–d.
non 1853: *Pleurotomaria expansa* D'ORB. — D'ORBIGNY, p. 413., pl. 352., fig. 1–4.
1854: *Pleurotomaria expansa* SOWERBY — CHAPUIS & DEWALQUE, p. 97, pl. 13, fig. 3.
1858: *Pleurotomaria expansa* SOWERBY — QUENSTEDT, p. 193, pl. 24, fig. 3.
1861: *Pleurotomaria expansa* SOWERBY — STOLICZKA, p. 185, pl. III, fig. 16.
1874: *Pleurotomaria expansa* SOWERBY — GEMMELLARO, G. G., p. 94, pl. 12, fig. 20.
1907: *Cryptaenia expansa* SOWERBY — SIEBERER, p. 25, pl. 1, figs 5 a–c.
1911: *Cryptaenia expansa* SOWERBY — GEMMELLARO, M., p. 214, pl. 10, figs 13–19.
? 1937: *Cryptaenia expansa* SOWERBY — PCHELINCEV, p. 24, pl. 1, fig. 25.

1966: *Cryptaenia expansa* (SOWERBY) — BOURROUILH, p. 43, fig. 16.
non 1980: *Ptychomphalus expansus* (SOWERBY, 1821) — SZABÓ, p. 55, pl. 1, fig. 9.
1997: *Ptychomphalus expansus* (SOWERBY, 1821) — FISCHER & WEBER , p. 160, pl. 26, figs 1a–b, 2, 3.
non 1998: *Ptychomphalus expansus* (SOWERBY, 1821) ? — GRÜNDEL & NÜTZEL, p. 66, Taf. 1, figs 6–9.
non 2008: *Ptychomphalus expansus* (SOWERBY, 1821) — SCHUBERT, GRÜNDEL & NÜTZEL, p. 20, figs 2: A–H.

M a t e r i a l — Fifteen, rather poorly preserved specimens (2008/69/36/1–15).

Measurements	H	HL	HP	D	W	AA	AL
2008/69/36/1	*8.5	*7	*6.5	16	*6.7		

S h a p e — Sublenticular shell with low, coeloconoidal spire and rather rapidly widening, flat or feebly convex whorls, changing into feebly concave only on adult shell near peristome (more exactly: concavities below subsutural swollen belt and above periphery gradually widen, then meet). Apex blunt, nucleus and first whorl of protoconch almost planispiral. Periphery angular but rounded in short radius. Selenizone narrow and hardly identifiable, two weak incisions delimit it. Its abapical half belt coincides outermost line of periphery. Selenizone exposed only on last whorl but overlapped on former whorls, suture just coincides with adapical rim of selenizone of previous whorl. Base strongly convex and higher than shell parts above periphery. Peristome discontinuous, columellar lip thickened and extending as heavy callus to middle of base. Outer lip not preserved on available specimens.

S c u l p t u r e — No ornament observable, disregarding extremely fine growth lines on shell spots of some specimens (possibly owing to their strong re-crystallisation).

R e m a r k s — SOWERBY's (1821) species has feebly concave whorls, convex selenizone and no nodes on its subsutural spiral swelling. In the available specimens, concavity of the whorls develops only in very late growth phase that seems acceptable as intra-specific variability. However, some authors identified shells with nodes and/or concave selenizone as *Ptychomphalus expansus*. In the synonym list notices indicate these. Presence-absence of nodosity and shape of the selenizone are observed as available species distinctive characters in *Ptychomphalus*. Unfortunately these characters have not been used consequently previously; sometimes even the information is lacking from the publications.

D i s t r i b u t i o n — The species is identified from the epicontinental, as well as the Mediterranean Lower Jurassic in Europe and in northern Africa. The authors mention it from the Lower and Middle Liassic, usually without further precision.

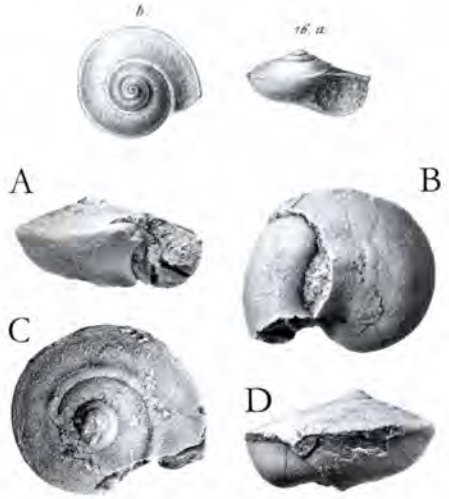

Figure 17 — *Ptychomphalus expansus* (SOWERBY, 1821) from the type locality of the Hierlatz Limestone. — 16 a–b: copy of STOLICZKA (1861) figures from Tafel III; **A–D**: photos of one of the two specimens, saved in the "originals collection"; apertural (A), basal (B), apical (C) and dorsal (D) views, ×1.6.

Ptychomphalus kericserensis n. sp.

(Figure 18)

1980: *Ptychomphalus expansus* (SOWERBY, 1821) — SZABÓ, p. 55, pl. 1, fig. 9.

H o l o t y p e — HGM J.08.16.1. (Figure 18).

T y p e l o c a l i t y — Lókút, Kericser-dűlő (Bakony Mts, Hungary).

T y p e s t r a t a — Hierlatz type limestone beds, rather rich in micrite and containing also Fe-Mn-oxide coated shells; co-occurred ammonites mixed from Obtusum to Ibex Zones (Upper Sinemurian to Lower Pliensbachian).

N a m e — From the name of locality area (Kericser-dűlő = an agricultural area SW from village Lókút, Hungary).

D i a g n o s i s — Small, lenticular shell with tubercled subsutural swelling on whorls except ?earliest (not preserved) and last half ones. Preserved inner lip parts show form, typical for *Ptychomphalus*. Selenizone concave and exposed only on last whorl. Suture slightly impressed and running just on adaxial edge of selenizone on previous whorl. Base covered by fine, dense spiral threads.

M a t e r i a l — A single shelly specimen without earliest shell parts and outer lip.

Measurements	H	HL	HP	D	W	AA	AL
holotype		5	4.5	11*	4.5*	-	130°

Figure 18 — *Ptychomphalus kericserensis* n. sp. — A–D: spiral (A), basal (B), apertural (C) and dorsal views of the holotype, ×3; **E–H**: same views of the holotype in natural size.

S h a p e — Dextral, sublenticular form. Spire depressed conical and consisting of feebly convex whorls. Periphery sharp, with narrow, concave selenizone immediately above it. Selenizone visible on last whorl but overlapped on former whorls. Suture just coincides with adapical rim of selenizone of previous whorl. Distinctly convex base, being higher than spire. Inner lip, forming thick, subcircular callus, extending to middle part of base. Outer lip completely lacking.

S c u l p t u r e — Spire ornamented with fine, prosocline growth-lines and collabrally elongate nodulae along suture. Nodulae fade out gradually on last whorl, merging into weak spiral elevation on last half whorl. Ornament of base consists of prosocyrt growth-lines and fine, dense spiral lines on peripheral part. These latter become gradually weaker from periphery to about middle of base.

R e m a r k s — Nodes are lacking from SOWERBY's (1821) *Helicina expansa*, however, some subsequent authors (e. g.: D'ORBIGNY 1853, MÜNSTER 1844) have regarded also such forms as *Ptychomphalus expansus* that have weaker or stronger nodes along the suture. First SIEBERER (1907) applied the nodosity as main character to distinguish his species "*Cryptaenia*" *nodosa* from the smooth shelled "*C*". *expansus*. *Cryptaenia nodosa* is much larger than *Ptychomphalus kericserensis* n. sp. and shows no nodes on that part, where the Bakony specimen is nodosed. The nodosity of *Cryptaenia nodosa* onsets just in that growth stage, in which the row of tubercles of *Ptychomphalus kericserensis* n. sp. changes into continuous swelling. The measurements are strongly different both from *P. expansus* and *P. nodosus*.

D i s t r i b u t i o n — Bakony Mts., Kericser: beds with mixed Obtusum to Ibex Zone faunas.

Ptychomphalus heliciformis (J. A. EUDES-DESLONGCHAMPS, 1849)

(Figure 19)

1849: *Pleurotomaria heliciformis* — J. A. EUDES-DESLONGCHAMPS, p. 149, pl. 17, figs 2 a–d.
1854: *Pleurotomaria heliciformis* J. A. EUDES-DESLONGCHAMPS — CHAPUIS & DEVALQUE, p. 96, pl. 12, figs 13 a–d.
1854: *Pleurotomaria rotellaeformis* DUNKER — D'ORBIGNY, p. 400, pl. 348, figs 3–7.
1861: *Pleurotomaria heliciformis* DESLONG. — STOLICZKA, p. 186, pl. 3, fig. 17.
1874: *Pleurotomaria heliciformis* J. A. EUDES-DESLONGCHAMPS — GEMMELLARO, G. G., p. 93, pl. 12, fig. 21.
1997: *Ptychomphalus heliciformis* (J. A. EUDES-DESLONGCHAMPS, 1849) — FISCHER & WEBER , p. 155, p. 25, figs 15 a–b, 16 a–b.

M a t e r i a l — Twelve specimens of various preservation (GBa 2008/69/38/1–12).

Measurements	H	HL	HP	D	W	AA	AL
GBa 2008/69/38/1	*17	14.5	13.5	30	14.6	148°	–

Figure 19 — *Ptychomphalus heliciformis* (J. A. EUDES-DESLONGCHAMPS, 1849). — **17 a–b**: copy of figure from STOLICZKA (1861) Tafel III.; **A–D**: photos of the specimen, drawn by STOLICZKA, apical (A), basal (B), apertural (C) and dorsal (D) view, ×1.

⇐

S h a p e — Rather large, sublenticular shell with flattened spire consisting of slightly convex, rapidly increasing whorls, separated by thin incision of suture. Whorls and base roughly equally high. Periphery angular but strongly rounded and bearing rather wide, somewhat flattened selenizone on its adapical slope. Outermost line of shell coincides with abapical edge of selenizone, being invisible on spire whorls because suture of subsequent whorl just running on its adapical rim. Terminal part of selenizone damaged but remnants suggest short (about 5 mm) slit. Base convex, with rather broad periaxial depression; shell probably moderately phaneromphalous or cryptomphalous (suggested also by cross-sections of axial region on some broken specimens). Aperture feebly

flattened in direction parallel to axis, outer lip simple, prosocline and strongly prosocyrt between selenizone and adapical suture, parietal lip not visible on available specimens. Callosity, connected to columellar lip in *Ptychomphalus*, present on visible part of periumbilical shell wall; umbilicus itself not filled in completely as usual in this genus.

S c u l p t u r e — Shell completely smooth, disregarding extremely fine growth lines, visible under magnification and two weak spiral lines, delimiting selenizone.

R e m a r k s — Because EUDES-DESLONGCHAMPS's (1849) syntypes has been lost, FISCHER & WEBER (1997) selected a neotype and a paraneotype for *Ptychomphalus heliciformis* EUDES-DESLONGCHAMPS, 1849 from the collection, served as basis to D'ORBIGNY's (1851–1860) monograph, in which the specimens were identified as "*Pleurotomaria rotellaeformis* DUNKER". This peculiar situation well demonstrates the distinction problems between these two species with use only literature data. A material-based revision of these two species is badly needed.

FISCHER & WEBER (1997) suggested two characters to distinguish *P. heliciformis* from *P. rotellaeformis*; the spire angle that is narrower (115–125°) in the latter and wider in the former species (130–140°), and the "little difference" between the shape of the columellar calluses. Because the latter difference has remained unspecified, the spiral angles of the Hierlatz specimens (135–153°) is the only objective character that seems to support to choose the name "*heliciformis*".

D i s t r i b u t i o n — Fontaine-Etoupefour, (Calvados, France), Upper Pliensbachian (Spinatum Zone); Luxembourg, Lower Liassic; Hallstatt, Hierlatz Alpe and Schafberg (Austria), Upper Sinemurian (Oxynotum Zone); West Sicily (Italy), Upper Pliensbachian.

Family Lophospiridae WENZ, 1938

Genus *Worthenia* DE KONINCK, 1883

T y p e s p e c i e s: *Turbo tabulatus* CONRAD, 1835

Worthenia superstes SZABÓ, 1980

(Figure 20)

1980: *Worthenia? superstes sp. n.* — SZABÓ, p. 56, pl. 1, figs 10–11.
1991: *Worthenia superstes* SZABÓ, 1980 — INESTA et al., p. 20, pl. 1: 1.

M a t e r i a l — Five more or less fragmentary inner mould specimens with shell fragments (HGM, holotype J 9595).

Measurements	H	HL	HP	D	W	AA	AL
holotype	-	24.5	17	27	17	-	56°

S h a p e — Gradate (pagodiform) shell, consisting of whorls with broad, slightly convex ramp, bordered by rather marked angulation at midwhorl. Selenizone carina-like and coincides with angulation; periphery also keel-like. Outer face slightly concave, and abapically feebly inclined toward axis. Base convex and anomphalous. No peristome part preserved in available material.

S c u l p t u r e — Whorls covered by fine spiral lines, while base ornamented with stronger spiral cords. Selenizone crenulate and bearing also two or three spiral threads. Growth-lines distinctly prosocline, slightly prosocyrt on ramp, prosocyrt on outer face and opisthocyrt on base.

R e m a r k s — The shape and the ornament of the selenizone distinguish this form from the similarly gradate *Bathrotomaria* and *Sisenna* species. Its ornament can be reconstructed from the shell remnants (arrows in Figure 20: C).

In the first description, the genus name seemed questionable but the subsequent, extended studies on Jurassic and Triassic gastropods confirmed its rightness. This species belongs to a survivor line of *Worthenia*. After long Palaeozoic–Triassic history and species richness, this genus became really extinct most probably during the Toarcian crisis.

D i s t r i b u t i o n — Lókút, Kericser (Bakony Mts), beds with Obtusum to Ibex Zone mixed fauna, and Stokesi Zone (Upper Sinemurian? to Upper Pliensbachian); Mola Hill (Novelda, Alicante, Spain), Pliensbachian.

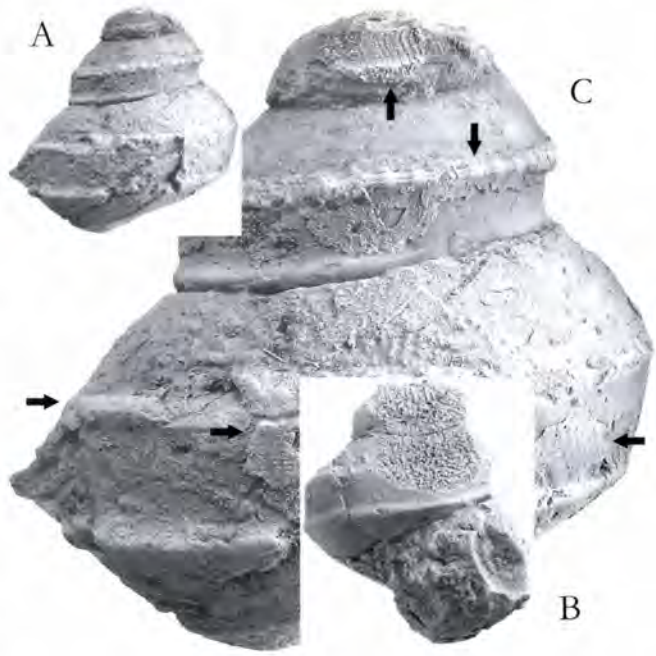

Figure 20 — *Worthenia superstes* SZABÓ, 1980; refiguration of the holotype — **A–B**: "apertural" and dorsal views, ×1; **C**: magnified dorsal view to show remnants of the shell with ornament (arrows), ×3.

Family Gosseletinidae WENZ, 1938

Genus *Cyclostomaria* SZABÓ, 1980

Type species — *Cyclostomaria monarii* SZABÓ, 2008. [Type species was revised and fixed by SZABÓ (2008)]

Cyclostomaria monarii SZABÓ, 2008

(Figure 21)

non 1853: *Pleurotomaria Suessii* HÖRNES — HÖRNES, p. 762.
1911: *Pleurotomaria Suessi* HÖRNES — M. GEMMELLARO, p. 213, pl. 10, figs 10–12.
1980: *Cyclostomaria suessii* (HÖRNES, 1853) — SZABÓ, p. 64, pl. 4, fig. 4.

cf. 1991: *Cyclostomaria* sp. — CONTI & MONARI, p. 264, pl. 5, figs 6–8.
2003: *Cyclostomaria* sp. — SZABÓ in VÖRÖS et al., p. 61.
2008: *Cyclostomaria monarii* n. sp. — SZABÓ, p. 174, figs 4: 1–7.

Material — Seven, damaged specimens; the earliest and terminal shell parts are poorly known (types in the HGM).

Measurements	H	HL	HP	D	W	AA	AL
holotype	**25	**22.5	**18.5	*45.5	**19	-	150°
paratype	*10.5	*9	**8.5	*19.2	-	130°	165°

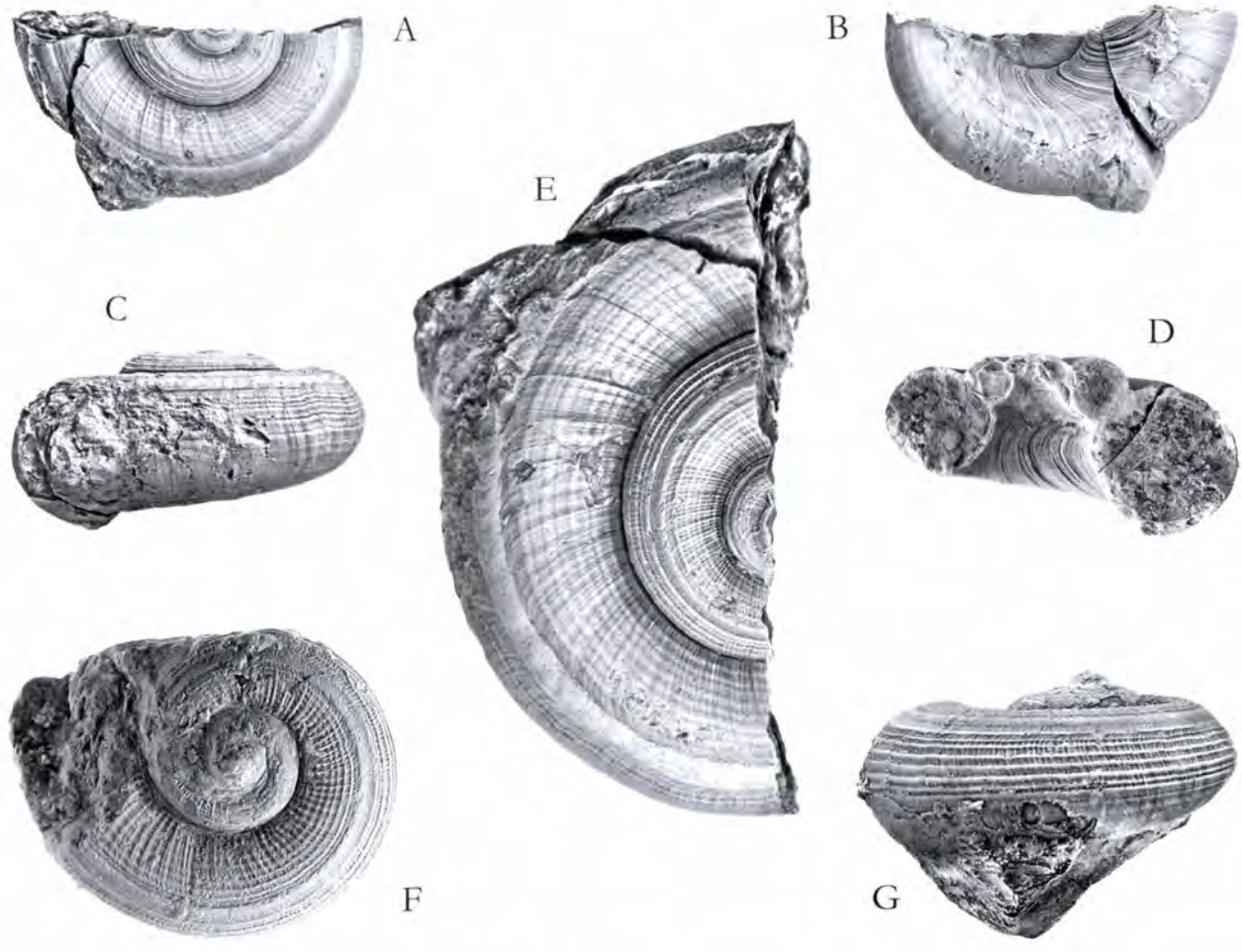

Figure 21 — *Cyclostomaria monarii* SZABÓ, 2008 (refiguration of the type specimens) — **A–E**: holotype (HGM J 08.1.1.), apical (A), basal (B), dorsal (C) and natural cross section (D) view; ×1; **E**: magnified apical view to show details of the ornament, ×2; **F–G**: a juvenile specimen (paratype HGM J 08.1.2.) in apical (F) and side (G) views, ×2.5.

Shape — Low spired, nearly discoidal form with acute apex, and rapidly expanding, convex whorls, having suborbicular cross-section. Sutures deeply impressed to canaliculate both on spiral and umbilical side. Selenizone runs near highest adapical line of whorls; its shape concave initially but changing into convex on last whorl. Periphery rounded; base convex and (extreme) broadly phaneromphalous with flattened, spiral swelling that may be regarded as rim of umbilicus. Peristome unknown.

Sculpture — Whorls covered by spiral cords, lacking from selenizone, and intersecting collabral cords, disrupted at selenizone. Juvenile shell has regular network ornament but sculpture elements become flattened, irregular, and collabral cords fade out in last growth phase,

especially from peripheral region. Base ornamented by some faint, wide spiral elevations and furrows, and marked growth-lines. Umbilical region similarly sculptured, but growth-lines bound into ridges here.

R e m a r k s — The measurable spiral angles show that first whorls strongly tend to discoidal shape (angle increases) but this tendency changes into opposite on last whorl; spiral angle decreases, the last whorl slightly deviates downwards.

Low spired pleurotomariid species (like some "morphes" of *Pleurotomaria debuchii*) may resemble *C. monarii*, but their angulations in the whorl cross-section help in the distinction.

D i s t r i b u t i o n — Bakony Mts (Hungary): Tés, Hamuháza, Lower Pliensbachian (Davoei Zone); Eplény, manganese ore mine and Kávás-hegy, Upper Pliensbachian (Margaritatus Zone); Lókút, Fenyveskút, Upper Pliensbachian (Margaritatus Zone); Northern Calcareous Alps (Austria): St. Wolfgang (near Bad Ischl), Schafberg (at Mittersee), Upper Pliensbachian; East Sicily (Italy), Galati, Rocche Rosse: Upper Pliensbachian.

Family Raphistomatidae KOKEN, 1896

Genus *Wortheniopsis* J. BÖHM, 1895

T y p e s p e c i e s: *Pleurotomaria margarithae* KITTL, 1894

An extremely variable group of Early Jurassic gastropods, having *Sisenna* and/or *Wortheniopsis* morphology will be discussed here, that could be most easily characterised by the species name "*Pleurotomaria faveolata* J. A. EUDES-DESLONGCHAMPS, 1849" (though the actual variability is much higher than that has been originally covered with this name). EUDES-DESLONGCHAMPS (1849) demonstrated the variability with establishing "varieties" to the different shell character combinations, which were regarded, with some modifications, as species by D'ORBIGNY (1854). Their two basic monographs, especially D'ORBIGNY's idealized figures, strongly influenced how the subsequent authors interpreted the related finds. Recently, in the monograph about results of a revision of D'ORBIGNY's material, FISCHER & WEBER (1997) have suggested again the name "*Pleurotomaria faveolata*", but they have kept also the names of some previous varieties to indicate "morphes". Because, they selected also types to D'ORBIGNY's species beside "*Sisenna faveolata*", actually they still fixed also a species level subdivision of EUDES-DESLONGCHAMPS's "mega-species".

The lower spired forms of this group conform to the diagnosis of *Sisenna* KOKEN, 1896, however, two species from the available material (*Wortheniopsis (Wortheniopsis)* aff. *procera* (J. A. EUDES-DESLONGCHAMPS, 1849), *Wortheniopsis (Wortheniopsis) urkutensis* n. sp.) well correspond also to the definition of genus *Wortheniopsis* J. BÖHM, 1895. No marked morphological distinction possibility has yet been found between the two genera, the differences (spire height and related transformations) do not exceed the subgeneric level seemingly. That is the explanation for the unusual combination of names in the generic identification below. The fact, that some authors (e.g. KNIGHT et al. 1960) regard *Sisenna* and *Wortheniopsis* as belonging to different superfamilies (Pleurotomarioidea and Murchisonoidea, respectively), gives a special aspect to this name usage. However, a full revision to explore the nature of this morphological similarity is out of scope of this work.

STOLICZKA (1861) applied the name "*Pleurotomaria foveolata*" for the rare finds from the Hierlatz Limestone. This decision was probably supported by the fact that none of the specimens are conform with the morphology of EUDES-DESLONGCHAMPS's varieties or D'ORBIGNY's species; see *Wortheniopsis (Wortheniopsis) urkutensis* n. sp. and *Wortheniopsis (Sisenna) hierlatzensis* n. sp.).

With some doubts in the identifications of the Bakony Mts specimens, SZABÓ (1980) tried to follow D'ORBIGNY's (1854) species subdivision. However, the photos of the types in FISCHER & WEBER's (1997) revision demonstrate that D'ORBIGNY's drawings are sometimes significantly different from the specimens; actually they display also not existing forms. Therefore, and because some new "morphes" must be also taken into consideration, further doubts have arisen about rightness of the former identification of the Bakony Mts finds.

In seeking for a right taxonomical treatment of this group, most troubles seem to origin from the inferable palaeobiology. The main distribution area of the "*faveolata* group" was the Tethyan (Mediterranean) Early Jurassic carbonate platform system that gradually drowned and disintegrated into disjunct submarine areas; isolated biotopes are known also in stable Europe. The scattered area resulted in separated populations with independent evolution/morphological development. The discussed forms are known as not really frequent, accessorial elements of predominantly hard bottom dweller associations where their fossilization chance is rather low with their thin-walled (probably nacreous), therefore fragile shells. Their documentation remained poor both horizontally and vertically. That is why the available finds offer two taxonomical models: either a single but extremely variable species (easy way), or numerous species that sometimes may be not well distinguishable in lack of sufficient support from the fossil record.

The Hierlatz Limestone finds imply the multispecific taxonomical solution, but the poor preservation does not allow to outline satisfactorily all the inferable species. Therefore some species, which do not belong to the "historical" materials, are also involved into this revision to support the "multispecific" taxonomical model of the "*faveolata*" group. The relatively well preserved specimens of these species are collected from a small, lenticular intercalation of the Úrkút (Bakony Mts) Hierlatz Limestone; they possibly belong to contemporaneous population or have lived in a narrow time interval. The unusually "numerous" specimens

of *Wortheniopsis (Sisenna) jancsii* n. sp. demonstrate a rather high morphological stability on the species level (see Figure 25).

Two strongly different specimens are saved in STOLICZKA's (1861) original collection under the name "*Pleurotomaria foveolata*". One has been found also in the Bakony Mts but both are unknown in the "stable" European faunas [*Wortheniopsis (Wortheniopsis) urkutensis* n. sp. and *Wortheniopsis (Sisenna) hierlatzensis* n. sp., respectively]. In the available material, further *Wortheniopsis (Sisenna)* species are also indicated, but most of them are known only in small areas of a few localities. The morphes/species of the "stable" European "*faveolata*" group are not or only doubtfully identifiable.

Subgenus *Wortheniopsis* J. BÖHM, 1895

Wortheniopsis (Wortheniopsis) aff. *procera* (J. A. EUDES-DESLONGCHAMPS, 1849)

(Figure 22)

aff. 1849: *Pleurotomaria faveolata* var. *procera* — J. A. EUDES-DESLONGCHAMPS, p.74, pl. 15, figs 5a–b.
aff. 1854: *Pleurotomaria procera* D'ORB. — D'ORBIGNY, p. 409, pl. 351, figs 3–4.
non 1980: *Sisenna* cf. *procera* (J. A. EUDES-DESLONGCHAMPS) — SZABÓ, p. 55, pl. 1: 2–3.
aff. pars 1997: *Sisenna faveolata* (J. A. EUDES-DESLONGCHAMPS) — FISCHER & WEBER, p. 159, pl. 25, fig. 8.

M a t e r i a l — A single damaged, shelly specimen without earliest shell parts and peristome (HGM J.08.3.1.).

Measurements	H	HL	HP	D	W	AA	AL
HGM J.08.3.1.	**26	**15.5	*10	**15.5	**8	-	50°

S h a p e — Rather high spired shell, consisting of convex whorls, separated by deeply impressed (subcanaliculate) suture. Whorl surface separated by rounded angulation into narrow, steep and flat ramp with concave selenizone on its abapical edge, and feebly concave, rather wide outer face. Rounded periphery gives transition into convex, narrowly phaneromphalous base. Peristome not preserved.

S c u l p t u r e — Predominant ornament of spiral cords at peripheral region, and spiral threads on remaining parts of shell. Selenizone bordered also by two cords. Disregarding earliest preserved whorl, no collabral ornament beside growth-lines observable, even lunulae lacking from selenizone. Granules developed on all spiral ornamental elements but became obscure on (or eroded? from) some cords of last whorl. Strength of peripheral cords gradually decreases towards umbilicus.

R e m a r k s — The available specimen is a damaged shell, slightly more slender than that one, figured by FISCHER & WEBER (1997) as holotype of *Sisenna procera* (J. A. EUDES-DESLONGCHAMPS, 1849). The ornament of the single Hierlatz Limestone (Úrkút, Bakony Mts) find is more significantly different because its spiral cords are much stronger. This might be the second known specimen in *W. (W.) procera* (J. A. EUDES-DESLONGCHAMPS, 1849).

The shape and ornament of this species strongly recall that of the type species of *Wortheniopsis* J. BÖHM, 1895.

D i s t r i b u t i o n — Lower? Sinemurian Hierlatz Limestone, Úrkút (Bakony Mts).

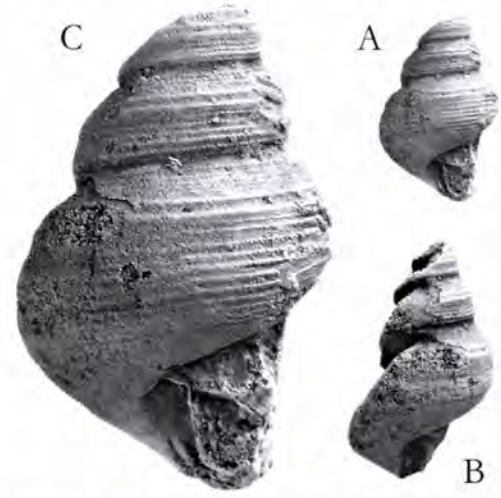

Figure 22 — *Wortheniopsis (Wortheniopsis)* aff. *procera* (J. A. EUDES-DESLONGCHAMPS, 1849) — **A–B**: apertural and dorsal view, ×1; **C**: apertural view with details of the ornament, ×2.7.

Wortheniopsis (Wortheniopsis) urkutensis n. sp.

(Figure 23)

pars 1861: *Pleurotomaria foveolata* DESLONG. — STOLICZKA, p. 186, pl. 4, fig. 1.

H o l o t y p e — GBa 2008/69/39/1/1, paratype: HGM J.08.2.1.
T y p e l o c a l i t y — Hallstatt, Hierlatz Alpe.
T y p e s t r a t a — Upper Sinemurian (Oxynotum Zone) Hierlatz Limestone.
N a m e — From the locality of the paratype (Úrkút, Bakony Mts, Hungary).
D i a g n o s i s — Turbiniform shell of whorls with lacking or obscure angulation; "ramp" feebly convex; selenizone running above flattened outer face; subregular network ornament on belt between upper suture and selenizone ("ramp"); spiral cords predominate ornament of outer face and base.

M a t e r i a l — One of the two specimens in the "*Pleurotomaria foveolata*" box from STOLICZKA (1861) GBa "originals collection" (= holotype of *Wortheniopsis (Wortheniopsis) urkutensis* n. sp.), and another specimen from Úrkút (Hungary), HGM collection (= paratype).

Measurements	H	HL	HP	D	W	AA	AL
holotype	**16	**10.7	**7.2	**12.2	**7	*64°	64°
paratype	**14	**10	**7.2	**11.8	**6	*70°	70°

S h a p e — Moderately high turbiniform shell with convex whorls, separated by impressed suture. Angulation between ramp and outer face obscurely visible on latest whorls. Selenizone concave, its position above flattened outer face. Periphery strongly rounded, base convex and narrowly phaneromphalous. No peristome part preserved; apical whorls also lacking.

S c u l p t u r e — Thin collabral and spiral threads compose network ornament on ramp, collabral elements somewhat stronger. Two spiral cords delimit selenizone, having no lunulae; further spiral cords of nearly equal density cover outer face and base; most prominent ones visible at periphery. Granules developed at crossing points of network and on cords of outer face.

R e m a r k s — The turbiniform shape may appear in juvenile phase also in other species but similarly sized specimens already have angulation on the whorls and their specific ornament has also developed. However, the marked ornament of *Wortheniopsis (Wortheniopsis) urkutensis* n. sp. usually provides a tool also to distinguish the young specimens of the co-occurring other species.

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Sinemurian (Oxynotum Zone); Úrkút (Bakony Mts, Hungary), Early(?) Sinemurian.

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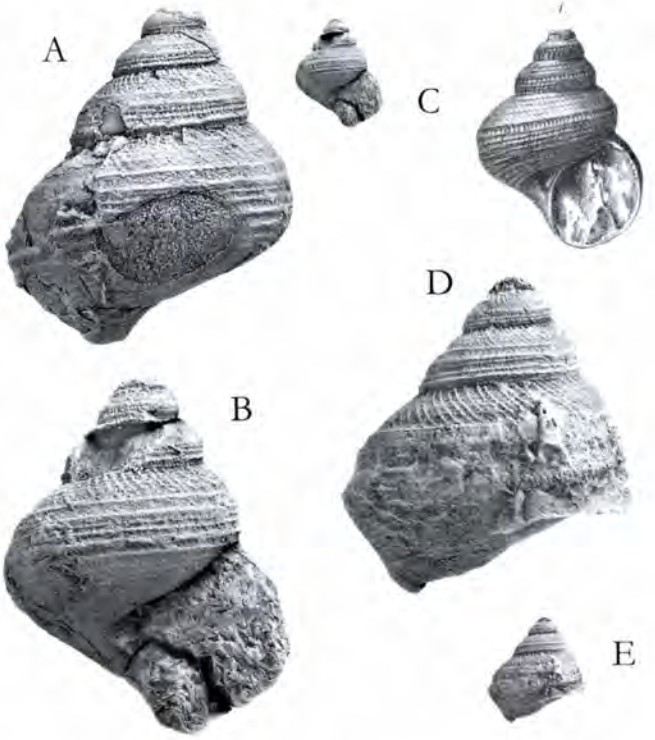

Figure 23 — *Wortheniopsis (Wortheniopsis) urkutensis* n. sp. — **1**: copied figure of *Pleurotomaria foveolata* from STOLICZKA (1861) Tafel IV; **A–B**: holotype, Hierlatz Alpe; dorsal (A) and "apertural" (B) view, ×3; **C**: holotype in apertural view, natural size; **D–E**: paratype, Úrkút (Bakony Mts); dorsal view in ×3 (D) and ×1 (E) view.

Subgenus *Sisenna* KOKEN, 1896

T y p e s p e c i e s: *Pleurotomaria turbinata* HÖRNES, 1855.

Wortheniopsis (Sisenna) hierlatzensis n. sp.

(Figure 24)

pars 1861: *Pleurotomaria foveolata* DESLONG. — STOLICZKA, p. 186, pl. 4, fig. 1.

H o l o t y p e — NhM 2007/0101/0004, paratype: GBa 2008/69/39/2/1.

T y p e l o c a l i t y — Hallstatt, Hierlatz Alpe.

T y p e s t r a t a — Sinemurian (Oxynotum Zone) Hierlatz Limestone.

N a m e — From the locality of the holotype.

D i a g n o s i s — Conical-gradate shell with steep ramp; angulation close below midwhorl; evenly developed network ornament on whole shell surface; granules at crossing points of network even on base, rare amongst studied species.

M a t e r i a l — One of the two specimens is from the "*Pleurotomaria foveolata*" box of STOLICZKA (1861) GBa "original collection" (= paratype), and another, unidentified specimen is from the NhM Hierlatz Alpe collection (holotype).

Measurements	H	HL	HP	D	W	AA	AL
holotype	**33	**21	**15	**28	-	*72°	*72°
paratype	-	-	-	-	-	*66°	*66°

S h a p e — Conical-gradate shell, having whorls with nearly median angulation. Ramp steep, feebly convex in juvenile stage but flat on last whorl with narrow, concave belt above selenizone. Selenizone itself narrow, initially flat then becomes feebly concave. Outer face rather wide, flat on juvenile shell but feebly concave on last whorl. Periphery rounded angular, base convex and narrowly phaneromphalous. No peristome part observable.

S c u l p t u r e — Fine network of collabral and spiral threads covers whorls and the base with granules at crossing points. On outer face and base, spiral components of network predominant.

R e m a r k s — The granulate ornament of *Wortheniopsis (Sisenna) hierlatzensis* n. sp. reminds that of *W. (S.) pinguis* (J. A. EUDES-DESLONGCHAMPS, 1849), however, the spiral elements of the latter species are much denser and finer. Furthermore, *Wortheniopsis (Sisenna) hierlatzensis* n. sp. differs from *W. (S.) pinguis* also in the shell shape; the latter species has cyrtoconoidal while the former one possesses simple conical shells. The position of the selenizone/angulation is lower in *W. (S.) pinguis*, i.e. the ramp is wider and the outer face narrower than in *Wortheniopsis (Sisenna) hierlatzensis* n. sp.

D i s t r i b u t i o n — Hierlatz Alpe, Sinemurian (Oxynotum Zone).

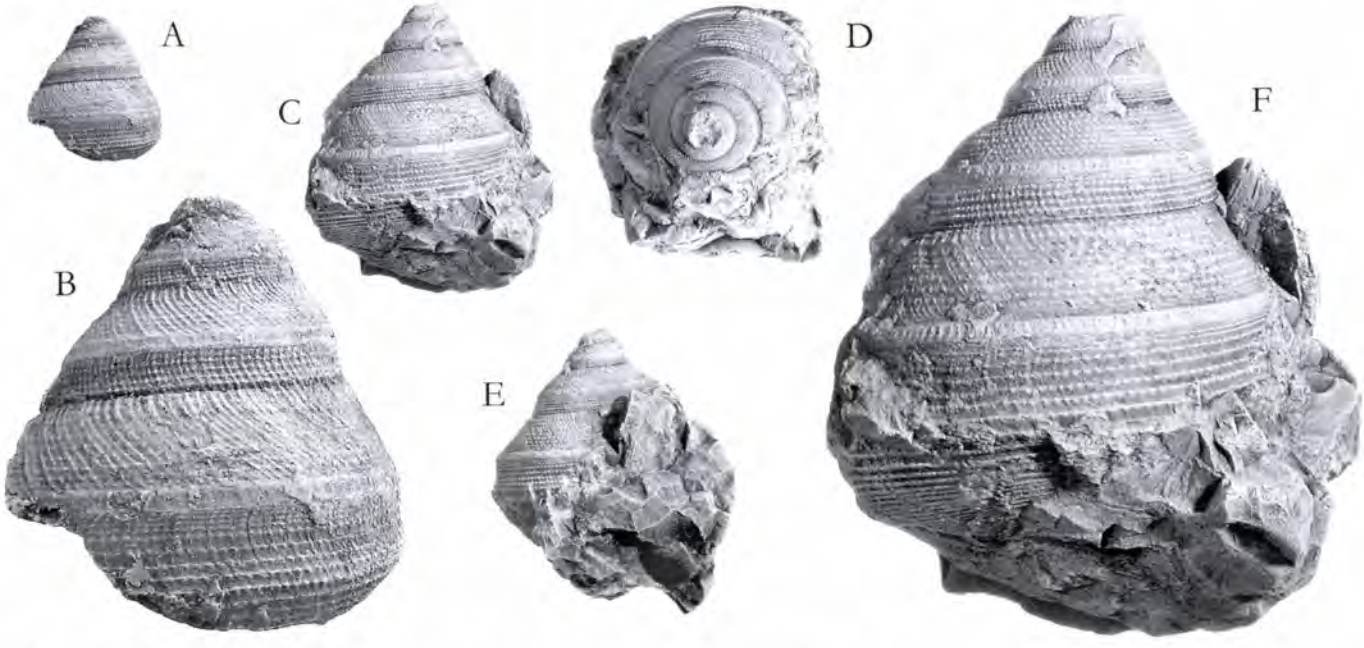

Figure 24 — *Wortheniopsis (Sisenna) hierlatzensis* n. sp. — **A–B**: paratype in ×1 (A) and ×3 (B) magnification; **C–F**: holotype; lateral views in ×1 (C) and ×3 (F) magnification; E: another lateral view to display the outline of the spire, ×1; D: apical view, ×1.

Wortheniopsis (Sisenna) jancsii n. sp.

(Figure 25)

H o l o t y p e — HGM J.08.4.1. (Figure 25: A–D); paratypes: HGM J.08.5.1–4. (specimens in Figure 25: E–P).

T y p e l o c a l i t y — Úrkút, Csárdahegy (Bakony Mts).

T y p e s t r a t a — Lower(?) Sinemurian Hierlatz Limestone.

N a m e — Dedicated to the author's elder son, János SZABÓ (jun.).

D i a g n o s i s — Feebly coeloconoidal shell with distinctly developed angulation on post-juvenile whorls; ramp feebly convex or flat; last whorls prominently expanding; periphery subangular, base convex and narrowly phaneromphalous; ornament composed of spiral cords and threads, crossed by collabral threads resulting in network ornament; spiral cords predominate over collabral threads at periphery and on base.

M a t e r i a l — Twelve specimens of various preservation; all with remnants of the shell (HGM collection).

Measurements	H	HL	HP	D	W	AA	AL
holotype	**15	**13	-	**11.5	-	*57°	*73°
paratype HGM J.08.5.1.	-	-	-	**15	-	*61°	*72°
paratype HGM J.08.5.2.	-	-	-	**9	-	*59°	*78°
paratype HGM J.08.5.3.	-	-	-	**14.5	-	-	*84°
paratype HGM J.08.5.4.	-	-	-	**12	-	**60°	*71°

S h a p e — Feebly coeloconoidal shell of convex whorls, having distinctly developed angulation in post-juvenile stages. Ramp feebly convex on early whorls but flat on latest ones. Latest preserved whorls prominently expanding; periphery subangular, base convex and narrowly phaneromphalous; ornament composed of spiral cords and threads, crossed by collabral threads resulting in network ornament; at periphery and on base spiral cords predominate over collabral threads.

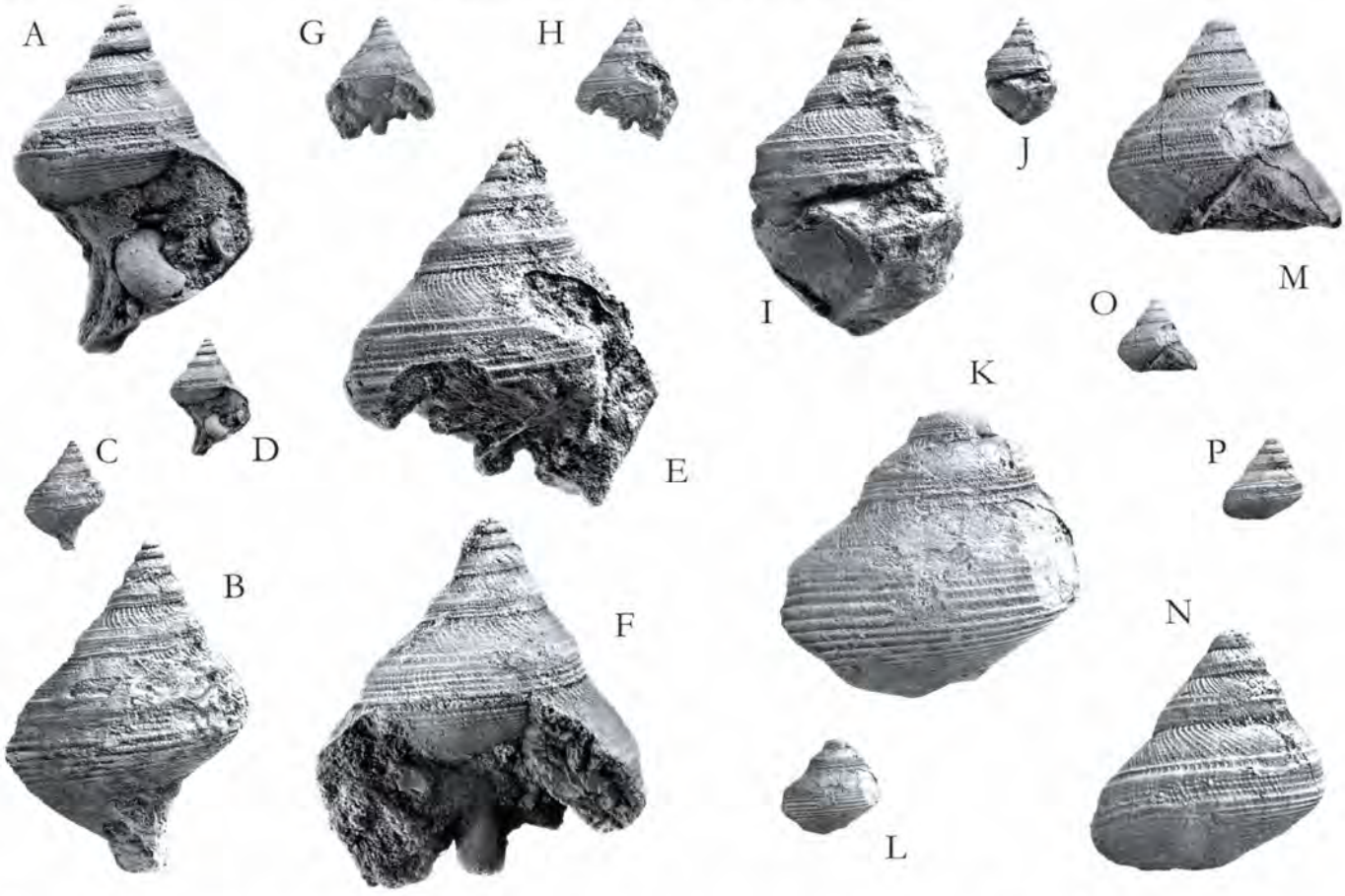

Figure 25 — *Wortheniopsis (Sisenna) jancsii* n. sp. type specimens to demonstrate the rather low morphological variability of the species. — **A–D**: holotype, "apertural" view, A = ×3, D = ×1; lateral view, B = ×3, C = ×1; **E–H**: paratype (HGM J.08.5.1.) with best preserved details of the ornament, two lateral views, E– F = ×3, G–H = ×1; **I–J**: paratype (HGM J.08.5.2.) showing earliest preserved whorls, lateral view, I = ×3, J = ×1; **K–L**: paratype (HGM J.08.5.3.) to display the morphology of the latest (known) whorls, lateral view, K = ×3, L = ×1; **M–P**: paratype (HGM J.08.5.4.) with somewhat more marked ornament, "apertural" and lateral views, M–N = ×3, O–P = ×1.

S c u l p t u r e — Network ornament of spiral cords and threads, and collabral threads on whole surface of shell; lunulae also developed on selenizone, but no spiral lines cross them. In last ontogenetic stages, cords became predominant and network vanished in peripheral region and on base.

R e m a r k s — Most similar species is *Wortheniopsis (Sisenna) hierlatzensis* n. sp. (see above) but it has a simple conical (not coeloconoidal) shell and the character of the ornament does not change in the last growth phases like in *Wortheniopsis (Sisenna) jancsii* n. sp.

EUDES-DESLONGCHAMPS (1849) established the similarly shaped *Pleurotomaria faveolata* var. *trochoidea* that were named as *Pleurotomaria subfaveolata* D'ORB. by D'ORBIGNY (1854). FISCHER & WEBER (1997) did not find specimen to design any type for this species. They noticed that D'ORBIGNY's (1854) figure to *Pleurotomaria subfaveolata* is actually a reproduction of EUDES-DESLONGCHAMPS's (1849) drawing from *Pleurotomaria faveolata* var. *trochoidea*. Both figures are different from *Wortheniopsis (Sisenna) jancsii* n. sp. in having a strong peripheral spiral bulge that is ribbed or nodosed by the drawings, and it remains exposed on all former whorls. No trace of this morphological element has been found on the specimens of *Wortheniopsis (Sisenna) jancsii* n. sp.

D i s t r i b u t i o n — Úrkút (Bakony Mts), Lower(?) Sinemurian.

Wortheniopsis (Sisenna) lokutensis n. sp.

(Figure 26)

1980: *Sisenna turrita* (DESLONGCHAMPS, 1849) — SZABÓ, p. 54, pl. 1, 4–5

H o l o t y p e — HGM J.08.6.1. (Figure 26: A–B); paratypes: HGM J.08.7.1–2. (both further specimens in Figure 26).

T y p e l o c a l i t y — Lókút (Kericser), Bakony Mts.

T y p e s t r a t a — Typical Hierlatz Limestone of stratified development.

N a m e — From the village near the locality.

D i a g n o s i s — Turbiniform-conical, thin-walled shell; ramp convex and prominently wide while outer face narrow; base slightly convex and narrowly phaneromphalous; juvenile shell has network ornament of fine threads, but

adult whorls ornamented by dense, fine spiral threads crossed by growth-lines only; dense, somewhat stronger threads cover full base.

M a t e r i a l — Most of the available 28 specimens are strongly damaged owing to their extremely thin–walled shell.

Measurements	H	HL	HP	D	W	AA	AL
holotype	*23	*15.5	*10.5	*18	*11.5	61°	61°
paratype HGM J.08.7.1.	-	**23	**18	*28	-	-	*50°
paratype HGM J.08.7.2.	-	**35	**23	**37	-	-	-

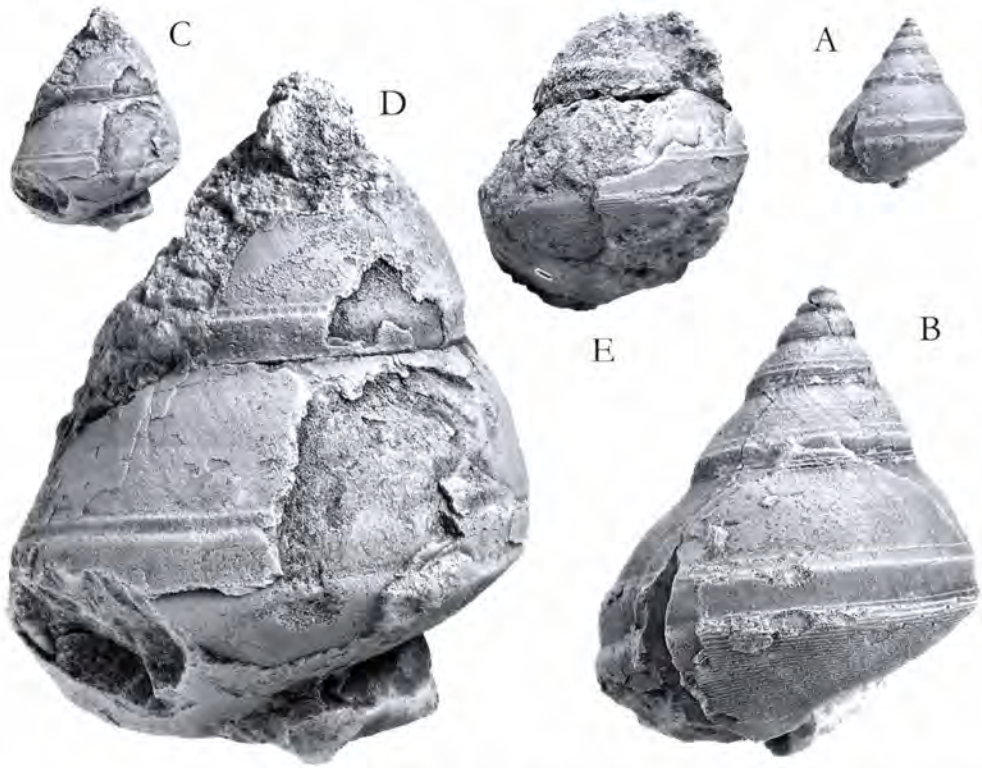

Figure 26 — *Wortheniopsis (Sisenna) lokutensis* n. sp. — **A–B**: holotype in dorsal view, A = ×1, B = ×3; **C–D**: paratype (HGM J.08.7.1.) to show shape and ornament of the adult whorls, C = ×1, D = ×3; **E**: inflated last whorl of the largest available specimen (paratype HGM J.08.7.2.), ×1.

S h a p e — Turbiniform-conical, thin-walled shell with blunt apex. Nucleus and first protoconch whorl slightly depressed; next three whorls probably belonging to orthostrophic protoconch. With appearance of nearly midwhorl angulation, pentagonal axial whorl-section of whorls develops at end of fourth volution. Selenizone runs at middle of early whorls, on lower rim of somewhat convex ramp that gradually widened relative to outer face, therefore selenizone shifted below midwhorl on post-juvenile whorls. It forms concave belt, bordered by two spiral cords. Immediately below selenizone, narrow, slightly concave outer face developed with angular periphery abapically alongside. Base slightly convex and narrowly phaneromphalous.

S c u l p t u r e — Ornament of protoconch, disregarding first half whorl, and juvenile shell (about five whorls) cancellate and granulate at crossing points of network. Adult shell ornamented with fine growth-lines, and more regularly spaced, dense, fine spiral threads of similar strength. From these latter, only those two, bordering selenizone, and 3 to 4 ones, situating on periphery became cords. Stronger, densely developed, almost uniform spiral threads cover narrowly phaneromphalous base.

R e m a r k s — The width of the outer face, compared to the distance between upper and lower sutures and/or to the width of the ramp, smallest of all published *Wortheniopsis (Sisenna)* species. Concomitant character is the broadest ramp; this shape makes *Wortheniopsis (Sisenna) lokutensis* n. sp. distinguishable from the related species.

From the "morphes" of FISCHER & WEBER (1997) *Sisenna faveolata* subdivision, *ellipsoidea* and *pinguis* are comparable to *Wortheniopsis (Sisenna) lokutensis* n. sp. because of their subglobular adult whorl. However, the outer face/ramp ratio as distinctive character is working in these cases, too. Besides, their spiral angle is considerably larger and they seem to have smaller number of whorls at same dimension; "morphe" *ellipsoidea* has flat selenizone without delimiting spiral cords, and "morphe" *pinguis* has granulate ornament, respectively.

D i s t r i b u t i o n — Herend, Kisnyerges-árok: Jamesoni to Ibex Zones; Lókút, Kericser: beds with mixed Obtusum to Ibex Zone fauna and Davoei Zone; Szentgál, Gombáspuszta: Ibex Zone; Eplény, Kávás-hegy: Davoei Zone (all in the Bakony Mts).

Wortheniopsis (Sisenna) aff. *lokutensis*

(Figure 27: A–B)

1980: *Sisenna* cf. *procera* (DESLONGCHAMPS, 1849), — SZABÓ, p. 55, pl. 1, figs 2–3

M a t e r i a l — A single specimen (HGM J.08.8.1.) from Sümeg (Bakony Mts) and another from the Hierlatz Alpe.

Measurements	H	HL	HP	D	W	AA	AL
HGM J.08.8.1.	**47	**30	**19	**33	-	55°	63°

S h a p e — Similar to that of *Wortheniopsis (Sisenna) lokutensis* n. sp., but juvenile whorls acute and angulation of whorls more distinct, keel like. Ramp feebly convex on juvenile shell, then gradually changes into feebly concave on last whorl, having rather wide concave band just above selenizone. Ramp narrower, outer face wider than in *Wortheniopsis (Sisenna) lokutensis* n. sp.

S c u l p t u r e — Whorls and base covered by delicate spiral lines, being visible only with magnification. Growth-lines of similar strength cross them. First whorls of available specimen show cancellate ornament.

R e m a r k s — The somewhat acute spire and the conspicuous, keel-like angulation of the whorls suggested affinity of the species to *Pleurotomaria faveolata* var. *procera* J. A. EUDES-DESLONGCHAMPS, 1849 drawings (SZABÓ 1980), but FISCHER & WEBER's (1997) photos display a specimen as "morphe" *procera* that is strongly different from the first figurations.

A juvenile specimen from the Hierlatz "background collection" is completely identical with the early whorl of the Sümeg shell and supports its possible new species status.

D i s t r i b u t i o n — Sümeg (Bakony Mts), Upper(?) Sinemurian; Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone.

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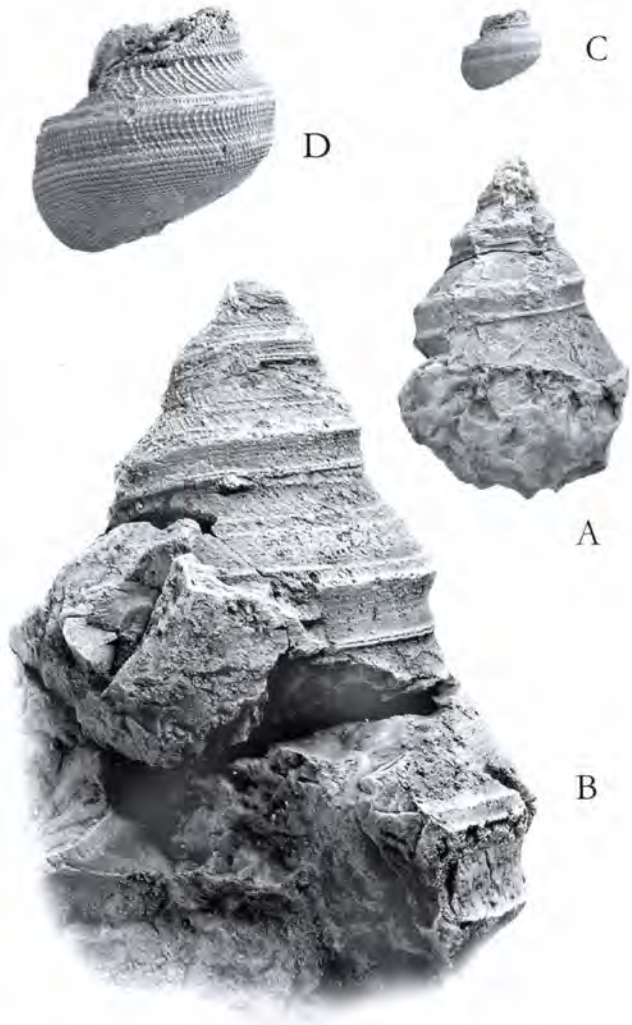

Figure 27 — *Wortheniopsis (Sisenna)* aff. *lokutensis* (A–B) and *Wortheniopsis (Sisenna)* aff. *hierlatzensis* (C–D) — **A**: best view to display the shape of the Sümeg *Wortheniopsis (Sisenna)* aff. *lokutensis* specimen (HGM J.08.8.1.), ×1; **B**: back side of the specimen with best preserved details of the ornament, ×3; **C**: the better preserved specimen (HGM J.08.9.1.) of *Wortheniopsis (Sisenna)* aff. *hierlatzensis*, ×1; **D**: magnified view of the same specimen to demonstrate details of the shape and the ornament, ×3.

Wortheniopsis (Sisenna) aff. *hierlatzensis*

(Figure 27: C–D)

1980: *Sisenna pinguis* (DESLONGCHAMPS, 1849) — SZABÓ, p. 53, pl. I: fig. 1.

M a t e r i a l — Two poorly preserved specimens (HGM); figured one (HGM J.08.9.1.).

Measurements	H	HL	HP	D	W	AA	AL
Figure 27: C–D	-	-	**5	*10	**5.5	-	-

S h a p e — Fragment of gradate shell, consisting of half whorl, being distinctly angular in spite that small size indicative of early ontogenetic stage. Ramp slightly convex below suture, but its abapical rim concave above selenizone. Selenizone itself moderately wide, concave and running between two spiral cords. Abapical cord coincides with angulation. Outer face rather wide, nearly parallel to axis and having feebly concave median portion. Its lower edge slightly swollen next rounded-angular periphery. Base convex and seemingly without(?) umbilicus. Peristome cannot be studied in available specimen.

S c u l p t u r e — Spiral and collabral threads intersect each other on shell, latter ones much weaker on base. Points of crosses bearing granules. Spiral threads (cords) most conspicuous at periphery, collabral threads (riblets) most prominent on ramp. Selenizone bears dense lunulae.

R e m a r k s — This shell fragment is most similar to *Wortheniopsis (Sisenna) hierlatzensis* n. sp. but its shells are without angulation in that growth stage where measurements are similar to that of *Wortheniopsis (Sisenna)* aff. *hierlatzensis*; the position and morphology of the selenizone and the outer face are also different.

D i s t r i b u t i o n — Lókút, Kericser (Bakony Mts): beds with mixed Obtusum to Ibex Zone fauna.

Family ? Phymatopleuridae BATTEN, 1956
Genus *Trochotomaria* CONTI & FISCHER, 1984
Type species: *Leptomaria somhegyensis* SZABÓ, 1980

Trochotomaria lobitzeri SZABÓ, 2008

(Figure 28)

pars 1861: *Pleurotomaria suessi* HÖRNES — STOLICZKA, p. 192, pl. 5, figs 1 a–b.
2008: *Trochotomaria lobitzeri* n. sp. — SZABÓ, p.173, fig. 3: 7–11.

M a t e r i a l — Single specimen without early shell parts and peristome, holotype (GBa 2008/69/45/5).

Measurements	H	HL	HP	D	W	AA	AL
holotype	-	*9.5	*6	*20	-	**78°	*91°

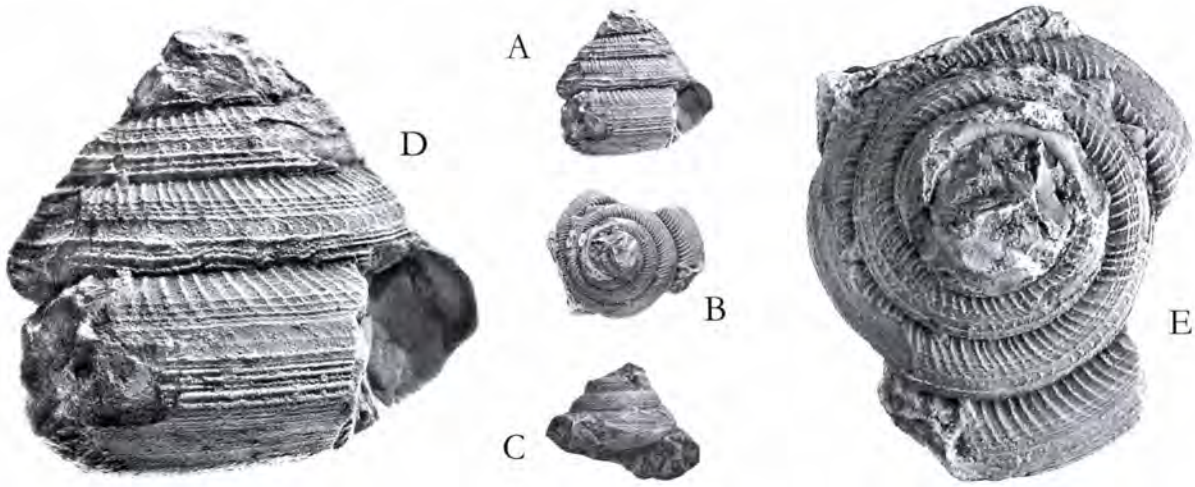

Figure 28 — *Trochotomaria lobitzeri* SZABÓ, 2008 (refiguration of the holotype). — **A–C**: "apertural" (A), apical (B) and back (C) views, ×1; **D–E**: magnified side and apical view to show details of the ornament, ×3.

S h a p e — Moderately high, feebly coeloconoidal shell with rather low, evenly arched, convex whorls, and moderately impressed suture. Selenizone rather wide (~20 % of distance between sutures) and running slightly below midwhorl; its surface feebly concave on juvenile whorls but flattened on last whorl. Periphery rounded angular, base low, convex and rather broadly phaneromphalous.

S c u l p t u r e — Collabral ornament consists of periodically repeated riblets between adapical suture and adapical edge of selenizone, and similarly spaced lunulae on selenizone itself. Lunulae gradually disappear on last whorl. No collabral ornament developed on base, disregarding delicate growth-lines. Collabral morphological elements fairly prosocline and feebly prosocyrt between adapical suture and selenizone, slightly prosocyrt between selenizone and abapical suture (or periphery); parasigmoidal growth-lines on base.

Spiral threads appear on whorls and abaxial half of base. Most prominent two threads delimit selenizone, few similar ones visible at periphery, and between selenizone and abapical suture on previous whorls. Spiral threads become thinner towards suture in belt adaxially from selenizone and gradually weaken on base, then vanish towards coiling axis.

R e m a r k s — *Trochotomaria* collects conical pleurotomarioidean shells with concave selenizone and no angulation on the outer surface of the whorls that are covered by delicate network ornament. The habit of shell of the new species well corresponds to this genus concept, however, the shape, the measurements and the details of the ornament are different from those of the type species. *Trochotomaria lobitzeri* SZABÓ, 2008 has coeloconoidal shell outline while *T. somhegyensis* has simple cone shape of 45° apical angle, but the smallest measurable coiling angle is 78° in the new species. The reticulate ornament evenly developed on the shells of the type species but different belts are on the shell of *Trochotomaria lobitzeri*. The umbilicus is much wider in *Trochotomaria lobitzeri* than in *Trochotomaria somhegyensis*.

Comparing to the species "from the same box" *Anodo-*

maria stojaspali SZABÓ, 2008, *Pleurotomaria suesii* and *P. debuchii* are somewhat similar but all have gradate shells (spiral angulation on whorls), i.e. whorl cross-section pentagonal while it is quadrangular in *Trochotomaria lobitzeri* SZABÓ, 2008. Shell shape, measurements and ornaments are also different.

D i s t r i b u t i o n — Hierlatz Alpe, Hallstatt, Sinemurian (Oxynotum Zone).

Genus *Anodomaria* SZABÓ, 1980

T y p e s p e c i e s: *Pleurotomaria scacchi* G. G., GEMMELLARO, 1874.

Anodomaria stojaspali SZABÓ, 2008

(Figure 29)

pars 1861: *Pleurotomaria suessi* HÖRNES — STOLICZKA, p. 192, pl. 5, figs. 1 a–b.
2008: *Anodomaria stojaspali* n. sp. — SZABÓ, p. 171, Fig 3: 1–6.

M a t e r i a l — Single specimen without early shell parts and peristome from *Pleurotomaria suessi* HÖRNES unit of STOLICZKA (1861) "original collection", holotype (GBa 2008/69/45/4).

Measurements:	H	HL	HP	D	W	AA	AL
holotype	**23	*12	**8.5	**23	-	**78°	*91°

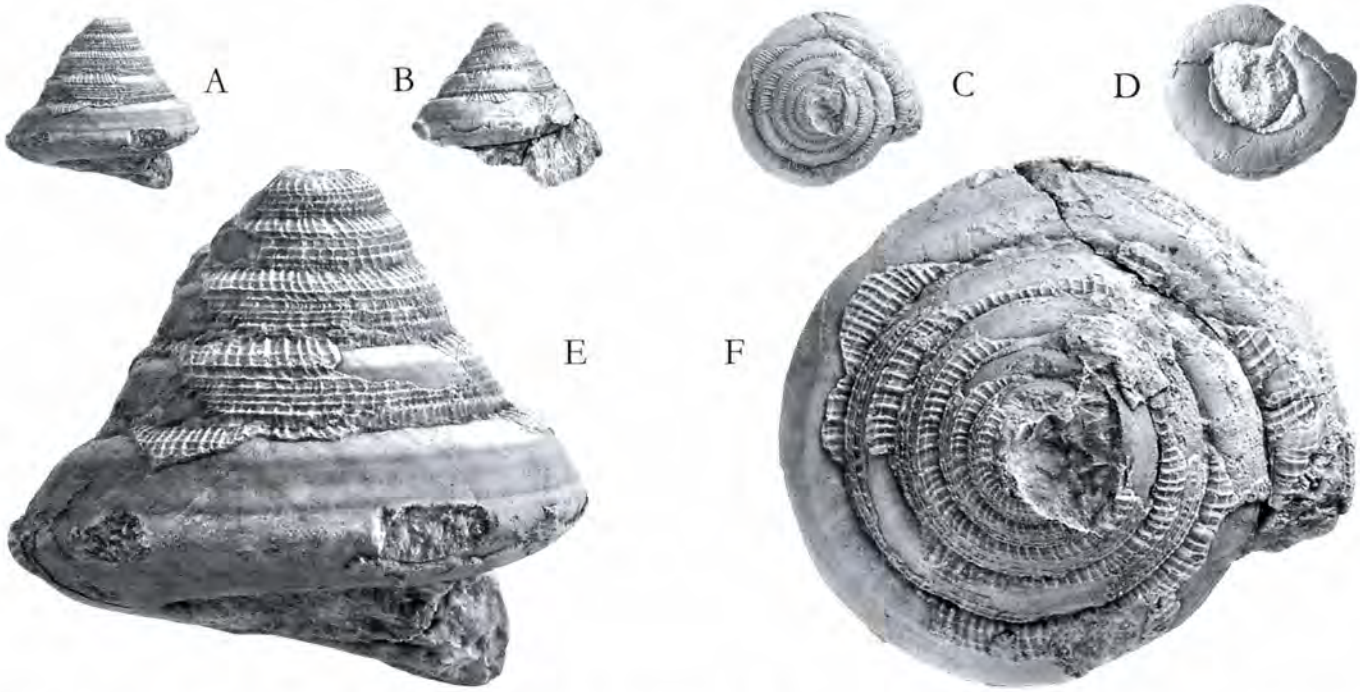

Figure 29 — *Anodomaria stojaspali* SZABÓ, 2008 (refiguration of the holotype). — **A–D**: lateral (A), "apertural" (B), apical (C) and basal (D) view in natural size; **E–F**: ×3 magnified back and apical image to display details of the ornament.

S h a p e — Conical shell of feebly concave outline, composed of rather low whorls of pentagonal cross-section. Subsutural ramp is narrow but marked, well reflected also on inner surface of shell (on inner mould). Suture canaliculate, especially on post-juvenile whorls. Selenizone running above middle of outer face; selenizone feebly concave on juvenile whorls but concavity extends also to neighbouring belts of outer face on subsequent whorls (like in the type species of the genus). Periphery rounded-angular and somewhat swollen. Base feebly convex and rather broadly phaneromphalous.

S c u l p t u r e — Whorls have network ornament of similarly strong spiral and collabral threads that extends also to selenizone and outermost narrow belt of base. Selenizone delimited by two spiral threads and third thread subdivides it on last three whorls. Crossing points of network bear small granules, being rather marked on spiral thread, coinciding with abaxial edge of ramp. Collabral threads terminate short after periphery on base but spiral threads of gradually decreasing strength visible on outer half of base. Collabral elements feebly prosocline and feebly prosocyrt both on ramp and on outer face. Lines on base sickle–shaped but parasigmoidal way as common in Pleurotomarioidea.

R e m a r k s — *Anodomaria stojaspali* has much lower whorls and wider spiral angle than *Anodomaria scacchi* (G. G. GEMMELLARO, 1874), *Anodomaria trochotomopsis* (G. G. GEMMELLARO, 1874) and *Anodomaria anodosa* SZABÓ,

1980. Beside these, the network ornament of GEMMELLARO's two species fully covers the base. *Anodomaria latigradata* JAITLY, SZABÓ & FÜRSICH, 2000 has similar spiral angle but its whorls are considerably higher, *Anodomaria depressa* JAITLY, SZABÓ & FÜRSICH, 2000 has much wider spire angle, fewer and lower whorls.

D i s t r i b u t i o n — Hierlatz Alpe, Hallstatt, Sinemurian (Oxynotum Zone).

Anodomaria anodosa (SZABÓ, 1980)

(Figure 30)

1980: *Pleurotomaria (Anodomaria) anodosa* sp. n. — SZABÓ, p. 59, Pl. 2, figs 8–9.
2003: *Anodomaria anodosa* SZABÓ, 1980 — SZABÓ in VÖRÖS et al., p. 61, pl. 5: 1.

M a t e r i a l — Three fragmentary specimens; holotype: HGM J 9597; figured juvenile shell: GBa 2008/69/49.

Measurements	H	HL	HP	D	W	AA	AL
holotype	**40	-	**14	**31	**16	**70°	**70°

S h a p e — Moderately high shell, having gradate spire with distinct spiral angulations. Ramp flattened, its abaxial border running slightly above midwhorl, and sharply angular; carina makes it more conspicuous. Outer face flattened on earlier shell parts, but feebly concave on subsequent whorls. Sharp angulation, bearing also carina, separates it from base, being slightly convex and moderately phaneromphalous. Rather wide, flat selenizone courses slightly above middle of outer face.

S c u l p t u r e — Juvenile whorls have marked network ornament with collabral elements, being more prominent than spiral ones. Post-juvenile whorls, as well as base covered only by spiral cords. Similar cords appear also on selenizone, and on carinae of angulations. Density of growth-lines changing, that may result in weak ridges, more or less periodically along upper suture. These ridges fade out rapidly away from suture.

R e m a r k s — In the studied material, *Anodomaria anodosa* most closely resembles in shape to *Worthenia superstes* SZABÓ, 1980. However, the position of the selenizone clearly distinguishes these two forms. The same feature marks out this species from all *Bathrotomaria*. With its different dimensions and dominantly longitudinal adult ornament, it is distinguishable from *Anodomaria scacchi* G. G. GEMMELLARO, 1874 and *Anodomaria trochotomopsis* G. G. GEMMELLARO, 1874 of cancellate sculpture. Some stratigraphically younger species were found also in the Kachchh (western India) Jurassic; they have different shape and rounded angulations. *Anodomaria stojaspali* SZABÓ, 2008 has lower whorls with network ornament and less prominent angulations. With its sharp and carinate angulations, *A. anodosa* remains a morphologically unique member of *Anodomaria*.

The holotype damaged in an accident of collection works (cleaning); the earliest whorls lost. In Figure 30: C–D, images of a young specimen from the Schafberg demonstrate the early shape and ornament.

D i s t r i b u t i o n — Eplény manganese ore mine (Bakony Mts): Late Pliensbachian; Schafberg, Upper Pliensbachian.

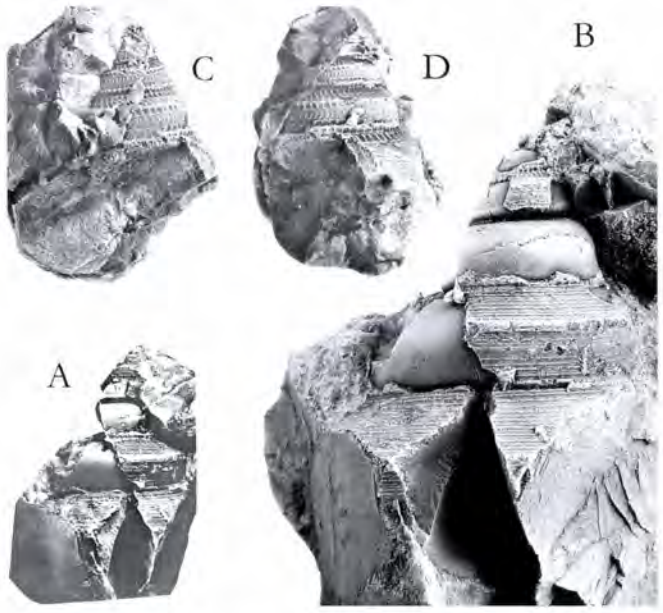

Figure 30 — *Anodomaria anodosa* SZABÓ, 1980 — **A**: copy of the original figure, showing the holotype, still having also juvenile part, ×1; **B**: holotype in present state (after an accidental damage), ×2; **C–D**: two views of a juvenile specimen from Schafberg to demonstrate the early shape and ornament; the midwhorl and peripheral keels have already appeared in early juvenile stage (roughly on the 3rd whorl); ×3.

Anodomaria scacchi (G. G. GEMMELLARO, 1874)

(Figure 31)

1874: *Pleurotomaria scacchi* GEMM. — GEMMELLARO, G. G., p. 92, pl. 12, fig. 18.
1980: *Pleurotomaria (Anodomaria) scacchi* GEMM. — SZABÓ, p. 58, pl. 2, figs 6–7.

M a t e r i a l — Two (+ one?) specimens (HGM).

Measurements	H	HL	HP	D	W	AA	AL
Figure 31: A–D	-	12.5	8.5	15.5	-	52°	52°

S h a p e — Dextral form with gradate spire. Whorl-section nearly pentagonal. Narrow ramp below suture, being bordered by rounded angulation abapically. Outer face feebly concave in it middle. Periphery rounded angular. Rather wide selenizone in deepest part of depression of outer face. Base flattened, and moderately phaneromphalous with rounded angular umbilical rim. Peristome unknown.

S c u l p t u r e — Both whorls and base covered by network of rather evenly spaced spiral and transverse cords. One of these spiral cords divides selenizone into two parts. Growth-lines extremely fine and prosocline above selenizone, prosocyrt between selenizone and periphery, and opisthocyrt on base but becoming prosocline again at umbilical rim. Continuous course of collabral sculpture elements disrupted only by selenizone, bearing lunulae of same strength as cords.

R e m a r k s — The available specimens are well identifiable with GEMMELLARO's (1874) description. Most similar species is *Anodomaria trochotomopsis* (G. G. GEMMELLARO, 1874), having wider spire angle, and different other measurements; no concavity is on its shell surface

D i s t r i b u t i o n — Western Sicily: "Terebratula Aspasia Zone" (Pliensbachian); Bakony Mts: Lókút, Kericser: Davoei to Stokesi Zones; Tés, Hamuháza: Stokesi Zone.

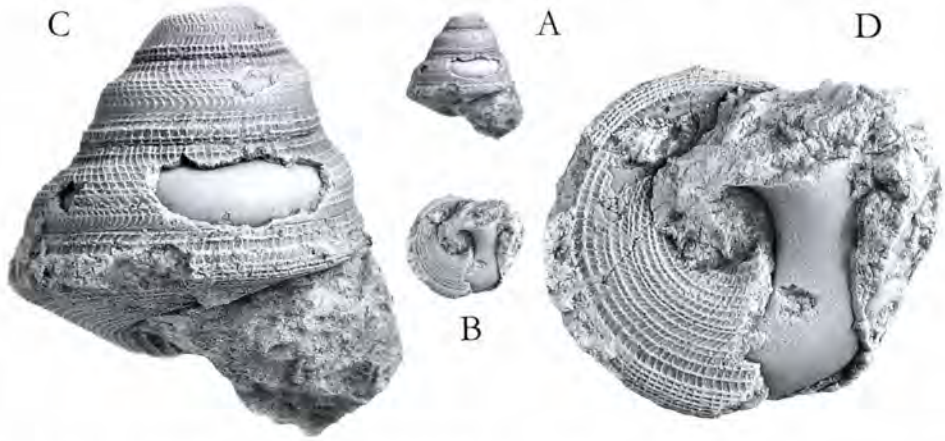

Figure 31 —*Anodomaria scacchi* (GEMMELLARO, G. G., 1874) — **A–B**: "apertural" and basal views of the best preserved specimen from Lókút, Kericser (Bakony Mts), ×1; **C–D**: magnified varieties of the same views to show the details of the sculpture, ×3.

Family Pleurotomariidae SWAINSON, 1840

Genus Pleurotomaria DEFRANCE, 1826

T y p e s p e c i e s: *Trochus anglicus* SOWERBY, 1818

Pleurotomaria eplenyensis n. sp.

(Figure 32)

1980: *Pleurotomaria (Pleurotomaria) anglica* (SOW.) — SZABÓ, p. 57, pl. 2, fig. 5.

H o l o t y p e — HGM J.08.10.1. (Figure 32: A–F).

T y p e l o c a l i t y — Eplény (Mn-ore mine), Bakony Mts.

T y p e s t r a t a — Upper Pliensbachian massive, red, micritic limestone with accumulation of shells that frequently have Fe–Mn-oxide coating, found as fissure-filling in Upper Triassic to lowermost Jurassic platform limestone (Dachstein Limestone and Kardosrét Limestone Formations).

N a m e — From the village next to the locality.

D i a g n o s i s — Medium high, gradate shell with strongly rounded angulation on whorls and at periphery; rather sparse ridges developed both at ramp angle and at periphery; juvenile ramp ridges have opisthocline-opisthocyrt shape (crossing growth-lines) and extend to upper suture; ridges confined to abaxial part of ramp on last whorl; ornament consists of spiral cords of different strength on whorls and base, growth-lines cross them and subregularly repeating collabral threads visible on ramp in subsutural belt.

M a t e r i a l — Two damaged specimens, one strongly fragmentary (HGM).

Measurements	H	HL	HP	D	W	AA	AL
holotype	**42	*30	*22	*47	-	88°	88°

S h a p e — Rather large shell with moderately high, gradate spire. Whorls having narrow, slightly convex ramp of low slope, abaxially bordered by strongly rounded (obscure) angulation. Outer face markedly oblique to axis, slightly convex, bearing flattened selenizone on its middle. Base flattened-convex, narrowly phaneromphalous. Outer lip conspicuously prosocline above selenizone. Inner lip, as rather large callus, overlaps partially base and umbilicus

(visible on fragmentary paratype). Basal rim of umbilicus widely arched.

S c u l p t u r e — Whorls, as well as base, covered by strong spiral cords, undulating at zones of nodes and ridges. Collabral ornament consists of marked growth-lines, being prosocline above selenizone, prosocyrt on outer face and opisthocyrt on base.

Ramp of juvenile shell bears characteristic opistho-cline-opisthocyrt arched ridges, crossing course of growth-lines. These shorten on subsequent whorls, and tend to restrict to abaxial ramp edge and to become parallel to growth-lines in their arrangement. Nodes at periphery weaker, denser and slightly elongate collabrally but fading out rapidly both ad- and abapically.

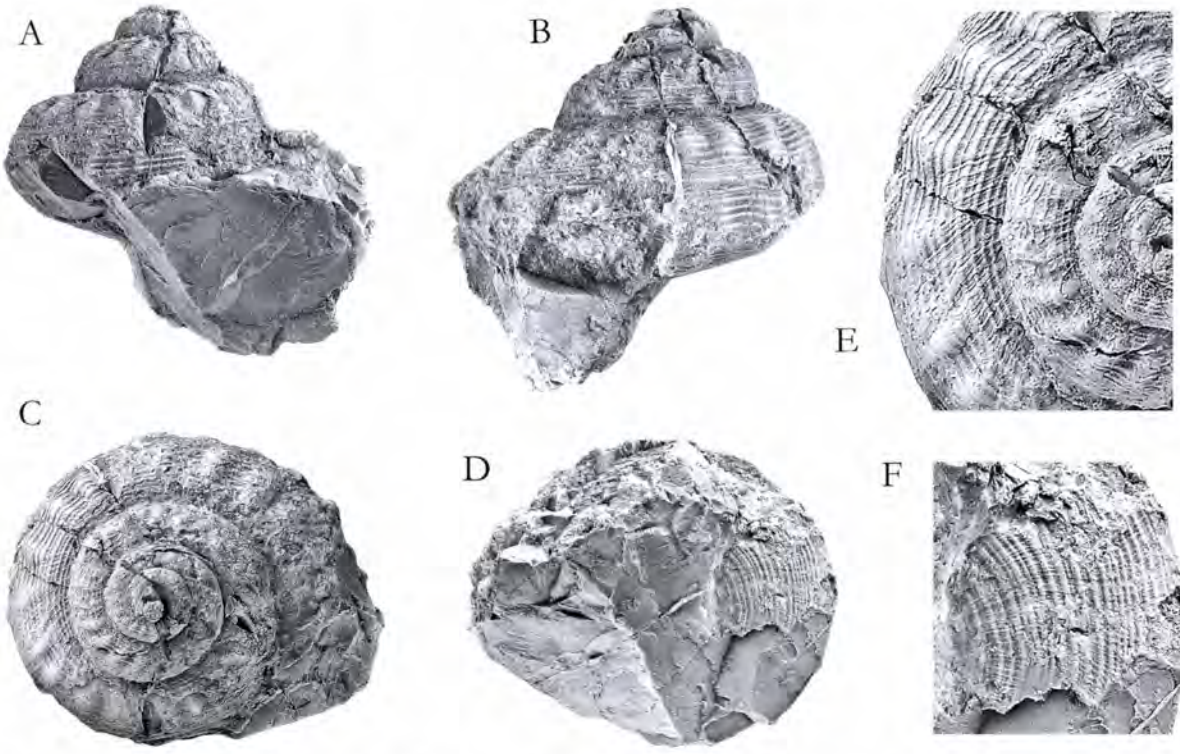

Figure 32 — *Pleurotomaria eplenyensis* n. sp., holotype. — **A–D**: "peristomal" (A), dorsal (B), apical (C) and basal (D) views, ×1; **E**: details of the ornament in apical view, ×2; **F**: basal ornament, ×2.

R e m a r k s — These specimens were identified by SZABÓ (1980) as *P. anglica*. However, rigorous morphological analysis and comparisons between specimens suggested a distinction from the true *P. anglica*. There are differences in the measurements: *Pleurotomaria eplenyensis* n. sp. has slightly lower spired shell and more rapidly expanding whorls, but the more important distinctive characters are found in the morphology of whorls and the nodosity. The whorls (abaxial edge of ramp and periphery) are rather sharply angular in *P. anglica*, but strongly rounded in *Pleurotomaria eplenyensis* n. sp. In *Pleurotomaria anglica*, the nodes are smaller, shorter, denser, not arched and collabrally elongate, furthermore, the ramp row of them are restricted to the midwhorl angulation.

The stratigraphically younger Bakony forms, as compared to *Pleurotomaria* aff. *anglica* (see below) from the Hierlatz Alpe, show bigger spire angle, diameter and whorl-height. The Hierlatz finds have fewer and stronger spiral ornamental elements than *Pleurotomaria eplenyensis* n. sp. Their shared character, differently from *Pleurotomaria anglica*, is the not collabral orientation of the ridges. These ridges are constantly straight in *Pleurotomaria* aff. *anglica* but arched in the juvenile *Pleurotomaria eplenyensis* n. sp. specimens.

The similarly shaped *Pleurotomaria escheri* MÜNSTER, 1844 has a cancellate ornament against the dominant spiral sculpture of *Pleurotomaria eplenyensis* n. sp., additionally, the nodes are sparser, just like in *Pleurotomaria armata* MÜNSTER, 1844, which has also more convex base, much wider spire angle and spirally elongate nodes.

D i s t r i b u t i o n — Bakony Mts, Eplény: Upper Pliensbachian.

Pleurotomaria aff. *eplenyensis*

(Figure 33)

2003: *Pleurotomaria* aff. *anglica* (J. SOWERBY, 1818) — SZABÓ in: VÖRÖS et al., p. 61, Pl. V: 2–3.

M a t e r i a l — Single specimen amongst STOLICZKA's (1861) originals in the NhM (1859/0019/0054), labelled as "*Trochotoma striatum* HÖRNES, 1853".

Measurements:	H	HL	HP	D	W	AA	AL
NhM 1859/0019/0054	**40	-	-	**38	-	**80°	**80°

S h a p e — Moderately high, gradate shell with convex whorls represents this species. Angulation of ramp strongly rounded. Outer face of whorls wide and slightly convex; selenizone runs on adapical half of this surface. Periphery rounded angular; base feebly convex and narrowly phaneromphalous. No peristome part preserved.

S c u l p t u r e — Single row of periodically repeated, slightly opisthocline ridges formed between upper suture and abaxial edge of ramp. Unequally sized, irregularly undulating, dense spiral cords cover the whorls. Juvenile shell part has reticulate ornament of equally strong threads but collabral ones fade away on subsequent whorls, where only growth-lines cross spiral cords.

R e m a r k s — The shape of the specimen is somewhat similar, but surely does not belong to "*Trochotoma striatum* HÖRNES, 1853" as the label in its box has suggested. This latter species has no ridges in the sculpture and has lower and less rapidly expanding whorls of different ornament. [The true, figured specimen was found in the collection of the GBa; see below as *Leptomaria striata* (HÖRNES, 1853)].

The single row of ridges on the ramp is a rather characteristic morphological element but the specific identification needs further studies. The shape resembles to that of *Pleurotomaria eplenyensis* n. sp., but it has two rows of much stronger, collabrally elongate ridges on the ramp and along the periphery, respectively.

Bathrotomaria intermedia (MÜNSTER, 1844) bears also a comparable shell with a single row of ridges on the ramp, but its spiral cords are weaker, denser and of equal size; position of the selenizone coinciding just with the angulation of the whorls that distinguishes it from *P.* aff. *eplenyensis*, having selenizone on the outer face.

D i s t r i b u t i o n — Schafberg (St. Wolfgang), Upper Pliensbachian.

Figure 33 — *Pleurotomaria* aff. *eplenyensis* — Two lateral views to show shape and ornament of the available specimen, ×1.

Pleurotomaria aff. *anglica* (SOWERBY, 1818)

(Figure 34)

aff. 1818: *Trochus anglicus* SOW. — SOWERBY, p. 195, pl. 142.
aff. 1853: *Pleurotomaria anglica* D'ORB. — D'ORBIGNY, p. 396, pl. 346.
aff. 1858: *Pleurotomaria anglica* SOW. — QUENSTEDT, p. 82, pl. 10, fig. 9.
1861: *Pleurotomaria anglica* SOW. — STOLICZKA, p. 191, pl. 4, fig. 10.
aff. 1894: *Pleurotomaria anglica* SOW. — PARONA, p. 162, pl. 6, figs 1–2.
aff. 1907: *Pleurotomaria anglica* SOW. — SIEBERER, p. 14, pl. 1, fig. 3.
aff. 1937: *Pleurotomaria anglica* Sow. — PCHELINCEV, p. 19, pl. 1, fig. 1.
aff. 1964: *Pleurotomaria anglica* (SOW.) — SACCHI VIALLI, p. 4, pl. 1, figs 2 a–c.
non 1980: *Pleurotomaria (Pleurotomaria) anglica* (SOW.) — SZABÓ, p. 57, pl. 2, fig. 5.

M a t e r i a l — Most of the available specimens are badly damaged fragments (GBa 2008/69/44/1–17)

Measurements	H	HL	HP	D	W	AA	AL
GBa 2008/69/44/1	**31	*17.5	*11	*31	*16	**73°	**73°

S h a p e — Rather large species with gradate spire. Narrow ramp of low slope, being almost horizontal, abaxially bordered by rounded angulation. Outer face slightly convex, with broad feebly convex selenizone on its middle, reinforced by strong median cord. Base convex, narrowly phaneromphalous. Outer lip rather strongly prosocline above selenizone. Inner lip, extending as rather large callus, partially overlaps base and umbilicus. Rim of umbilicus strongly rounded.

S c u l p t u r e — Whorls, as well as base, covered by sparse, strong, undulating spiral cords. Collabral ornament consists of marked growth-lines, being prosocline above selenizone, prosocyrt on outer face and opisthocyrt on base.

Lower edge of ramp bears characteristic nodes, being elongate orthocline way, i.e. crossing prosocline course of growth-lines. In post-juvenile growth stage, denser and collabrally elongate nodes develop also on periphery that fade out rapidly both ad- and abapically.

R e m a r k s — The shape of the Hierlatz Alpe speci-

mens is similar to that of *Pleurotomaria anglica*, published from the Western European localities. However, notable differences are in the sculpture; in general: the Hierlatz specimens are much more coarsely ornamented: the nodes are larger (and somewhat fewer) at the same size of shell and their swellings reach the suture, while in the true *P. anglica* specimens they are smaller and confined to the abaxial edge of the ramp; the spiral cords are about in half number on the Hierlatz specimens but with double thickness. Another important difference: the typical *P. anglica* has collabrally elongate nodes, but they cross growth lines in the Hierlatz finds (like in *Pleurotomaria eplenyensis* n. sp.).

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe: Sinemurian (Oxynotum Zone).

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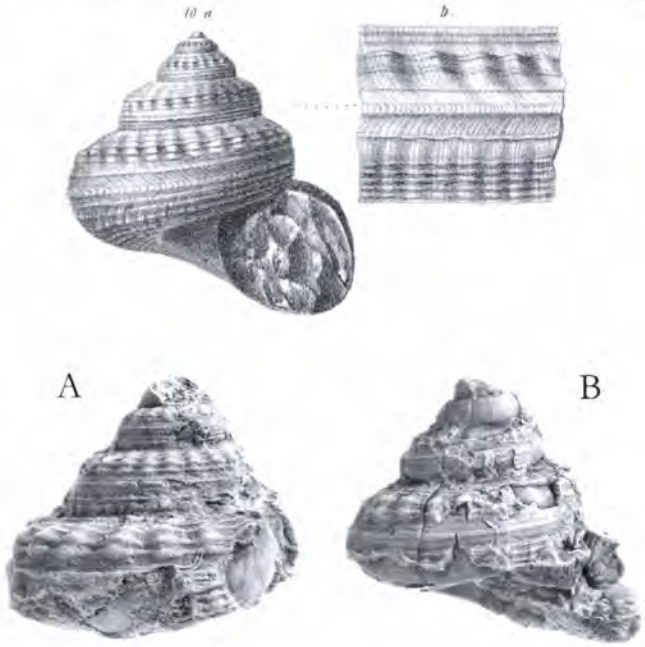

Figure 34 — *Pleurotomaria* aff. *anglica* (SOWERBY, 1818) — **10 a–b**: copy of figure, drawn as *Pleurotomaria anglica* SOW., from STOLICZKA (1861) Tafel IV; **A**: dorsal view of a specimen (GBa 2008/69/44/1), **B**: "apertural" view of another one of the best preserved four shells (GBa 2008/69/44/2), found in *P. anglica* box of STOLICZKA (1861) "originals" collection; both ×1.

Pleurotomaria deshayesii J. A. EUDES-DESLONGCHAMPS, 1849

(Figure 35)

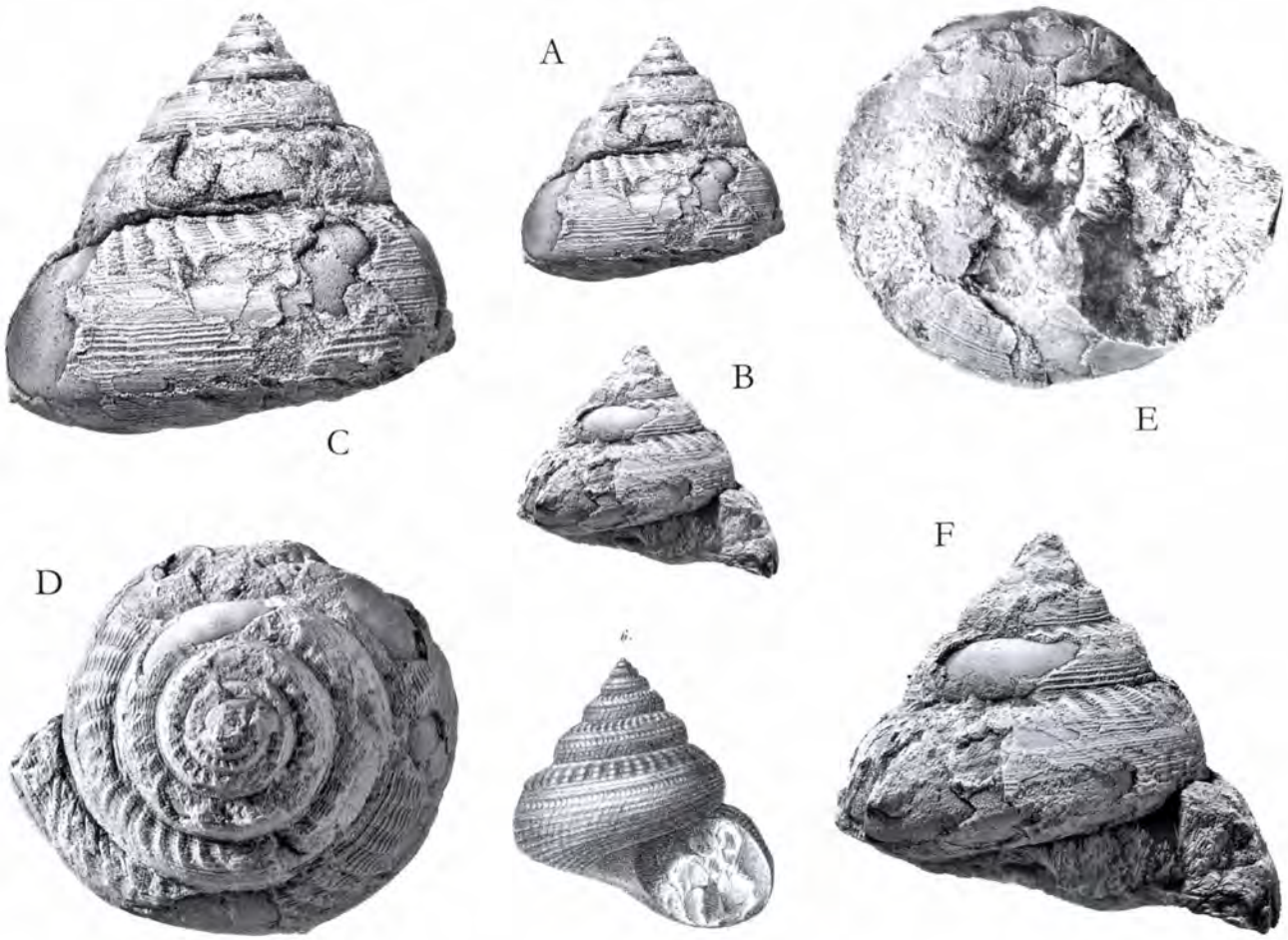

Figure 35 — *Pleurotomaria deshayesii* J. A. EUDES-DESLONGCHAMPS, 1849. The early shell morphology well corresponds to that of the typical *Pleurotomaria*. — **6**: copied figure of *Pleurotomaria intermedia* MÜNSTER from STOLICZKA (1861) Tafel IV; **A–B**: abapertural (A) and apertural (B) views of STOLICZKA's figured specimen, ×1; **C–F**: magnified dorsal (C), apical (D), apertural (F) and basal (E) views of the same specimen to demonstrate the sculpture, ×1.8.

1849: *Pleurotomaria Deshayesii* var. *subgradata* — J. A. EUDES-DESLONGCHAMPS, p. 130, pl. 9, figs 5 a–c.
cf. 1854: *Pleurotomaria Deshayesii* DESL. — D'ORBIGNY, p. 420, pl. 354, figs 1–5.
1861: *Pleurotomaria intermedia* MÜNST. — STOLICZKA, p. 188, pl. 4, fig. 6.
1997: *Perotrochus deshayesii* (J. A. EUDES-DESLONGCHAMPS, 1849) — FISCHER & WEBER, p. 161, pl. 31, figs 1–5.

M a t e r i a l — STOLICZKA's single specimen has neither apex nor peristome (GBa 2008/69/42).

Measurements	H	HL	HP	D	W	AA	AL
GBa 2008/69/42	**35	**22	**14	*37	*15	75°	65°

S h a p e — Medium sized, trochiform species with moderately convex whorls, sharply angular and distinctly gradate in juvenile stage. Angulation and ramp becomes gradually rounded and narrower. Ramp and outer face flattened on juvenile shell but gradually become rather convex towards last whorl, where practically disappears. Suture moderately impressed. Selenizone flat on juvenile shell, then feebly convex; its position slightly above middle of outer face. Periphery rounded angular, base slightly convex and rather broadly phaneromphalous.

S c u l p t u r e — Excepting selenizone, whorls and base covered by unequally spaced spiral cords, slightly variable in strength. Selenizone smooth on earliest visible whorls, but spiral threads cover it later. Other spiral threads appear mainly as interposed ones between pairs of cords on both sides of selenizone. Ramp collabrally ribbed on all preserved whorls. Ribs onset at suture and terminate at ramp angle on juvenile shell but almost reach selenizone on later whorls. Ribs have unique shape: they feebly slope abaperturally, but their frontal side steep, almost perpendicular to surface of shell.

R e m a r k s — STOLICZKA (1861) identified his find as *Pleurotomaria intermedia* MÜNSTER, 1844, however this name refers actually to a *Bathrotomaria* species because its selenizone runs just on the angulation of the whorls not on the outer face as it is well observable in the figured Hierlatz specimen.

The species nearest in shell morphology is *Pleurotomaria deshayesii* (var. *subgradata*) J. A. EUDES-DESLONGCHAMPS, 1849, the apical and last whorl spiral angles of the other varieties are usually much higher than in the Hierlatz Limestone one. Var. *tumidula* has also similar spiral angles, but its whorls are more rounded and the ornament is obscure. FISCHER & WEBER (1997) have ranged this species to *Perotrochus* but the Hierlatz find clearly shows the *Pleurotomaria* characters in juvenile stage; the ramp becomes strongly rounded only on the last whorl.

D i s t r i b u t i o n — Calvados (France), Upper Pliensbachian (Margaritatus to Spinatum Zone); Hallstatt, Hierlatz Alpe, Sinemurian (Oxynotum Zone).

Pleurotomaria suessii HÖRNES, 1853

(Figure 36)

1853: *Pleurotomaria Suessii* HÖRNES — HÖRNES, p. 762.
pars 1861: *Pleurotomaria Suessi* HÖRNES — STOLICZKA, p. 192, pl. 5, figs 1 a–b.
non 1911: *Pleurotomaria Suessi* HÖRNES — M. GEMMELLARO, p. 213, pl. 10, figs 10–12.
non 1980: *Cyclostomaria suessi* (HÖRNES) — SZABÓ, p. 64, pl. IV, fig. 4.
? 1994: *Pleurotomaria suessii* HÖRNES — CONTI & MONARI, p. 202, Fig. 2.
2008: *Pleurotomaria suessii* HÖRNES — SZABÓ, p. 169, Fig. 2: 9–13.

M a t e r i a l — Single, damaged specimen (2008/69/45/1) from the *Pleurotomaria suessii* box of STOLICZKA (1861) "originals collection" without earliest shell parts and peristome; most probably it is a syntype to HÖRNES's description, selected as lectotype by SZABÓ (2008).

Measurements:	H	HL	HP	D	W	AA	AL
lectotype	**18	*12.6	*9	*32	*11	*105°	*110°

S h a p e — Flattened coeloconoidal shell of gradate outline with broadly phaneromphalous, rather strongly convex base. Whorls bear moderately wide ramp and broader outer face with nearly median selenizone, being concave along full length of preserved shell. Periphery rounded-angular. Umbilicus has also gradate interior.

S c u l p t u r e — Subregularly repeating dense riblets ornament ramp on all preserved whorls. Riblets reach adapical edge of selenizone on spire whorls but fade away at ramp angle on last whorl. Beside riblets, only fine growth-lines cross spiral ornament. Dense, thin spiral threads cover whorls and outermost, narrow belt of base. Stronger threads develop at edge of ramp (single), on both edges of selenizone and some on abapical part of outer face. Obscure spiral lines of irregular interspaces appear also on other parts of base. Neither spiral lines nor regular lunulae appear on selenizone.

R e m a r k s — The measurements and the other morphological details of the available specimen well correlate to the first description of *P. suessii* that seems to speak about a single specimen but notices about further specimens are also found. It is rather conceivable that HÖRNES (1853) has based the description of the species on this single specimen. However, it is impossible to reconstruct if the other specimens in the box really belonged to the syntypes or STOLICZKA added them to the single *P. suessii*.

P. suessii resembles "morphe *exertiuscula*" (FISCHER & WEBER 1997) of *P. debuchii* J. A. EUDES-DESLONGCHAMPS,

1849 mainly owing to the comparably ribbed ramps. However, the construction and rate of expansion of the whorls, reflected also in the measurements, are different. A prominent difference is the strongly impressed suture on *P. debuchii* specimens; i.e. the ramp slopes outward (abaxially–abapically) in *P. suessii* but in *P. debuchii*, it slopes also inward (adaxially–abapically) along the suture.

CONTI & MONARI (1994) published a gastropod specimen of 10 mm diameter from the Umbrian Apennines (Italy) as *P. suessii* that should be identifiable with the juvenile part of the lectotype. However, the Umbrian specimen has much wider spiral angle, and ornament of several weak spiral lines while the lectotype markedly ornamented both spirally and collabrally.

D i s t r i b u t i o n — Doubtlessly found only in Hallstatt, Hierlatz Alpe; Sinemurian (Oxynotum Zone).

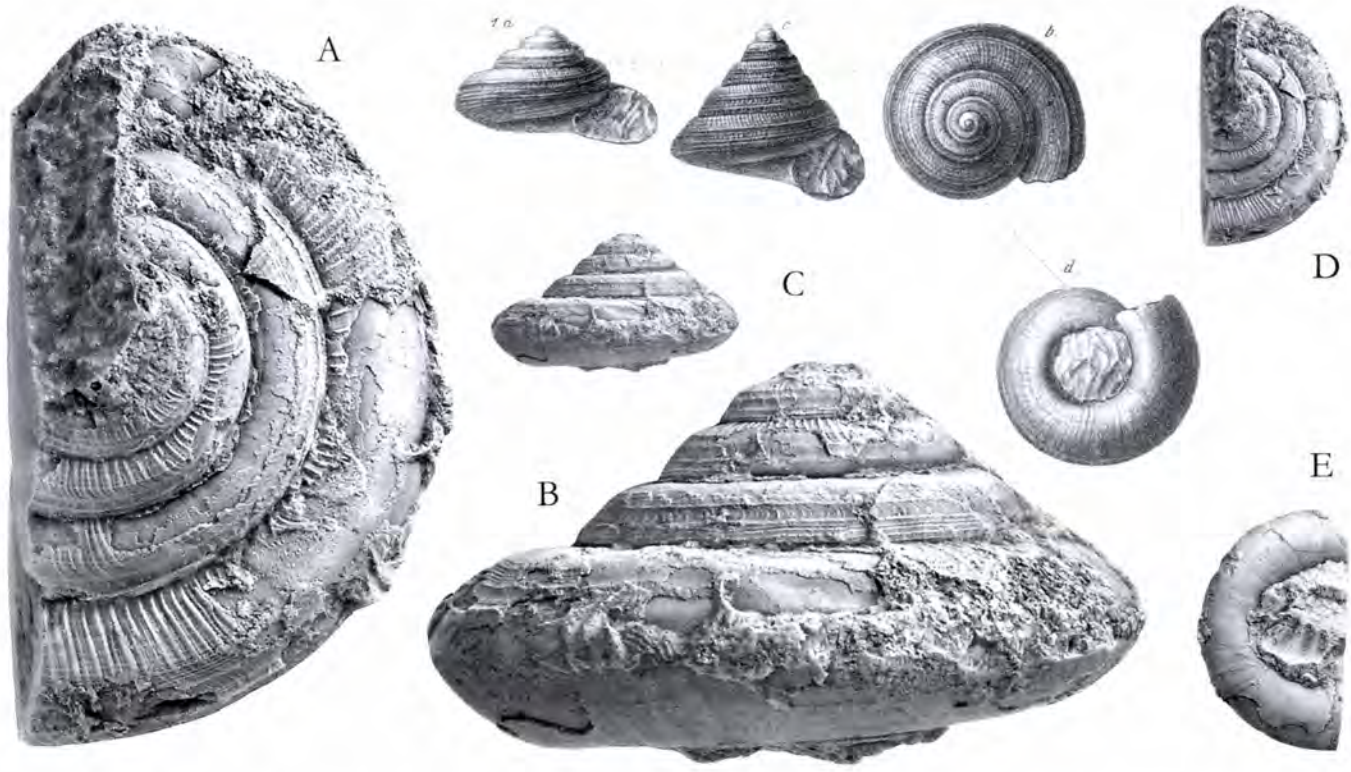

Figure 36 — Lectotype of *Pleurotomaria suessii* HÖRNES, 1853. — **1 a–d**: copy of the original figures, illustrating *Pleurotomaria suessii* from STOLICZKA (1861) Tafel V that were drawn on the basis of five specimens which belong to three genera and four species (see also *Pleurotomaria debuchii*, *Anodomaria stojaspali* and *Trochotomaria lobitzeri*); **A–E**: copy of figures from original designation of the lectotype (SZABÓ 2008, Figure 2: 9–12); **A–B**: magnified apical and side view, ×3; **C–E**: side (C), apical (D) and basal (E) view, ×1.

Pleurotomaria debuchii J. A. EUDES-DESLONGCHAMPS, 1849

(Figures 37, 38)

1849: *Pleurotomaria Debuchii* DESL. — J. A. EUDES-DESLONGCHAMPS, pp. 92–94, pl. 15, figs 8–10 , pl. 16, fig 1, pl. 17 fig 5.
1853: *Pleurotomaria Buchii* DESLONGCHAMPS — HÖRNES, p 762.
1854: *Pleurotomaria Mopsa* D'ORBIGNY — D'ORBIGNY, p. 421. pl. 354, figs 6–10.
1854: *Pleurotomaria platyspira* D'ORBIGNY — D'ORBIGNY, p. 423, pl. 355, figs 1–4.
1861: *Pleurotomaria Buchi* DESLONGCHAMPS — STOLICZKA, p. 188, pl. 4, figs 4–5.
pars 1861: *Pleurotomaria Suessi* HÖRNES — STOLICZKA, p. 192, pl. 5, figs 1 a–b.
1980: *Pleurotomaria* cf. *platyspira* DESLONGCHAMPS, 1849 — SZABÓ, p. 57, pl. 2, fig. 10.
1997: *Pleurotomaria (Talantodiscus) debuchii* J. A. EUDES-DESLONGCHAMPS, 1849 — FISCHER & WEBER, p. 162, pl. 29, figs 2–6.
2008: *Pleurotomaria debuchii* J. A. EUDES-DESLONGCHAMPS — SCHUBERT, GRÜNDEL & NÜTZEL, p. 18, fig. 2: I–N.
2008: *Pleurotomaria debuchii* J. A. EUDES-DESLONGCHAMPS, 1849 — SZABÓ, p. 171, fig. 2: 1–8.

M a t e r i a l — *Pleurotomaria debuchii* were stored in the collection of STOLICZKA's (1861) figured specimens either as "*P. Buchi*" (GBa 2008/69/41/1–2), but two further specimens (GBa 2008/69/45/2–3) were found in the *P. suessii* box and 12 ones (GBa 2008/69/41/3–14) in the background material.

Measurements	H	HL	HP	D	W	AA	AL
GBa 2008/69/41/1	*8.5	*6.5	*5.5	*15.5	*6.5	123°	123°
GBa 2008/69/41/2	*13	*8.5	**6.5	*15	**7.5	-	81°
GBa 2008/69/45/2	-	-	-	**27	-	*88°	115°
GBa 2008/69/45/3	-	-	-	*24	-	-	123°

S h a p e — Shells with medium high to depressed gradate spire, composed of convex whorls with deeply impressed suture. Whorls have narrow to moderately wide ramp, abaxially delimited by rounded angulation. Ramp distinctly convex on higher spired but flat on depressed forms, respectively. Outline of axial whorl section rounded pentagonal. Selenizone situated at midwhorl, close to angulation, delimiting ramp on depressed forms but in lower position on higher spired forms. Selenizone concave on depressed forms but flush or feebly convex on higher spired forms. Outer face wide, distinctly convex, unlike that of typical *Pleurotomaria* species. Base moderately convex and broadly phaneromphalous. Rim of umbilicus strongly rounded.

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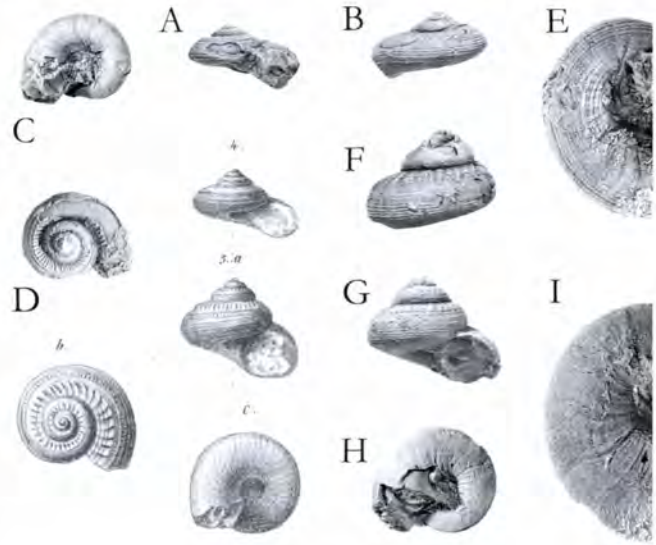

Figure 37 — *Pleurotomaria debuchii* J. A. EUDES-DESLONGCHAMPS, 1849 from the *P. Buchi* box of STOLICZKA's (1861) "originals collection". — **3 a–c, 4**: copy of STOLICZKA's (1861) "*Pleurotomaria Buchi*" drawings from Tafel IV; **A–E**: photos of the specimen (2008/69/41/1) in drawing 4, "apertural" (A), dorsal (B), basal (C), apical (D) and magnified basal (E) views (A–D = ×1, E = ×2), **F–I**: photos of the specimen (2008/69/41/2) in drawing 3 a–c, "apertural" (G), dorsal (F), basal (H) and magnified basal (I) views (F–H = ×1, I = ×2); **E, I**: an example to demonstrate the variability of the ornament; spiral lineation present or totally absent.

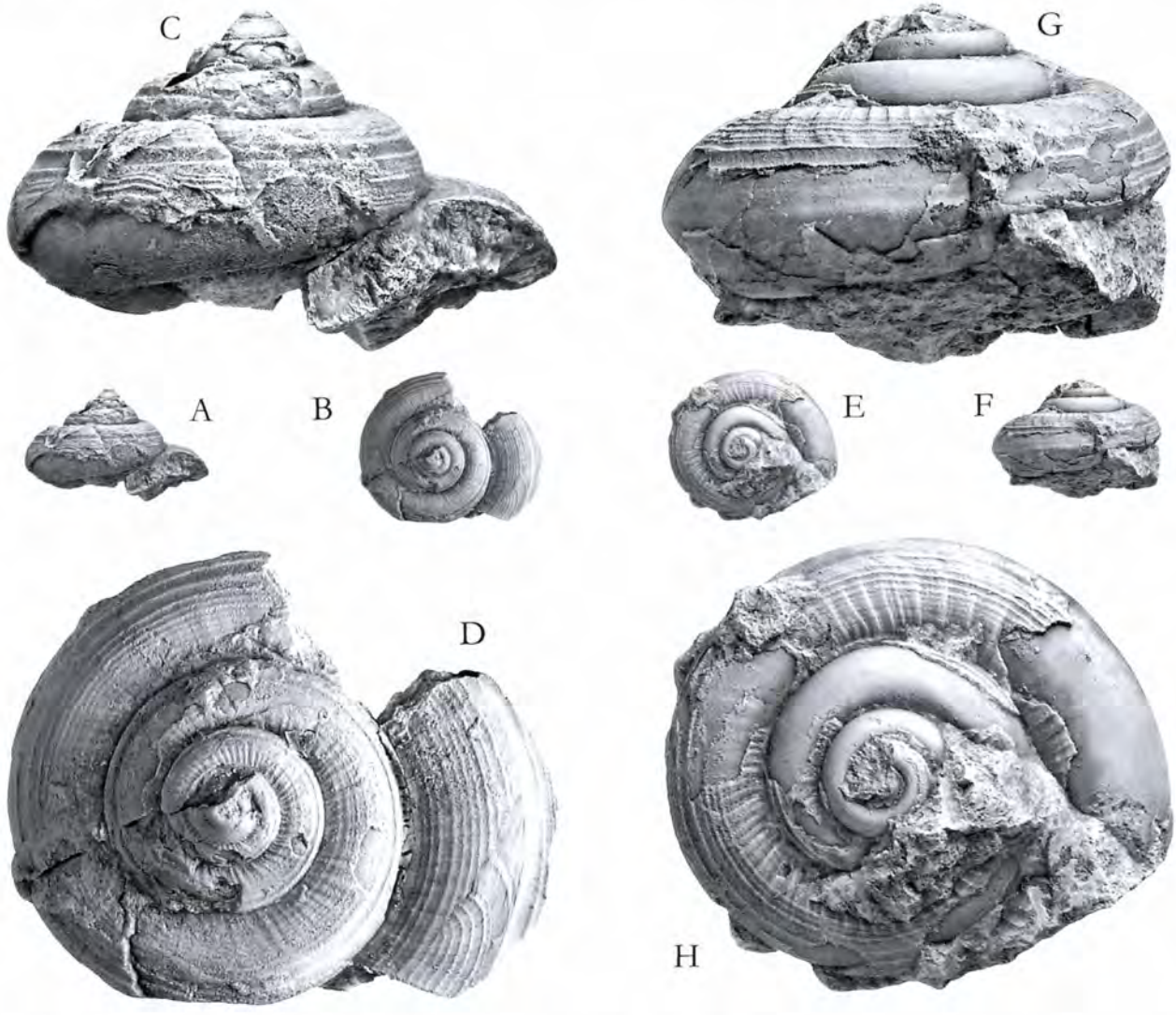

Figure 38 — *Pleurotomaria debuchii* J. A. EUDES-DESLONGCHAMPS, 1849 — Refiguration of the specimens GBa 2008/69/45/2 (**A–D**) and GBa 2008/69/45/3 (**E–H**), found in the box of *Pleurotomaria suessii* HÖRNES, 1853, for further demonstration to variability of *Pleurotomaria debuchii* (elements of figure from SZABÓ 2008); apical (B, D, E, H), "apertural" (A, C) and dorsal (F, G) views; A–B, E–F = ×1; C–D, G–H = ×3.

S c u l p t u r e — Whorls ornamented with spiral cords, crossed by club-shaped, more or less periodically repeating ribs from upper suture to angulation of whorls where suddenly terminating with thickest part. Secondary riblets also appear on some specimens. Collabral ornament of threads and cords sometimes produce network with spiral cords. Ridges or riblets may be irregularly present also around umbilicus.

R e m a r k s — J. A. EUDES-DESLONGCHAMPS (1849) established *P. debuchii* as having four varieties of discoidal to medium high trochospiral forms. D'ORBIGNY (1854) applied new species names instead of varieties, *P. Mopsa* D'ORBIGNY for "*oxyspira*" and "*exertiuscula*" (higher trochospiral forms), and *P. platyspira* D'ORBIGNY for var. "*platyspira*" and "*cingulifera*" (almost planispiral forms). STOLICZKA (1861) applied the name "*P. Buchi*" DESL. for some shells (Figure 37), two specimens (Figure 38) were also found in the box labelled as "*P. Suessi* HÖRNES, 1853" (SZABÓ 2008). Further specimens of high morphological variability, but in bad state of preservation, are found also in the "background" collection; some specimens considerably differ from the published "varieties".

SZABÓ (1980) identified three specimens as *Pleurotomaria* cf. *platyspira* DESLONGCHAMPS, 1849, belonging to a single morphotype.

Recently FISCHER & WEBER (1997) revised D'ORBIGNY's originals; they practically renewed J. A. EUDES-DESLONGCHAMPS's species interpretation. Their *Pleurotomaria (Talantodiscus) debuchii* is a single but extremely variable species with "morphes" instead of EUDES-DESLONGCHAMPS's (1849) varieties. Spire height of this species varies from the almost plane (170°) to rather high (85°). At the same time, without explanations, they suggested subgenus status to *Talantodiscus* P. FISCHER, 1885 within *Pleurotomaria*. This suggestion might be acceptable, but problematic with the extremely variable species concept of *P. (T.) debuchii*. Namely, by this species interpretation, two (sub)generic diagnosis would refer to the same species because the trochospiral forms rather well fit to the diagnosis of *Pleurotomaria* but *Talantodiscus* would be applicable for the depressed, almost discoidal "morphes". In realty the taxonomical problem is similar to that of the "*foveolata*" species-group: is "*debuchii*" a single but extremely variable species or more than one species, unsatisfactorily documented in the fossil record therefore unreliably distinguished? In their case, the available documentation is much worse than in the "*foveolata*" species-group therefore formation of an opinion remains pending.

D i s t r i b u t i o n — Hierlatz Alpe, Sinemurian (Oxynotum Zone); Sümeg (Bakony Mts), Upper(?) Sinemurian; Calvados, (France),Pliensbachian (Margaritatus to Spinatum Zones); Herford (NW Germany), Upper Pliensbachian

? *Pleurotomaria princeps* (KOCH, 1837)

(Figure 39: G–H, K)

?	1837: *Trochus princeps* KOCH — in: KOCH & DUNKER, p. 26, pl. 1, fig. 18.
?pars	1853: *Pleurotomaria principalis* MÜNSTER — HÖRNES, p. 761.
pars	1861: *Pleurotomaria princeps* KOCH & DUNKER — STOLICZKA, p. 189, pl. 4, figs 7 c, 9.
cf.	1997: *Pyrgotrochus princeps* (KOCH, 1837) — FISCHER & WEBER, pp. 156, 160, pl. 34: 10 a–b, 11 a–b.

M a t e r i a l — GBa 2008/69/43/1/1–11

Measurements	H	HL	HP	D	W	AA	AL
GBa 2008/69/43/1/1	-	16	*9	*27	-	-	*53°
GBa 2008/69/43/1/2	-	**9.5	**6	**13	-	52°	57°

S h a p e — Moderately high conical shell of rather low whorls, separated by impressed-canaliculate suture. Early whorls have cyrtoconoidal outline. Narrow ramp appear on third whorls after nucleus, that remains present on all subsequent whorls but nodes on its abapical edge may make it obscure. Periphery rounded and swollen, corrugated by another row of strong nodes. Outer face oblique and concave with selenizone in its middle line; selenizone itself feebly concave in early juvenile stage then gradually changing into flat, and median thread appears on it, becoming keel-like on last whorls. Base flat or concave and broadly phaneromphalous; peristome not preserved in available material.

S c u l p t u r e — Beside mentioned prominent rows of nodes and keel on selenizone, spiral treads cover whorls and base. On juvenile shell collabral ornament also marked (reticulate sculpture) but on subsequent whorls, it becomes subordinate, only fine growth-lines visible. Both rows of nodes collabrally elongate, sharp and rib-like on juvenile shell but rounded on last whorls.

R e m a r k s — *Trochus princeps* is an early recognised species. Subsequent authors sometimes forced identification of their specimens with it, therefore its interpretation extended that appears unjustified in some cases. Until a comparison of the Hierlatz finds to type specimen(s), the question mark seems justified before the name.

The specimens in STOLICZKA (1861) collection surely do not belong to a single species, nor to the same genus, and, regarding the unique, non-pleurotomariid early shell morphology in *Pyrgotrochus*? cf. *precatoria* (J. A. EUDES-DESLONGCHAMPS, 1849) (see below), they may belong also to different families.

Because the shells, identified under the name ? *P. princeps* (KOCH, 1837), has a narrow subsutural ramp on full length of the shells and a selenizone in mid-whorl position, the correct genus name is most probably *Pleurotomaria*; in this case, the shell form is somewhat homeomorphic to that of *Pyrgotrochus* P. FISCHER, 1885.

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Sinemurian (Oxynotum Zone).

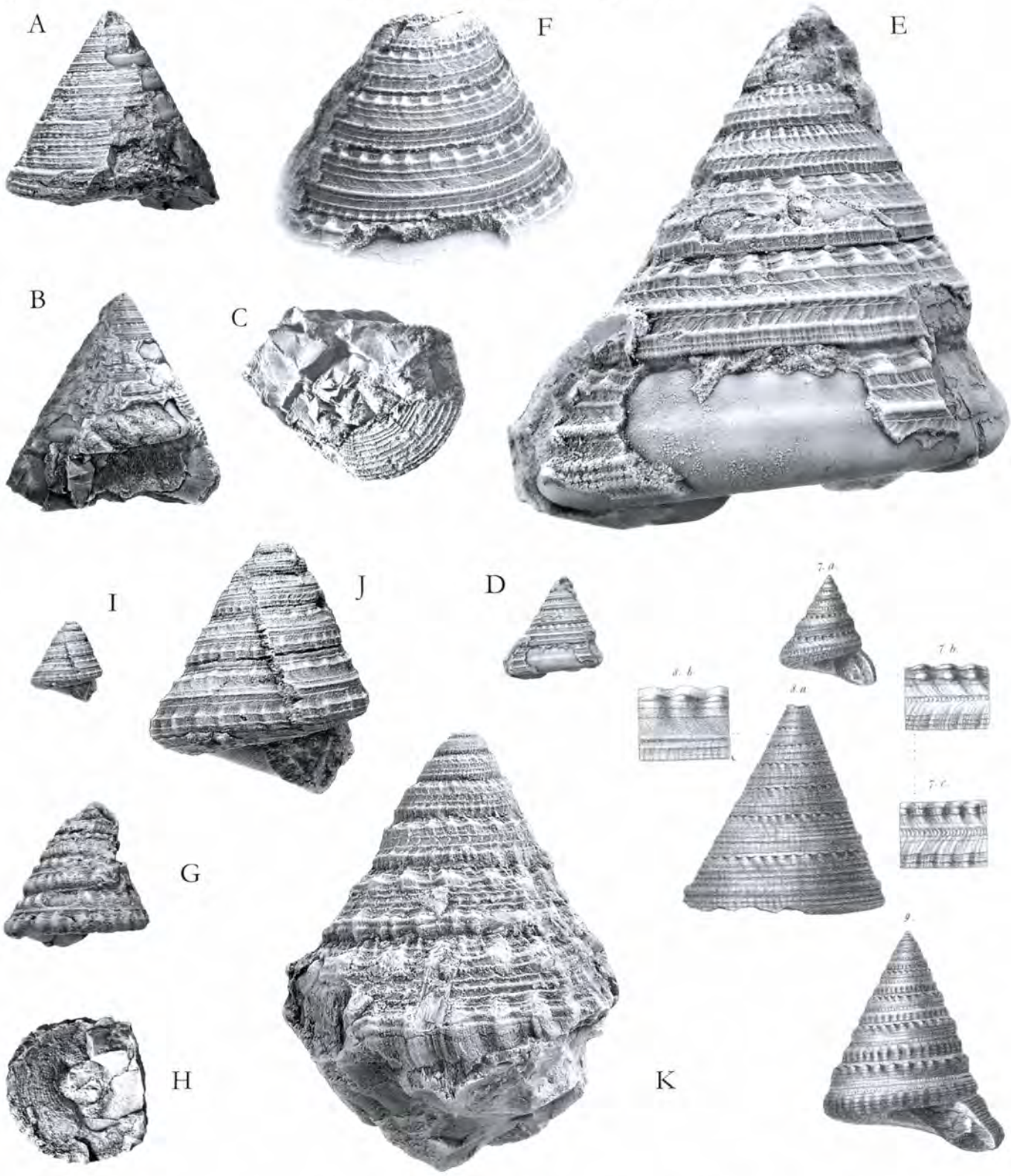

Figure 39 — ? *Pleurotomaria princeps* KOCH, 1837 (G–H, K), *Pleurotomaria* sp. (I–J) and *Pyrgotrochus*? cf. *precatoria* (J. A. EUDES-DESLONGCHAMPS, 1849) (A–F), the three distinguishable species in STOLICZKA (1861) "originals collection" from the *Pleurotomaria princeps* KOCH & DUNKER inventory unit. — **7 a–c, 8 a–b, 9**: STOLICZKA's (1861) figures, copied from Tafel IV; **A–C, F**: the specimen in STOLICZKA's 8 a–b figures (revised name: *Pyrgotrochus*? cf. *precatoria*) (GBa 2008/69/43/2/1); two different lateral views (A–B) and basal view (C), ×1; F = feebly oblique view of the earliest whorls of the specimen in figures A–C to display the unique, granulate early selenizone morphology, ×3; **D–E**: refiguration of the specimen in STOLICZKA's Tafel IV, 7 a–b figures (GBa 2008/69/43/2/2) to display the early ornament of *Pyrgotrochus*? cf. *precatoria* (compare to F) that is different from the pleurotomariid ones (compare also to I, J and K), ×1 (D) and ×5 (F); **G–H**: the specimen (GBa 2008/69/43/1/1) figured in STOLICZKA's Tafel IV, 9 (revised name: ? *Pleurotomaria princeps* KOCH, 1837); lateral (G) and basal (H) views, ×1; **I–J**: the specimen, being model to STOLICZKA's Tafel IV, 7 c figure (GBa 2008/69/43/3/1, revised name: *Pleurotomaria* sp., it does not match morphologically to the figured adult shells); ×1 (I) and ×3 (J); **K**: figure of a specimen from the "background" collection (GBa 2008/69/43/1/2), a pleurotomariid juvenile shell that morphologically well fits to the adult one in figures G–H (? *Pleurotomaria princeps* KOCH, 1837).

Genus ? *Pyrgotrochus* P. FISCHER, 1885

Type species: *Pleurotomaria bitorquata* J. A. EUDES-DESLONGCHAMPS, 1849

Pyrgotrochus? cf. *precatoria* (J. A. EUDES-DESLONGCHAMPS, 1849)

(Figure 39: A–F)

?pars 1853: *Pleurotomaria principalis* MÜNSTER — HÖRNES, p. 761.
pars 1861: *Pleurotomaria princeps* KOCH & DUNKER — STOLICZKA, p. 189, pl. 4, figs 7 a–b, 8.
cf. 1997: *Pyrgotrochus princeps* (KOCH, 1837) — FISCHER & WEBER, pp. 156, 160, pl. 34: 10 a–b, 11 a–b.

Material — GBa 2008/69/43/2/1–30 specimens, most of them are very poorly preserved fragment.

Measurements	H	HL	HP	D	W	AA	AL
GBa 2008/69/43/2/1	**37	**22	**13	-	-	*55°	60°
GBa 2008/69/43/2/2	*20	*9	*5.5	*8	*8	-56	*60°

Shape — Rather widely conical(-trochiform) shell with broad, concave, moderately phaneromphalous base, having slightly convex outer belt. Apex feebly acute, and last whorl slightly more expanding than penultimate one. Whorls flattened but having feebly sigmoidal surface. Selenizone courses somewhat below mid-whorl on juvenile shell but gradually shifting near to periphery during growth. Periphery itself rather sharp.

Sculpture — Shell ornamented with spiral cords, growth-lines and two rows of nodulae above and below suture, respectively. Third row of tubercles/granules visible on early juvenile selenizone; with their disappearance, selenizone becomes continuous cord, being strongest spiral sculpture element along full length of shell. Subsutural row of nodulae present already on earliest known whorl but suprasutural ones develop only in post-juvenile stage. These latter rows of nodes remain weak, observable mainly as undulation of spiral cords. Subsutural nodulae gradually extend as low ridges to selenizone on last three whorls. Base covered by widely spaced spiral cords.

Remarks — The granulate ornament of the selenizone on the juvenile whorl is an unusual feature in the Pleurotomariidae. Its taxonomical meaning has to be further studied, but it surely distinguishes these shells from those that have typical pleurotomariid juvenile selenizone. This character excludes the possibility to treat *Pyrgotrochus*? cf. *precatoria* (J. A. EUDES-DESLONGCHAMPS, 1849) and ? *Pleurotomaria princeps* (KOCH, 1837) as a single species.

Distribution — Hallstatt, Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone).

Genus *Laevitomaria* CONTI & SZABÓ, 1987

Type species: *Pyrgotrochus? problematicus* SZABÓ, 1980

Laevitomaria coarctata (STOLICZKA, 1861)

(Figure 40)

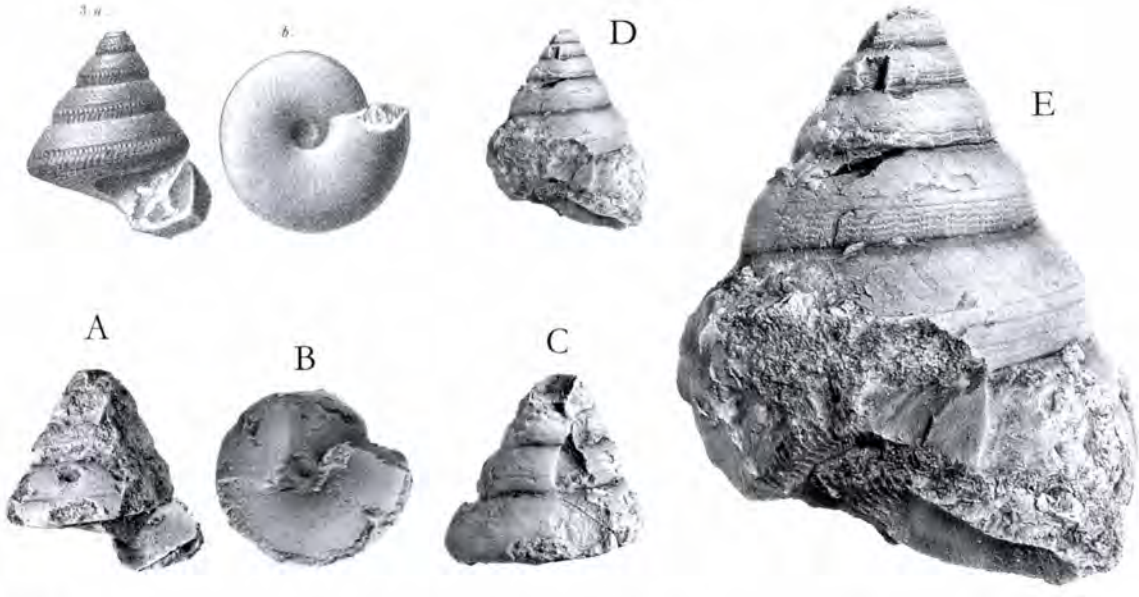

Figure 40 — *Laevitomaria coarctata* (STOLICZKA, 1861) — **3 a–b**: copy of *Pleurotomaria coarctata* STOL. figures from STOLICZKA (1861) Tafel IV; **A–C**: lectotype in "apertural" (A), basal (B) and abapertural (C) views, ×1; **D–E**: paralectotype ×1 (D), and in ×2.5 (E) magnification to display the ornament.

1861: *Pleurotomaria coarctata* STOL. — STOLICZKA, p.188, pl. 4, fig. 3.
? 1937: *Pleurotomaria coarctata* STOLICZKA — PCHELINCEV, p. 22, pl. 1, fig. 24.
2003: *Laevitomaria coarctata* (STOLICZKA, 1861) — SZABÓ in: VÖRÖS et al., p. 61, Pl. V: 4–7.

L e c t o t y p e — NhM 1861/0034/0029 (1) in Figure 40: A–C (selected here); paralectotype: NhM 1861/0034/0029 (2) in Figure 40: D–E.

M a t e r i a l — Two specimens from the Schafberg, that belong to STOLICZKA (1861) syntypes, saved in the NhM collection.

Measurements	H	HL	HP	D	W	AA	AL
1861/0034/0029 (1)	-	*15.8	*9.2	*25.7	**12.4	-	56°
1861/0034/0029 (2)	*27	*15	*9.5	*22.5	**12.5	70°	57°

S h a p e — Extremely thin-walled, conical shells with low, moderately convex (subangulate) whorls, separated by impressed suture; apex blunt (cyrtoconoidal). Flat selenizone runs between two striae at top of convexity on whorls. Rather wide, flat outer face accompanies selenizone. Periphery rounded angular. Base flattened and narrowly phaneromphalous.

S c u l p t u r e — Ornament consists of delicate growth-lines, some obscure spiral lines and spiral striae on whorls between selenizone and upper suture. Network of faint spiral and collabral lines visible on outer face of whorls. Base not ornamented, except fine growth-lines.

R e m a r k s — PCHELINCEV (1937) identified *Pleurotomaria coarctata* STOL. from the Crimean Liassic, however, its figure shows pagodifom outline, the periphery coincides with the selenizone, therefore most probably not conspecific with the Schafberg finds.

D i s t r i b u t i o n — Schafberg, (St. Wolfgang, Austria) fissure-filling Hierlatz Limestone (s. l.) with Fe-Mn-oxide coating on fossils (Upper Pliensbachian).

Laevitomaria periferialis (SZABÓ, 1980)

(Figure 41)

1980: *Pyrgotrochus periferialis* sp. n. — SZABÓ, p. 62, pl. 3, fig. 6.
1987: *Laevitomaria periferialis* SZABÓ — CONTI & SZABÓ, p. 46.

M a t e r i a l — Seventeen shelly, but more or less fragmentary specimens (HGM).

Measurements	H	HL	HP	D	W	AA	AL
HGM J 9599	*28	*18.5	*10	*24	*11	43°	43°

S h a p e — Conical shell, consisting of feebly convex whorls of tetragonal cross-section. Broad, slightly convex selenizone courses somewhat below middle of whorls. Base slightly convex and moderately phaneromphalous. Peristome not preserved in available material.

S c u l p t u r e — Whorls as well as base ornamented with spiral lines. Collabral sculpture composed of growth-lines and riblets along sutures (and periphery). Sometimes elongated nodulae replace riblets. Corresponding elements of these nodes distinct, sharp costellae on juvenile whorls.

R e m a r k s — Originally SZABÓ (1980) ranged this species to *Pyrgotrochus* P. FISCHER, 1885 with expressing the differences from the typical forms of the genus. To unite the similarly shaped species that remained out of the genus definitions of Pleurotomariidae, CONTI & SZABÓ (1987) established a new genus, *Laevitomaria*.

D i s t r i b u t i o n — Lókút, Kericser (Bakony Mts), beds with mixed Obtusum to Ibex Zone fauna and Davoei Zone (Upper Sinemurian to Upper Pliensbachian); Tés, Hamuháza (Bakony Mts): Davoei Zone (Lower Pliensbachian.

⇒

Figure 41 — *Laevitomaria periferialis* (SZABÓ, 1980); refiguration of the holotype (HGM, J 9599). — **A**: "apertural" view, ×1; **B**: slightly oblique lateral view to display the sculpture, ×2.

Laevitomaria hierlatzensis (HÖRNES, 1853)

(Figure 42)

1853: *Pleurotomaria Hierlatzensis* HÖRNES — HÖRNES, p. 762.
1861: *Pleurotomaria Hierlatzensis* HORN. — STOLICZKA, p. 187, pl. 4, fig. 2.
1937: *Pleurotomaria* aff. *hierlatzensis* HÖRNES — PCHELINCEV, p. 22 , pl. 5: 6.

L e c t o t y p e — GBa 2008/69/40/1 (selected here).
M a t e r i a l — GBa 2008/69/40/1–35 specimens, none of them is undamaged.

Measurements	H	HL	HP	D	W	AA	AL
lectotype	*9.5	*8.5	*5	**11	**7	80°	52°

S h a p e — Small, conical shell with cyrtoconoidal earliest whorls and blunt apex. Whorls feebly convex and separated by slightly canaliculate suture. Selenizone flush, wide (one quarter of distance between nearest sutures) and running at midwhorl on juvenile shell but shifting slightly toward periphery on subsequent whorls. Periphery rounded angular and feebly swollen. Base low, flattened and narrowly phaneromphalous (probably cryptomphalous in adult stage). Rim of umbilicus rounded angular. Outer lip not preserved between periphery and suture but collabral ornament suggests it rather prosocline and slightly prosocyrt above slit. Basal lip strongly prosocyrt except short outer part where opisthocyrt. Parietal lip present as thin inducture, columellar (umbilical) lip considerably thickened and bearing a few (4-5) spiral threads terminating before outer edge.

S c u l p t u r e — Whorls and base covered by nearly equally spaced spiral threads, being stronger near upper suture, at and near periphery and around umbilicus. Periodically repeating collabral riblets between selenizone and sutures; lunulae of same periodicity on selenizone. On last whorl, riblets fade out in outermost belt of base. All riblets weaken towards selenizone. Peripheral riblets sometimes interfering with spiral threads thus resulting tubercles.

R e m a r k s — Top of convexity of the whorls can be found in the middle of upper half of the whorls on some specimens therefore the shell resembles those of gradate outline. However, no distinct angulation (and ramp) was observed. Therefore this species must be ranged to genus *Laevitomaria*.

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone).

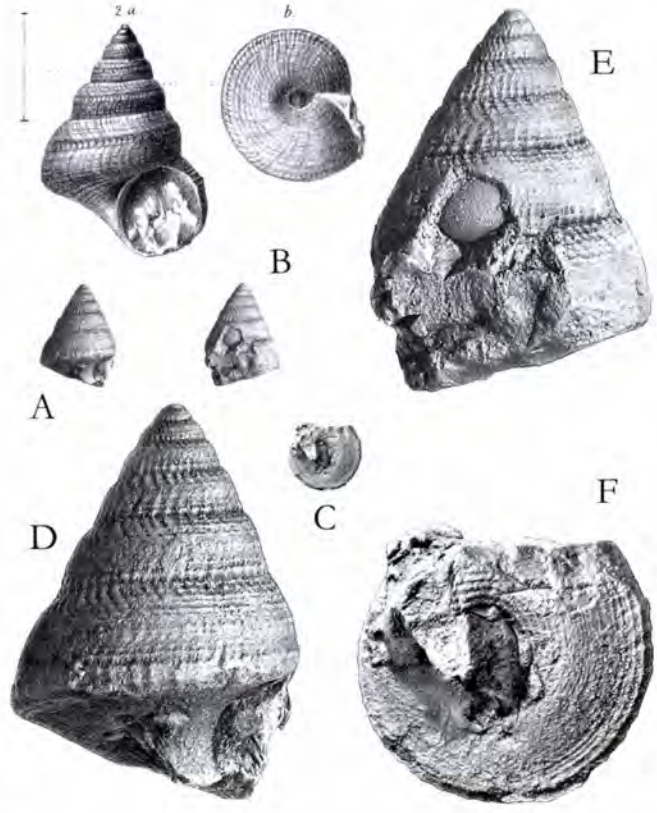

Figure 42 — *Laevitomaria hierlatzensis* (HÖRNES, 1853) — **2 a-b**: copy of the first figure of this species (STOLICZKA 1861, Tafel IV); **A–F**: figures of the lectotype; apertural (A), dorsal (B) and basal (C) views, ×1; D–F: the same views to show details of the shell, ×4.

Laevitomaria danii n. sp.

(Figure 43)

1980: *Leptomaria* sp. – SZABÓ, p. 60, pl. 3, fig. 5.

H o l o t y p e — HNHM, M 2008.542.1. (Figure 43: A–C), paratypes: HGM J.08.11.1. and J.08.12.1. (Figure 43: D–H).
T y p e l o c a l i t y — Lókút, Fenyveskút (Bakony Mts).
T y p e s t r a t a — Upper Pliensbachian massive, red, micritic limestone (atypical Hierlatz Limestone), found on uneven surface and in fissures of Upper Triassic to lowermost Jurassic platform limestone (Dachstein Limestone and Kardosrét Limestone Formations); the fossils frequently have Fe–oxide coating.
N a m e — Dedicated to Daniel SZABÓ, the author's younger son, photographer of many images in this monograph.
D i a g n o s i s — Conical shell with feebly acute apex (juvenile whorls), consisting of numerous low, convex whorls, separated by impressed-canaliculate suture; selenizone prominently wide; periphery rounded angular, base feebly convex and rather broadly phaneromphalous; network ornament of fine threads on whorls, only spiral lines on base.
M a t e r i a l — Three specimens from three different localities; one of them Late(?) Sinemurian, the others are Late Pliensbachian.

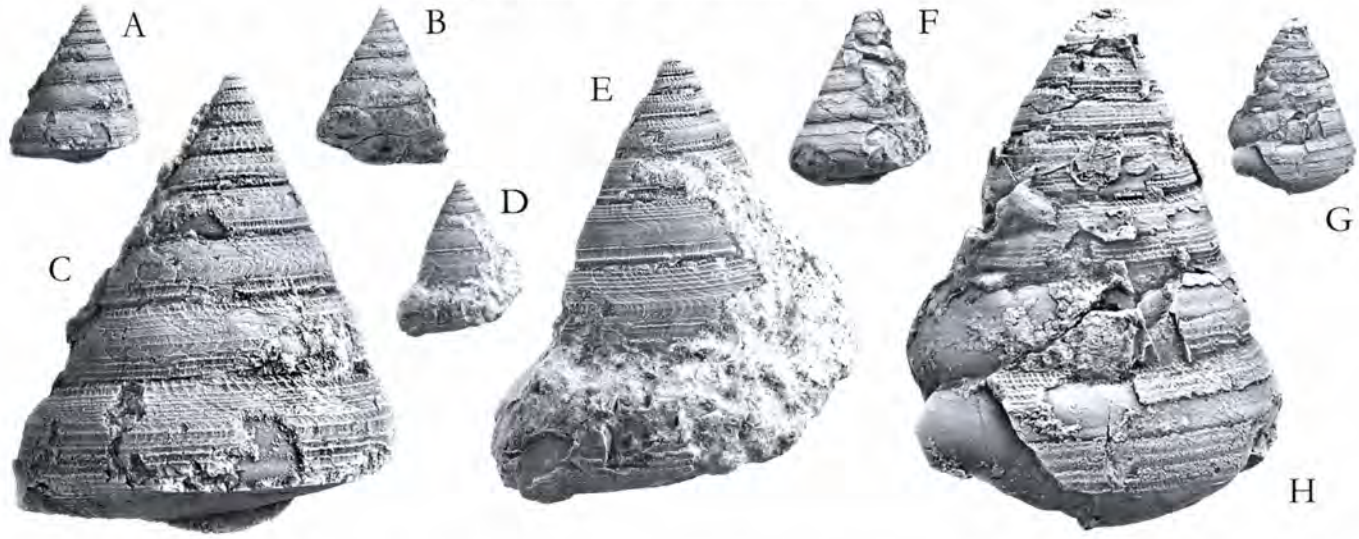

Figure 43 — *Laevitomaria danii* n. sp. — **A–C**: holotype (Fenyveskút) in dorsal (A) and "apertural" (B) views, ×1, and magnified dorsal view (C) to show the ornament, ×3; **D–E**: paratype (HGM J.08.11.1., Eplény) back view (the outline is truncated by a fracture on the left side!), ×1 (D) and ×3 (E); **F–H**: a specimen from Sümeg (HGM J.08.12.1.), mentioned in the synonymy, that seems to be an early representative of *Laevitomaria danii* n. sp., lateral views, ×1 (F–G), and ×3 (H).

Measurements	H	HL	HP	D	W	AA	AL
holotype	*20	*8.5	*6	*16	**6	56°	48°
HGM J.08.11.1.	-	-	-	-	-	58°	-
HGM J.08.12.1.	-	*10	*6	**18	-	*53°	*46°

S h a p e — Moderately high conical shell, built of numerous low whorls. Surface of whorls slightly convex, whorl-section tetragonal with rounded angles. Conspicuously wide selenizone (~quarter of distance between sutures) in midwhorl position. Periphery rounded angular, base slightly convex and moderately phaneromphalous; peristome poorly known; basal lip partially preserved in paratype, showing remnants of considerable external varix.

S c u l p t u r e — Whorls, as well as base covered by spiral threads, crossed by weaker collabral threads, resulting in network, and very fine growth-lines. Collabral elements of network appear as riblets on juvenile whorls. Fine granules may also appear on intersections of differently oriented threads on whorls, mainly in both near-suture belts of whorls. Growth-lines run strongly prosocline-prosocyrt above selenizone, opisthocline between selenizone and lower suture/periphery, and strongly opisthocline-feebly opisthocyrt on base.

R e m a r k s — The specimens best fit to the *Laevitomaria* genus concept, in which *L. hierlatzensis* (HÖRNES, 1853) has similar shape and ornament. However, *Laevitomaria danii* n. sp. has much lower, less rapidly expanding whorls and, consequently, bigger whorl number at same shell height (lectotype of *L. hierlatzensis* has 7, *L. danii* n. sp. has more than 8 whorls at same height). *L. hierlatzensis* has cyrtoconoidal apex, but early shell of *L. danii* n. sp. is acute; furthermore, differently from *Laevitomaria danii* n. sp., *L. hierlatzensis* has a narrow subsutural shoulder, and many other details are different (see Figures 42, and 43).

D i s t r i b u t i o n — Bakony Mts: Sümeg, Late(?) Sinemurian; Eplény, Mn-ore mine and Lókút, Fenyveskút, both Domerian (Late Pliensbachian).

Genus *Leptomaria* E. EUDES-DESLONGCHAMPS, 1864

T y p e s p e c i e s: *Pleurotomaria amoena* J. A. EUDES-DESLONGCHAMPS, 1849

Leptomaria striata (HÖRNES, 1853)

(Figure 44)

1853: *Trochotoma striatum* HÖRNES — HÖRNES, p. 762.
1861: *Trochotoma striatum* HÖRNES — STOLICZKA, p. 193, pl. 5, fig. 2.
non 1872: *Trochotoma striatum* HÖRNES — BLAKE, p. 141.
1980: *Trochotoma striatum* HÖRNES — SZABÓ, p. 65, pl. 4, fig. 2.

L e c t o t y p e — GBa 2008/69/46 (selected here).

M a t e r i a l — Two specimens in the GBa collections, and two ones from the Bakony Mts.

Measurements	H	HL	HP	D	W	AA	AL
lectotype	*41	*28	**17	**41	-	75°	75°

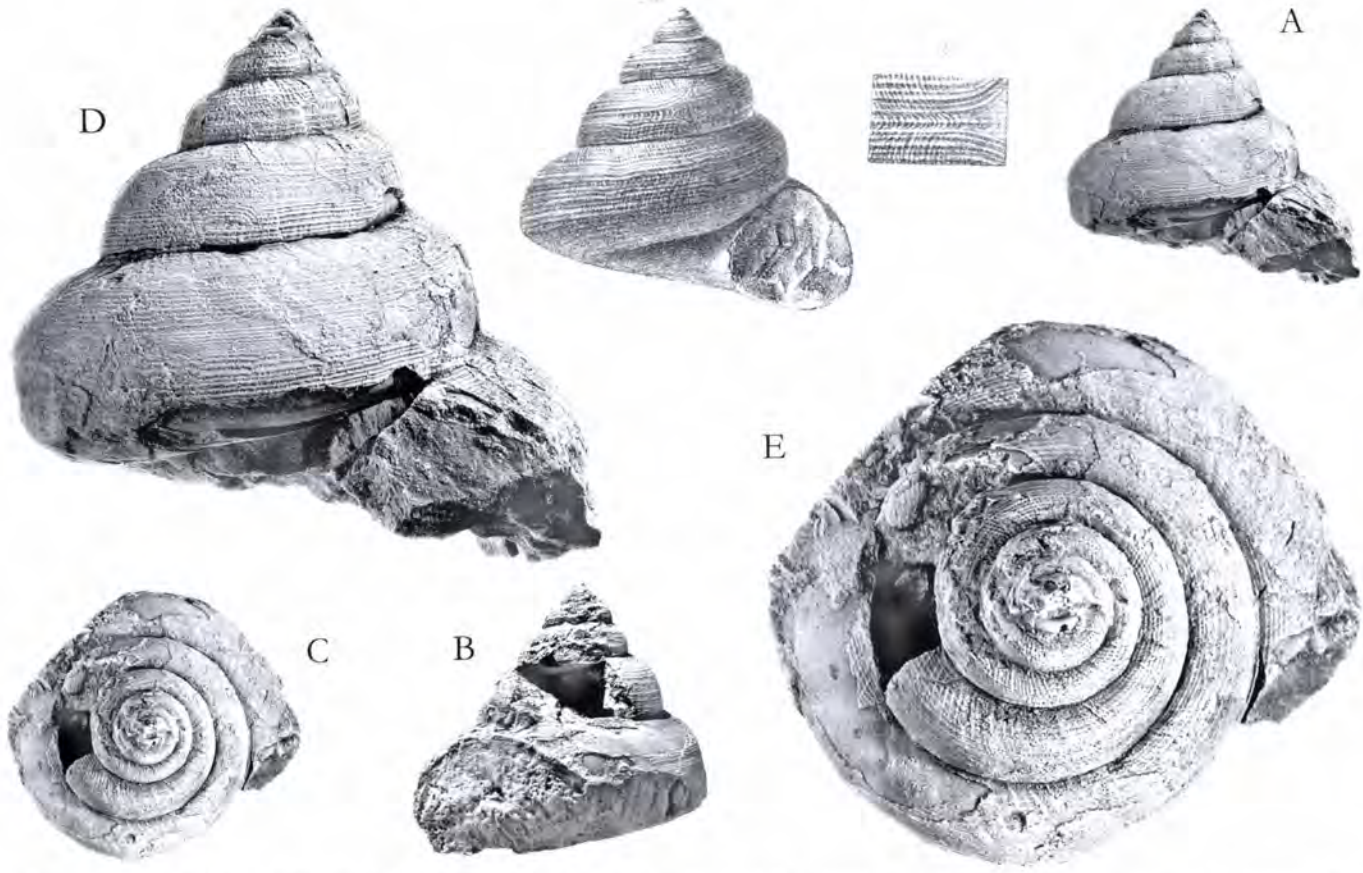

Figure 44 — *Leptomaria striata* (HÖRNES, 1853), lectotype. — **2 a–b**: STOLICZKA's (1861) figures from Tafel V (copy); **A–C**: "apertural" (A), back (B) and apical (C) views, ×1; **D–E**: magnified views to show the ornament, ×2.

S h a p e — Wide-based, moderately high turbiniform shell. Whorls markedly convex, but without obvious angulation, however, more convex upper and moderately convex lower ("outer face") belts distinguishable, narrow ramp without clear abaxial boundary exists. Suture rather strongly impressed; periphery rounded-angular. Selenizone (~15 % of distance between sutures) situated somewhat below midwhorl on moderately convex outer face. Base convex and phaneromphalous. Peristome not preserved on lectotype but cross-section of inner ("columellar") lip seems slightly thickened on Bakony Mts specimens, visible at funnel-shaped umbilicus.

S c u l p t u r e — Juvenile shell bearing cancellate ornament of equally strong spiral and collabral cords. Subsequent whorls and base predominantly ornamented with spiral cords and threads, alternating. Spiral cords lacking from selenizone, only threads visible there. On post-juvenile whorls, threads and cords provide collabral sculpture. Latter arise from upper suture and weaken into threads well before reaching selenizone. Density and initial strength of these elements similar to those of spiral cords. Growth-lines markedly prosocline above selenizone, distinctly opisthocline between selenizone and periphery, and opisthocyrt on base.

R e m a r k s — HÖRNES (1853) and STOLICZKA (1861) regarded this species belonging to *Trochotoma* then SZABÓ (1980) accepted this generic attribution. However, verification of the presence and the place of the exhalant opening (trema), the most important basis for the generic arrangement remained missing.

Subsequent studies (SZABÓ 1984) in order to find a systematic place for *Urkutitoma* (see below) resulted in the recognition that in lack of trema, the best morphological character to distinguish trochotomids from the similarly shaped pleurotomarioideans is the orientation of the collabral ornament between the selenizone and the periphery. This is (strongly) prosocline (and sometimes feebly prosocyrt) in the trochotomids but orthocline or opisthocline and prosocyrt in the pleurotomarioideans.

In this species, the growth-lines between the selenizone and the periphery are markedly opisthocline; therefore its attribution to the Trochotomidae has been erroneous. In lack of a true angulation on the whorls the most probable systematic place is within *Leptomaria*. However, the subgradate outline of the shell reminds also the shape of *Anodomaria*.

BLAKE (1872) identified a species as *Trochotoma striatum* that were regarded by TATE (1876) a synonym of his new Sinemurian species, *Pleurotomaria obesula*. Though he expressed some differences from *Trochotoma striatum*, HÖRNES's species remained also in his synonym list with question mark. Based on TATE's (1876) Pl. X: 6 figure, *P. obesula* has gradate shell with wide (true) ramp and different measurements, thus it must belong at least to another genus and species.

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone); Eplény and Fenyveskút (near Lókút) (Bakony Mts), Upper Pliensbachian.

Genus *Bathrotomaria* COX, 1956

Type species: *Trochus reticulatus* J. SOWERBY, 1821

Bathrotomaria martiae n. sp.

(Figure 45)

1980: *Bathrotomaria* aff. *subreticulata* (D'ORBIGNY, 1850) — SZABÓ, p. 60, pl. 2, fig. 1.

Holotype — HGM J.08.13.1. (Figure 45: A–D); paratype: HGM J.08.14.1.

Type locality — Lókút, Kericser (Bakony Mts).

Type strata — Atypical Hierlatz Limestone of high micritic content, bearing ammonite fauna, mixed from Obtusum to Ibex Zone interval.

Name — Dedicated to Márta BÁNPATAKI, wife of the author.

Diagnosis — Rounded juvenile but clearly angular last whorls; network ornament on whole shell, its spiral components predominant on last whorl and on base; subsutural belt of whorls with periodically repeating, sharp nodes, being collabrally extended as gradually weakening riblets then low ridges.

Material — Two damaged shelly specimens with ferromanganese oxide coating HGM J.08.13.1., and J.08.14.1.

Measurements	H	HL	HP	D	W	AA	AL
holotype	-	*10	*6	*14	*6.5	64°	64°

Shape — Small, gradate shell. Ramp broad and rather steep on last whorl but less distinct in juvenile growth stages together with bordering abaxial angulation. Selenizone courses just upon angulation. Outer face flattened and subparallel to axis. Periphery rounded; base flattened and narrowly phaneromphalous. Columellar lip seems somewhat thickened; outer lip unknown.

Sculpture — Whorls and base ornamented with almost evenly spaced spiral threads of slightly different strength, crossed by threads, riblets, ridges and growth-lines. Juvenile ornament consists of equally strong spiral and collabral elements, resulting in network. On post-juvenile whorls, riblets start from regularly repeating, sharp nodulae, sitting just below suture. These riblets change into low ridges in short distance then fade out at selenizone. Collabral threads of outer face gradually vanish after penultimate whorl; no marked ornamental element crosses spiral threads on last whorl between selenizone and umbilicus. Selenizone subdivided by single spiral cord, running just on angulation, into narrower adapical and wider abapical belts; regularly repeating and asymmetrical lunulae developed.

Remarks — The increased density of the lunulae on the last whorl of the holotype indicate its probably adult stage (the dimensions of the second specimen are also similar).

Despite the characteristic shape and ornament, this form cannot be identified with anyone of the previously figured species. It resembles to the original drawings of *Pleurotomaria subreticulata* D'ORBIGNY, 1856, however, the photos of the type specimen, published by FISCHER & WEBER (1997) under the name *Bathrotomaria reticulata* (J. A. EUDES-DESLONGCHAMPS, 1849), are dissimilar both in shape and sculpture. It has smaller, denser and weaker riblets at the place of the tubercle row of *Bathrotomaria martiae* n. sp. specimens, and has an elevated, keel-like selenizone, while it is not raised from the neighbouring surface of the ramp and the outer face in the Bakony Mts specimens.

[There is a conflict in the nomenclature, concerning the authorship by FISCHER & WEBER's (1997) name usage: *Bathrotomaria reticulata* (J. A. EUDES-DESLONGCHAMPS, 1849), against the type species of the genus, *Bathrotomaria reticulata* (J. SOWERBY, 1821), which remained unresolved.]

Distribution — Lókút, Kericser (Bakony Mts), beds with mixed Obtusum to Ibex Zone fauna (Upper Sinemurian to Lower Pliensbachian).

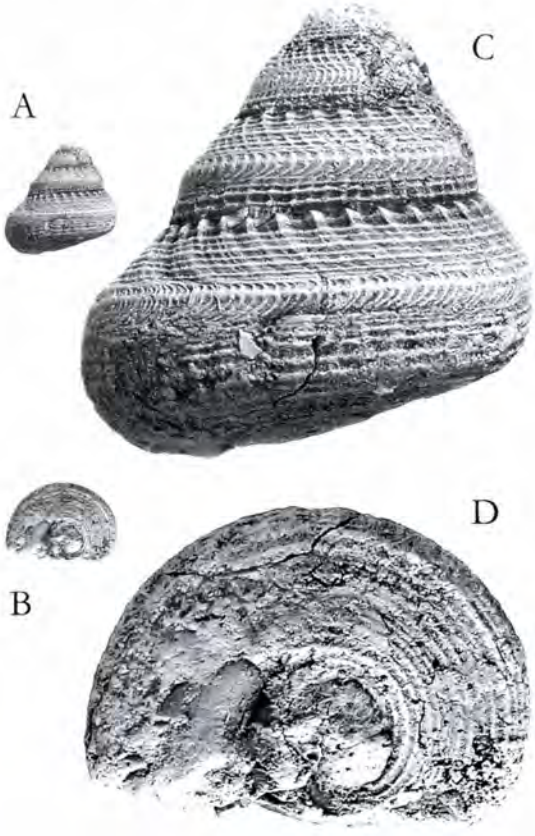

Figure 45 — *Bathrotomaria martiae* n. sp., holotype. — **A–B**: dorsal (A) and basal (B) views, ×1; **C–D**: magnified dorsal (C) and basal (D) images to show details of the sculpture, ×4.

Family ? Trochotomidae Cox, 1960

Genus *Urkutitoma* SZABÓ, 1984

Type species: *Urkutitoma bartkoi* SZABÓ, 1984

Urkutitoma bartkoi SZABÓ, 1984

(Figure 46)

1984: *Urkutitoma bartkoi* sp. n. — SZABÓ, p. 70, fig. 3.

? 1995: *Sisenna* cf. *foveolata* (EUDES-DESLONGCHAMPS) — CONTI & MONARI, p. 201, pl. 1, fig. 9.

Material — Only one, rather poorly preserved specimen (holotype, HGM J 10143).

Measurements	H	HL	HP	D	W	AA	AL
holotype	*16.8	11.3	8.5	-	7.4	64°	64°

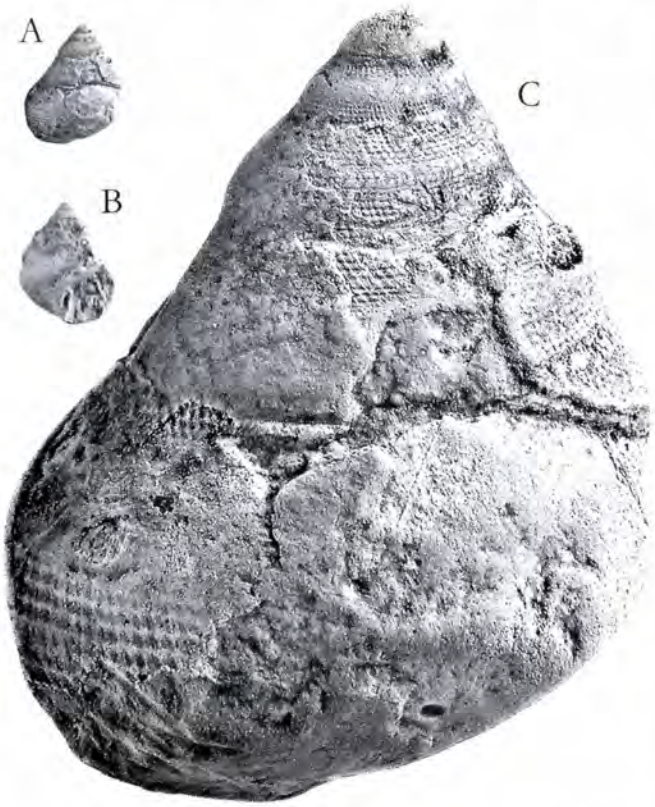

Figure 46 — *Urkutitoma bartkoi* SZABÓ, 1984, refiguration of the holotype; note presence of a selenizone and the entire outer lip (no slit). — **A–B** =×1, **C**: ×6.7.

Shape — Turbiniform shell with somewhat convex whorls. Top of convexity coincides with selenizone running below midwhorl. Only small shelly parts of last whorl preserved therefore position of anal trema unknown. Its existence may be inferred from joint presence of uninterrupted outer lip and selenizone on earlier whorls. Aperture nearly quadrangular with slightly arched sides, concave at parietal and columellar (umbilical) parts, convex at both outer lip parts. Umbilicus surrounded by swollen angulation, resembling to trace of rudimentary siphonal outlet. Inner lip callosity probably bends over umbilicus.

Sculpture — Ornament consists of collabral and spiral threads, resulting network on whorls with small granules at crossing points. On last whorl, spiral elements strengthened as cords. Collabral elements *prosocline* between selenizone and lower suture/periphery.

Remarks — In spite of the poor state of preservation, the specimen shows a number of features, which demanded the definition of *Urkutitoma* as new genus. Among the trochotomids, there are no species, which would not be separable. Without outer lip, this species is somewhat similar to the *Wortheniopsis (Sisenna)* species group in its shape and granulate ornament, but the characters of selenizones, the collabral ornaments between the anal fasciole and the lower suture/periphery, and the measurements support the distinction.

Distribution — Úrkút, Csárda-hegy (Bakony Mts), Lower(?) Sinemurian; ?Sasso di Pale (Central Apennines), Upper Pliensbachian.

Urkutitoma? sp.

(Figure 47)

cf. 1964: *Trochotoma subturrita* (D'ORBIGNY) — SACCHI VIALLI, p. 7, pl. 1, figs 13 a–b, 14.

1980: *Sisenna subturrita* (DESLONGCHAMPS, 1849)? — SZABÓ, p. 53, pl. 1, figs 6–8.

Material — Several specimens of bad state of preservation (HGM).

Measurements	H	HL	HP	D	W	AA	AL
Figure 47: A–B	-	11	7	13	9	-	-

Shape — Gradate shell with angulation, reinforced by carina-like spiral swelling on post-juvenile whorls. Morphology of periphery similar to that of angulation of whorls; rather deep, spiral concavity visible between them. Ramp convex but concave along swelling. Selenizone placed on adapical slope of spiral swelling. Base flattened but slightly convex. Single constriction (inner varix) observable on base between periphery and axial region short before (most probably) last peristome (about 20° in axial view). This morphological element found on four, mainly inner mould specimens, suggesting adult size of specimens around 25 mm diameter and 30 mm height. Narrow um-

bilicus present, but probably hidden by inner lip on adults. Outer lip fragments suggest considerable thickening at least in adult stage. Steinkern with impression of outer lip suggest peristome without slit. On same specimen (Figure 47: C) trace of selenizone still observable about 40° before peristome.

S c u l p t u r e — Predominantly spiral ornament, consisting of widely spaced spiral threads and cords, strongest of them running at peripheral region. Traces of subregularly repeating collabral threads (weak riblets) also found on available specimens mainly on ramp, but their continuation on outer face also observable. Intersection points of ornamental elements bear fine granules, similar to those of *Wortheniopsis (Sisenna)* species. Collabral ornament seem to lack sharply prosocyrt parts along both sides of selenizone; they seem to be cut by selenizone, formed later (= *Trochotoma*-like morphology).

R e m a r k s — Morphology of the collabral ornament is different from that of *Wortheniopsis (Sisenna)* species though the shape is rather similar. The differences required a systematical place near *Urkutitoma bartkoi* that has different shape, and selenizone morphology.

SACCHI VIALLI (1964) published a revised name [*Trochotoma subturrita* (D'ORBIGNY)] instead of *Pleurotomaria pinguis* D'ORBIGNY, given by PARONA (1894), to some specimens from Saltrio (Southern Alps, Italy) Sinemurian; these specimens may be conspecific with the Bakony Mts ones. SACCHI VIALLI's (1964) genus name supports the systematic arrangement in trochotomid relation, suggested also here.

D i s t r i b u t i o n — Bakony Mts (Lower Pliensbachian): Lókút, Kericser: Ibex to Davoei Zones; Lókúti-domb(?), Davoei Zone; Hárskút, Közöskúti-árok(?): Ibex Zone.

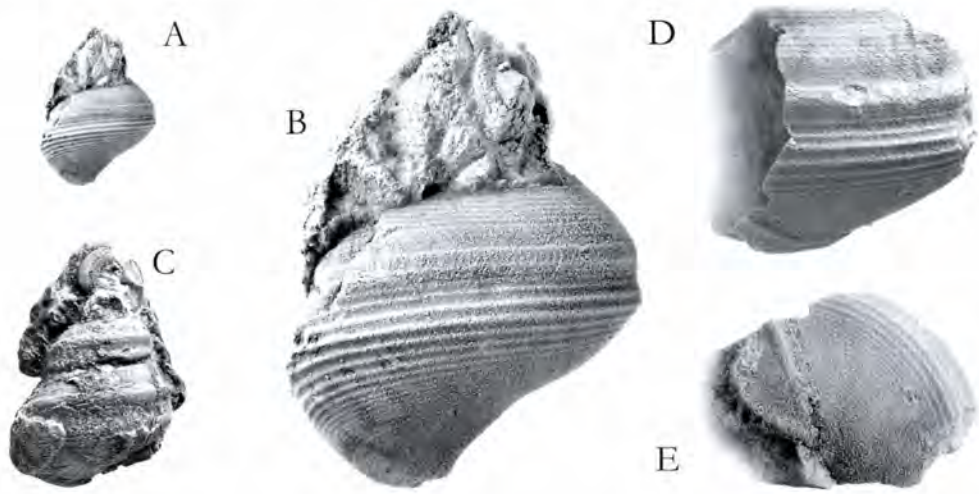

Figure 47 — *Urkutitoma*? sp., another species that does not seem to have slit on the outer lip, but have selenizone; it means that a trema must be the exhalant opening. — **A–B**: a juvenile specimen, showing traces of the trochotomid type collabral ornament, A = ×1, B = ×3; **D–E**: adult last whorl fragment in dorsal (D) and basal (E) views, ×2; **C**: steinkern of an adult specimen, ×1.

Superfamily Fissurelloidea FLEMING, 1822
Family ? Fissurellidae FLEMING, 1822
Genus *Austriacopsis* HABER, 1932
T y p e s p e c i e s: *Rimula austriaca* HÖRNES, 1853

Austriacopsis (Austriacopsis) austriaca (HÖRNES, 1853)

(Figure 48: A–D)

1853: *Rimula austriaca* HÖRNES — HÖRNES, p. 753.
1861: *Rimula austriaca* HÖRNES — STOLICZKA, p. 193, pl. 5, fig. 3.
1934: *Austriacopsis (Austriacopsis) austriaca* (HÖRNES, 1853) — HABER, p. 254.
1980: *Austriacopsis (Austriacopsis) austriaca* (HÖRNES, 1853) — SZABÓ, p. 65, pl. 4, figs 6–9

L e c t o t y p e — GBa 2008/69/47/1 (selected here).
M a t e r i a l — Eleven specimens in the GBa, and twenty in the HGM collections.

M e a s u r e m e n t s	H	HA	L	LP	W
lectotype	6.5	6.5	*19	*19	16.5

S h a p e — Patelliform shell with bilateral symmetry. Shell starts in spiral coiling, thus apex slightly backward curving. Peristome entire, ovate, pointed posteriorly. Apex position subcentral. In lateral view, anterior part convex, posterior part feebly convex or straight. Slight concavity frequently occurs just behind apex and near adult peristome.

Exhalant trema situated upon radially elongate elevation, somewhat removed apically from midway between peristome and apex. Available material indicates that elevation consists of two radial riblets, being seamed after formation of trema. Between trema and apex these riblets separate, possibly bordering short selenizone. On some specimens, concentric undulation of shell visible in apical view. This feature more conspicuous on inner moulds. Muscle scar horse-shoe shaped, symmetrically appears on inner surface as more marked, but shallow concentric depression in height of trema, on posterior side of shell (Figure 48: B).

S c u l p t u r e — Most distinct sculpture elements radial ribs, being nearly evenly spaced. Two of them along elevation of trema course with wider interspaces. These ribs appear at apex, but in their interspaces, secondary ribs develop later, then weak threads appear near peristome as third generation of radial elements. Secondary grade of ribs missing in band between two ribs bordering field of trema elevation, while tertiary grade represented here with more (i.e. 3–3 or 4–4) elements. First order riblets in apical region indicate trochospiral initial coiling. Growth-threads do not run side by side within neighbouring bands between radial elements, and this results characteristic texture of lines (see Figure 48: D).

R e m a r k s — Correctness of the family ascription of *Austriacopsis* to Emarginulidae seems questionable; its exhalant opening is a trema, therefore distinction from the peristomal slit bearing forms seems necessary (like in case of Trochotomidae in Pleurotomarioidea). Exhalant opening of the fissurellids is morpologically similar to a trema, that is why this family attribution has been selected here but some differences are obvious; further studies are necessary to the best final decision.

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone); Bakony Mts, Upper Sinemurian to Upper Pliensbachian: Lókút, Kericser, Obtusum to Stokesi Zones, Szentgál, Raricostatum Zone).

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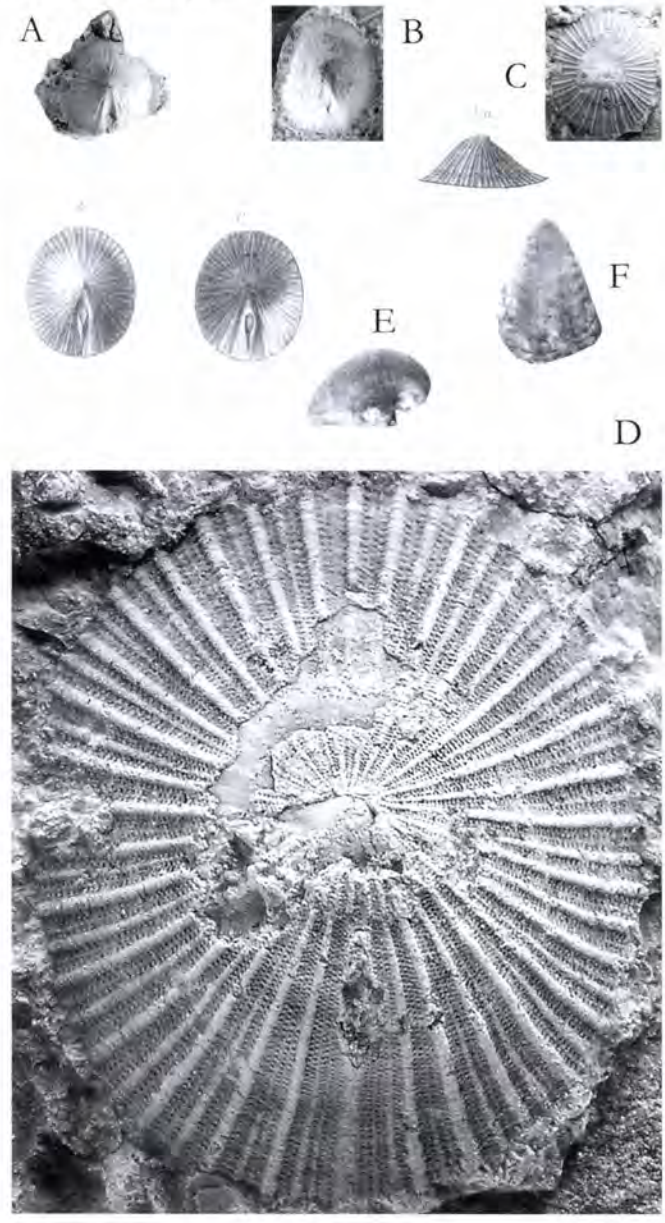

Figure 48 — *Austriacopsis (Austriacopsis) austriaca* (HÖRNES, 1853) (A–D) and *Emarginula (Emarginula) vedanaei* TONI, 1912 (E–F) — **3 a–c**: STOLICZKA's (1861) figures of *Rimula austriaca* HÖRNES (copy from Tafel V); **A**: paralectotype (inner mould, ×1); **B**: lectotype (shell interior, ×1); **C**: exterior of a specimen from the Bakony Mts (Lókút, Kericser), having the available best preserved shell, ×1; **D**: magnified view of the specimen in image C to display details of the ornament, ×5; **E–F**: anterior (E) and lateral (F) views of *Emarginula (Emarginula) vedanaei*, ×2.5.

Family Emarginulidae GRAY, 1834

Genus *Emarginula* LAMARCK, 1801

T y p e s p e c i e s: *Emarginula conica* LAMARCK, 1801

Emarginula (Emarginula) vedanaei DE TONI, 1912

(Figure 48: E–F)

1912: *Emarginula vedanaei* n. sp. — DE TONI, p. 38, pl. 2, figs 1 a–d.
1980: *Emarginula (Emarginula) vedanaei* DE TONI, 1912 — SZABÓ, p. 66, pl. 4, figs 10–11.
1991: *Emarginula (Emarginula) vedanaei* DE TONI, 1912 — CONTI & MONARI, p.266, pl. 7, figs 7–14.
1995: *Emarginula (Emarginula) vedanaei* DE TONI, 1912 — CONTI & MONARI, p. 203, pl. 1: 11.

M a t e r i a l — Three poorly preserved specimens (HGM).

Measurements	H	HA	L	LP	W
Figure 48: E–F	4	1	5.5	3.5	5

S h a p e — High, cap-shaped form with apex, curving backwards behind line of peristome. In collabral cross-section, shell flattened along selenizone, but convex in other parts. Selenizone slightly elevated, peristomal slit extending to about one-third of shell height. Peristome slightly ovate in anterior-posterior direction.

S c u l p t u r e — Shell ornamented with spiral and collabral threads of nearly equal strength, resulting in network sculpture. In interspaces of spiral riblets, secondary riblets develop in later growth stage. Lunulae of selenizone similarly strong as secondary spiral elements. Density of lunulae roughly three times higher than that of collabral ribs. Fine growth-lines also observable.

R e m a r k s — The Bakony specimens resemble *Emarginula (E.) lepsiusi* GEMMELLARO, 1879, but this latter has fewer ribs, different size and convex shell along the anal slit.

DE TONI's (1912) figures show weaker collabral riblets than the spiral ones, while both elements are of equal strength in the Bakony specimens. However, the latter shells are rather strongly re-crystallised and this effect might have modified also the details of the shell morphology.

D i s t r i b u t i o n — Vedana (Alps, Italy), Middle Liassic; Lókút, Kericser (Bakony Mts), Ibex to Davoei Zones; Gorgo a Cerbara (Central Apennines), Upper Pliensbachian; Bileçik (Western Pontids, Turkey), Upper Sinemurian to Early Pliensbachian.

Suborder Trochina COX & KNIGHT, 1960
Superfamily Turbinoidea RAFINESQUE, 1815
Family Ataphridae COSSMANN, 1918
Subfamily Ataphrinae, COSSMANN, 1918

Genus *Ataphrus* GABB, 1869
T y p e s p e c i e s: *Ataphrus crassus* GABB, 1869

Ataphrus latilabrus (STOLICZKA, 1861)

(Figure 49)

1861: *Trochus latilabrus* STOL. — STOLICZKA, p. 173, pl. 2, fig. 9.
1876: *Turbo latilabrus* STOLICZKA — TATE, p. 343. pl. 9, fig. 15.
1981: *Ataphrus folcoi* (M. GEMMELLARO, 1911) — SZABÓ, p. 61, pl. 2, fig. 14.
1981: *Trochopsidea latilabra* (STOLICZKA, 1861) — SZABÓ, p. 62, pl. 2, figs 15–16.

L e c t o t y p e — GBa 2008/69/23 (selected here).
M a t e r i a l — Lots of specimens, 51 cleaned and many on rock pieces of other species (GBa), four ones in the HGM.

Measurements	H	HL	HP	D	W	AA	AL
lectotype	13.3	10.7	6.8	12.7	7	74°	74°

S h a p e — Low turbiniform shell, with blunt apex, strongly convex whorls and base. Shell bending up along moderately impressed suture. Base convex and has no umbilicus. Last peristome continuous, prosocline and subcircular; aperture orbicular. Columellar lip strong and having rather wide outer face with swelling at foot of columella. Shallow, wide, backward sinus of basal lip starts from abapical end of swelling and almost reaching peripheral part of outer lip. On wide outer face of peristome part with sinus, shallow furrow visible.

S c u l p t u r e — Fine growth lines and obscure spiral striae give ornament both on whorls and base. Growth lines prosocline on whorls and feebly parasigmoidal on base.

R e m a r k s — Some fragmentary specimens suggest presence of a narrow umbilicus that becomes closed in the last growth stage.

TATE's (1876) *Turbo latilabrus* STOLICZKA differs from the others in its feebly cyrtoconoidal outline. Practically, there are no differences between the lectotype and the specimens from the Bakony Mts finds that were firstly identified as two different species by SZABÓ (1981, see synonym list above).

D i s t r i b u t i o n — Hierlatz, Schafberg, Kratzalpe (Northern Calcareous Alps), Late Sinemurian; SW England, Spinatum Zone (Upper Pliensbachian); Sümeg, Upper? Sinemurian, Lókút, Kericser, and Eplény (Bakony Mts), Upper Pliensbachian.

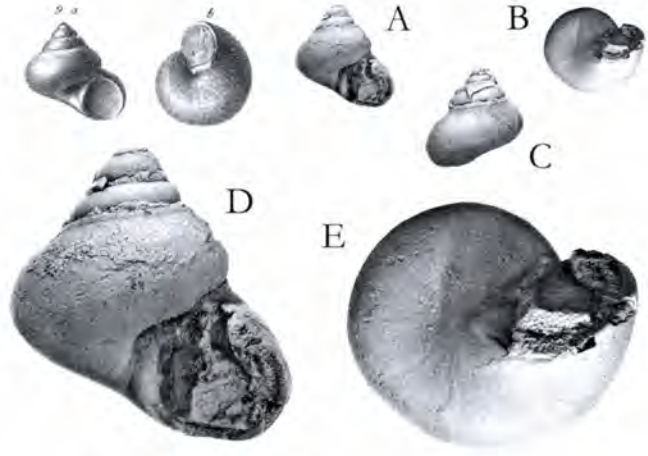

Figure 49 — *Ataphrus latilabrus* (STOLICZKA, 1861), lectotype. — **9 a–b**: copy of figures from STOLICZKA (1861) Tafel II; **A–C**: apertural (A), dorsal (C) and basal (B) views, ×1; **C–D**: apertural (D) and basal (E) views; ×3.

Ataphrus aciculus (HÖRNES, 1853)

(Figure 50)

1853: *Trochus aciculus* HÖRNES — HÖRNES, p. 759.
1861: *Trochus aciculus* HÖRNES — STOLICZKA, p. 173, pl. 2, fig. 8.
1876: *Turbo aciculus* STOLICZKA — TATE, p. 344, pl. 9, fig. 22.
non 1983: *Lewisiella acicula* (HÖRNES, 1853) — SZABÓ, p. 29, pl. 1, figs 4–5.

L e c t o t y p e — GBa 2008/69/22/1 (selected here).
M a t e r i a l — Thirty-three specimens (GBa).

Measurements	H	HL	HP	D	W	AA	AL
lectotype	*17	11.5	8.5	12	7	50°	50°

S h a p e — Medium sized species of rather high turbiniform shell, having moderately convex whorls with narrow concave belt just below suture. Last whorl subangulate at periphery except near peristome where angulation disappears. Concomittantly growth direction deviates from previous mode and shell extending mainly downward but also abaxially (like trumpet). Base convex and anomphalous. Adult peristome axially elongate, continuous at parietal region. Columellar lip thick and having a convex outer face with roundish top at foot of columella. Outer face delimited from base by wide "C"-shaped angulation.

S c u l p t u r e — Disregarding very fine, prosocline-prosocyrt growth-lines and obscure spiral lines, visible under strong magnification, shell completely smooth.

R e m a r k s — In the given state of preservation, the inner lip not completely cleanable and the (sub)generic characters not well exposed, however, the visible part suggests belonging to subgenus *Ataphrus* and not to *Endianaulax*. Paralectotypes preserved blunt apex.

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone).

Figure 50 — *Ataphrus aciculus* (HÖRNES, 1853), lectotype. — **8 a–b**: copy of STOLICZKA's (1861) figures from Tafel II; **A–C**: lectotype in apertural (A), basal (B) and dorsal (C) views, ×1.

Ataphrus? laeviusculus (STOLICZKA, 1861)

(Figure 51)

1861: *Trochus laeviusculus* STOL. — STOLICZKA, p. 168, pl. 2, fig. 12.
2003: *Ataphrus? laeviusculus* (STOLICZKA, 1861) — SZABÓ in VÖRÖS et. al., p. 61, pl. 5: 11–13.

L e c t o t y p e — NhM 1861/0034/0011 (1) (selected here), paralectotype: NhM 1861/0034/0011 (2).
M a t e r i a l — Two damaged specimens.

Measurements	H	HL	HP	D	W	AA	AL
lectotype	*15	7.6	5.9	9.9	5.1	*52°	41°
paralectotype	**14.5	*6	*	*8.8	*4.8		*46°

S h a p e — Feebly cyrtoconoidal shell with moderately convex whorls, separated by impressed suture. Protoconch not found. Periphery rounded-angular. Angulation disappearing on last whorl near peristome, simultaneously last whorl abapically extending. Peristome itself strongly prosocline as suggested by remnants. No intact peristome part found but cross-sections of columellar lip indicate strongly thickened part (swelling?) below base.

S c u l p t u r e — Growth-lines hardly visible; obscure pieces indicate them as strongly prosocline on whorls and opisthocline on base.

R e m a r k s — The conical shape resembles also *Proconulus* because of the relatively numerous low whorls. Though undamaged peristome has not been found, both specimens show cross-section of inner lip with well-developed swelling at columellar region, characteristic in *Ataphrus (Ataphrus)*. The shell form reminds also *Lewisiella* (Ataphridae) but no trace of the heavy basal callosity of this latter genus has been found.

D i s t r i b u t i o n — Schafberg at St. Wolfgang (Austria); Upper Pliensbachian.

Figure 51 — *Ataphrus? laeviusculus* (STOLICZKA, 1861), lectotype. — **12 a–b**: copy of STOLICZKA's (1861) drawings from Tafel II; **A–C**: lectotype in dorsal view (A), in lateral view to show the strongly prosocline peristome (B), and basal view (C), ×1; **D**: magnified dorsal view, × 2.5.

Genus *Trochopsidea* Wenz, 1938

Type species: *Trochopsis moroi* G. G. GEMMELLARO, 1879

Trochopsidea haidingeri (STOLICZKA, 1861)

(Figure 52)

1861: *Loxonema Haidingeri* STOL. — STOLICZKA, p.177, pl. 3, fig. 3.

Lectotype — GBa 2008/69/27/1 (selected here).

Material — An almost complete (lectotype) and a one whorl fragment without peristome are in the "originals collection". The latter specimen does not belong to the same species, but unidentifiable. Eleven further syntypes found in the background collection; all specimens are strongly recrystallized.

Measurements	H	HL	HP	D	W	AA	AL
lectotype	8.2	4.7	3.6	4.1	2.8	66°	11°

Shape — High cyrtoconical shell with blunt apex and feebly convex whorls, separated by weakly impressed suture. Protoconch depressed, first whorl almost planispiral around initial chamber, its morphology correspond to BANDEL's (1982) "archaeogastropod type". Last whorl tending downward threfore shell reminds pupoid shape. Periphery subangulate on juvenile whorls but rounded subsequently. Base convex and anomphalous. Peristome continuous, subcircular not thickened. Inner lip almost vertical (slightly backward inclined from axis) and having shallow furrow, parallel to edges from middle of parietal lip to middle of columellar lip. Outer lip prosocline and feebly reflected on some specimens.

Sculpture — Shell completely smooth, even growth-lines hardly visible also with strong magnification. Orientation of growth-lines feebly prosocline.

Remarks — On the fragmentary specimen from the figured ones, the growth-lines are feebly prosocline and also somewhat opisthocyrt. Both specimens have different ornament from those that is visible in STOLICZKA's figure and from the description. The figure is also erroneous in having a pointing apex, the protoconchs of all syntypes are clearly depressed, the first whorl is almost planispiral in every case.

In lack of sinuous growth-lines on the whorls and beside the archaeogastropod type protoconch, the correct genus identification can not be *Loxonema*. The peristome and other shell characters indicative to *Trochopsidea*, though the unusually high spire is quite unique in this genus.

Distribution — Hallstatt, Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone).

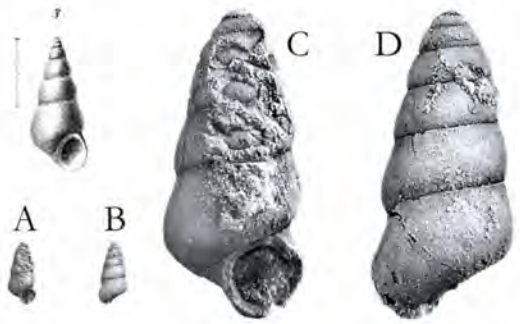

Figure 52 — *Trochopsidea haidingeri* (STOLICZKA, 1861), lectotype. — **3**: copy of the original figure from Tafel III of STOLICZKA (1861) paper; **A–B**: the lectotype in natural size, apertural (A) and dorsal (B) views; **C–D**: apertural (C) and dorsal (D) views in ×5 magnification.

Genus *Lewisiella* STOLICZKA, 1868

Type species: *Pitonellus conicus* D'ORBIGNY, 1853

As a result of their revision, FISCHER & WEBER (1997) published a specimen, the only syntype, as the holotype of *Pitonellus conicus* D'ORBIGNY, 1853 that is considerably different from the Herlatz Alpe specimens on one hand and also from D'ORBIGNY's original figures on the other hand. The magnitude of differences justify instituting of a new species on the Hierlatz Limestone specimens: *Lewisiella stoliczkai* n. sp. (see below).

STOLICZKA (1868, p. 345) clearly expressed that he has saw the differences from D'ORBIGNY's (1853) figures but he belived that D'ORBIGNY's drawings were wrong in reality. (The notice suggests also that STOLICZKA has never seen D'ORBIGNY's specimen.) Therefore he applied the morphology of the Hierlatz Alpe specimens to determine the diagnostic characters of his new genus, *Lewisiella* STOLICZKA, 1868 in the original designation. Consequently, *Lewisiella stoliczkai* n. sp. is the actual type species but STOLICZKA indicated it with the misused name, *Pitonellus conicus* D'ORBIGNY, 1853.

On the basis of FISCHER & WEBER's (1997) information about the type specimen, the true *Pitonellus conicus* D'ORBIGNY, 1853 does not seem really correspond even to the *Lewisiella* concept because the basal and peristomal morphology is so strongly different (just like in the case of *Lewisiella*? *turbinata* n. sp. see below). A comparison of the specimens is necessary to decide whether the two forms are really members of the same genus or not.

Lewisiella stoliczkai n. sp.

(Figure 53)

1861: *Pitonillus conicus* D'ORB. — STOLICZKA, p. 178, pl. 3, fig. 4.
1911: *Pitonillus conicus* D'ORB. — M. GEMMELLARO, p. 230, pl. 10, figs 7–9.

H o l o t y p e — GBa 2008/69/28/1.

T y p e l o c a l i t y — Hallstadt, Hierlatz Alpe.

T y p e s t r a t a — Sinemurian (Oxynotum Zone) Hierlatz Limestone.

N a m e — Dedicated to Ferdinand STOLICZKA.

D i a g n o s i s — Conical shell with blunt apex and slightly convex whorls; periphery angular, except last quarter whorl; large axial depression on base, surrounded by angulation; extremely heavy callus forms ridge in basal depression and terminates in broad triangular surface accreted to columellar lip. Dense spiral striae visible on whole base (except ridge) and few ones above periphery.

M a t e r i a l — Two strongly recrystallised specimens in the "originals collection", one of them with poorly preserved protoconch; twenty-five specimens in the "background collection".

M e a s u r e m e n t s	H	HL	HP	D	W	AA	AL
holotype	9.3	6.5	3.8	8.2	4.2	57°	57°
GBa 2008/69/28/2	-	6	4	7.5	4.2	63°	63°

S h a p e — Conical shell with blunt apex, slightly convex whorls and somewhat impressed suture. Periphery angular on juvenile whorls of both specimens but becoming rounded on last whorl of one specimen. Protoconch subglobular with sphaerical initial chamber and roughly one whorl, after that final mode of coiling onsets. Base convex with shallow central depression, surrounded by angulation at midway between periphery and columellar lip. Peristome continuous, semicircular with thickened sutural and extremely thickened columellar lip. Latter thickening has large, triangular outer face on columellar lip; this surface corresponds to terminal part of haevy callosity, forming ridge that raising from median depression of base. Between ridge and columellar lip, narrow false umbilicus visible; aperture circular.

S c u l p t u r e — Protoconch seems completely smooth (may be also eroded). Few fine, spiral striae visible on both sides of suture and whole base striated. Growth-lines extremely fine, feebly prosocline on whorls and outer half of base and broken into more prosocline along basal ridge.

R e m a r k s — STOLICZKA (1861) identified the same specimens as *Pitonellus conicus* D'ORBIGNY, 1853, however the characters, collected in the diagnosis above, separate the Hierlatz (and Sicily) finds as independent species from the holotype, presented by FISCHER & WEBER (1997). The same characters, the lack of an umbilicus and the smaller adult size distinguish *Lewisiella stoliczkai* n. sp. from *Lewisiella? turbinata* n. sp. (see below).

D i s t r i b u t i o n — Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone); Galati (East Sicily), Upper Pliensbachian.

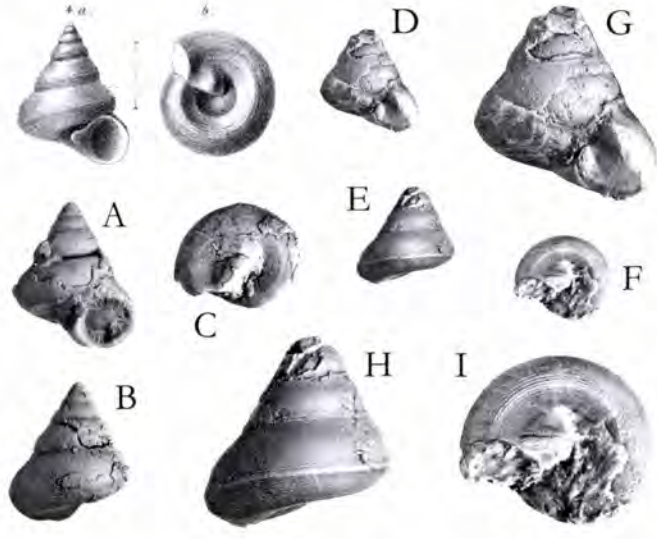

Figure 53 — *Lewisiella stoliczkai* n. sp. — 4 a–b: STOLICZKA (1861) figures of "*Pitonillus conicus* D'ORB." from Tafel III (copy); **A–C**: apertural (A), dorsal (B) and basal (C) views of the holotype, ×1; **D–F**: a paratype (GBa 2008/69/28/2) in apertural (D, G), dorsal (E, H) and basal (F, I) views, D–F = ×1; G–I = ×2.

Lewisiella? turbinata n. sp.

(Figure 54)

1983: *Lewisiella acicula* (HÖRNES, 1853) — SZABÓ, p. 29, pl. 1, figs. 4–5.

H o l o t y p e — HGM J.08.17.1.

T y p e l o c a l i t y — Lókút, Kericser (Bakony Mts).

T y p e s t r a t a — Atypical Hierlatz Limestone with Upper Sinemurian to Lower Pliensbachian mixed fauna.

N a m e — Referring the high turbiniform shape.

D i a g n o s i s — Rather high turbiniform–conical shell of convex whorls and impressed suture. Periphery rounded, base convex and having rather deep basal depression. Narrow umbilicus present, surrounded by heavy carina

terminating at abapical end of columellar lip. Abapertural side of carina extending towards base and forming semicircular callus of concave surface.

M a t e r i a l — A single specimen with damaged apex and peristome.

Measurements	H	HL	HP	D	W	AA	AL
holotype	*17.5	10	6.5	10.5	*6.5	*45	45°

Figure 54 — *Lewisiella? turbinata* n. sp., holotype. — **A–B**: holotype in peristomal (A) and basal (B) views, ×1; **C–D**: the same views, magnified to display details of the shell, ×2.

S h a p e — Moderately high turbiniform shell with convex whorls; their inner space being nearly circular in cross section. Suture impressed, accompanied by narrow, upward bending subsutural belt. Periphery rounded, base convex with large, median depression; shell narrowly phaneromphalous. Peristome continuous, rather strongly thickened at suture and parietal region. Heavy carina surrounds narrow umbilicus and terminates at columellar lip. Thinner, semicircular callus of concave surface attaches carina to base on abapertural side.

S c u l p t u r e — Whorls covered by fine, prosocline growth lines, turning into nearly orthocline on base then strongly prosocyrt near callosity and broken at boundary of callus that gives rise to strong peri-umbilical carina. Obscure spiral grooves may intersect growth-lines on whorls only.

R e m a r k s — The shape of the spire in this species is practically the same as in *Ataphrus aciculus* (HÖRNES, 1853), that is why SZABÓ (1983) has applied the name "*Lewisiella acicula* (HÖRNES, 1853)". However, study of the original specimens proved the species identification was erroneous (see *Ataphrus aciculus* HÖRNES, 1853, above).

During the recent revision, an accidental damage of the only specimen exposed a surface, displaying cross-section of a narrow umbilicus that had been not observable previously. In the recent state of knowledge, the only specimen of *Lewisiella? turbinata* n. sp. belongs to a species that may be a high spired transformation of *Bakonyia* SZABÓ, 1981 however, the protonchs have not yet been comparable.

From "*Lewisiella*" *conica* (D'ORBIGNY, 1853) (FISCHER & WEBER 1997), *Lewisiella? turbinata* n. sp. differs in having somewhat smaller spiral angle, more convex whorls and base, and in the presence of an umbilicus. After all, *Lewisiella? turbinata* n. sp. is much more similar to the holotype of *Pitonellus conicus* D'ORBIGNY, 1853, presented by FISCHER & WEBER (1997), than the specimens, which have been conspecific with it by STOLICZKA's (1861) opinion (see *Lewisiella stoliczkai* n. sp. above).

The similarities in the shell construction to *Bakonyia* mean new data to tracing of phylogenetic connections within Ataphridae.

D i s t r i b u t i o n — Lókút, Kericser (Bakony Mts), beds with mixed Obtusum to Ibex Zone faunas (Upper Sinemurian to Lower Pliensbachian).

Subfamily Crossostomatinae COX, 1960

Genus *Crossostoma* MORRIS & LYCETT, 1851

T y p e s p e c i e s: *Crossostoma pratti* MORRIS & LYCETT, 1851

Crossostoma macrostoma (STOLICZKA, 1861)

(Figure 55)

1861: *Rotella macrostoma* STOL. — STOLICZKA, p. 178, pl. 3, fig. 5.

L e c t o t y p e — GBa 2008/69/29/1 (selected here).

M a t e r i a l — Thirty-nine specimens of various preservation.

Measurements	H	HL	HP	D	W	AA	AL
lectotype	*6	5.7	5.3	11.6	6.8	*160°	*160°
GBa 2008/69/29/2	6.6	5.5	5.4	10	-	138°	138°

S h a p e — Specimens of low spire, consisting of few, rather depressed and rapidly expanding whorls. Suture feebly impressed; periphery rounded; base convex. Last fifth whorl outward expanding, outer lip of adult peristome trumpet-like. Peristome discontinuous at parietal region, columellar lip short.

S c u l p t u r e — Only growth-lines visible as sculpture on shell, being prosocline on whorls and markedly parasigmoidal on base. Weathered surface show each growth line corresponds to frontal edge of backward sloping thin shell layer.

R e m a r k s — Some of the Hierlatz specimens show rudimentary abaxial deviation from the normal coiling like in *Adeorbisina* GRECO, 1899. However, the deviation

in this case is adaxial actually (width of whorl decreases) and connected to slight, simultaneous downward (ab-apical) turning of last whorl at the initial expansion.

Slightly older (Obtusum Zone) specimens from Kratzalpe have a short peripheral angulation at place of the abaxial deviation that belong also to the character set of *Adeorbisina*. No trace of callosity have been found along the inner lip of the available specimens.

It is rather likely that *Adeorbisina* have developed from this, or a similar species.

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone); Kratzalpe, Sinemurian.

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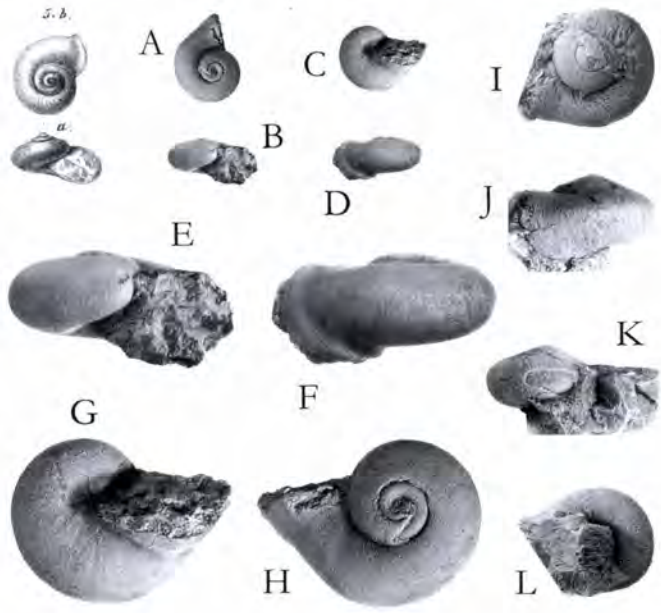

Figure 55 — *Crossostoma macrostoma* (STOLICZKA, 1861) — **5 a–b**: STOLICZKA's (1861) figures (copy); **A–H**: lectotype, selected from the box of figured specimens, most similar to the original figures, apical (A, H), apertural (B, E), basal (C, G) and dorsal (D, F) views; A–D = ×1, E–H = ×2.5; **I–L**: paralectotype (GBa 2008/69/29/2) with higher spire and subangulate abaxial deviation from normal coiling, and a rudimentary spiral angulation at the periphery just on the abaxial deviation; apical (I), apertural (J), dorsal (K) and basal (L) views, ×2.

Crossostoma? schafbergensis n. sp.

(Figure 56)

2003: *Crossostoma* sp. — SZABÓ in VÖRÖS et. al., p. 61, pl. 5: 14.

H o l o t y p e — NhM 2007/0101/0007.

T y p e l o c a l i t y — Schafberg at St. Wolfgang, Austria.

T y p e s t r a t a — Upper Pliensbachian fissure-filling limestone.

N a m e — From the name of the locality.

D i a g n o s i s — Medium high turbiniform shell of few (~5) strongly convex whorls and deeply impressed suture. Periphery rounded, base convex with shallow, central basal depression; narrow umbilicus infrable. Outer lip of last peristome widely enlarged but not thickened (trumpet-shape). Completely smooth shell; growth-lines extremely fine, except peristome extension.

M a t e r i a l — A single specimen with damaged apex and peristome. This specimen was found in the Naturhistorisches Museum, Vienna, in STOLICZKA's (1861) Schafberg type collection part; it had not been published, neither identified.

M e a s u r e m e n t s	H	HL	HP	D	W	AA	AL
holotype	*17.5	13.8	+12.4/7.7	+17.5/14	10.5	81°	81°

+ measured on enlarged peristome/just before peristome.

Figure 56 — *Crossostoma? schafbergensis* n. sp., holotype. — **A, F**: apertural, **B, G**: dorsal, **C, H**: apical, **D, I**: basal and **E, J**: peristome plane views. A–E = ×1, F–J = ×2.

S h a p e — Rather simple shell morphology, poor in characters, disregarding widely enlarged, trumpet-shaped outer lip, being really conspicuous element. Adapical edge of extended peristome reaches middle of penultimate whorl. Basal depression may be connected to narrow umbilicus; cross-section of apical part support this possibility. No trace of inner constriction found.

S c u l p t u r e — Delicate, prosocline growth-lines, crossed by dense, obscure spiral lineation, observable only in peripheral region of available specimen by strong magnification.

R e m a r k s — *C. reflexilabrum* D'ORBIGNY, 1853 is contemporary but having much lower spire and a peristome constriction. *C. macrostoma* (STOLICZKA, 1861) has low spire, smaller adult size and smaller peristome extension. The Bajocian *C. expansum* CONTI & FISCHER, 1984 is more similar in form but its outer lip extension is smaller.

The question mark in the genus name indicate the doubt because of the inferable umbilicus. Presence of an umbilicus may indicate belonging to *Palaeocollonia.*

Without the peristome modification, the shell could be identified with *Ataphrus latilabrus* (STOLICZKA, 1861) because the morphology and the measurements are so similar.

D i s t r i b u t i o n — Schafberg at St. Wolfgang (Austria); Upper Pliensbachian.

Superfamily Trochoidea RAFINESQUE, 1815
Family Trochidae RAFINESQUE, 1815
Subfamily Proconulinae COX, 1960
Genus *Anticonulus* COSSMANN, 1918
T y p e s p e c i e s: *Trochus mariae* D'ORBIGNY, 1853

Anticonulus lautus (STOLICZKA, 1861)

(Figure 57)

1861: *Trochus lautus* STOL. — STOLICZKA, p. 169, pl. 1, fig. 14.
2003: *Anticonulus lautus* (STOLICZKA, 1861) — SZABÓ in VÖRÖS et. al., p. 61, pl. 5: 8–10.

L e c t o t y p e — (monotype, de facto holotype) NhM 1856/0047/0168 (selected here).
M a t e r i a l — Single, damaged specimen that belongs to STOLICZKA (1861) original collection part in the NhM.

Measurements	H	HL	HP	D	W	AA	AL
NhM 1856/0047/0168	**10.5	*3.7	*1.9	*6.9	*2.9	*43°	41°

Figure 57 — *Anticonulus lautus* (STOLICZKA, 1861), lectotype. — **14 a–c**: copy of the original figures from STOLICZKA (1861) Tafel I; **A–C**: two lateral views (A–B) and basal view (B) ×1; **D**: magnification of the best preserved shell part to show the ornament, ×3.

S h a p e — Small, fragmentary, conical shell, consisting of numerous (10–12) low whorls of flat outer surface. Whorls feebly swollen along upper suture and bear distinct single spiral thread on lower edge. Flush suture, appearing as marked incision; periphery sharply angular. Base feebly convex and rather broadly phaneromphalous. Neither peristome nor protoconch part found preserved. Interior of whorl cross-section axially flattened ovate.

S c u l p t u r e — Obscure spiral lines visible on whorls and base beside distinct growth-lines, being strongly prosocline on whorls and opisthocyrt on base.

R e m a r k s — The only specimen (indicated also by STOLICZKA 1861) could be regarded as holotype.

The species is well distinguishable from the other species of the studied faunas. *Anticonulus acutus* n. sp. is the only surely congeneric species that has neither subsutural swelling, nor suprasutural thread like *Anticonulus lautus.* Besides, it has a markedly trochiform shell (acute early whorls, cyrtoconoidal intermediate and coeloconoidal last two whorls) while the shape of *Anticonulus lautus* (STOLICZKA, 1861) is almost a simple cone, having only feebly trochiform outline.

D i s t r i b u t i o n — Schafberg over St. Wolfgang, around boundary of Salzkammergut and Salzburg Regions, Austria; Upper Pliensbachian.

Anticonulus acutus n. sp.

(Figure 58)

1861: *Trochus lateumbilicatus* D'ORB. — STOLICZKA, p. 169, pl. 1, fig. 13.
1981: *Anticonulus lateumbilicatus* (D'ORBIGNY, 1852) — SZABÓ, p. 60, pl. 1, fig. 22.

H o l o t y p e — GBa 2008/69/11/1.
T y p e l o c a l i t y — Hierlatz Alpe over Hallstatt (Austria).

T y p e s t r a t a — Upper Sinemurian (Oxynotum Zone) Hierlatz Limestone.

N a m e — Acutus (Latin) = sharp, pointed.

D i a g n o s i s — Thin-walled trochiform shell, consisting of numerous, low whorls of smooth outer surface, separated by feebly incised, almost flush suture; juvenile whorls prominently acute; periphery angular, base convex and rather broadly phaneromphalous; spiral lineation may appear on base.

M a t e r i a l — Thirty specimens from the Hierlatz Alpe (GBa) and ten from the Bakony Mts (HGM).

Measurements	H	HL	HP	D	W	AA	AL
holotype	*17	11.8	4.4	13	6.2	*54°	44°

S h a p e — Markedly trochiform, thin-walled shell with numerous (12–15), slightly convex, low whorls and impressed suture. Periphery sharply angulate and convex, rather broadly phaneromphalous base seen below it. Aperture probably quadrangular but never found undamaged. Rim of umbilicus rounded-angular.

S c u l p t u r e — Almost only fine growth lines found, which prosocline on whorls and opisthocline–opishtocyrt on base, but some obscure spiral lines also found on base of holotype. Some Bakony Mts specimens have well visible, dense, fine spiral lineation on base.

R e m a r k s — STOLICZKA (1861) and SZABÓ (1981) identified this species as *Trochus lateumbilicatus* D'ORBIGNY, 1852, however, the latter author expressed the similarities of the Hierlatz Limestone specimens to each other and their differences from D'ORBIGNY's figures in the acute apex and larger adult dimensions. These differences (more in the diagnosis) provide basis to designate this new species.

The previously applied name became a nomen dubium by FISCHER & WEBER's (1997) revision of the collection to D'ORBIGNY's (1850–1854) monograph; no specimen had been found matching to the species description.

D i s t r i b u t i o n — Hierlatz Alpe, Sinemurian (Oxynotum Zone); Bakony Mts: Sümeg, Upper(?) Sinemurian, Szentgál, Sinemurian (Raricostatum Zone), Lókút, Kericser: beds of mixed fauna (Obtusum to Ibex Zone) and Ibex Zone.

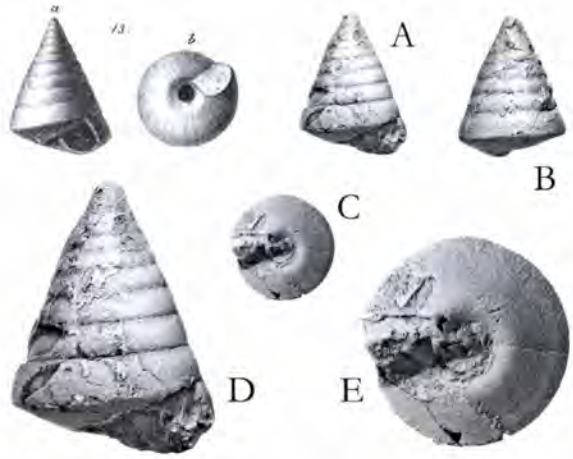

Figure 58 — *Anticonulus acutus* n. sp., holotype. — **13 a–b**: copy of figures of "*Trochus lateumbilicatus* D'ORBIGNY, 1852" from STOLICZKA (1861) Tafel I; **A–C**: holotype selected from the "originals collection", "apertural" (A), dorsal (B) and basal (C) views, ×1; **D–E**: magnified "apertural" (D) and basal (E) views to show the details, ×2.

Anticonulus? torosus (STOLICZKA, 1861)

(Figure 59)

1861: *Trochus torosus* STOL. — STOLICZKA, p. 170, pl. 1, fig. 18.

L e c t o t y p e — (monotype) GBa 2008/69/15/1 (selected here)

M a t e r i a l — The only specimen has neither apical nor basal parts of the shell.

Measurements	H	HL	HP	D	W	AA	AL
lectotype	-	-	-	**5	-	42°	42°

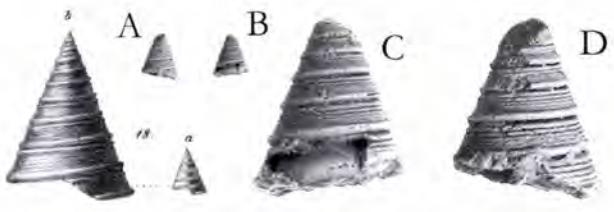

Figure 59 — *Anticonulus? torosus* (STOLICZKA, 1861), lectotype. — **18 a–b**: copied original figures from STOLICZKA (1861) Tafel I; **A–B**: lectotype in "apertural" (A) and "dorsal" (B) views, ×1; **C–D**: magnified "apertural" (D) and "dorsal" (C) views to show the ornament, ×3.

S h a p e — Small, thick-walled, conical shell of low, feebly concave whorls, carinate at periphery just above suture, being canaliculate. Apical broken surface uncertainly suggests presence of narrow umbilicus. Neither peristome nor base part remained observable.

S c u l p t u r e — Only ornament on first visible whorl weak, double thread just below suture; upper one stronger; remaining whorl surface smooth. On next whorl, three other threads appear on previously smooth surface and becoming gradually stronger, like lower subsutural one. These elements persist on remaining whorls. Growth-lines fine and strongly prosocline.

R e m a r k s — Because of the damages there is no certain indication to the generic attribution. At the same time, no doubt found about the independent state of the species.

D i s t r i b u t i o n — Kratzalm near Golling, Sinemurian (Obtusum Zone).

Genus *Epulotrochus* COSSMANN, 1918

Type species: *Trochus epulus* D'ORBIGNY, 1853

According to FISCHER & WEBER (1997), *Trochus epulus* D'ORBIGNY, 1853 can not be regarded as an independent species, it would be a morphotype within *Trochus acteon* D'ORBIGNY, 1853. Consequently, this latter species should be regarded as the type species of genus *Epulotrochus* COSSMANN, 1918. However, in the available material *Epulotrochus acteon* is doubtlessly found, but the "*epulus*" morphotype is unidentifiable, disregarding some uncertain cases in the "background" collection. Most of the simple conical forms belong to different species and specimens of transitional shape are also absent, in spite of the rather high frequency of *Epulotrochus* in the Hierlatz Limestone fauna. These facts suggest that unification of the two species was most probably unjustified, therefore both species are treated here as existing ones.

Epulotrochus COSSMANN, 1918 is established for anomphalous shells of conical outline, consisting of flush whorls and simple peristome. Studying genera of the subfamily, MONARI et al. (1996) recognised that the firmest basis to distingush genera of the Proconulinae are the peristome, mainly the inner lip characters; the ornament can provide secondary tools. In accordance with this experience, here the original interpretation of *Epulotrochus* will be modified. In the Hierlatz Limestone materials, some ornamented shells of *Epulotrochus* shape and peristome morphology are found, they will be added to the genus.

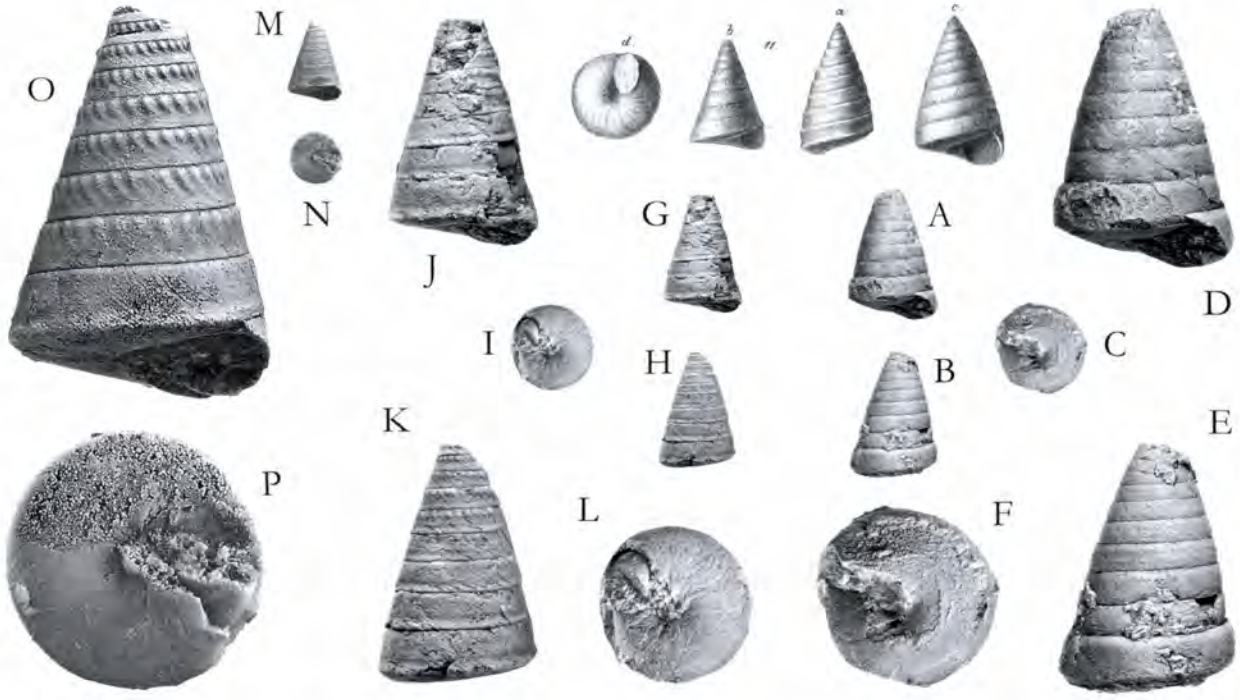

Figure 60 — *Epulotrochus acteon* (D'ORBIGNY, 1852) (A–F) and *Epulotrochus tuberculatus* n. sp. (G–P) from the boxes labelled as "*Trochus epulus* D'ORBIGNY" in STOLICZKA's (1861) collections (true *Epulotrochus epulus* not found). — **11 a–d**: copy of *Trochus epulus* figures from STOLICZKA (1861) Tafel I; **A–F**: one of the *Epulotrochus acteon* (D'ORBIGNY, 1852) specimens (GBa 2008/69/10/1/1) in apertural (A, D), dorsal (B, E) and basal (C, F) views, A–C = ×1, D–F = ×2; **G–L**: the paratype of *Epulotrochus tuberculatus* n. sp., apertural (G, J), dorsal (H, K) and basal (I, L) views, G–I = ×1, J–L = ×2; **M–P**: holotype of *Epulotrochus tuberculatus* n. sp. with well preserved tubercled-ribbed juvenile shell part; M–N = ×1, O–P = ×5.

Epulotrochus acteon (D'ORBIGNY, 1853)

(Figure 60: A–F)

1853: *Trochus acteon* D'ORBIGNY — D'ORBIGNY, p. 253, pl. 306, figs 13–16.

pars 1861: *Trochus epulus* D'ORBIGNY — STOLICZKA, p. 167, pl. 1, figs 11 a, c, ?d.

1997: *Epulotrochus acteon* (D'ORBIGNY, 1853) — FISCHER & WEBER, p. 97, pl. 19, figs 10 a–b.

non 1997: *Epulotrochus acteon* (D'ORBIGNY, 1853) — FISCHER & WEBER, p. 97, pl. 19, figs 11 a–b.

Material — In STOLICZKA's (1861) "originals collection", specimens of three species are saved as "*Trochus epulus* D'ORBIGNY", most of them (6) corresponds to *Trochus acteon* D'ORBIGNY but three other specimens represent two different species; one is diagnosed below as a new one (*Epulotrochus tuberculatus* n. sp.). About fifty specimens are available (GBa) from the Hierlatz Alpe and three ones from the Bakony Mts (HGM).

Measurements	H	HL	HP	D	W	AA	AL
GBa 2008/69/10/1/1	-	*6	*3.8	*11.5	*6.7	48°	28°

S h a p e — High cyrtoconical shell of numerous feebly convex, low whorls. Suture shallow incision; sharp angulation of last whorl corresponding to periphery. Base feebly concave, anomphalous. Poorly preserved peristome seems feebly reflected along short columellar lip; columella thick; no trace of callosity observed.

S c u l p t u r e — Shell smooth with delicate growth-lines. Their orientation moderately prosocline on whorls strongly opisthocyrt on base.

R e m a r k s — By STOLICZKA's (1861) interpretation, *Trochus acteon* D'ORBIGNY is icluded into *Trochus epulus* D'ORBIGNY. *Epulotrochus acteon* has been found amongst the figures (Tafel I: 11c) and in the "originals collection", however, the simple conical shell in Tafel I: 11b is not a representative of "*epulus*" but belongs to a new species (see *Epulotrochus tuberculatus* n. sp. below), nothing matches to Tafel I: 11a figure. However, further two specimens of slender, sharply acute shell of probably juvenile stage are found, which are representatives of another species. Their correct species attribution needs further studies.

D i s t r i b u t i o n — Fontaine-Etoupefour (Calvados, France) Upper Pliensbachian; Hallstatt, Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone); Sümeg (Bakony Mts), Upper(?) Sinemurian.

Epulotrochus tuberculatus n. sp.

(Figure 60: G–L, M–P)

pars 1861: *Trochus epulus* D'ORBIGNY — STOLICZKA, p. 167, pl. 1, fig 11 b.

H o l o t y p e — GBa 2008/69/10/2/1.

T y p e l o c a l i t y — Hierlatz Alpe, Hallstatt, Austria.

T y p e s t r a t a — Upper Sinemurian (Oxynotum Zone) Hierlatz Limestone.

N a m e — Referring the ornament.

D i a g n o s i s — Rather high conical shell with acute juvenile part, base feebly convex, peristome has short, simple columellar lip; juvenile whorls ornamented with single subsutural row of tubercles, becoming collabrally elongate ridges during growth; ridges gradually weaken then wanish before adult stage.

M a t e r i a l — The holotype is selected from the "background" material; the paratype is from STOLICZKA (1861) "originals collection" (*Epulotrochus epulus* box).

Measurements	H	HL	HP	D	W	AA	AL
holotype	-	*4	*2.5	*7	*4	37°	37°

S h a p e — Rather high conical shell with acute juvenile part, but without completely developed "trochiform" last growth phase. Whorls flat, but have narrow, swollen (tubercled) subsutural belt on juvenile, and weakly carinate periphery on post-juvenile whorls. Base feebly convex, and having shallow median depression. Peristome has short, simple columellar lip, oblique to axis; no modification visible (damaged on all specimens), except weak reflecting.

S c u l p t u r e — Subsutural spiral swelling of juvenile whorls ornamented with single row of tubercles, becoming collabrally elongate ridges during growth; initially length of ridges gradually increase but they never reach lower suture. On post-juvenile whorls strength of ridges (and tubercles) gradually decrease then wanish before adult stage; last whorl ornamented only by growth-lines.

R e m a r k s — The narrower cone shape with acute apex, and the ornament distingush this species from *Epulotrochus epulus* (D'ORBIGNY, 1853), just like from *E. acteon* (D'ORBIGNY, 1853) that has at the same time well developed trochiform shape with feebly convex whorls.

The subsutural nodosity is similar to that of *Epulotrochus? morpheus* (STOLICZKA, 1861) but it has a smaller, true trochiform adult shell of full development and the whorls are provided with a subsutural and a suprasutural carina along full length of the shell (however, a close phylogenetic relation between the two species is feasible).

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone).

Epulotrochus carinifer (HÖRNES, 1853)

(Figure 61)

1853: *Trochus carinifer* — HÖRNES, p. 759.
1861: *Trochus carinifer* HÖRN. — STOLICZKA, p. 169, pl. 1, fig. 15.

L e c t o t y p e — GBa 2008/69/12/1 (selected here).

M a t e r i a l — Shelly specimens (without juvenile part and peristome).

Measurements	H	HL	HP	D	W	AA	AL
lectotype	-	*3.6	*1.9	*8.5	*4.5	*27°	33°

S h a p e — High conical-trochiform shell, consisting of many (~20) extremely low whorls with flat surface and distinct carina on lower edge. Suture thin groove along carina of former whorl. Periphery sharply angular and carinate. Base flat in earlier growth stages but feebly concave in last growth phases; anomphalous, cross-sections suggest thick columella.

S c u l p t u r e — Growth-lines must be extremely fine, but actually not found visible. Surface of lectotype show traces of shell structure, showing layers of accreted material. Adapertural edge of layers on naturally etched shell surface provide impression of feebly prosocline (almost orthocline) growth-lines on whorls, with short prosocyrt lower part along carina. Growth-lines of base strongly opisthocyrt with short prosocyrt part around columella. Few obscure spiral lines also found near columella.

R e m a r k s — The remnants of the columellar region are indicative of a simple inner lip, therefore attribution to *Epulotrochus* seems the best solution. However, the growth-lines, that are almost orthocline on the whorls, not observed yet in other species of similar shell habit; they are usually strongly prosocline in *Epulotrochus*. This feature, the lack of the initial, and well preserved final shell parts mean some uncertainty of the systematical place.

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone), Kratzalpe at Golling Upper Sinemurian (Obtusum Zone).

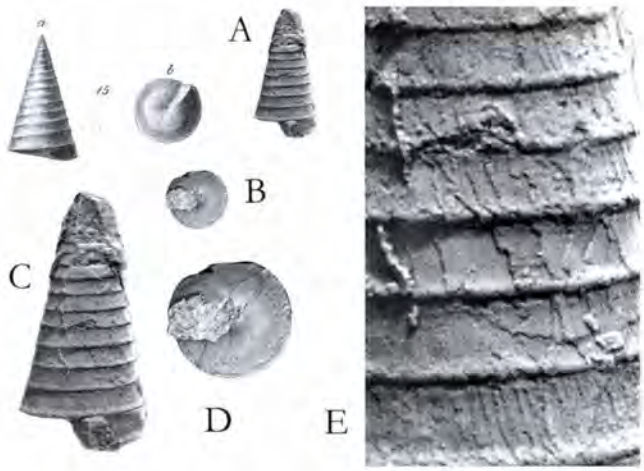

Figure 61 — *Epulotrochus carinifer* (HÖRNES, 1853), lectotype. — **15 a–b**: copy of STOLICZKA (1861) *Trochus carinifer* HÖRN. figures from Tafel I; **A–D**: lectotype in lateral (A, C) and basal (B, D) views, A–B = ×1, C–D = ×2; **E**: traces of the ornament and the shell structure that did not disappear in spite of the strong recrystallisation; ×7.

Epulotrochus? morpheus (STOLICZKA, 1861)

(Figure 62)

1861: *Trochus Morpheus* STOL. — STOLICZKA, p. 170, pl. 1, fig. 16.

L e c t o t y p e — GBa 2008/69/13/1 (selected here).
M a t e r i a l — Two specimens.

Measurements	H	HL	HP	D	W	AA	AL
lectotype	**7	*2.3	*1.3	*4	*2.5	*29°	*33°

S h a p e — Small, trochiform species of numerous, low whorls (13 in lectotype) and blunt apex. Protoconch depressed, almost planispiral with two feebly convex whorls following nucleus. From second volution, two strong carinae appear on whorls, one just above, other just below suture, forming this way rather deep sutural canal; carinae remain on shell in next growth phases. Subsequent whorls concave between carinae. Upper carina becomes less marked swelling on last 2–3 whorls. Periphery sharp, base feebly convex with shallow, central depression but without umbilicus. Peristome not preserved in the available material but short columellar lip inferable from cross section of last whorl.

S c u l p t u r e — Subsutural carina tubercled after protoconch, except last whorls. Last tubercles became collabrally elongate (like in *Epulotrochus tuberculatus* n. sp., see above) just before their gradual vanishing. Growth lines extremely fine, strongly prosocline on whorls and falciform (opisthocyrt way) on base.

R e m a r k s — The short columellar lip that is inferable from the shape of the available remnants, indicate an *Epulotrochus* species, however, belonging to another, similarly shaped, and anomphalous genus can not be still excluded.

Epulotrochus tuberculatus n. sp. has comparable shell shape and ornment, but its adult size (about 2 times larger), the different whorl-surface profile (without carinae) and the ornament distinguish it from *Epulotrochus? morpheus* (see more details above).

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone); Kratzalpe at Golling, Upper Sinemurian (Obtusum Zone).

Figure 62 — *Epulotrochus? morpheus* (STOLICZKA, 1861), lectotype. — **16 a–c**: copy of the original figures from STOLICZKA (1861) Tafel I; **A–F**: lectotype in oblique apertural (A, D), dorsal (B, E) and basal (C, F) views, A–C = ×1, D–F = ×2.5.

Genus *Plectotrochus* n. gen.

T y p e s p e c i e s: *Trochus plectus* STOLICZKA, 1861

D i a g n o s i s — Trochiform shell, consisting of numerous, extremely low whorls, separated by feebly impressed suture. Juvenile shell part prominently acute, but subsequent whorls have cyrtoconoidal outline. Base flat, aperture narrow, fissure-like. Disregarding edge of thin parietal callus, peristome unknown; whorl cross-section indicate extremely short columellar lip and a practically triangular peristome. Shell markedly sculptured; nodosed subsutural carina and regularly repeating, dense, collabral costellae compose ornament of whorls; base densely lineated (see details in description of type species below).

R e m a r k s — The general shell shape well fits to a genus group of the Proconulinae (like *Epulotrochus*, *Anticonulus*, *Dimorphotectus*, *Muricotrochus*), however *Plectotrochus plectus* (STOLICZKA, 1861) has a unique style of the ornament, therefore can not be accomodated in the other genera. Ribbed ornament of different type found in a few *Proconulus* species, but their shape is different because their whorls are higher.

Plectotrochus plectus (STOLICZKA, 1861)

(Figure 63)

1861: *Trochus plectus* STOL. — STOLICZKA, p. 171, pl. 1, 19.

L e c t o t y p e — (monotype) GBa 2008/69/16/1.

M a t e r i a l — Single specimen without earliest juvenile whorls, and major part of the peristome is also missing.

Measurements	H	HL	HP	D	W	AA	AL
lectotype	*8	*3.5	*1.8	6.2	*3.2	*37(–50)°	30°

S h a p e — Small, trochiform shell of low whorls separated by shallow impressed suture. Preserved part of juvenile shell acute conical but turning into distinctly cyrtoconical outline with growth. Number of preserved whorls 12; reconstructed shell consists of ≥15 whorls. Periphery sharply angulate; base flat; no sure trace of umbilicus found. On parietal region thin inducture preserved, columellar lip must be short (dislike original figure) but broken.

S c u l p t u r e — Tubercled subsutural spiral thread present already on earliest preserved whorl, that rapidly (in two whorls) strengthen as carina while tubercles becoming nodulae. From tubercles weak ridges run collabrally to lower suture, that becoming club–like ribs with growth. Their thicker (abapical) ends form another, weaker row of nodulae on last two whorls and causing impression of appearance of another (suprasutural, peripheral) carina. Thin incision follows subsutural carina on its abapical side, cutting ribs. Weak spiral thread follow this lines for abapically and causing irregular appearance of third (middle) row of tubercles. Base densely covered by extremely fine lines but most of them eroded.

R e m a r k s — The final growth stage of a true "trochiform shell" (i.e. the conical or coeloconoidal last whorls) lacking. Therefore the only available shell may be a not completely adult one.

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone).

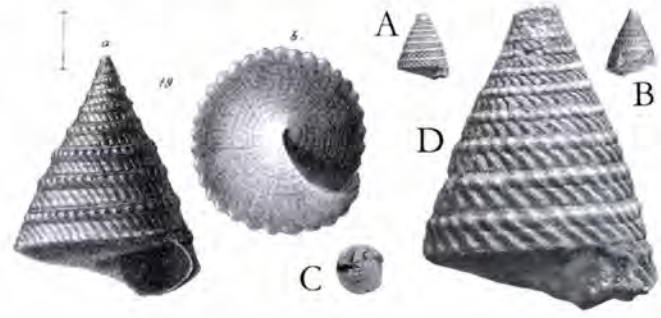

Figure 63 — *Plectotrochus plectus* (STOLICZKA, 1861), holotype. — **19 a–b**: copy of original figures from SOLICZKA (1861) Tafel I; **A–C**: the holotype in "apertural" (A), dorsal (B) and basal (C) views, ×1; **D**: magnified "apertural" view to show the peculiar ornament; ×5.

Genus *Dimorphotectus* COSSMANN, 1918

T y p e s p e c i e s: *Tectus hoernesi* KOKEN, 1896

Dimorphotectus simonyi (HÖRNES, 1853)

(Figure 64)

1853: *Trochus Simonyi* — HÖRNES, p. 759.
1861: *Trochus Simonyi* HÖRN. — STOLICZKA, p. 170, pl. 1, fig. 17.

L e c t o t y p e — GBA 2008/69/14/1 (selected here).

M a t e r i a l — Two specimens in the "originals collection" and 68 specimens in the "background" material.

Measurements	H	HL	HP	D	W	AA	AL
lectotype	**27	4.7	2.4	7.8	4.3	**19	21°

S h a p e — Turriculate – extremely high trochiform shell consisting of numerous, low, feebly convex or flush whorls (their number in reconstructed shell: ~25–27). Suture runnung in shallow, asymmetrical canal of much steeper adapical than opposite side. Periphery sharply angulate; base slightly convex and anomphalous. Peristome discontinuous, columellar lip short and its abapical part subglobularly swollen. Thickening connected to base by narrow neck and delimited from base by angulation on juvenile shells and by thin thread on adults. This nodule expanded in growth direction and also inwards aperture (not cleanable perfectly).

S c u l p t u r e — Early whorls of available specimens bear three tubercled cords. One of them running just on periphery but remains visible close above suture. Other ones formed below and above midwhorl, respectively. Lowermost (abaxial) one gradually becoming carina while others weaken on latest (4–5) whorls and, simultaneously, tubercles disappear. Tubercles spirally elongate; less on early, more distinctly on later whorls. Weak, prosocline (collabral) ridges connect each tubercles to one of those, sitting on neighbouring cords. On adult whorls, ridges observable also without tubecles. Excepting single, distinct outermost thread, base sculptured by obscure spiral lines. Growth-lines prosocline on whorls and markedly opisthocyrt on base.

R e m a r k s — In spite of the highly turriculate shell, the trochiform outline well recognisable. The shape and the columellar characters suggest belonging to genus *Dimorphotectus*. However, it is important to call the attention to the similarity to some *Trypanotrochus* species, manifested mainly in the turriculate shell and the granulate ornament.

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone).

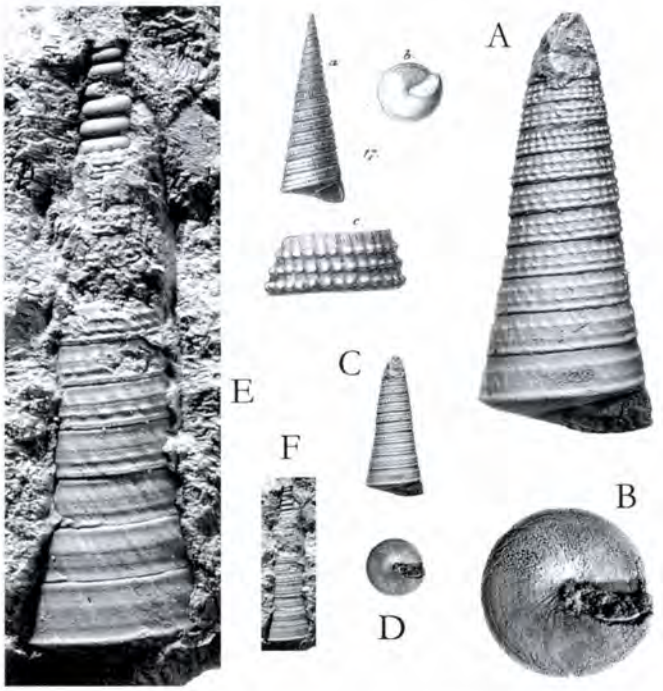

Figure 64 — *Dimorphotectus simonyi* (HÖRNES, 1853); lectotype and a paralectotype. — **17 a–c**: copy of STOLICZKA's (1861) original figures from Tafel I; **A–D**: lectotype in "apertural" and basal views, C–D = ×1; A–B = ×3; **E–F**: a paralectotype (GBA 2008/69/14/2) in lateral view, F = ×1, E = ×3.5.

Dimorphotectus? attenuatus (STOLICZKA, 1861)

(Figure 65)

1861: *Trochus attenuatus* STOL. — STOLICZKA, p. 171, pl. 2, fig. 1.

L e c t o t y p e — GBa 2008/69/17/1 (selected here).

M a t e r i a l — Two original specimens without apex and peristome.

Measurements	H	HL	HP	D	W	AA	AL
lectotype	-	*4.4	**2.3	*4.2	*2.8	18°	20°

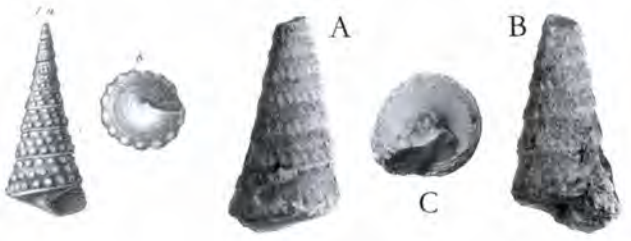

Figure 65 — *Dimorphotectus? attenuatus* (STOLICZKA, 1861), lectotype. — **1 a–b**: copy of the original figures of STOLICZKA's (1861) Tafel II; **A–C**: the lectotype in dorsal (A), "apertural" (B) and basal (C) views, ×1.5.

S h a p e — High conical (turriculate) shell of somewhat convex whorls, separated by asymmetrically canaliculate suture. Periphery rather sharply angulate, bicarinate; base feebly convex, anomphalous. Upper peripheral carina stronger and visible on all whorls, suture follows lower carina, remaining sometimes exposed. No peristome part preserved.

S c u l p t u r e — Above peripheral ones, two carinae or three cords provide further spiral sculpture elements. All of them tubercled; one tubercle of each row connected to neighbouring ones by low, prosocline, collabral ridges. Base covered by thin spiral threads.

R e m a r k s — The two specimens are rather different, they may be representatives of two species. One specimen has conical shell while the other is cyrtoconoidal.

On the conical specimen, the number of spiral ornamental elements are larger but they are weaker and the collabral ridges dominate over the granulae. On the other specimen, the granulae are much stronger and the ridges are only just visible. Further and better preserved specimens are needed to solve this problem.

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone).

Genus *Proconulus* COSSMANN, 1918

T y p e s p e c i e s: *Trochus guillieri* COSSMANN, 1885

Proconulus avernus (STOLICZKA, 1861)

(Figure 66)

1861: *Trochus Avernus* STOL. — STOLICZKA, p. 172, pl. 2, fig. 6.
1911: *Trochus Avernus* STOL. — M. GEMMELLARO, p. 224, pl. 10, figs. 3–4.

L e c t o t y p e — GBa 2008/69/20/1 (selected here).

M a t e r i a l — A single, damaged specimen; some uncertain ones are also in the background collection.

Measurements	H	HL	HP	D	W	AA	AL
lectotype	-	10.6	7.6	11.6	7	57°	57°

S h a p e — Medium sized, turbiniform – conical shell with rather high, convex whorls and shallow, canaliculate suture. On last whorl, narrow, steep ramp also develops. Periphery angular and bearing single, weak carina. Base convex and anomphalous. Peristome of "*Proconulus* type", slightly prosocline and discontinuous.

S c u l p t u r e — Whorls and base ornamented by spiral threads, equally strong on juvenile whorls but second generation also appearing from penultimate whorl and on base between pairs of earlier ones. Growth lines rather irregular and making surface of whorls uneven.

R e m a r k s — Shell shape and ornament is near to that of *Proconulus baldensis* (PARONA, 1894) (see: CONTI & SZABÓ 1987) from the Mediterranean Bajocian. The observable differences are the somewhat more slender shell of *P. avernus* and its fewer whorls. However, *P. baldensis* is extremely variable and this shape may occur within also the latter species. Regarding the significant difference in the age of the two species, their independency is quite conceivable, however, further and better preserved material is needed to make a more reliable comparison.

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone); Galati (East Sicily), Upper Pliensbachian.

Figure 66 — *Proconulus avernus* (STOLICZKA, 1861), lectotype. — 6 a–b: copy of the original figures from STOLICZKA's (1861) Tafel II; **A–C**: apertural (A), dorsal (B) and basal (B) view in natural size; **D**: magnified apertural view to show the details, ×2.5.

Proconulus? scherinus (G. G. GEMMELLARO, 1874)

(Figure 67: E–H)

1874: *Trochus Scherinus* GEMM. — GEMMELLARO, G. G., p. 99, pl. 12, figs 10 a–b.
1981: *Proconulus scherinus* (GEMMELLARO, 1874) — SZABÓ, p. 56, pl. 1, figs 4–5.

M a t e r i a l — Five damaged, shelly specimens (HGM).

Measurements	H	HL	HP	D	W	AA	AL
Figure 67: E–H	13	4.5	3	7.5	4	35°	28°

S h a p e — Dextral, conical shell with slightly acute apex. Whorls flat or feebly convex. Periphery rounded-angular; base slightly convex, anomphalous; peristome quadrangular and prosocline, its columellar part bearing weak callus.

S c u l p t u r e — Shell ornamented by growth lines, being prosocline on whorls and opisthocyrt on base. Obscure spiral line fragments also appear randomly under magnification, in 0.5-1 whorl length.

R e m a r k s — The base of a juvenile specimen is concentrically striated, corresponding mostly to GEMMELLARO's description. The adult specimens are without distinct spiral lines and their form is also slightly different: the surface of the last 1–2 whorls is somewhat more convex and the periphery is more rounded than on GEMMELLARO's figures. From the species occurring in

the Bakony Mts, the juvenile specimens of *P.? epuloides* SZABÓ, 1981 cause difficulty in the distinction. Above the measurements, *P.? epuloides* always has sharp periphery.

D i s t r i b u t i o n — Chiusa Sclafani (Sicily), Upper Pliensbachian; Sümeg, Upper(?) Sinemurian; Lókút, Kericser, Lower Pliensbachian (Ibex Zone), (Bakony Mts).

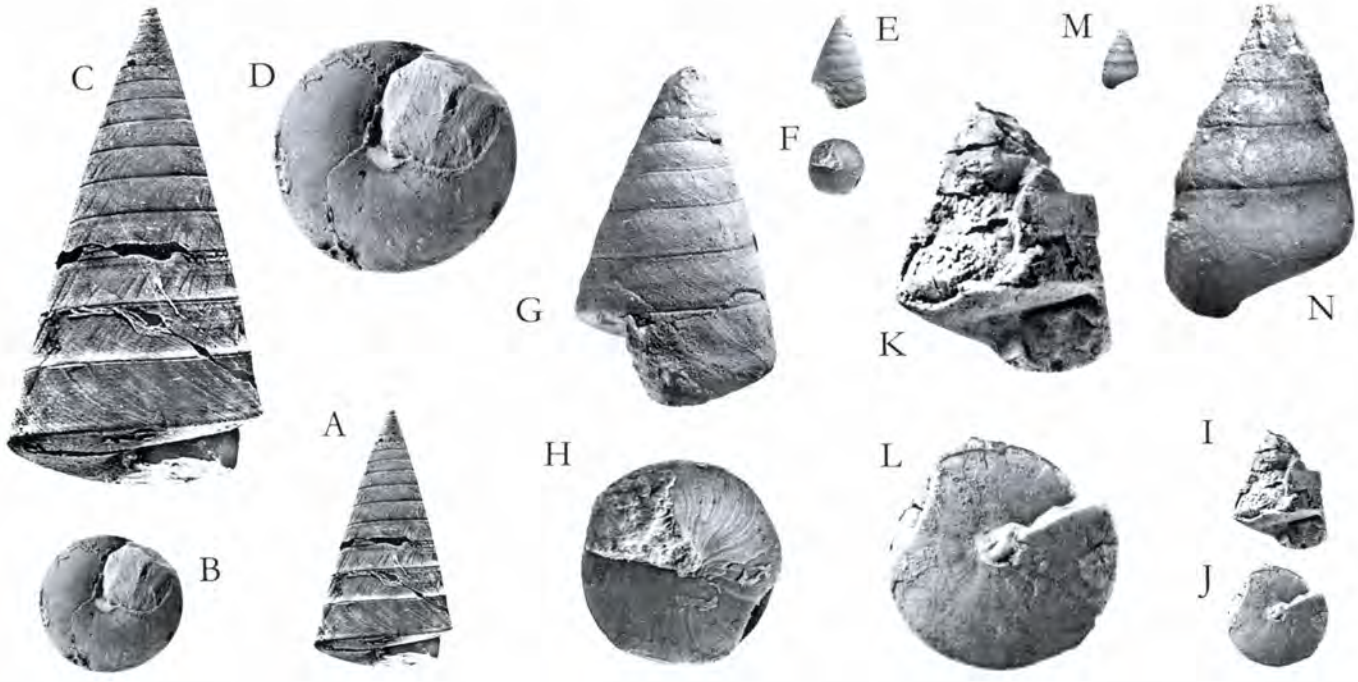

Figure 67 — *Proconulus? scherinus* (GEMMELLARO, 1874) (E–H), *Proconulus? epuloides* SZABÓ, 1981 (A–D), *Proconulus?* cf. *galatensis* (GEMMELLARO, M., 1911) (M–N), *Discotectus?* sp. (I–L). — **A–D**: holotype of *Proconulus? epuloides* SZABÓ, 1981, refiguration, dorsal (A, C) and basal (B, D) views, A–B = ×1, C–D = ×2; **E–H**: *Proconulus? scherinus* (GEMMELLARO, 1874), lateral (E, G) and basal (F, H) views, E–F = ×1, G–H = ×3; **M–N**: *Proconulus?* cf. *galatensis* (M. GEMMELLARO, 1911), lateral view, M = ×1, N = ×5; **I–L**: *Discotectus?* sp., apertural (I, K) and basal (J, L) views, I–J = ×1, K–L = ×3.

Proconulus? epuloides SZABÓ, 1981

(Figure 67: A–D)

1981: *Proconulus epuloides* sp. n. — SZABÓ, p. 56, pl. 1, figs. 2–3.

M a t e r i a l — One of the 22 specimens is inner mould, the others are shelly specimens, of which some are excellently preserved (HGM, holotype: J 10121).

Measurements	H	HL	HP	D	W	AA	AL
holotype	36.5	11.5	6.5	19.5	9.5	35°	27°

S h a p e — Dextral, high conical or feebly cyrtoconical spire with somewhat acute juvenile shell. Whorls flat, except last ones of adult specimens, being slightly concave. Periphery sharply angulate, like carina, on adult specimens. Base flattened, anomphalous, aperture strongly prosocyrt with conspicuously opisthocyrt basal lip. At foot of columella, distinct, narow "C"-shaped callus developed on base along basal lip.

S c u l p t u r e — Shell smooth, "ornament" consisting of fine growth lines, being strongly prosocline between sutures and opisthocyrt (sickle-shaped) on base. Adult whorls and mainly base show some obscure spiral lines, too.

R e m a r k s — The shape of the shell is similar to that of the *Epulotrochus* species but there is a considerable "C"-shaped callus at the foot of columella along the adaxial part of the basal lip. Because of this, SZABÓ (1981) identified this species as *Proconulus* in the original designation. However, this shell part has a different morphology in the typical *Proconulus*; first of all there is a true columellar lip in this genus, but it is so short in *Proconulus? epuloides* that it is practically equal with the absence. The callus-like, widened part in *Proconulus* is part of the outer face of the columellar lip, sometimes extending also to the basal lip, but the callus of *Proconulus? epuloides* is secreted onto the base along the adaxial part of the basal lip. This form may represent a new genus.

D i s t r i b u t i o n — Lókút, Kericser, beds with mixed Obtusum to Ibex Zone fauna, and higher Pliensbachian; Lókút, Fenyveskút, and Eplény, both Upper Pliensbachian (all in the Bakony Mts).

Proconulus? cf. *galatensis* (GEMMELLARO, M., 1911)

(Figure 67: M–N)

cf. 1911: *Chemnitzia galatensis* GEMM. — GEMMELLARO, M., p. 236, pl. 9, figs 17–18.
1983: *Proconulus*? cf. *galatensis* (GEMMELLARO, M., 1911) — SZABÓ, p. 28, pl. 1, fig. 6

M a t e r i a l — Three fragmentary specimens.

Measurements	H	HL	HP	D	W	AA	AL
Figure 67: M–N	-	5	3.5	5	-	50°	18°

S h a p e — Trochiform shell of thick wall, with distinctly acute apex. Shell consisting of high number of feebly convex or flat whorls with suture, appearing as narrow groove. Last whorl (related to diameter) higher than previous ones and having rounded periphery. Base convex, without umbilicus. Peristome slightly prosocline, roundish quadrate in outline; edge of outer lip sharp and columellar lip bears small callus, extending towards base.

S c u l p t u r e — Beyond slightly prosocline growth lines, collabral elements visible only on juvenile shell: tiny, suture to suture riblets. Spiral sculpture shown only on base, consisting of lines, being stronger centrally and fading out, then disappearing at periphery.

R e m a r k s — The morphology may suggests belonging to *Proconulus*, except the last whorl, coiling of which significantly differs from that of the pervious ones. This feature, with associated similar shape, appears in some genera of the Coelostylinidae. However, new, well preserved material is necessary to a more accurate identification.

The shape is near to that of the species *Chemnitzia galatensis* M. GEMMELLARO, but this form is described as a smooth species. Taking into consideration the weak ornament of the Sümeg specimens, it is possible that the lack of ornamentation is due to preservational causes.

D i s t r i b u t i o n — Galati (E Sicily, Italy), Upper Pliensbachian; Sümeg (Bakony Mts), Upper(?) Sinemurian.

Proconulus? *kneri* (STOLICZKA, 1861)

(Figure 68)

1861: *Trochus Kneri* STOL. — STOLICZKA, p. 172, pl. 2, fig. 2.

L e c t o t y p e — GBa 2008/69/19/1 (selected here).

M a t e r i a l — Two shelly specimens with damaged peristome and poorly preserved protoconch in STOLICZKA's (1861) "originals collection".

Measurements	H	HL	HP	D	W	AA	AL
lectotype	6	4.5	2.4	-	-	52°	37°

Figure 68 — *Proconulus*? *kneri* (STOLICZKA, 1861) lectotype (A–B) and paralectotype (C). — **5**: copy of the original figure from STOLICZKA (1861) Tafel II; **A–B**: apertural view of the lectotype, A = ×1, B =×5; **C**: dorsal view of the paralectotype (GBa 2008/69/19/2), ×5.

S h a p e — Small, thick-shelled species of few (6–7), moderately convex whorls and impressed suture. Shell outline more or less cyrtoconical. Periphery angular, base convex and having narrow false umbilicus along slightly reflected columellar lip. Peristome continuous but only in adult stage when moderately enlarged and thickened. Broken surface show only thin inducture on parietal wall behind adult parietal lip. Inner lip separated by furrow from base and has rather wide outer face with shallow depression on columellar lip, that probably continued also on basal lip, being not preserved. Aperture changes circular in last growth phase from earlier form.

S c u l p t u r e — Spiral threads cover whorls and base. Their number remains constant on whorls with increasing sthrength. On central part of base stronger threads visible than on belt of outer half. Single spiral cord running just on top of peripheral angulation. Growth-lines fine and prosocline.

R e m a r k s — In Proconulinae, peristome characters belong to the distinctive ones on (sub)generic level. The above descibed adult peristome modification is suitable to the criteria needed to establish a new (sub)genus. Another species of the same peristome modification has already been found in another material therefore the necessary new genus will be outlined elsewhere.

D i s t r i b u t i o n — Kratzalpe at Golling, Sinemurian (Obtusum Zone).

Proconulus? *multicostatus* (STOLICZKA, 1861)

(Figure 69)

1861: *Chemnitzia multicostata* STOL. — STOLICZKA, p. 164, pl. 1, fig. 4.

L e c t o t y p e — GBa 2008/69/4/1 (selected here).

M a t e r i a l — A single specimen without juvenile whorls and with partially preserved peristome in STOLICZKA's (1861) "originals collection"and a whorl fragment in the "background collection".

Measurements	H	HL	HP	D	W	AA	AL
lectotype	-	*5.5	*3.2	*5.5	*3.5	-	22°

S h a p e — High conical, rather thick-walled shell, composed of relatively low, feebly convex whorls with slightly impressed suture. Periphery sharply angular and bearing weak carina; base moderately convex and anomphalous. Peristome somewhat ovate and discontinuous; aperture almost circular, inner lip feebly convex and having furrow parallel to peristome rim at foot of columella, outer lip not preserved.

S c u l p t u r e — Collabrally, whorls densely covered by feebly parasigmoidal riblets (50 on last whorl). Near last peristome, riblets make peripheral carina first granulate then gradually reaching center of base. Disregarding some obscure spiral line above peripheral carina, spiral ornament visible only on base as dense, equally fine threads. Collabral ornament on base opisthocyrt.

R e m a r k s — The shape and ornament resembles to those of some proconulinae genera (e.g. *Proconulus* itself has also a shallow deepening at the meeting of the columellar and basal lips), and some unpublished species. Together they seem to belong to a genus, having been not established yet because of lack of satisfactory data.

D i s t r i b u t i o n — Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone).

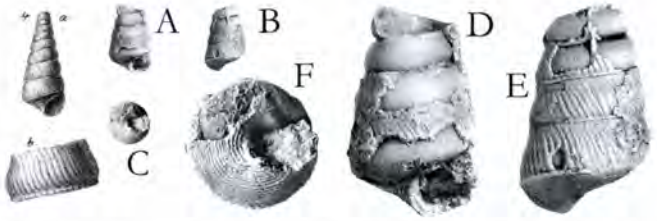

Figure 69 — *Proconulus*? *multicostatus* (STOLICZKA, 1861), lectotype. — **4 a–b**: copy of the original figures from STOLICZKA (1861) Tafel I; **A–C**: the lectotype in apertural, dorsal and basal views, ×1, **D–F** the same views, magnified to show the morphological details, ×3.

Genus ? *Discotectus* COSSMANN, 1918

T y p e s p e c i e s: *Trochus massalongoi* G. G. GEMMELLARO, 1868

Discotectus? sp.

(Figure 67: I–L)

1981: *Dimorphotectus* sp. — SZABÓ, p. 58, pl. 1, figs 14–15

M a t e r i a l — A single, fragmentary specimen (HGM).

Measurements	H	HL	HP	D	W	AA	AL
Figure 67: I–L	-	*8.2	*5	*13.5	*6.8	-	28°

S h a p e — Dextral, feebly cyrtoconical shell; surface of numerous low whorls flat, periphery carinated and base slightly convex. On columellar lip, large flattened swelling visible.

S c u l p t u r e — Ornament consists of only fine growth-lines, being prosocline on whorls and opisthocyrt on base.

R e m a r k s — Owing to bad preservation, the specimen is not identifiable on species level. Its shape is similar to that of *Epulotrochus acteon* (D'ORBIGNY) but the columellar structure suggests another genus. First time SZABÓ (1981) has guessed belonging to *Dimorphotectus* COSSMANN, 1918 but subsequent comparisons to types require modification. The shape of the columellar fold is most similar to that of *Discotectus* COSSMANN, 1918. Further material is needed to a right identification.

D i s t r i b u t i o n — Sümeg, (Bakony Mts), Upper(?) Sinemurian.

Family Paraturbinidae COSSMANN, 1916

Genus ? *Chartronella* COSSMANN,1902

T y p e s p e c i e s: *Chartronia digoniata* COSSMANN,1902

Chartronella? noszkyi SZABÓ, 1982

(Figure 70)

1982: *Chartonella noszkyi* sp. n — SZABÓ, p. 22, pl. 2, figs 7–8.

M a t e r i a l — Three rather well preserved shelly specimens (HGM, holotype: J 10132).

Measurements	H	HL	HP	D	W	AA	AL
holotype	*24	16	12	19.5	11.5	69°	69°

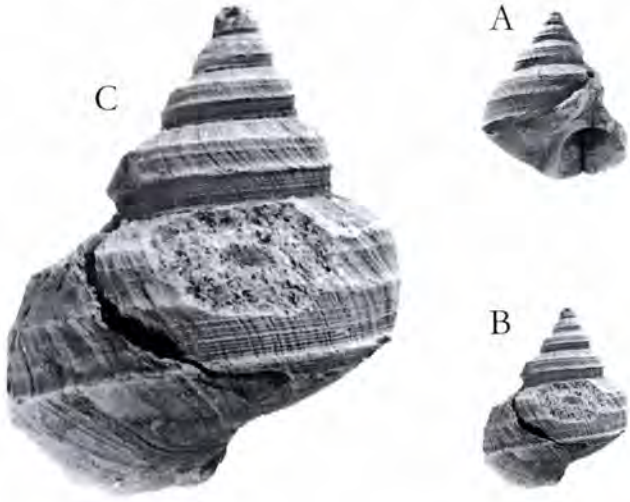

Figure 70 — *Chartronella? noszkyi* SZABÓ, 1982, refiguration of the holotype. — **A–B**: apertural and dorsal views, ×1; **C**: magnified dorsal view to show the ornament, ×3.

S h a p e — Dextral, moderately high turbiniform, thick-walled shell. Surface of whorls convex and divided into three flattened, longitudinal belts, being roughly equal in width; uppermost one of these forms narrow ramp. Suture running just on lower edge of lowermost band. Base convex and anomphalous. Peristome rounded, prosocline, particularly at its outer lip (being damaged but its orientation given by growth-lines). Narrow and shallow furrow separates moderately thickened inner lip from low basal ridge, running from parietal lip to foot of columella.

S c u l p t u r e — As strongest spiral ornamental elements, three carinae visible on last whorl, just on angulations, separating flattened bands. On earlier whorls, lowermost carina just overlapped by suture. Other, weaker cords also present on juvenile shell, but disappear on penultimate whorl. Besides these, fine, dense threads both on base and spire observable. Growth-lines prosocline, slightly sigmoidal on whorls and parasigmoidal on base.

R e m a r k s — On the basis of the rather gradate outline and the tricarinate last whorl (and bicarinate preceding ones) *Chartronella noszkyi* is distinguishable from the majority of its congeners. A comparable species is HUDLESTON's (1894) "*Trochus spiratus* D'ACHIAC", especially the specimen on pl. XXXI. fig. 7 having a tricarinate last whorl, but differs by its somewhat cyrtoconoidal shape and a suture less deep than in *Chartronella noszkyi*. Moreover, the secondary spiral sculptural elements are rarer and stronger, than in *Chartronella noszkyi*.

D i s t r i b u t i o n — Eplény (Bakony Mts), Upper Pliensbachian.

Family Nododelphinulidae COX, 1960

Genus *Guidonia* DE STEFANI, 1880

T y p e s p e c i e s: *Trochus rotulus* STOLICZKA, 1861 [suggested by HAAS (1953) to fix a type species to *Guidonia* beacause of unsolvable nomenclatorial troubles around the originally selected "*Trochus* or *Turbo Songavatii*" STOPPANI].

R e m a r k s — *Guidonia* belongs to the genera that are somehow missing from the well known handbooks, targeting classification of gastropods. HAAS (1953) suggested a tentative systematic place in Pleurotomarioidea (Trochonematidae), similarly to the former authors, however, he expressed his opinion that no pleurotomarioidean relation were indicated by the shell morphology. Actually, the shell morphology is just slightly different from that of *Trochonema*, but it is meaningful for classification: no sinus band or row of lunulae are recognisable on the shells of *Guidonia*. Therefore, a Trochoidean systematic position seems to be more correct.

GRÜNDEL (2004) regarded *Guidonia* as member of Liotiidae (Trochoidea). However, on the basis of the bicarinate whorls and the gradate shell outline, here the family Nododelphinulidae is thought as the best systematic place for *Guidonia*. The shell shape resembles also typical *Chartonella* and this indicate a possible accomodation in another family.

Guidonia rotula (STOLICZKA, 1861)

(Figure 71)

1861: *Trochus rotulus* STOL. — STOLICZKA, p. 173, pl. 2, figs 7 a–c.

L e c t o t y p e — GBa 2008/69/21/1 (selected here).

M a t e r i a l — Three specimens of various preservation.

Measurements	H	HL	HP	D	W	AA	AL
lectotype	*4.5	*4	*2.4	*4.3	*2.2	~170°	90°

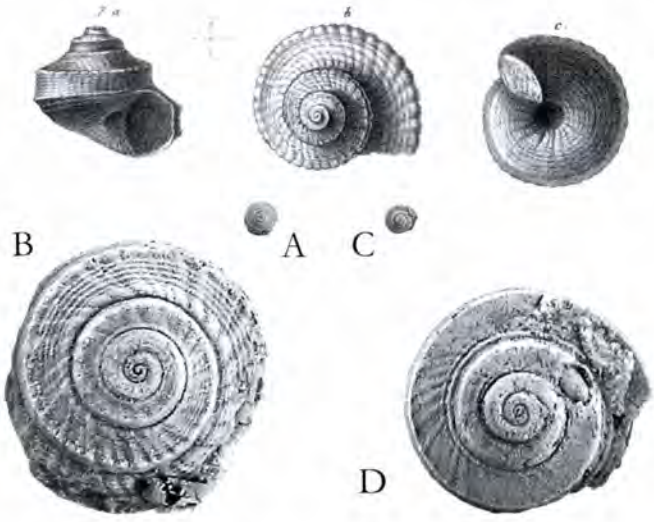

Figure 71 — *Guidonia rotula* (STOLICZKA, 1861), lectotype (A–B) and paralectotype(C–D). — **7 a–c**: copy of the original figures from STOLICZKA (1861) Tafel II; **A–B**: lectotype in apical view, A = ×1, B = ×8; **C–D**: paralectotype (GBa 2008/69/21/2) in apical view, C = ×1, B = ×8.

S h a p e — Small, few (5) whorled shell of planispiral protoconch and gradate teleoconch. Protoconch consisting of two whorls; first half and initial chamber slightly impressed. First three whorls simply convex then angulation developes gradually below midwhorl, subdividing whorls into gently sloping, wide ramp and narrower outer face. Latter almost parallel to axis but abapically feebly deviates abaxially. Ramp becoming slightly concave short after appearance, simultaneously with formation of keel on angulation; outer face does it also but in various growth stages in different specimens. Periphery angulate and carinate. Base convex and narrowly phanerompalous or having considerable false umbilicus. Peristome strongly prosocline, not in one plane and discontinuous, only thin inducture connect suture to columellar lip, being backward inclined.

S c u l p t u r e — Protoconch seems to have no ornament. Spiral threads appear on third whorl first along suture then cover, on two specimens, complete whorl and also base. Third specimen has spiral threads only along suture and in outer, near periphery belt of base. Collabrally, marked growth-lines cross the spiral ornamental elements on whole shell and low, periodically repeating ridges do it on the ramp. Ridges gently corrugating angulation at abaxial rim of ramp and subsutural swollen (cord-like) edge of whorls.

R e m a r k s — In the available small material two strongly different ornament appear but the shapes are similar. Two specimens have the ornament, displayed in Figure 71: A–B (lectotype), this matches better to the original figuration. The other ornament type is much more delicate and lacks many elements of the previous sculpture; to find a possible taxonomical conclusion to these differences, further material is necessary.

Guidonia rotula resembles to some *Helicacanthus*, and low spired *Amphitrochus* species; both genera are member of family Nododelphinulidae COX, 1960. COX accomodated this family in superfamily Amberleyoidea WENZ, 1938 (= Eucycloidea KOKEN, 1897). *Guidonia* resembles also *Chartronella* (Paraturbinidae, Palaeotrochoidea). This similarity also call the attention that a revision of Eucycloidea and Palaeotrochoidea is badly needed. Tentatively Nododelphinulidae regarded as independent family here but within Trochoidea.

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone).

Superfamily Eucycloidea KOKEN, 1897
Family Eucyclidae KOKEN, 1897
Subfamily Eucyclinae KOKEN, 1897
Genus *Eucyclus* J. A. EUDES-DESLONGCHAMPS, 1860
Subgenus *Eucyclus* J. A. EUDES-DESLONGCHAMPS, 1860
T y p e s p e c i e s: *Eucyclus obeliscus* J. A. EUDES-DESLONGCHAMPS, 1860

R e m a r k s — Beside the most common, low to high turbiniform species of the genus, moderately and strongly turriculate transformation of shells with *Eucyclus* morphology were also found in the Hierlatz Limestone material. Two of the three species, distinguishable amongst the "*Chemnitzia margaritacea* STOLICZKA, 1861" syntypes, have rather slender shells of 18° and 25° coiling angle, respectively; [*Eucyclus margaritaceus* (STOL.) and *Eucyclus sandrae* n. sp.]. Their "cenogastropod-like" form caused some hesitation owing to their strongly fragmentary shells. However, their genus identification as *Eucyclus* was supported by the subturriculate form of the type species on one hand, and by the occurrence of a new species in the fauna with rather typical *Eucyclus* morpohology (*Eucyclus mitterseensis* n. sp.) that has rather high and acute shell of coeloconoidal outline with coiling angles, changing from ~20° to 31°, on the other hand.

GRÜNDEL (2007) also reported similar trouble in his paper, written about the Feuguerolles (Normandy, France) Pliensbachian gastropod fauna; he regarded the turriculate and cyrtoconoidal *Procerithium*(?) *dimorphospira* COSSMANN, 1913 as questionably belonging to *Eucyclus*.

Eucyclus (Eucyclus) alpinus STOLICZKA, 1861

(Figure 72)

1861: *Eucyclus alpinus* STOL. — STOLICZKA, p. 176, pl. 2, fig. 12.
1874: *Eucyclus alpinus* STOL. — GEMMELLARO, G. G., p. 98, pl. XII, fig. 13.
1911: *Eucyclus alpinus* STOL. — GEMMELLARO, M., p. 223, pl. X, figs 26-28., 31.
1912: *Eucyclus alpinus* STOL. — DARESTE DE LA CHAVANNE, p. 53, pl. IV, fig. 4.
1937: *Amberleya alpina* STOL. — PCHELINCEV, p. 29, pl. II, fig. 14.
1966: *Eucyclus alpinus* STOL. — BOURROUILH, p. 36, pl. I, fig. 1.
1967: *Pleurotomaria* (?) *obesa* (TERQUEM & PIETTE) — SACCHI VIALLI & CANTALUPPI, p. 118, pl. 18, fig. 2.
1982: *Amberleya (Eucyclus) alpina* (STOLICZKA, 1861) — SZABÓ, p. 23, pl. 2, figs 11–13.
1991: *Amberleya (Eucyclus) alpina* (STOLICZKA, 1861) — CONTI & MONARI, p. 272, pl. 8, figs 10–13.
2003: *Eucyclus alpinus* STOL. — SZABÓ in VÖRÖS et al., p. 62, pl. 5: 15

L e c t o t y p e — GBa 2008/69/25/1 (monotype).
M a t e r i a l — Single specimen from the Schafberg (GBa); 22 specimens in the HGM.

Measurements	H	HL	HP	D	W	AA	AL
lectotype	-	*17	*12	*15	-	-	40°

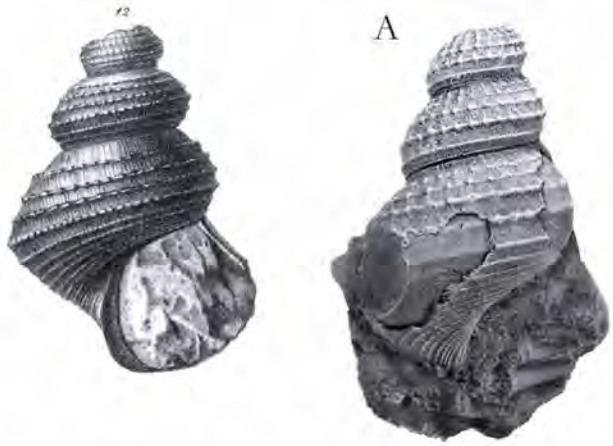

Figure 72 — *Eucyclus (Eucyclus) alpinus* STOLICZKA, 1861, holotype. — **12**: copy of the original figure from STOLICZKA (1861) Tafel II; **A**: photo of the lectotype, ×2.

S h a p e — High littoriniform shell with rounded-angular periphery, deeply impressed suture and convex base without umbilicus. Peristome subquadral, its columellar lip vertical and strong, having a rather wide outer face; outer lip rather weak and thin, just like remaining parts of shell.

S c u l p t u r e — Spirally, whorls ornamented by tubercled carinae, strongest of which runs along periphery well below midwhorl. Two carinae situated between suture and periphery on earliest whorls, but their number increases to four on larger (adult) specimens. Next carina below periphery, exposed only on last whorl, slightly weaker from strongest one; suture follows this one. Some other carina in peripheral region and numerous cords in internal parts ornament base spirally. These latter arranged with narrower interspaces than carinae and have no tubercles. Collabral ornament consists of delicate, somewhat prosocline growth-threads.

R e m a r k s — Though STOLICZKA (1861) stated that *Eucyclus alpinus* is frequent in the Schafberg material, a single specimen (= lectotype) represents this species in the GBa "originals collection". At the same time, this is the only specimen in this collection from the Schafberg.

The earliest appearance of *Eucyclus alpinus* is indicated from the Raricostatum Zone (latest Sinemurian) in the Moroccan Atlas (BOURROUILH 1966). From the Early Plensbachian in association with *Discohelix orbis*, *Eucyclus alpinus* has become widely distributed in the Mediterranean Faunal Province of the Tethyan Realm and therefore they can be regarded as "palaeobiogeographical indeces" during the Pliensbachian. They occur also in some lithological types whose depositional environment is thought to have been in the deepest see bottom region during the Jurassic of the studied palaeogeographic region (e. g. Adnet Limestone).

Different authors have documented also different forms, with slightly coeloconoidal outline, smaller spiral angle or slight changes in the sculptural characters. These differences mark a rather high variability of the species.

D i s t r i b u t i o n — Schafberg at St. Wolfgang (Austria), Late Pliensbachian; Bakony Mts, ?Latest Sinemurian (beds with mixed Obtusum to Ibex Zone fauna) to latest Pliensbachian (Stokesi Zone); Southern Alps (Italy), Late Pliensbachian; Sicily (Italy), Late Pliensbachian; Atlas Mountains, Guelma (Algeria) Pliensbachian, Marocco, latest Sinemurian and earliest Pliensbachian; East Caucasus, Pliensbachian.

Eucyclus (Eucyclus) mitterseensis n. sp.

(Figure 73)

H o l o t y p e — NhM 1861/0001/0028.
T y p e l o c a l i t y — Schafberg over St. Wolfgang, Salzkammergut, Austria.
T y p e s t r a t a — Sinemurian Hierlatz Limestone.
N a m e — From the Mittersee, a lake near the Schafbergspitze; gastropod bearing rocks were found around this lake.
D i a g n o s i s — Turriculate-pagodiform shell of coeloconoidal outline, nodose-carinate angulation on whorls near

lower suture, which becomes periphery on last whorl; wide, steep, feebly convex ramp between upper suture and angulation; base rather low, convex and anomphalous; beside peripheral carina weaker, sparse cords ornament both ramp and base with traces of granules on them.

M a t e r i a l — A single specimen from STOLICZKA (1861) collection (NhM), identified as *Trochus cupido*.

Measurements	H	HL	HP	D	W	AA	AL
holotype	-	*16.5	*11.8	*17.2	-	*≤20°	*31°

S h a p e — Turriculate-pagodiform shell of coeloconoidal outline consisting of relatively high number of whorls, nodose-carinate spiral angulation running on whorls near lower suture. Angulation becomes periphery on last whorl. Suture running in deep, wide canal little below angulation. Wide, steep, feebly convex ramp extending between upper suture and angulation. Base rather low, convex and anomphalous; no peristome part neither apical whorls found preserved.

S c u l p t u r e — Below peripheral carina slightly weaker spiral carina visible that is just covered by the suture on former whorls. Further, weaker, sparse cords ornament both ramp and base with traces of granules on them. Growth-lines moderately prosocline.

R e m a r k s — *Eucyclus (Eucyclus) mitterseensis* n. sp. has smaller and more slender shell than *Eucyclus (Eucyclus) alpinus*, and the number, the strength and the arrangement of the spiral ornamental elements are also different. The shell outline is also unlike because it is slightly coeloconoidal. In this latter character, the specimen resembles the Toarcian *Eucyclus (Eucyclus) barnabasi* SZABÓ, 1995 but the shape of the whorls and the ornament distinguish it.

D i s t r i b u t i o n — Schafberg at St. Wolfgang, Austria), the preservation of the only available specimen suggests its occurrence in the typical Hierlatz Limestone (Sinemurian).

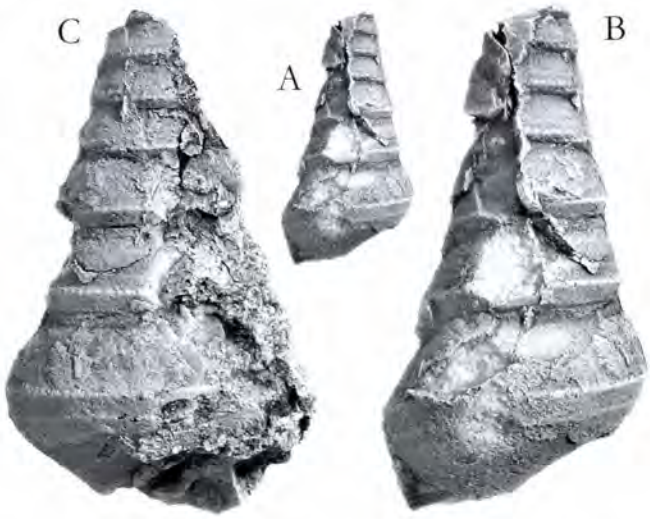

Figure 73 — *Eucyclus (Eucyclus) mitterseensis* n. sp., holotype. — **A**: holotype in dorsal view, ×1; **B–C**: holotype in "apertural" and dorsal views, ×2.

Eucyclus (Eucyclus) margaritaceus (STOLICZKA, 1861)

(Figure 74: A–D)

pars 1861: *Chemnitzia margaritacea* STOL. — STOLICZKA, p. 167, pl. 1, fig. 10 a.

L e c t o t y p e — GBa 2008/69/9/1/1 (selected here).

M a t e r i a l — Single, fragmentary specimen from the *Chemnitzia margaritacea* STOLICZKA, 1861 box of the "originals collection" in the GBa Museum. No more specimen were found in the "background" material.

Measurements	H	HL	HP	D	W	AA	AL
lectotype	-	*12	*7	11	*6.7	-	25°

S h a p e — Fragments indicative of turriculate shell, consisting of rather high, strongly convex whorls, separated by impressed suture. Periphery rounded, suture running far below it. Base convex, anomphalous but narrow false umbilicus visible behind slightly reflecting columellar lip. Parietal region suggests discontinuous peristome. No other part of peristome preserved, but from cross-section of last whorl, outer lip inferable subcircular between foot of columella and suture.

S c u l p t u r e — Spiral cords and threads, and subregularly repeating fine collabral threads ornament whorls. Four cords present on last periphery, lowermost one just covered by suture on former whorls. On "ramp", five granulate threads visible; uppermost two cords of peripheral region also granulate. Tubercles of neighbouring spiral threads and cords connected by weak collabral riblets. Base covered by dense spiral threads crossed only by fine growth-lines.

R e m a r k s — There are three fragmentary syntypes in STOLICZKA's (1861) "originals collection" under the name "*Chemnitzia margaritacea*" that belong to three different species. From these specimens, that one is selected as the name bearing type, which is the most probable model to the drawing in STOLICZKA (1861) Tafel I, Figure 10 a.

This kind of ornament is rather common in Eucyclidae, its pattern is frequent in *Eucyclus*, but the reconstruable shell is unusually turriculate. That is why some notices are given about some other instances in the remarks to *Eucyclus* (see above).

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Late Sinemurian (Oxynotum Zone).

Eucyclus (Eucyclus) sandrae n. sp.

(Figure 74: E–F)

pars 1861: *Chemnitzia margaritacea* STOL. — STOLICZKA, p. 167, pl. 1, fig. 10 b.

H o l o t y p e — GBa 2008/69/9/2/1.

T y p e l o c a l i t y — Hierlatz Alpe over Hallstatt, Salzkammergut, Austria.

T y p e s t r a t a — Sinemurian (Oxynotum Zone) Hierlatz Limestone.

N a m e — Dedicated to Prof. Maria Alessandra CONTI (Universitá "La Sapienza", Rome).

D i a g n o s i s — Turriculate shell with convex whorls; suture deeply impressed; base convex and anomphalous. Four cords ornament whorls beween midwhorl and abapical suture, no spiral ornament developed between midwhorl cord and upper suture except single, later paired, granulate cord(s) just below suture; granulae may appear also on other cords. Base densely lineated spirally; periodical collabral riblets cross last whorl from suture to middle of base.

M a t e r i a l — Single, fragmentary specimen (holotype) is distinguished from the *Chemnitzia margaritacea* STOLICZKA, 1861 box of the "originals collection" in the GBa Museum, and three specimens are found in the "background collection".

Measurements	H	HL	HP	D	W	AA	AL
holotype	-	**14	-	**12.5	-	-	18°

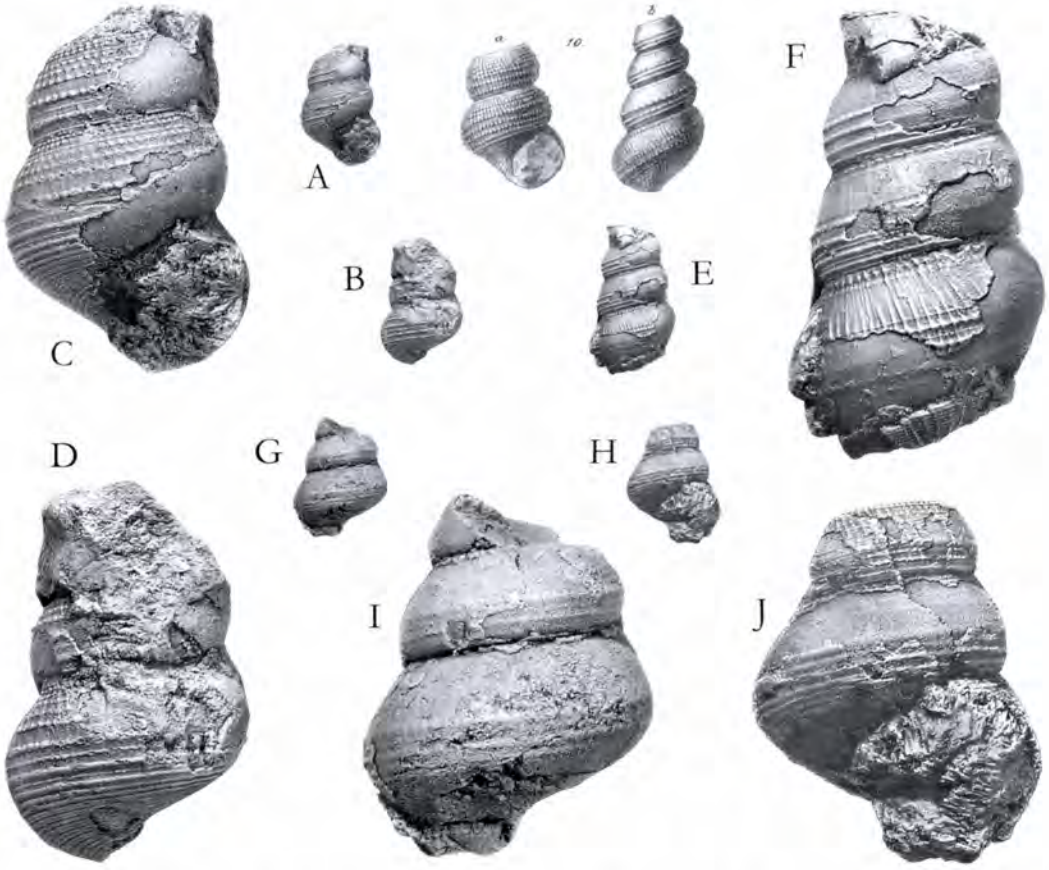

Figure 74 — *Eucyclus (Eucyclus) margaritaceus* (STOLICZKA, 1861), lectotype (A–D); *Eucyclus (Eucyclus) sandrae* n. sp., holotype (E–F); *Eucyclus (Eucyclus)* sp., (G–J). — 10 a–b: copy of the original figures of "*Chemnitzia margaritacea*" from STOLICZKA (1861) Tafel I; **A–D**: apertural (A, C) and dorsal (B, D) views of *Eucyclus (Eucyclus) margaritatus* (STOLICZKA, 1861) lectotype, A–B = ×1, C–D = ×3; **E–F**: *Eucyclus (Eucyclus) sandrae* n. sp., dorsal view, E = ×1, F = ×3; **G–J**: *Eucyclus (Eucyclus)* sp. in apertural (H, J) and dorsal (G, I) views, G–H = ×1, I–J = ×3.

S h a p e — Rather high spired shell with convex, evenly rounded whorls, their suture deeply impressed and canaliculate owing to close cords on its both side. Base convex and anomphalous. No peristome part observable.

S c u l p t u r e — Characteristic pattern of ornament found on holotype. Four cords visible on all preserved whorls beween midwhorl (periphery) and lower suture, but no spiral ornament developed between midwhorl cord and upper suture, except single (but on last whorl already paired), granulate cord(s) just below suture. Granulae found also on other cords but only on last whorl. Thin threads appear between cords on penultimate whorl. Base

densely lineated spirally; periodical collabral riblets cross last whorl from upper suture to middle of base. Collabral riblets of base stronger than spiral lines

R e m a r k s — The similar size exclude the possibility that the available specimens of *Eucyclus (Eucyclus) sandrae* n. sp. would be part of *Eucyclus (Eucyclus) margaritaceus* (STOLICZKA, 1861) specimens of different growth stage, thus the ornament also can not be regarded as an ontogenetic modification. Therefore, while the measurements are not markedly different, the onaments provide tools to distinguish these two species; dissimilarity is prominent in the sculpture of the "ramp" belts and of the bases, but the configuration of the cords and threads on the abapical half of the whorls also offers a good method.

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Late Sinemurian (Oxynotum Zone).

Eucyclus (Eucyclus) sp.

(Figure 74: G–J)

pars 1861: *Chemnitzia margaritacea* STOL. — STOLICZKA, p. 167, pl. 1, fig. 10 a–b.

M a t e r i a l — A fragmentary steinkern specimen (2008/69/9/3) from the *Chemnitzia margaritacea* STOLICZKA, 1861 box of the "originals collection" in the GBa Museum; it has also some remnants of the shell.

Measurements	H	HL	HP	D	W	AA	AL
GBa 2008/69/9/3	-	*13.5	*8	*12.8	*8	-	34°

S h a p e — Moderately high conical, thin-walled shell without juvenile part. Whorls convex, rather low and angular below midwhorl; angulation reinforced by nodose spiral cord, nodes reflecting also on inner mould. Ramp above angulation slightly convex. Suture deeply impressed and canaliculate because of near spiral threads, accompanying it. Base moderately convex and anomphalous. Peristome damaged, only straight columellar lip of axial position preserved; its outer face somewhat widened.

S c u l p t u r e — Below cord on angulation, four further cords visible, suture follows and partly covers lowermost one. Their best preserved parts on penultimate whorl bear also granulae. Ramp of penultimate whorl ornamented by network of spiral and prosocline collabral threads. Traces of some spiral cords found also on outermost belt of base but no more ornamental elements preserved.

R e m a r k s — With its significantly wider spiral angle, much lower whorls and different ornament, this species is well distinguishable from the other two specimens from STOLICZKA's (1861) "*Chemnitzia margaritacea*" syntypes. It seems to represent also a new species, but some further studies are necessary to be sure.

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Late Sinemurian (Oxynotum Zone).

Subgenus *Lokuticyclus* SZABÓ, 1995

T y p e s p e c i e s: *Eucyclus (Lokuticyclus) urkutensis* SZABÓ, 1995

Eucyclus (Lokuticyclus) urkutensis SZABÓ, 1995

(Figure 75: A–D)

1995: *Eucyclus (Lokuticyclus) urkutensis* sp. n. — SZABÓ, p. 70, pl. 7, figs. 7–9.

M a t e r i a l — A single specimen, the holotype (HGM J 11461).

Measurements	H	HL	HP	D	W	AA	AL
holotype	*21	*14	*10	*13	-	55°	45°

S h a p e — Shell of slightly convex spire outline ("cyrtoconoidal"). Whorls themselves also convex, deeply impressed-canaliculate suture separate them. Base strongly convex, umbilical rim rounded angular. This angulation, though no element of peristome preserved, suggests siphonal outlet like modification at foot of "umbilical" lip. Earliest whorls also lacking.

S c u l p t u r e — Six spiral cords visible on earliest preserved whorl, their number increases to seven at penultimate whorl. On juvenile shell, spiral cords crossed by subregularly repeating, suture to suture collabral cords of same strength as spiral ones. Collabral cords gradually weaken and become shorter from lower suture then restricted to narrow band along uppermorst spiral cord on last preserved whorl. In crossing points of cords, small granules sit, which also dissappear short after collabral cords do it. On last preserved whorl, granules present only on two uppermost spiral cords. Base seems also covered by spiral cords, denser than on whorls.

Growth lines extremely fine, dense and slightly prosocline with shallow, just visible opisthocyrt sinus above middle of last preserved whorl.

R e m a r k s — The available specimen does not seem to represent completely adult stage. More exactly, the shelly part of the base shows that at least another whorl is lacking. The basal cords are almost completely resorbed within the shell as it is shown by the preserved part of the lacking ?last whorl.

In other regions, there are published species of similar shape but without information about presence or absence of an umbilicus. The most similar of them is "*Turbo*" *ferryi* DUMORTIER, 1864 because of the comparable ornament [the number of spiral cords is only little more (7) than in the whorl of the same diameter in *Eucyclus (Lokuticyclus) lokutensis* SZABÓ, 1995 (5)]. However, on the basis of the considerably lower spire [H/D=1.4 while H/D=2.0–2.2 can be calculated in *E. (L.) lokutensis* at the same diameter], the distinction is possible vithout other characters.

A distinction from *Eucyclus (Lokuticyclus) kericserensis* SZABÓ, 1995 (see below) is less simple because of the similar shapes. The number of spiral cords on the (apparent) penultimate whorl gives a good basis for separation: seven in *Eucyclus (Lokuticyclus) urkutensis* SZABÓ, 1995 and only five on *Eucyclus (Lokuticyclus) kericserensis*. Beside this, the latter species has subregularly repeating collabral threads between the spiral cords even on the last whorl where only extremely fine growth lines are found in *E. (Lokuticyclus) urkutensis*.

On the basis of its lower spired shell and the few (four) spiral cords on the penultimate whorl, *Eucyclus (Lokuticyclus) lokutensis* is well separable.

Eucyclus (Lokuticyclus) urkutensis is easily distinguishable from *Eucyclus (Lokuticyclus)* aff. *campiliensis* on the much narrower umbilicus, the higher number of spiral cords on the whorls, the density of the collabral elements and the measurements.

D i s t r i b u t i o n — Úrkút, Csárdahegy (Bakony Mts), Early(?) Sinemurian.

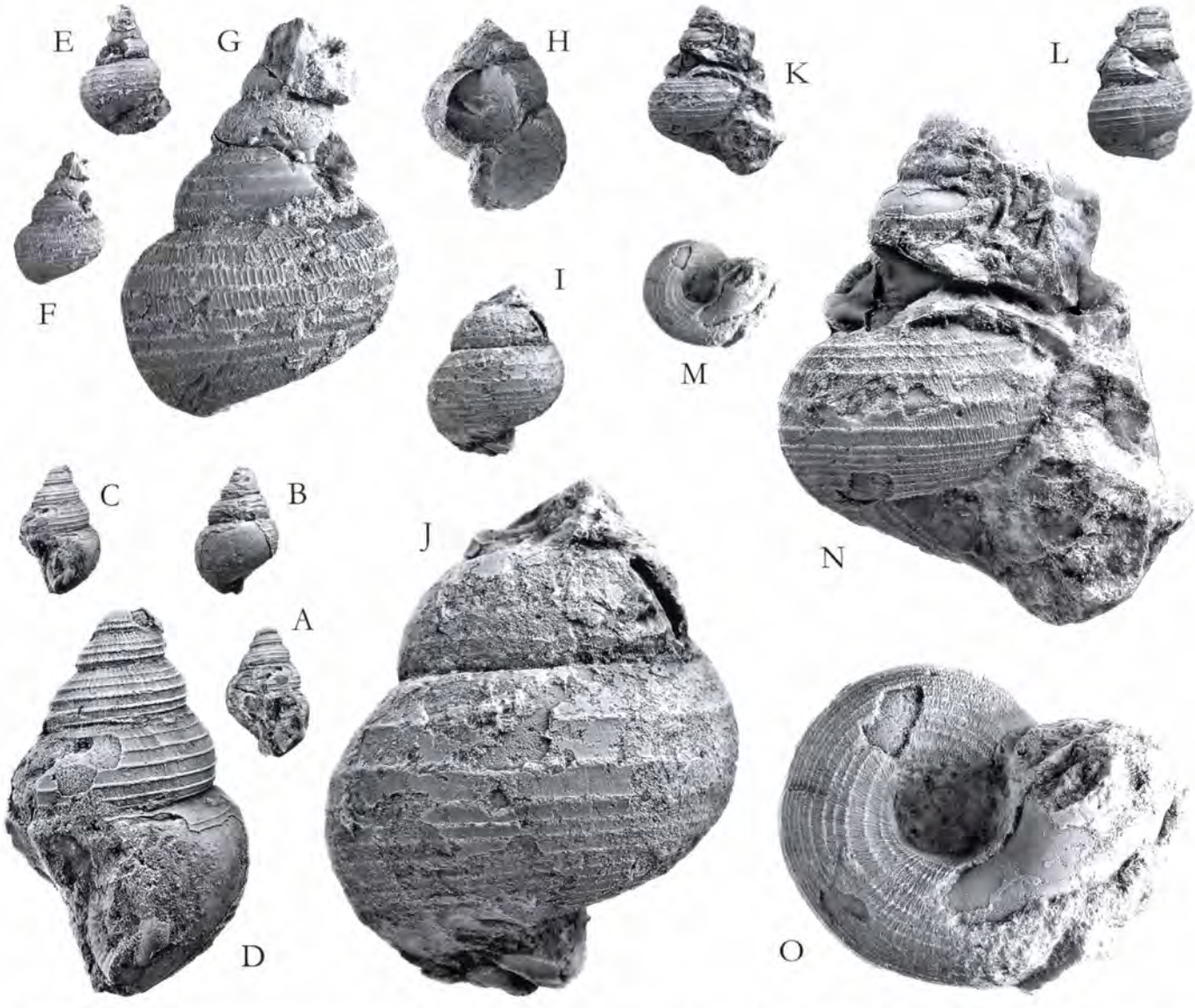

Figure 75 — Refiguration of holotypes of *Eucyclus (Lokuticyclus) urkutensis* SZABÓ, 1995 (A–D), *Eucyclus (Lokuticyclus) kericserensis* SZABÓ, 1995 (E–G), *Eucyclus (Lokuticyclus) lokutensis* SZABÓ, 1995 (H–J); refiguration of *Eucyclus (Lokuticyclus)* aff. *campiliensis* (DE STEFANI, 1887) (K–O). — **A–B**: "apertural" (A) and dorsal (B) views of *E. (L.) urkutensis*, ×1; **C–D**: oblique apertural view of *E. (L.) urkutensis* to show the best preserved ornament parts, A = ×1, B = ×3; **E–F**: "apertural" (E) and dorsal (F) views of *E. (L.) kericserensis*, ×1; **G**: magnified dorsal view of *E. (L.) kericserensis* to display the ornament, ×3; **H–I**: "apertural" (H) and dorsal (I) views of *E. (L.) lokutensis* ×1; **J**: magnified dorsal view of *E. (L.) lokutensis* to display the ornament, ×3; **K–M**: "apertural" (K), dorsal (L) and basal (M) views of *E. (L.)* aff. *campiliensis* (HGM J.08.15.1.) in natural size; **N–O**: magnified "apertural" (N) and basal (O) views to show the details of the ornement, ×3.

Eucyclus (Lokuticyclus) lokutensis SZABÓ, 1995

(Figure 75: H–J)

1995: *Eucyclus (Lokuticyclus) lokutensis* sp. n. — SZABÓ, p. 71, pl. 7, figs 10–11 (!originally erroneously indicated as figs 12–13).

M a t e r i a l — A single specimen, the holotype (HGM J 11463).

Measurements	H	HL	HP	D	W	AA	AL
holotype	-	*21.5	*15	*21	-	55°	55°

S h a p e — Low littoriniform, cyrtoconoidal species of extremely thin-walled shell, having convex whorls and strongly convex base. Rim of umbilicus subangulate. Peristome not preserved, whorl cross-section suggests *Eucyclus* type apertural region. Cross section of "umbilical" lip shows moderate thickening on last peristome.

S c u l p t u r e — Number of spiral cords four on penultimate whorl, one of them just above suture. Cords on base (12–14) of similar strength than on whorls but more closely spaced. Interspaces between them crossed by delicate growth lines. No evidence for presence of collabral threads, and tubercles on spiral cords has been found.

R e m a r k s — The spiral angle value given is measured on last whorl, the apical angle must be much higher because of the cyrtoconoidal shape.

The strongly different shape, the difference in the number of exposed spiral cords on the penultimate whorl and in the width of the umbilicus of the two species give an easy way of distinction of *Eucyclus (Lokuticyclus) lokutensis* from *Eucyclus (Lokuticyclus)* aff. *campiliensis* (DE STEFANI, 1887). (See distinction from *E. (L.) urkutensis* and *E. (L.) kericserensis* in their descriptions, above.)

D i s t r i b u t i o n — Lókút, Kericser (Bakony Mts), beds with Upper Sinemurian to Lower Pliensbachian (Obtusum to Ibex Zone) mixed fauna. (The specimen does not show any trace of reworking therefore it is probably Lower Pliensbachian; the Sinemurian fossils are redeposited.)

Eucyclus (Lokuticyclus) kericserensis SZABÓ, 1995

(Figure 75: E–G)

1982: *Eucyclomphalus* sp. — SZABÓ, p. 27, pl. 3, fig. 10.
cf. 1995: *Eucyclomphalus* sp. — CONTI & MONARI, p. 206, pl. 2, figs 12–14.
1995: *Eucyclus (Lokuticyclus) kericserensis* sp. n. — SZABÓ, p. 70, pl. 7, 12–13 (!originally erroneously indicated as figs 10–11).

M a t e r i a l — A single specimen, the holotype (HGM J 11462).

Measurements	H	HL	HP	D	W	AA	AL
holotype	*21	*13	*9	*14	*9	55°	55°

S h a p e — High turbiniform-littoriniform shell, with convex surface of whorls and narrowly phaneromphalous base. Suture moderately impressed. Umbilical lip straight and parallel to axis, cross-section of whorls subcircular on part corresponding to outer lip.

S u l p t u r e — Whorls and base sculptured by spiral cords, on latter region in double density. Fine threads and very fine, prosocline growth-lines give collabral ornament. Because of poor preservation, it cannot be seen, whether tubercles exist on crossing points of cords and threads or not.

R e m a r k s — The shape of this species nearest to that of *Eucyclus (Lokuticyclus) urkutensis*; see their distincton in the description of the latter species above.

Eucyclus (Lokuticyclus) lokutensis has more globular shape, lacks the collabral threads in the interspaces of the (fewer) spiral cords.

On the basis of the wider spiral angle and the narrower umbilicus, this species is distinctly separable from *Eucyclus (Lokuticyclus)* aff. *carnpiliensis* DE STEFANI.

Definitely, this species also belongs to the relatives of "*Turbo*" *elegans* MÜNSTER, 1844 *and* "*Turbo*" *ferryi* DUMORTIER, 1864 but there are disagreements in the number and nature of the cords, and the measurements.

D i s t r i b u t i o n — Lókút, Kericser (Bakony Mts), beds with mixed Obtusum to Ibex Zone fauna, and Davoei Zone (Upper Sinemurian to Lower Pliensbachian).

Eucyclus (Lokuticyclus) aff. *campiliensis* (DE STEFANI, 1887)

(Figure 75: K–O)

aff. 1887: *Pleurotomaria campiliensis* sp. n. — DE STEFANI, p. 45, pl. 1, figs 12–13.
1982: *Eucyclomphalus aff. campiliensis* (DE STEFANI, 1887) — SZABÓ, p. 26, pl. 3, figs 8–9
cf. 1991: *Eucyclomphalus aff. campiliensis* (DE STEFANI, 1887) — CONTI & MONARI, p. 273, pl. 8, figs 15–16.
1995: *Eucyclus (Lokuticyclus) aff. campiliensis* (DE STEFANI, 1887) — SZABÓ, p. 71.

M a t e r i a l — Two damaged shelly and six internal mould specimens are available (figured one: HGM J.08.15.1).

Measurements	H	HL	HP	D	W	AA	AL
HGM J.08.15.1	**21	**15	**9	**18.5	**7.5	**45°	**45°

S h a p e — High conical test with rather deep suture; juvenile whorls possessing somewhat less convex surface than later ones. Periphery rounded, base convex and broadly phaneromphalous with subangulate umbilical margin. Last peristome probably thickened as suggested by one or two weak collabral constrictions on last whorl of figured shelly and some inner mould specimens.

S c u l p t u r e — Whorls and base as well as inner parts of umbilicus covered by granulate spiral cords; strongest of them running at periphery. Some cords at abaxial part of base follow each other with narrower interspaces, than the rest. Very fine, prosocline growth-lines yield collabral ornament.

R e m a r k s — The shape and the ornament correspond to DE STEFANI's species, excepting two characters and the generic arrangement. The doubtfulness of its relegation to *Pleurotomaria*, remarked by DE STEFANI (1887), was established; it is an eucyclid species. However, it is unknown, whether DE STEFANI's specimens have an umbilicus and tubercles or not, thus the use of open nomenclature is necessary.

CONTI & MONARI (1991) published a species under the same name. Because of the poor preservation of the Turkey as well as the Bakony Mts specimens, their belonging to the same species remains also doubtful.

Unfortunately, no opportunity for comparison to DE STEFANI's originals has yet been found.

D i s t r i b u t i o n — ?Northern Apennines, (Italy), Sinemurian; Lókút, Kericser (Bakony Mts), beds with Late Sinemurian to Lower Pliensbachian mixed fauna (Obtusum to Ibex Zone) and Davoei Zone; ?Western Pontids (Turkey), Raricostatum to Ibex Zone.

Eucyclus (Lokuticyclus) spinnerinensis n. sp.

(Figure 76)

1861: *Turbo orion* D'ORB. — STOLICZKA, p. 176, pl. 2, fig. 13.
2003: *Eucyclus (Lokuticyclus)* sp. — SZABÓ in VÖRÖS et al., p. 62, pl. 5: 16–18.

H o l o t y p e — NhM 1861/0001/0028.

T y p e l o c a l i t y — Schafberg over St. Wolfgang, Austria.

T y p e s t r a t a — Vertical fissure-filling limestone with fossils of Fe-Mn-oxide coating.

N a m e — Formed from name of Spinnerin, a peak nearby the inferable locality.

D i a g n o s i s — Low spired, rapidly expanding, turbiniform shell with deeply impressed suture, narrow feebly convex, almost horizontal subsutural ramp on last whorl; cross-section of whorls subcircular; moderately broad umbilicus on base; sculpture of spiral threads, being sparser and stronger on whorls than on base.

M a t e r i a l — Single specimen of Mn-oxide coating (NhM 1861/0001/0028).

Measurements	H	HL	HP	D	W	AA	AL
holotype	*12	9.4	7.7	12.2	7.2	80°	88°

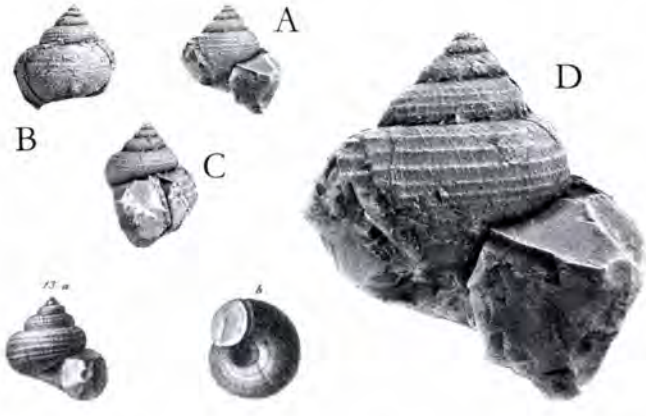

Figure 76 — *Eucyclus (Lokuticyclus) spinnerinensis* n. sp., holotype. — **13 a–b**: copy of "*Turbo orion* D'ORBIGNY" figures from STOLICZKA (1861) Tafel II; **A–C**: "apertural" (A), dorsal (B) and oblique "apertural" views, ×1; **D**: magnified "apertural" view to show the ornament, ×3.

S h a p e — The specimen is low turbiniform, spire has feebly cyrtoconoidal outline, and extremely thin-walled shell like the other members of the subgenus. Whorls are convex, rapidly expanding, and impressed suture separates them. Narrow, feebly convex ramp developed on last whorl without marked abaxial boundary. Base convex and moderately phaneromphalous; margin of umbilicus is rounded-angular. Peristome does not show outer modification, internally not observable, but trace of inner thickening visible on inner mould of last whorl.

S c u l p t u r e — Ornament consists of sparse, spiral threads on whorls, and dense, weaker threads on base. Delicate, collabral threads cross them on juvenile whorls with small granules at crossing-points. On penultimate whorl, early network ornament gradually vanishes, only spiral threads persist to peristome. Fine, dense, subregularly repeating growth-threads cross them.

R e m a r k s — STOLICZKA indicated this species as "selten" that is more than one, but only a single specimen is found available. It is different from the previously known members of subgenus *Lokuticyclus*; it has the lowest spire, therefore all related measurements can help the identification. Character of the ornament is most similar to that of *Eucyclus (Lokuticyclus) urkutensis* in having an early network, from which the collabral components vanish before reaching the adult stage; however, the spiral angles are strongly different. In having few inner shell constrictions, *Eucyclus (Lokuticyclus) spinnerinensis* n. sp. is similar also to *Eucyclus (Lokuticyclus)* aff. *campiliensis*, but the narrower spiral angle, the higher spire, and the markedly nodosed ornament (even on the base) distinguish the

latter species. In its lower spired shell, *Eucyclus (Lokuticyclus) lokutensis* is somewhat likely, but the outline, higher whorls, and fewer spiral cords between the sutures distinguish it.

STOLICZKA (1861) misidentified the rare Schafberg specimens as "*Turbo orion* D'ORBIGNY, 1853". COSSMANN 1916) then FISCHER & WEBER (1997) revised D'ORBIGNY's species and they regarded it as member of *Metriomphalus* (Nododelphinulidae) because of its marked, spiny ornament, which is strongly different from that of the specimen, available in STOLICZKA (1861) collection.

D i s t r i b u t i o n — Schafberg over St. Wolfgang, (Salzkammergut, Austria), Late Pliensbachian.

Genus *Riselloidea* COSSMANN, 1909

T y p e s p e c i e s: *Risellopsis subdisjuncta* COSSMANN, 1908

Riselloidea multistriata (BÖCKH, 1874)

(Figure 77)

1874: *Turbo multistriatus* n. sp. — BÖCKH, p. 110, pl. 4, fig. 5.
1982: *Riselloidea multistriata* (BÖCKH, 1874) — SZABÓ, p. 25, pl. 3, figs. 3–6.
1991: *Riselloidea* cfr. *multistriata* (BÖCKH, 1874) — CONTI & MONARI, p. 272, pl. 8, fig. 14.

M a t e r i a l — Sixteen, mainly inner mould specimens, some with shell remnants (HGM).

M e a s u r e m e n t s	H	HL	HP	D	W	AA	AL
Figure 77: A–E	-	*13.5	*8.5	*16	*9	-	-

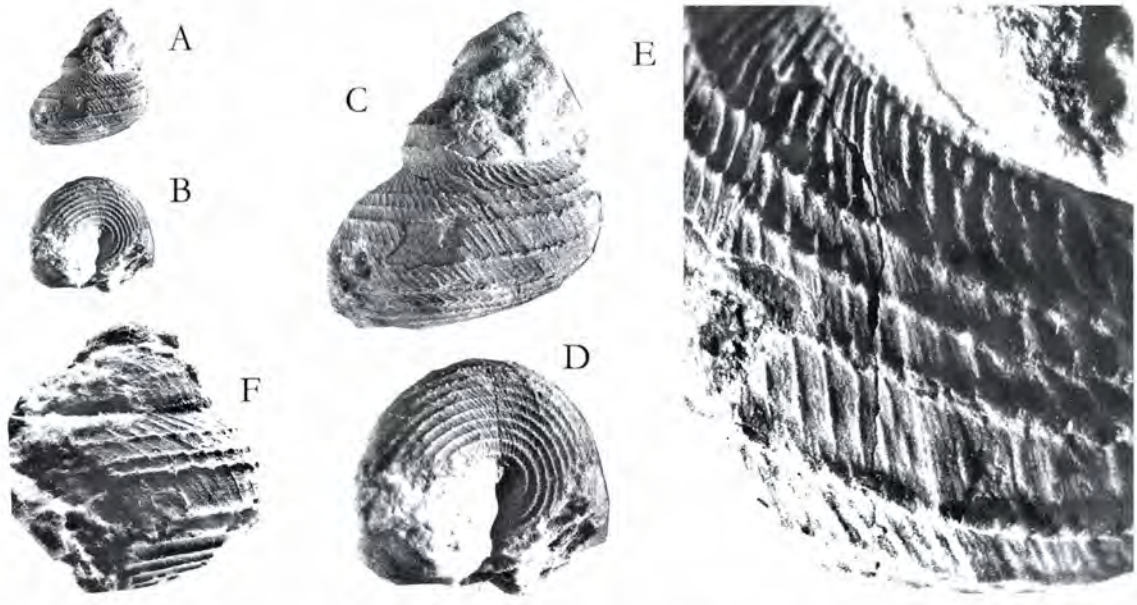

Figure 77 — *Riselloidea multistriata* (BÖCKH, 1874); copy figures from SZABÓ (1982). — **A–B**: dorsal (A) and basal (B) views, ×1; **C–E**: magnified views of the specimen in A–B, to display the details of the sculpture, C–D = ×2, E = ornament of the ramp, ×6; **F**: different configuration of the spiral cords on a stratigraphically older specimen, ×2.

S h a p e — Turbiniform species with convex whorls and rounded-angular periphery. Peristome prosocline with somewhat thickened columellar lip, separated from moderately convex base by pseudoumbilicus. Aperture rounded but with angulations at foot of columella and at suture.

S c u l p t u r e — Spiral carinae ornament whorls and base. Strongest three of them situated just at periphery and immediately beside it. Lowermost one of these just overlapped by suture of subsequent whorl. All other (weaker) carinae similar to each other in strength. Pairs of cords separated from each other by interspaces, being wider and different on whorls but narrower and equal on base. Collabral ornament consists of weak collabral cords, being denser than spiral ones and usually running from suture to suture (or to inner lip). Some cords do not reach upper suture but disappear near to it. In such cases, short riblets appear at suture beside earlier ones. Ends of riblets and related cords do not meet. Nodules or tubercles sitting at crossing points of differently oriented cords. Growth-lines strongly prosocline and, somewhat opisthocyrt on base.

R e m a r k s — *Riselloidea multistriata* (BÖCKH, 1974) was the only gastropod species described before the 1980's years from the Bakony Mts Jurassic. The holotype in the Hungarian Geological Institute Museum is just like the available specimens in shape and ornament, but the depiction given by BÖCKH is somewhat incorrect, since the peripherial carinae follow each other with wider interspaces in reality than on the figure.

D i s t r i b u t i o n — Bakony Mts, in almost all localities of the Upper Sinemurian (Raricostatum Zone) to Upper Pliensbachian (Stokesi Zone) strata; Western Pontids (Turkey), Raricostatum to Ibex Zone.

Riselloidea noszkyi SZABÓ, 1995

(Figure 78)

1995: *Riselloidea noszkyi* sp. n. — SZABÓ, p. 71, pl. 7, figs 1–3.

M a t e r i a l — Three poorly preserved specimens, the holotype (HGM J11464) shows all specific characters.

M e a s u r e m e n t s	H	HL	HP	D	W	AA	AL
holotype	*14	*10	*7	*13	-	-	70°

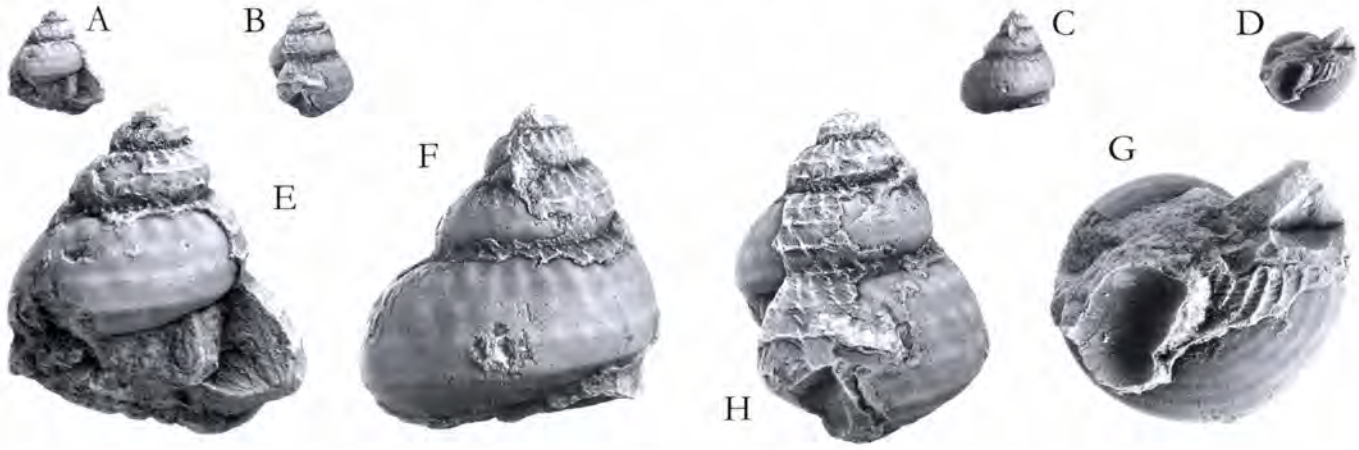

Figure 78 — *Riselloidea noszkyi* SZABÓ, 1995; refiguration of the holotype. — "Apertural" (**A, E**), dorsal (**C, F**), basal (**D, G**) views, **B** and **H** images show the largest shell remnants with ornament; A–D = ×1, E–H = ×3.

S h a p e — Shell trochiform, rather small. Spire nearly conical, whorls and base moderately convex; suture in shallow canal; periphery angular. Base more flattened than whorls and anomphalous. Peristome not preserved.

S c u l p t u r e — Three spiral cords visible on last and penultimate whorls, fourth one on last whorl periphery, just overlapped by suture on earlier whorls. Collabral ornament consists of periodically repeated riblets of similar strength to that of spiral cords. Riblets strongest near upper suture and gradually weaken towards abapical edge of whorls. Tubercles developed at crossing points of ribs and cords. All these ornamental elements reflected also on inner mould. Denser spiral cords on base, fine collabral threads cross them. Growth lines and other collabral elements prosocline and prosocyrt.

R e m a r k s — *Riselloidea noszkyi* has sparser ornamental elements on the whorls than *R. multistriata* (BÖCKH, 1874) and collabral elements are much weaker, only cords in the latter species; the measurements are also significantly different.

Morphologically and by the stratigraphical occurrence, *Riselloidea noszkyi* SZABÓ, 1995 may be the ancestor of *Riselloidea multistriata* (BÖCKH, 1874).

D i s t r i b u t i o n — Úrkút, Csárdahegy, Lower(?) Sinemurian; Sümeg, Mogyorósdomb, Upper(?) Sinemurian (both Bakony Mts).

Genus *Trypanotrochus* Cossmann, 1918

T y p e s p e c i e s: *Trochus normanianus* D'ORBIGNY, 1850

Trypanotrochus granuliferus (STOLICZKA, 1861)

(Figure 79)

1861: *Trochus granuliferus* STOL. — STOLICZKA, p. 172, pl. 2, figs 2–4.

L e c t o t y p e — GBa 2008/69/18/1 (selected here).

M a t e r i a l — Five damaged, shelly specimens without protoconch and peristome from the "originals collection" and several specimens from the "background" collection.

M e a s u r e m e n t s	H	HL	HP	D	W	AA	AL
lectotype	-	*5.5	*3.3	6.5	*3.3	-	33°
GBa 2008/69/18/2	**13	*11.5	-	7.2	*4	-	30°

S h a p e — Rather high conical shells with flat or feebly convex whorls, concave belts may also present (between pairs of cords). Suture canaliculate or impressed (depending on configuration of cords). Periphery angular, bicarinate but lower carina may be weak as thread therefore seemingly unicarinate specimens also exist. Base moderately convex, anomphalous. Neither apical nor peristomal morphology observable.

S c u l p t u r e — Ornament consists of granulate spiral cords and threads, being extremely variable both in number (4–8 on last whorl) and strength. All available specimens show different ornament. Single granulae (nodules) of each cords may be connected to those of the neighbouring cords by weak collabral riblets (threads). Dense spiral threads of different strength cover base.

R e m a r k s — *Trypanotrochus* is usually regarded as a Proconulinae/-idae related genus, but GRÜNDEL (2007) suggested a sytematical place in the Eucyclidae within his new subfamily Eucycloscalinae, that is in accordance with the morphological features. *T. granuliferus* itself shows considerable variability both in the shape and the ornament. Unfortunately, its real boundaries have not yet been visible because the specimens are hardly removable safely from the strongly recrystallised matrix owing to their coarse ornament.

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone).

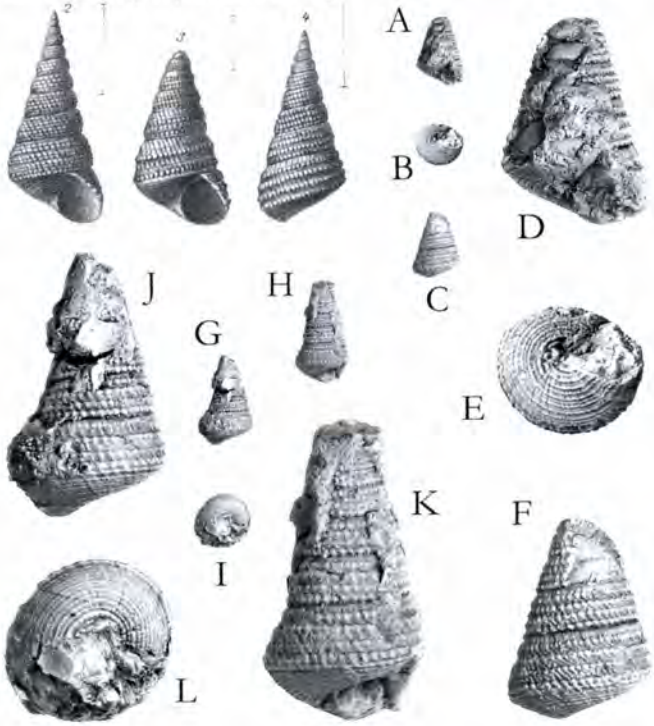

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Figure 79 — *Trypanotrochus granuliferus* (STOLICZKA, 1861), lectotype and a paralectotype. — **2–4:** copy of the original figure from STOLICZKA (1861) Tafel II; **A–F:** lectotype in "apertural" (A, D), dorsal (C, F) and basal (B, E) views, A–C = ×1, D–F = ×3; **G–L:** a paralectotype (GBa 2008/69/18/2) in lateral (G–H, J–K) and basal (I, L) views; G–I = ×1; J–L = ×3.

Subfamily Chilodontinae WENZ, 1938

Genus *Cupaniella* M. GEMMELLARO, 1911

T y p e s p e c i e s: *Cupaniella biplicata* M. GEMMELLARO, 1911

Cupaniella biplicata M. GEMMELLARO, 1911

(Figure 80)

v. 1911: *Cupaniella biplicata* sp. n. — M. GEMMELLARO, p. 239, pl. 10, figs 22–25.
1995: *Wilsoniconcha?* cf. *biplicata* (M. GEMMELLARO) — SZABÓ, p. 72, pl. 7, fig. 14.
2003: *Wilsoniconcha?* aff. *biplicata* (M. GEMMELLARO) — SZABÓ in VÖRÖS et al., p. 62, pl. 5: 19–20.

M a t e r i a l — A naturally prepared cross section on a weathered rock surface, some recently collected shelly specimens from the Bakony Mts, and a single, formerly unpublished specimen form the GBa Museum [not from the collections that were available also for STOLICZKA (1861)].

Measurements	H	HL	HP	D	W	AA	AL
Figure 80: E (HGM)	-	9	5.1	6.5	4.7	-	22°

S h a p e — High spired, cyrtoconoidal, sometimes feebly pupifom shell. Whorls weakly convex, suture in shallow canal. Periphery rounded, base strongly convex and anomphalous. Inner space of whorls quadrangular in juvenile shell part, ovate (dropp shaped) later just like peristome. Within whorls, "V" shaped cross section of two strong and sharp columellar folds, terminating in rounded, denticle like end at columellar lip.

S c u l p t u r e — Consisting of dense spiral threads, crossed by slightly prosocline collabral threads with granulae at crossing points, forming a network.

R e m a r k s — Some specimens have feebly concave belt on the penultimate and/or last whorl but this character seems to belong the magnitute of inner specific variability.

Finding new specimens, and studies on M. GEMMELLARO's (1911) type material made the species identity doubtless. The morphology of the species indicate belonging to Chilodontinae, and the Cerithioidean relation, suggested by M. GEMMELLARO in the designation of *Cupaniella*, does not seem really likely. Subsequently, *Cupaniella* M. GEMMELLARO, 1911 became a neglected genus, lacking from the well known treatises of Gastropod systematics. It is almost sure, that this genus is a

senior synonym of *Wilsoniconcha* WENZ, 1939, but a comparison of specimens has still been necessary.

D i s t r i b u t i o n — Galati, Rocche Rosse (East Sicily), Upper Pliensbachian; Lókút, Kericser beds with Upper Sinemurian to Lower Pliensbachian (Obtusum to Ibex Zone) mixed fauna, and Lókút, Fenyveskút, Upper Pliensbachian (both Bakony Mts); St. Wolfgang, Schafberg (Austria), Upper Pliensbachian.

Figure 80 — *Cupaniella biplicata* M. GEMMELLARO, 1911. — **A–D**: apertural and dorsal views of the Schafberg specimen, A–B = ×1, C–D = ×4; **E**: the Lókút, Kericser specimen (natural, oblique cross-section), clearly showing the terminal part of the two plicae in the aperture; ×4.

Genus *Eucyclomphalus* VON AMMON, 1892

T y p e s p e c i e s: *Trochus Cupido* D'ORBIGNY, 1853

Eucyclomphalus hierlatzensis VON AMMON, 1892

(Figure 81)

1853: *Trochus Deslongchampsi* HÖRN. — HÖRNES, p. 758.
1861: *Trochus Cupido* D'ORBIGNY — STOLICZKA, p. 174, pl. 2, figs 10–11.
1892: *Eucyclomphalus hierlatzensis* VON AMMON — VON AMMON, p. 169.
non 1874: *Trochus cupido* D'ORBIGNY — GEMMELLARO, G. G., p. 100, pl. 12, figs 11–12.
1911: *Trochus cupido* D'ORBIGNY — GEMMELLARO, M., p. 226, pl. 10, figs 29–30.
1982: *Eucyclomphalus cupido* (D'ORBIGNY, 1852) — SZABÓ, p. 26, pl. 3, fig. 7.
1991: *Eucyclomphalus* cfr. *hierlatzensis* VON AMMON — CONTI & MONARI, p. 273, pl. 8, fig. 17.

L e c t o t y p e — GBa 2008/69/24/1 (selected here).
M a t e r i a l — Lots of specimens (220).

M e a s u r e m e n t s	H	HL	HP	D	W	AA	AL
lectotype	**37	**20	-	**29	-	57°	52°
GBa 2008/69/24/2	*22.5	*14.5	**9	*18	**6.5	48°	41°

S h a p e — Conical shell with feebly convex whorls separated by canaliculate suture. Periphery more or less sharply angular; this angulation just overlapped by suture on juvenile shell but becoming more and more exposed with growth while sutural canal gradually deepen and widen. Base strongly convex and broadly phaneromphalous with rounded angulation at umbilical margin.

S c u l p t u r e — Strong cord (weak carina) as most prominent ornamental element running on angulation. Between angulation and lower suture and on whole base dense, weaker spiral cords visible; all cords tubercled. Single spiral thread occasionally appears also immediately below suture. Thin growth-threads cross cords, usually two or three meet in one tubercle of near peripheral cords (typical "eucycloidean" ornament). Between angulation and upper suture, spiral ornament commonly lacking, only prosocline growth-threads give ornament.

R e m a r k s — STOLICZKA (1861) and some subsequent authors (see synonyms list) identified this species with *Trochus cupido* D'ORBIGNY, 1853 (containing also *T. nesea* D'ORBIGNY, 1853). FISCHER & WEBER (1997) have given reliable photographs, which demonstrate on one hand that *T. cupido*, and *T. nesea* are well separable species and, on the other hand, the Hierlatz finds can not be identified with them. *Eucyclomphalus cupido* has a higher spire of coeloconoidal outline and deeper, canaliculate suture along all whorls; *Eucyclomphalus nesea* has much fewer and higher whorls with narrower umbilicus than *Eucyclomphalus hierlatzensis*.

VON AMMON (1892), establishing his new genus, *Eucyclomphalus*, referred to OPPEL's recognition of the above specific differences, and gave the new genus and species name, *Eucyclomphalus hierlatzensis*.

G. G. GEMMELLARO (1874) also published *Trochus cupido* D'ORBIGNY, 1853 that resemble to *Eucyclomphalus hierlatzensis*

but both specimens belong to genus *Eucyclus* (pers. observ.).

M. GEMMELLARO's (1911) *T. cupido* does not show any significant difference from the Hierlatz Limestone finds of *Eucyclomphalus hierlatzensis* (pers. observ.).

This is one of the most frequent gastropod species in the type locality of the Hierlatz Limestone.

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone); Galati, (Eastern Sicily), Upper Pliensbachian; Szentgál, Tűzköveshegy (Bakony Mts), Upper Sinemurian (Raricostatum Zone).

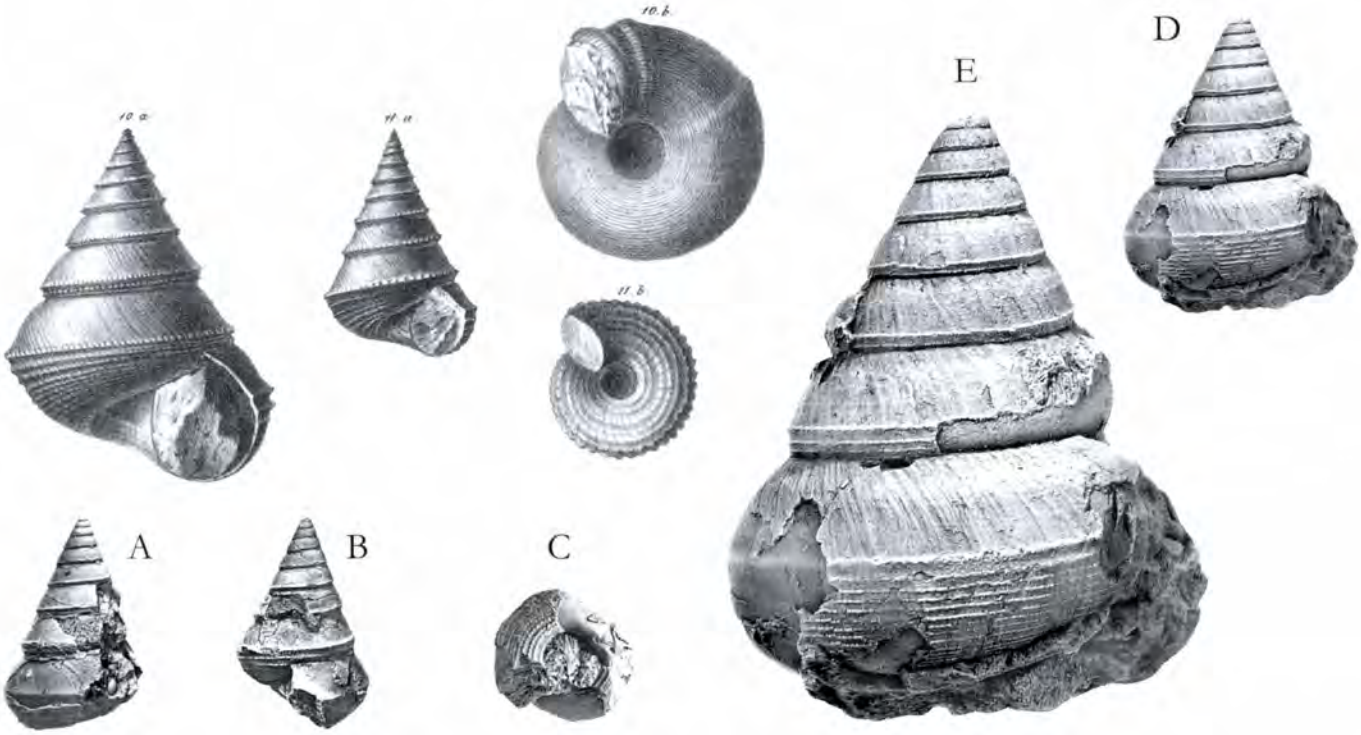

Figure 80 — *Eucyclomphalus hierlatzensis* VON AMMON, 1892 — 10–11: copy of the original figures from STOLICZKA (1861) Tafel II; **A–C**: a paralectotype (GBa 2008/69/24/2), most probably model to STOLICZKA's figure 11 a–b, dorsal (A), "best outline" (B) and basal (C) views, ×1; **D–E**: dorsal view of the lectotype, ×1 (D) and ×2 (E).

Superfamily Cirroidea COSSMANN, 1916
Family Cirridae COSSMANN, 1916
Genus ? *Hamusina* G. G. GEMMELLARO, 1878
T y p e s p e c i e s: *Turbo bertheloti* D'ORBIGNY, 1850

Hamusina? hoernesi (STOLICZKA, 1861)

(Figure 81: A–C)

1861: *Turbo Hörnesi* STOL. — STOLICZKA, p. 176, pl. 2, figs 14 a–b.
2003: *Cirrus hoernesi* (STOLICZKA, 1861) — SZABÓ in VÖRÖS et al., p. 62, pl. 5: 21–23.

L e c t o t y p e — NhM 1859/0019/0051 (1) (selected here).

M a t e r i a l — Two specimens from the three "*Turbo Hoernesi*" syntypes, found in STOLICZKA (1861) "originals collection"; the third specimen repsents another species (see *Scaevola? suissenseensis* n. sp. below). In STOLICZKA's (1861) paper (p. 176, Taf. II, Fig. 14.), the description and figures of "*Turbo Hörnesi*" were created from characters of specimens, belonging to two different species.

M e a s u r e m e n t s	H	HL	HP	D	W	AA	AL
lectotype	-	*25	*10.5	*28	*17	~52°	~52°
NhM 1859/0019/0051 (2)	-	*30	*20	*33	*23	-	*47°

S h a p e — High-turbiniform, most probably hyperstrophically left-handed shells of apparently truncated apex belong to this species. Four latest whorls are visible that are convex, bicarinate at periphery and a rather deep suture separates them. Base is slightly convex, anomphalous and evenly arched. Peristome circular, fairly prosocline; its inner lip wide and outward tapering.

S c u l p t u r e — Strong, sparse, suture to suture costae and marked growth lines give the collabral ornament on whorls, and opisthocyrt growth-lines mean the only basal

ornament. Costae reflected also on inner surface of shell.

R e m a r k s — In STOLICZKA's (1861) original material three specimens have been found under the name "*Turbo Hörnesi*". However, they belong to two different species and to two different genera. Two specimens have shells with growth-lines as the only basal ornament, but a last whorl fragment has also spiral carinae. The morphology of the peristome and the shape of the growth-lines are also different (see Figure 81, and description of *Scaevola? suissenseensis* n. sp. below). The two specimens, similar to each other, are regarded here as the name bearing types of "*Turbo Hörnesi* STOLICZKA, 1861".

The generic identification is problematic because of the poor preservation, but the circular aperture delimits the possibilities to four genera to be discussed. The habit of whorls shows similarity to those of *Cirrus* and its subgenera, however, the costae do not extend beyond the periphery towards the base; in this character, the shells are similar to *Spirocirrus*, *Scaevola* and *Hamusina*; only the latter one is said to be anomphalous, that is why this genus name is selected, however, the open usage is necessary owing to the dissimilarities in the ornament of the whorls.

D i s t r i b u t i o n — Schafberg over St. Wolfgang, (Austria), Upper Pliensbachian.

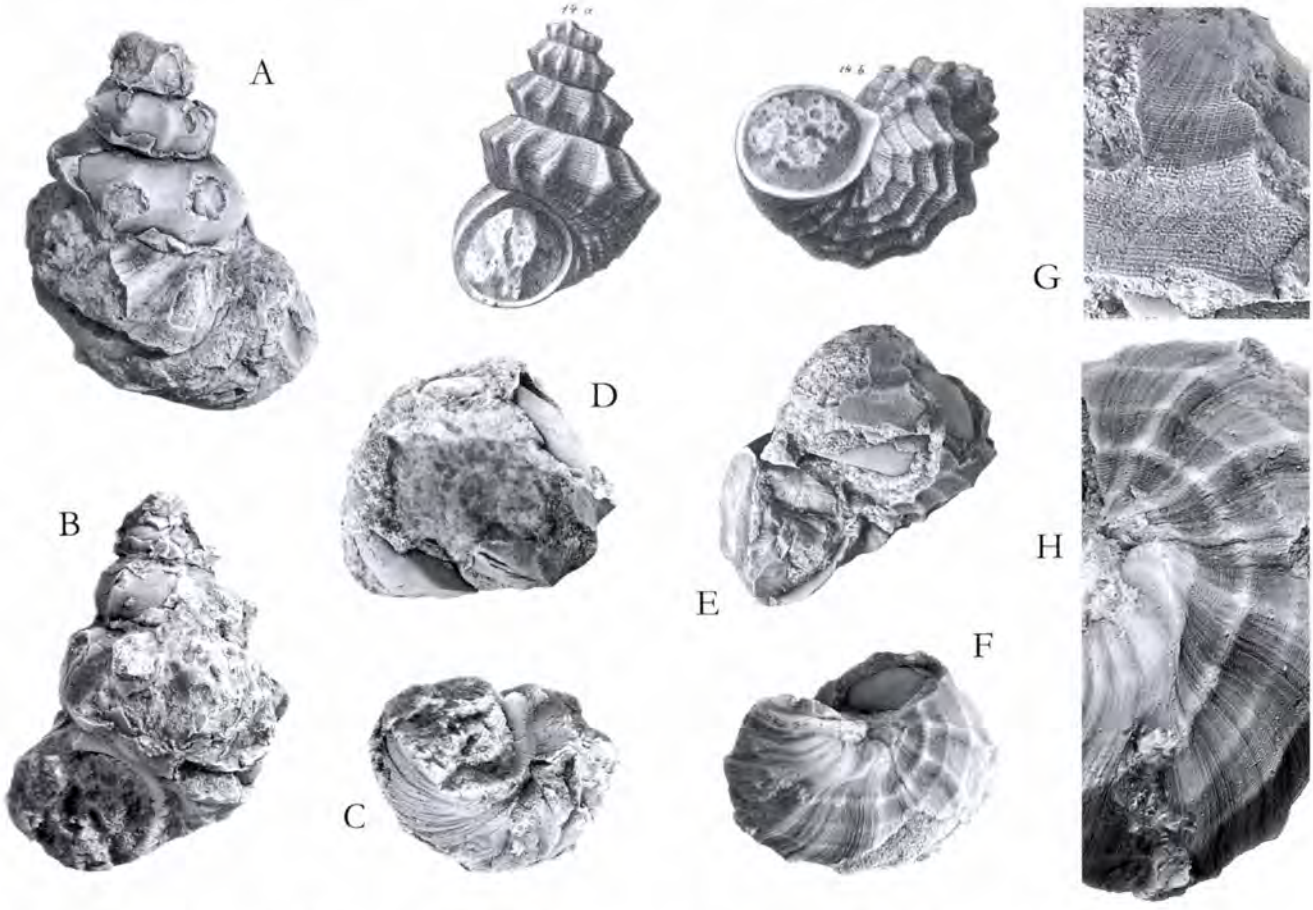

Figure 81 — The lectotype of *Hamusina? hoernesi* (STOLICZKA, 1861) (A–C) and the holotype of *Scaevola? suissenseensis* n. sp. (D–H) — **14 a–b**: copy of the original figures of "*Turbo Hörnesi*" from STOLICZKA (1861) Tafel II; **A–C**: apertural (B), dorsal (A) and basal (C) views of the lectotype of *Hamusina? hoernesi*, ×1; **D–H**: the holotype of *Scaevola? suissenseensis* n. sp. in apertural (E), apical (D) and basal views, ×1; details of the ornament of the last whorl (G, ×3) and the base (H, ×2).

Genus ? *Scaevola* G. G. GEMMELLARO, 1879

T y p e s p e c i e s: *Scaevola intermedia* G. G. GEMMELLARO, 1879

Scaevola? suissenseensis n. sp.

(Figure 81: D–H)

H o l o t y p e — NhM 2007/0101/0009.

T y p e l o c a l i t y — Schafberg over St. Wolfgang, Salzkammergut, Austria.

T y p e s t r a t a — Vertical fissure-filling limestone.

N a m e — From the Suissensee, a small lake beneath the Schafbergspitze, along the structural line where the gastropod bearing fissure-fillings can be found.

D i a g n o s i s — Low spired shell of rapidly expanding whorls; base slightly convex, and having narrow (?pseudo-)

umbilicus with ridge around; aperture feebly prosocline and weakly ovate, axially elongate, its basal lip slightly thickened; most prominent ornament consists of sparse spiral carinae and collabral costae; fine, dense spiral lines cover whorls and base.

M a t e r i a l — A single specimen, a fragmentary last whorl.

Measurements	H	HL	HP	D	W	AA	AL
holotype	**35	*25.8	*15.5	*31.5	-	-	-

S h a p e — Remnants indicate low spired sinistral shell of rapidly expanding, moderately convex whorls. Base slightly convex and bears a narrow umbilicus with a ridge around. Broken surface obscurely shows infilling of axial hole, but umbilicus may be false. Aperture feebly prosocline, axially somewhat elongate, its columellar lip simple, basal lip slightly thickened externally. Trace of thickening visible around umbilicus on base.

S c u l p t u r e — Sculpture consists of spiral carinae, three of them on whorls and three ones on base. Strength of basal carinae nearly equal, but peripheral and median ones much stronger than subsutural one of visible whorl surface, and basal ones. Sparse, collabral costae cross carinae from suture to edge of umbilicus. On peripheral and midwhorl carinae, presence of (spiny) nodes seems likely at crossing points. Dense, fine, uniform spiral lines cover shell surface (even carinae and costae). Growth-lines delicate, their shape feebly prosocline on whorls and slighly sigmoidal on base.

R e m a r k s — *Scaevola? suissenseensis* n. sp. is different both in shape and sculpture from *Hamusina? hoernesi* (STOLICZKA, 1861). Broken surface of the penultimate and preceding whorl suggest a much lower shell than that of *Hamusina? hoernesi*; the reconstructed spiral angle is about 30° wider in *Scaevola? suissenseensis* n. sp. Its peristome and the growth-lines on the whorls are much less prosocline than in *Hamusina? hoernesi* (compare Figure 81: C and F). Basal growth-lines are opisthocyrt in *Hamusina? hoernesi* but sigmoidal in *Scaevola? suissenseensis* n. sp. On the latter species, weaker and denser costae of the whorls continue to the periumbilical ridge, but terminate at periphery in *Hamusina? hoernesi*. The spiral carinae are lacking from the complete shell of *Hamusina? hoernesi* (STOLICZKA, 1861).

D i s t r i b u t i o n — Schafberg over St. Wolfgang, (Austria), Upper Pliensbachian.

Order Neritomorpha KOKEN, 1896
Superfamily Neritoidea GRAY, 1847
Family Neritopsidae GRAY, 1847
Subfamily Neritopsinae GRAY, 1847
Genus *Neritopsis* GRATELOUP, 1832
Subgenus *Neritopsis* GRATELOUP, 1832
T y p e s p e c i e s: *Neritopsis moniliformis* GRATELOUP, 1832

Neritopsis (Neritopsis) elegantissima HÖRNES, 1853

(Figure 82)

1853: *Neritopsis elegantissima* HÖRNES — HÖRNES, p. 763.
1861: *Neritopsis elegantissima* HÖRNES — STOLICZKA, p. 179, pl. III. fig. 7.
1982: *Neritopsis (Neritopsis) elegantissima* HÖRNES, 1853 — SZABÓ, p. 17, pl. 1, figs 1–3.
1995: *Neritopsis (Neritopsis) elegantissima* HÖRNES, 1853 — CONTI & MONARI, p. 205, pl. 2, figs 7–10.
non 2002: *Neritopsis (Neritopsis) elegantissima* HÖRNES, 1853 — FISCHER et al., p. 448, Fig. 3: 9 a–c.

L e c t o t y p e — GBa 2008/69/31/1 (selected here).

M a t e r i a l — 260 specimens are more or less cleaned, but, because *N. (N.) elegantissima* is one of the most frequent gastropod species in the Hierlatz Alpe locality, lots of specimens are also on the rock pieces of other species.

Measurements	H	HL	HP	D	W	AA	AL
lectotype	18.5	16.5	14	*16	*12	120°	120°

S h a p e — Shell low-spired, few-whorled and subglobose with canaliculate suture and broad, ovate aperture. Though completely undamaged protoconch not found, remnants suggest consisting of one and half whorl, following nucleus; shape similar to that of adult form. Adult peristome extends like trumpet, bearing only angulation at suture. Shallow furrow running parallel with narrowly callous inner lip, resulting also pseudoumbilicus.

S c u l p t u r e — Protoconch smooth, teleoconch covered in beginning by spiral threads, strengthening into cords of two kinds alternating each other on later growth stages. Onset of spiral ornament sudden, well marking end of protoconch. Strong varices and growth-threads crossing spiral elements collabrally. On juvenile shell part, varices rounded but becoming sharper and higher on subsequent shell regions. Generally, varices run from suture to suture, or to basal furrow.

R e m a r k s — STOLICZKA's figure shows two kinds of varices alternating each other. This cannot be observed on the specimens but the strength, form and number in a

whorl are rather variable comparing the specimens (see e.g. figured specimens).

Neritopsis taramellii G. G. GEMMELLARO, 1879 and *Neritopsis praeclara* M. GEMMELLARO, 1911 are rather similar species. However, the figures show different views, and due to this fact, the distinction needs comparison of specimens.

FISCHER et al. (2002) misidentified a spiny species with different peristome as *N. (N.) elegantissima* from the Monte Cucco Sinemurian; the species, having a well distinguishable ramp, seems related to *N. (N.) compressula* von GÜMBEL, 1861.

D i s t r i b u t i o n — Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone), Sümeg (Bakony), Upper(?) Sinemurian.

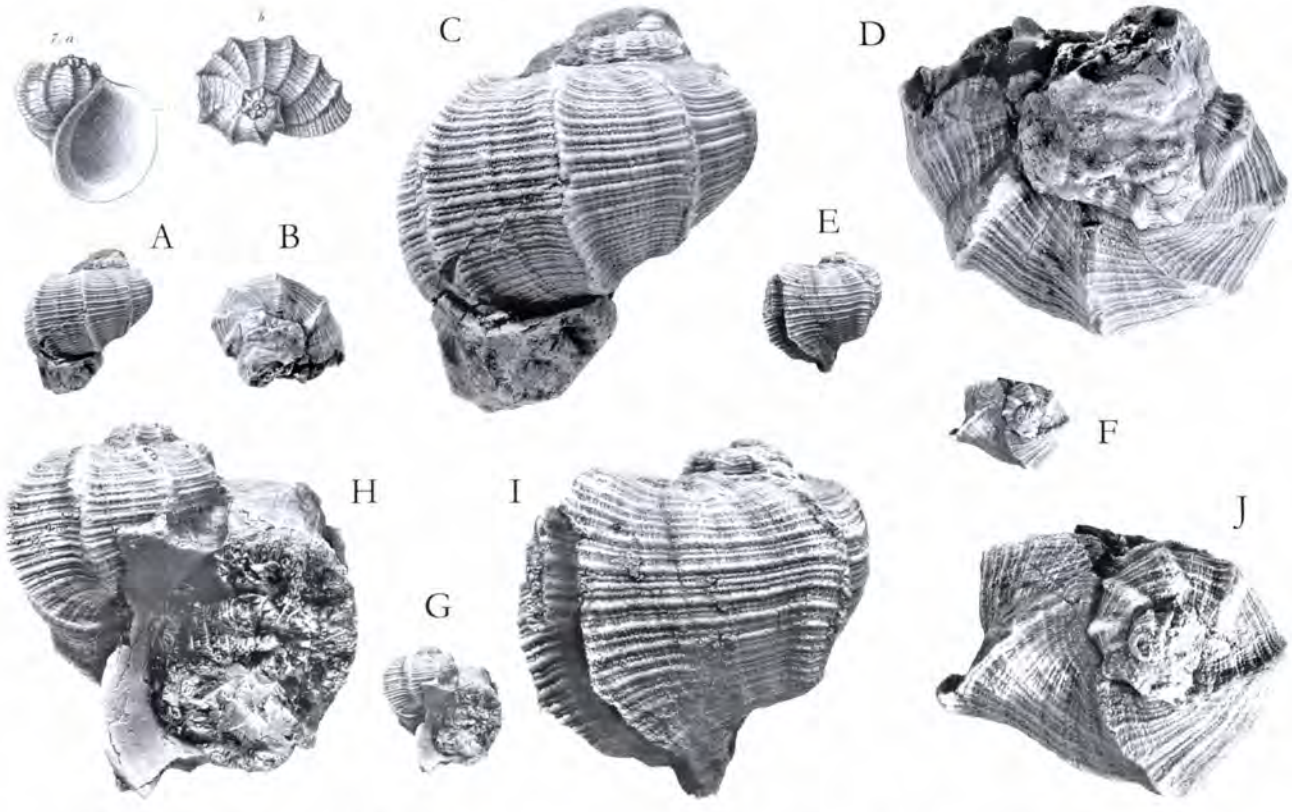

Figure 82 —*Neritopsis (Neritopsis) elegantissima* HÖRNES, 1853; lectotype and a paralectotype. — **7 a-b**: copy of the original figures from STOLICZKA (1861) Tafel III; **A–D**: lectotype, dorsal (A, C) and apical (B, D) views, A–B = ×1, C–D = ×2.5; **E–J**: a paralectotype (GBa 2008/69/31/1) in apertural (G, H), dorsal (E, I) and apical (F, J) views, E–G = ×1, H–J = ×2.5.

Neritopsis (Neritopsis) fabianii TONI, 1912

(Figure 83: E–H)

1912: *Neritopsis fabianii* TONI — TONI, p. 40, pl. 2, figs. 3a-d.
1980: *Neritopsis (Neritopsis) fabianii* TONI, 1912 — SZABÓ, p. 18, pl. 1, figs. 4–5

M a t e r i a l — More than forty specimens, that are inner moulds in majority (HGM).

M e a s u r e m e n t s	H	HL	HP	D	W	AA	AL
Figure 83	-	-	-	13.5	8.5	130°	130°

S h a p e — Low-spired, subglobose shell. Protoconch shape not different from that of adult. Subsutural belt of whorls bent upwards. Last whorl covering former parts of shell almost completely. Peristome nearly circular but angular at suture. Narrow callus developed along parietal lip.

S c u l p t u r e — Following smooth protoconch, whole surface of teleoconch ornamented by spiral lines of two strength, weaker secondary lines appearing in intersections of first order ones on post-juvenile shell. Growth-lines prosocline and arranged into bundles, appearing subregularly on some specimens. On some other specimens, these bundles protruded as low ridges subsuturally. Bundles and ridges lacking from some specimens.

R e m a r k s — In spite of the relatively high number of the specimens, the identification of this species was difficult, owing to the low number of specimens having no marked collabral ornament, like it is in TONI's depiction. The measurements do not vary as does the sculpture.

Neritopsis fabianii specimens with collabral ridges are comparable to *N. elegantissima* and related species, but the latters have rarer, longer and stronger varices than the former. Distinction from *N. (N.) papodensis* see below.

D i s t r i b u t i o n — Belluno (Southern Alps), Pliensbachian; Bakony Mts (many localities), from beds with mixed Obtusum to Ibex Zone faunas, and from Jamesoni to Davoei Zone (Lower Pliensbachian).

Figure 83 — *Neritopsis (Neritopsis) papodensis* SZABÓ, 1982 (A–D), refiguration of the holotype, *Neritopsis (Neritopsis) fabianii* TONI, 1912 (E–H) and *Neridomus* aff. *tethys* (G. G. GEMMELLARO, 1878) (I), images reproduced from SZABÓ (1982). — **A–D**: holotype of *N. (N.) papodensis*, apertural (A), dorsal (B) and apical (C, D) views, A–C = ×1, D = ×4; **E–H**: *N. (N.) fabianii*, apertural (F, H) and apical (E, G) views, E–F = ×1, G–H = ×2.5; **I**: *Neridomus* aff. *tethys*, the only neritid, published from the Hierlatz Limestone; ×2.

Neritopsis (Neritopsis) papodensis SZABÓ, 1982

(Figure 83: A–D)

1982: *Neritopsis (Neritopsis) papodensis* sp. n. — SZABÓ, p. 18, pl. 1, figs 6–9.

M a t e r i a l — Four fragmentary specimens (holotype HGM J 10130).

Measurements	H	HL	HP	D	W	AA	AL
holotype	11.5	10.5	9	11	8.5	118°	118°

S h a p e — Neritiform shell with moderately protruded spire and strongly convex surface of whorls, having also narrow ramp. Ramp appearing on last protoconch whorl that ends with marked growth line and sudden onset of spiral ornament. Peristome somewhat ovate with angulation at suture and without outer thickening. Inner lip extending to base as narrow, thin parietal callus.

S c u l p t u r e — Following sharp prosocline-prosoycrt growth-line, marking end of protoconch, spiral threads appear first that strengthen as cords, than secondary lines appear in almost all interspaces. These crossed by prosocline growth-lines and few suture to suture (to inner lip, on base) collabral costae. Costate shell portion begins quarter whorl after protoconch and endures on following whorl.

R e m a r k s — These forms are similar to those of *Neritopsis fabianii* TONI, which have transverse ridges or riblets, but differ in having stronger and longer costae restricted to a longer and definite shell portion. Moreover, *N. papodensis* has a higher spire and a deeper suture than *N. fabianii*. *N. (N.) elegantissima* HÖRNES and the related species with heavy costae or varices differ in having them over the full length of teleoconch.

D i s t r i b u t i o n — Lókút, Fenyveskút (Bakony Mts), Upper Pliensbachian.

Family Neritidae RAFINESQUE, 1815

Genus *Neridomus* MORRIS & LYCETT, 1851

T y p e s p e c i e s: *Nerita haemisphaerica* MORRIS & LYCETT, 1851 (= *Neridomus anglica* COX & ARKELL, 1950)

Neridomus aff. *tethys* (G. G. GEMMELLARO, 1878)

(Figure 83: I)

aff. 1878: *Neritina Tethys* GEMM. — GEMMELLARO, G. G., p. 326, pl. 27, figs 40, 42.
1982: *Neritoma (Neridomus)* aff. *tethys* (GEMMELLARO, G. G., 1878) — SZABÓ, p. 20, pl. 2, fig. 1.

M a t e r i a l — A single specimen (HGM).

Measurements	H	HL	HP	D	W	AA	AL
Figure 83: I (HGM)	*6	*5.5	*5	*7	*4.5	-	-

S h a p e — Small, globose shell, with last whorl nearly completely enveloping earlier parts. Peristome ovate, angular at suture, inner lip thick and largely callous.

S c u l p t u r e — Shell smooth with some obscure spiral lines on last whorl, and very fine growth-lines without sinus.

R e m a r k s — The shape of the specimen is highly similar to that of *Neritina tethys* G. G. GEMMELLARO, 1878, but owing to the bad preservation and to its possible juvenile state, the identification is doubtful.

D i s t r i b u t i o n —Lókút, Kericser (Bakony Mts), Davoei Zone (Lower Pliensbachian).

Subclass Caenogastropoda COX, 1959
Order Ptenoglossa GRAY, 1853
Superfamily Loxonematoidea KOKEN, 1889
Family Zygopleuridae WENZ, 1938
Genus *Pseudokatosira* NÜTZEL & GRÜNDEL, 2007
Type species: *Turritella undulata* BENZ, 1832

Pseudokatosira undulata (BENZ, 1832)

(Figure 84: C–D)

1832: *Turritella undulata* BENZ — in: ZIETEN, p. 43, pl. 32, fig. 2.
? 1852: *Chemnitzia undulata* — D'ORBIGNY, p. 35, pl. 237 fig. 16.
1858: *Turritella undulata* ZIET. — QUENSTEDT, p. 153, pl. 19, fig. 13.
non 1861: *Chemnitzia undulata* BENZ — STOLICZKA, p. 163, pl. 1, fig. 1.
? 1869: *Chemnitzia undulata* (ZIETEN) — DUMORTIER, p. 101, pl. 18, fig. 8.
1884: *Turritella undulata* ZIET. — QUENSTEDT, p. 305, pl. 196, figs 45–51.
1909: *Katosira undulata* BENZ — BRÖSAMLEN, p. 286, pl. 21, fig. 28.
1983: *Katosira undulata* (BENZ, 1832) — SZABÓ, p. 31,pl. 2, figs 1–2.
1997: *Katosira undulata* (BENZ, 1832) — HAGELE, p. 81.
2002: *Katosira undulata* (BENZ, 1832) — NÜTZEL & HORNUNG, p. 58, pl. 1, figs 4–5.
2007: *Pseudokatosira undulata* (BENZ, 1832) — NÜTZEL & GRÜNDEL, p. 59, pl. 1, figs 1–6.

Material — Nine specimens, most of them preserved as steinkern.

Measurements	H	HL	HP	D	W	AA	AL
Figure 84: C–D (HGM)	-	*35	*22.5	-	-	-	17.5°

Shape — Dextral, campaniliform shell with high spire and moderately convex whorls. Top of convexity corresponds to periphery. Hardly visible angulation at outer edge of base, accentuated by carina. Parietal and columellar lips covered by thin callus.

Sculpture — Whorls and base divided by deep spiral grooves, crossed by opisthocyrt growth lines and strong, periodically repeated, more or less collabral ribs or wrinkles on whorls. Ribs characterise younger whorls, but their shape changes into flattened, wide ridge or undulation on later whorls. They run from suture to suture or to carina, bordering the base on last whorl. Growth lines orthocline on base.

Remarks — The Bakony Mts specimens, though they are rather poorly preserved, well identifiable. The figured fragmentary specimen well corresponds the latest growth phase of *Pseudokatosira undulata* (BENZ, 1832) as interpreted by NÜTZEL & GRÜNDEL (2007).

The juvenile shell of *P. undulata* is very similar to *Katosira periniana* (D'ORBIGNY, 1853); some authors (e. g. STOLICZKA 1861) unified the two species. However, the Bakony Mts specimens justify that the two species are distinguishable; the whorls of *K. periniana* (D'ORBIGNY, 1853) remain flattened in that growth stage in which the convexity of the whorls in *P. undulata* increase. Simultaneously, the ribs weaken in *K. periniana*, while strengthen in *P. undulata*.

No specimen has been found in the Hierlatz Alpe material that would be really identical with *Pseudokatosira undulata* (BENZ, 1832). With its considerably slimmer shell, the specimen, inferably figured by STOLICZKA (1861) as "*Chemnitzia undulata*", and some other shell fragments most probably represent another species.

Distribution — South Germany, Pliensbachian; Bakony Mts, Pliensbachian.

Pseudokatosira? aff. *undulata* (BENZ, 1832)

(Figure 84: A–B, J–K)

1861: *Chemnitzia undulata* BENZ — STOLICZKA, p. 163, pl. 1, fig. 1.

Material — GBa 2008/69/1/1–8 specimens.

Measurements	H	HL	HP	D	W	AA	AL
GBa 2008/69/1/1	-	*25	*12	*10	*7	-	11°

Remarks — The Hierlatz Alpe finds belong partly to *Katosira periniana* and partly to another species. The latter forms are similar in their habit to *Pseudokatosira undulata* but they differ in having much more slender shell of 10° (±1°) spiral angle. The smallest spiral angle values are 15–20°, measurable on the juvenile shell parts of *P. undulata*. The prominent shell morphology changes of the different growth phases, characterising *P. undulata*, are unrecognisable on the Hierlatz Alpe specimens. However, the habit of the earliest shell parts are really similar (Figure 84: J–K) and the presence of a rudimentary siphonal outlet is also inferable at the foot of columella. Therefore a comparative study of the specimens is necessary to reach the final taxonomical conclusions.

The post-juvenile whorls of these shells are different from those of *Katosira periniana* in keeping their convexity on full length of the shell, fairly exceeding that size where

the whorls become flattened and the ribs weakened in D'ORBIGNY's species.

In the slender shell form, the Hierlatz Alpe specimens are similar also to *Katosira carusensis* (D'ORBIGNY, 1853), but is has an even more turriculate shell of 8° spiral angle and a smaller adult(?) size.

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Late Sinemurian (Oxynotum Zone).

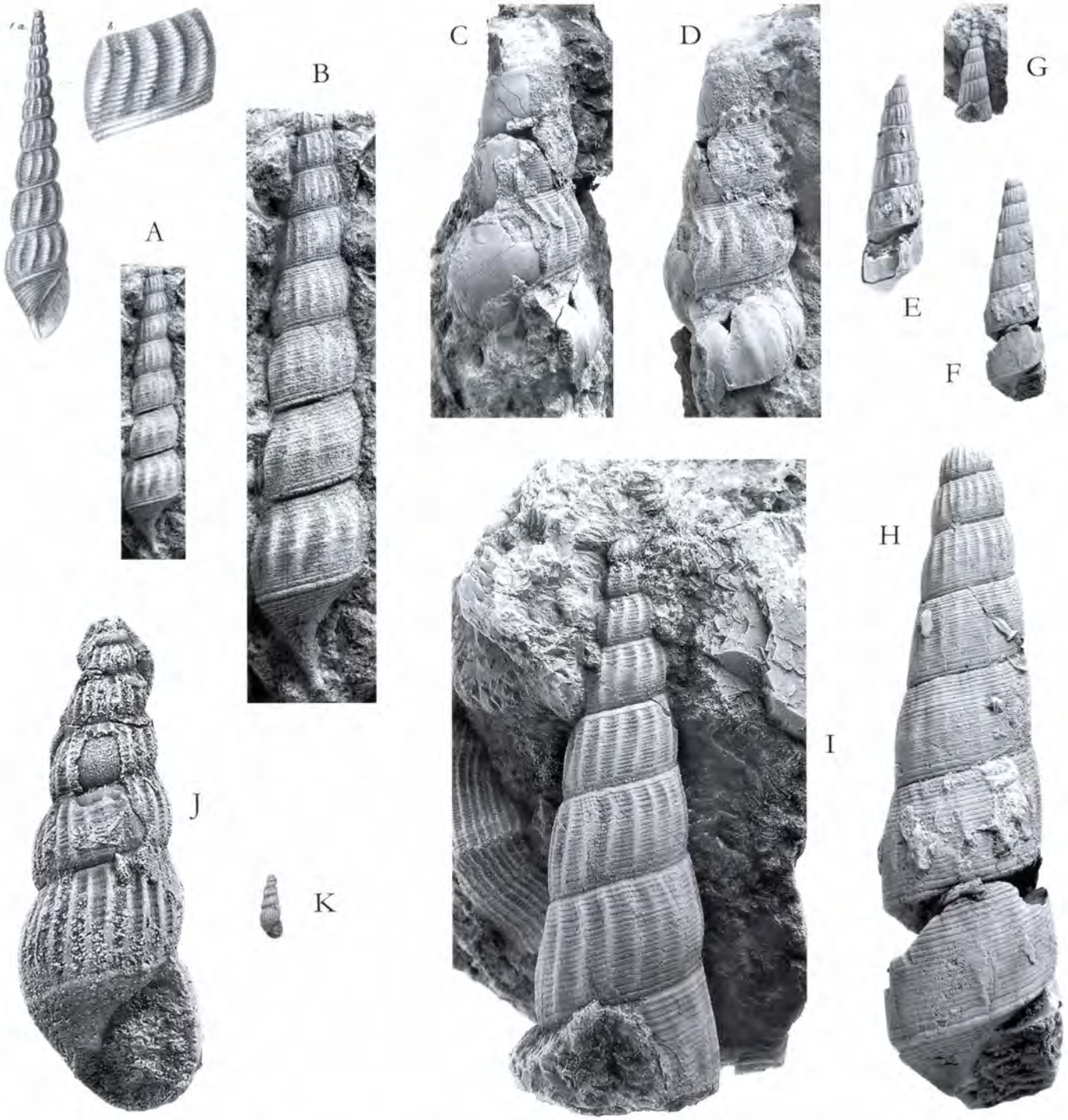

Figure 84 — *Pseudokatosira*? aff. *undulata* (BENZ, 1832) (A–B, J–K), *Pseudokatosira undulata* (BENZ, 1832) (C–D) and *Katosira periniana* (D'ORBIGNY, 1853) (E–I). — **1 a–b**: copy of the original "*Chemnitzia undulata*" figures from STOLICZKA (1861) Tafel I; **A–B**: peristomal view of *Pseudokatosira*? aff. *undulata* (BENZ, 1832) (GBa 2008/69/1/1) from the Hierlatz Alpe in apertural view, A = ×1, B = ×2; **C–D**: *Pseudokatosira undulata* (BENZ, 1832) from the Bakony Mts (refiguration, HGM), ×1; **E–I**: *Katosira periniana* (D'ORBIGNY, 1853), E–F, H: refiguration of a specimen from Lókút, Kericser (Bakony Mts, HGM), E–F = ×1, H =×3; G, I: a juvenile specimen from the "originals collection" of STOLICZKA (1861) (GBa 2008/69/1/2/1), its dimensions suggest belonging to *K. periniana*, G = ×1, I = ×5.5; **J–K**: a juvenile specimen with protoconch from the "originals collection" K = ×1, J = ×7; the outline of the last whorls of this cyrtoconoidal shell(part) coiled in 10° spiral angle, which corresponds to that of the adult shell of *Pseudokatosira*? aff. *undulata* (BENZ, 1832); in the other characters, this juvenile shell well correlates with the comparable shell parts of *Pseudokatosira undulata* (BENZ, 1832) figured by NÜTZEL & GRÜNDEL (2007, pl. 1: 5 a–e), even the riblets of the protonch of the same type are obscurely visible.

Genus *Katosira* KOKEN, 1892

Type species: *Katosira fragilis* KOKEN, 1892

Katosira periniana (D'ORBIGNY, 1853)

(Figure 84: E–I)

1853: *Chemnitzia periniana* D'ORB. — D'ORBIGNY p. 36 pl. 243. figs 1–2.
pars 1861: *Chemnitzia undulata* BENZ — STOLICZKA, p. 163, pl. 1, fig. 1.
1983: *Katosira periniana* (D'ORBIGNY, 1853) — SZABÓ, p. 31, pl. 2, fig. 3.
1997: *Katosira periniana* (D'ORBIGNY, 1853) — FISCHER & WEBER, p.14, pl.1, fig. 5.

Material — Two specimens from the Bakony Mts (HGM) and two from the Hierlatz Alpe (GBa 2008/69/1/2/1–2).

Measurements	H	HL	HP	D	W	AA	AL
Figure 84: E–F, H (HGM)	-	*17.5		*11	-	-	15°

Shape — Turriculate shell of conical outline and high number of whorls, being moderately convex in juvenile and feebly convex in later growth stages, respectively. Suture feebly impressed on juvenile whorls, but flush subsequently. Distinct angulation runs at basal margin, corresponding to periphery in this species. Base itself conical with somewhat concave outline where inclining to columella. Peristome quadrangular with rudimentary outlet at foot of columella, and thin, narrow parietal callosity.

Sculpture — Whorls and base divided into bands by spiral grooves. Number of striae hardly increases with growth, rather their distance grows. Angulation of basal margin accentuated by carina. Growth lines somewhat opisthocyrt on whorls and orthocline on base. Only whorls ornamented with low, collabral ridges, being more regular and rib-like on juvenile whorls. Ribs become flattened during growth. Inner moulds show traces of these latter elements only. Ridges in later growth stages seem to be in surface of cone determined by suture, while furrows between their pairs sunken below this surface

Remarks — For distinction of this form from *Pseudokatosira undulata* (BENZ), which also occurs in the Bakony Mts, see above. *Katosira carusensis* (D'ORBIGNY, 1853) has much smaller spiral angle (8°) and more convex whorls. However, unfortunately, D'ORBIGNY's types show less characters than his drawings.

From the Hierlatz Alpe fauna, *Katosira suessii* (STOLICZKA, 1861) has much smaller adult size, much wider spiral angle, deeper suture and different ornament (marked ribs on whole shell, only two spiral threads).

Distribution — Normandy (France), Middle Liassic; Hallstatt, Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone); Lókút, Kericser (Bakony Mts), Upper Pliensbachian (Stokesi Zone).

Katosira suessii (STOLICZKA, 1861)

(Figure 85)

1861: *Chemnitzia Suessii* STOL. — STOLICZKA, p. 163, pl. 1, fig. 2.

Lectotype — GBa 2008/69/2/1 (selected here).

Material — Seven more or less fragmentary specimens; no undamaged protoconch and peristome found.

Measurements	H	HL	HP	D	W	AA	AL
lectotype	*10	*4.5	-	*4	-	25°	25°

Shape — Moderately turriculate, conical shell with convex whorls and slightly impressed suture. Top of convexity (=periphery) somewhat below midwhorl. Suture following angular periphery of convex, anomphalous base; this line bearing also strong spiral cord or carina. Fragments suggest subcircular peristome and circular aperture.

Sculpture — Except youngest visible whorl of figured specimen (lectotype), all whorls covered by dense, feebly parasigmoidal, suture to suture collabral ribs (22–24/last whorl). Between peripheral carina/cord and midwhorl, two spiral threads also visible; they bear also tubercles at crossing points with ribs. Further (10–12), equally strong spiral threads cover base.

Remarks — The earliest visible but poorly preserved whorl is probably part of the protoconch. It does not seem to be ribbed but bears two spiral threads above the suture.

Distribution — Hallstatt, Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone).

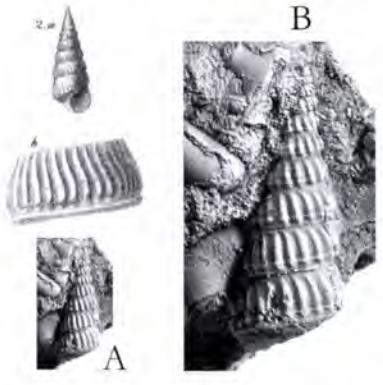

Figure 85 — *Katosira suessii* (STOLICZKA, 1861), lectotype. — **2 a–b**: copy of the original figures from STOLICZKA (1861) Tafel I; **A–B**: the lectotype, A = ×1, B = ×2.5.

Katosira? hierlatzensis (STOLICZKA, 1861)

(Figure 86)

1861: *Chemnitzia Hierlatzensis* STOL. — STOLICZKA, p. 164, pl. 1, figs 3 a–b.
v. 1911: *Zygopleura? dubia* n. sp. — M. Gemmellaro, p. 237, pl. 9, fig. 19.

L e c t o t y p e — GBa 2008/69/3/1 (monotype).
M a t e r i a l — A five whorls fragment of a single specimen is saved in the "originals collection".

Measurements	H	HL	HP	D	W	AA	AL
lectotype	-	-	-	**5.8	-	-	9°

S h a p e — Holotype indicative of high turriculate shell with slightly convex whorls and impressed suture, but neither earliest whorls nor terminal parts of shell found preserved. Low, swollen belt and shallow spiral concavity below it follow suture abapically. Weaker spiral swollening and concave belt above it observable supra-suturally. This latter swollening probably abaxial part of that carina, running on angulation separating base and (last) whorl of *Katosira* and usually overlapped by suture. No trace of umbilicus found.

S c u l p t u r e — Feebly opisthocyrt, dense, collabral costellae cover all whorls. In crossing points with sub-sutural spiral swelling, tubercles formed. No tubercles developed on lower spiral swelling. Two other obscure spiral threads cross riblets, one at top of convexity of whorls and another halfway towards lower suture. On last preserved whorl, nodulae seem to appear also at crossings with these latter two spiral elements. Growth-threads also riblet like sometimes, mainly in interspaces of costellae.

R e m a r k s — The species *Zygopleura? dubia* M. GEMMELLARO, 1911 is most probably identical with *Katosira? hierlatzensis* (STOLICZKA, 1861). However, from the latest whorl of the Sicily specimen, which is also incomplete, the marked ornament of the earliest whorls vanished. This changing may indicate belonging to *Anoptychia*.

The shape and the ornament are indicative of a species, distinguishable from the other contemporaneous, similar forms. However, the generic accomodation remains uncertain, because of the lacking shell parts (e.g. the shell may be the juvenile part of an *Anoptychia* species). Further material and studies are necessary to find confirmed generic name.

D i s t r i b u t i o n — Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone); Galati (Rocche Rosse), East Sicily, Upper Pliensbachian.

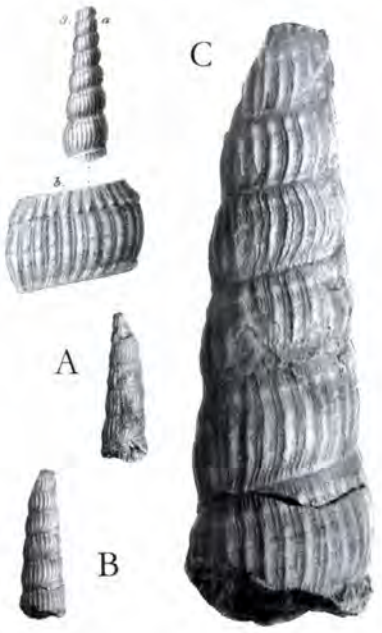

Figure 86 — *Katosira? hierlatzensis* (STOLICZKA, 1861), holotype. — **3 a–b**: copy of the original figures from STOLICZKA (1861) Tafel I; **A–B**: two lateral views of the holotype, ×1; **C**: magnified lateral view to show the ornament of *Katosira? hierlatzensis*, ×4.

Genus *Anoptychia* KOKEN, 1892
T y p e s p e c i e s: *Melania supraplecta* MÜNSTER, 1841

Anoptychia crenata (STOLICZKA, 1861)

(Figure 87: A–B)

1861: *Chemnitzia crenata* STOL. — STOLICZKA, p. 166, pl. 1, fig. 8.
2003: *Anoptychia crenata* (STOLICZKA, 1861) — SZABÓ in VÖRÖS et al., p. 64, Pl. V: 26–27.

L e c t o t y p e — NhM 1861/0034/0008 (monotype).
M a t e r i a l — Single, rather well preserved specimen with Mn-oxide coating is available in the NhM "originals collection".

Measurements	H	HL	HP	D	W	AA	AL
lectotype	-	*11	*7	-	-	37°	18°

S h a p e — Feebly cyrtoconoidal, moderately turriculate shell of thin wall without earliest whorls and peristome. Whorls evenly convex with moderately impressed suture. Base anomphalous and meets whorl surface in rounded angular periphery.

S c u l p t u r e — Earliest preserved juvenile whorls bear periodically repeating, dense, suture-to-suture, slightly prosocline riblets that become feebly parasigmoidal on subsequent whorls then gradually vanish (first from sub-sutural region). Five ribbed post-protoconch whorls pre-

served; three spiral threads appear on second one. Granules are sitting at crossing points of riblets and threads. With weakening of riblets, additional spiral threads develop below periphery of whorls, and then fine lines appear also on "ramp". Spiral threads cover also base.

R e m a r k s — Doubtlessly, this species is rather similar to *Anoptychia turgida* (STOLICZKA, 1861), but the measurements, first of all the wider spiral angle, and the details of the ornament distinguish them. Their close phylogenetic relation is very likely.

D i s t r i b u t i o n — Schafberg over St. Wolfgang, (Austria), Late Pliensbachian.

Anoptychia turgida (STOLICZKA, 1861)

(Figure 87: C–I)

1861: *Chemnitzia turgida* STOL. — STOLICZKA, p. 165, pl. 1, fig. 5.
1983: *Anoptychia turgida* (STOLICZKA, 1861) — SZABÓ, p. 32, pl. 2, fig. 4.

L e c t o t y p e — GBa 2008/69/5/1 (monotype).
M a t e r i a l — Single specimen in the "originals collection" (GBa), two specimens from Sümeg (Bakony Mts) (HGM).

M e a s u r e m e n t s	H	HL	HP	D	W	AA	AL
lectotype	-	*9	*6	7.5	4	-	22°

S h a p e — Moderately turriculate shell with convex whorls, last one turns without angulation into similarly convex, anomphalous base. Suture rather deeply impressed. Last whorl feebly deviates abapically, probably indicating adult stage. Aperture subcircular, peristome seems simple.

S c u l p t u r e — Abapical half of whorls and whole base sculptured by spiral lines. Collabral ornament consists of fine, slightly opisthocyrt growth lines, and tiny riblets on middle of juvenile whorls. Riblets more regularly repeated and more distinct on earlier shell parts, where they also bear tiny granulae at intersections with spiral lines. Strongest granulae sitting on spiral thread little below midwhorl.

R e m a r k s — The only Hierlatz Alpe specimen is rather poorly preserved, only small spots of the ornament visible, but they well correlate with STOLICZKA's (1861) figures. Marked variety of this ornament was found on two Bakony Mts specimens (SZABÓ 1983) that have also the shape of *Anoptychia turgida* (see Figure 87: C–I).

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Late Sinemurian (Oxynotum Zone); Bakony Mts (Sümeg), Late(?) Sinemurian.

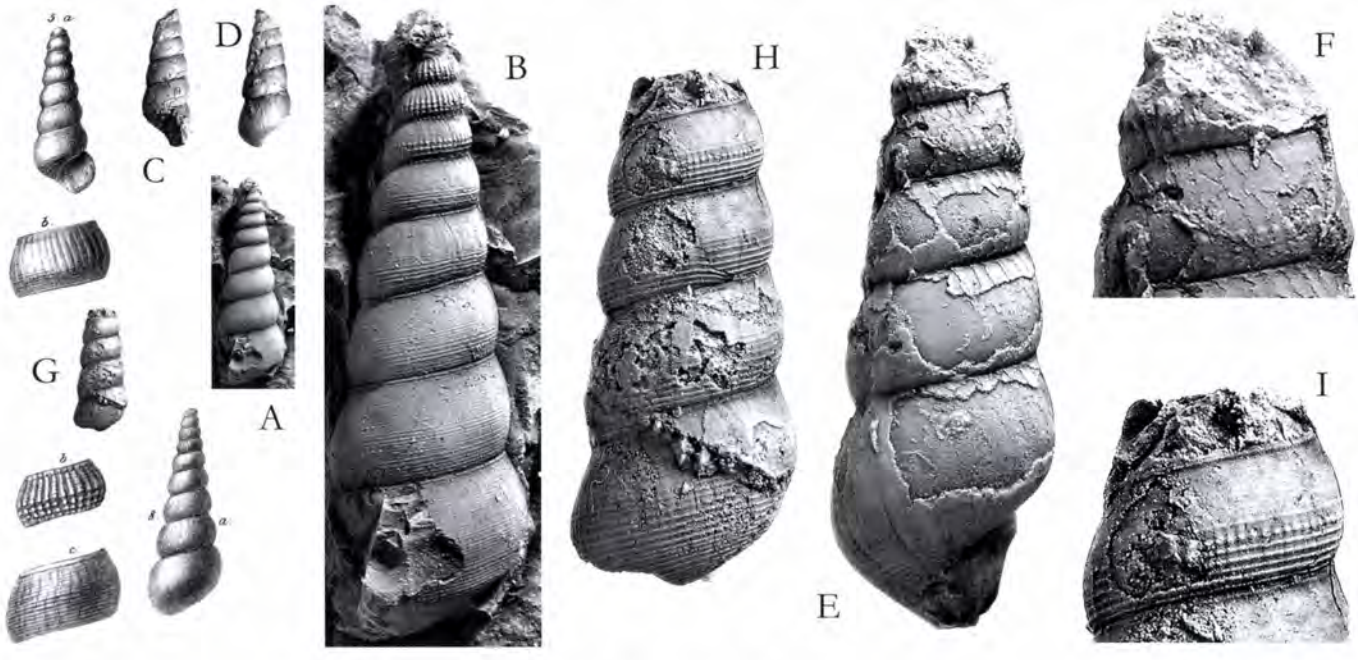

Figure 87 — *Anoptychia crenata* (STOLICZKA, 1861), lectotype (A–B), and *Anoptychia turgida* (STOLICZKA, 1861), lectotype (C–F) and an additional specimen from the Sümeg (Bakony Mts) Sinemurian (G–I). — **8 a–c**: copy of the original figures of "*Chemnitzia crenata*" from STOLICZKA (1861) Tafel I; **A**: lateral view of the lectotype of *Anoptychia crenata*, ×1; **B**: magnified lateral view to show the ornament of *Anoptychia crenata*, ×3; **5 a–b**: copy of the original figures of "*Chemnitzia turgida*" from STOLICZKA (1861) Tafel I; **C–D**: oblique "apertural" (C) and dorsal (D) views of the lectotype of *Anoptychia turgida*, ×1; **E–F**: magnified images to show details of the ornament of the lectotype of *Anoptychia turgida*, E = ×4, F = ×7; **G–I**: another specimen of *Anoptychia turgida* from the Bakony Mts (Sümeg) Sinemurian (refiguration of specimen published by SZABÓ 1983), having much better preserved ornament than the lectotype, G = ×1, H = ×4, I = ×7.

Anoptychia acutissima (HÖRNES, 1853)

(Figure 88)

1853: *Chemnitzia acutissima* HÖRN. — HÖRNES, p. 757.
1861: *Chemnitzia acutissima* HÖRN. — STOLICZKA, p. 165, pl. 1, fig. 6.

L e c t o t y p e — GBa 2008/69/6/1 (selected here).
M a t e r i a l — Thirty-two specimens, protoconch and undamaged peristome not found (GBa collections).

Measurements	H	HL	HP	D	W	AA	AL
lectotype	**28	**8.5	-	*3	-	*8°	cylindrical

S h a p e — Medium size but extremely high, needle-like, turriculate shell, consisting of extremely high whorls (HL/D≥2.6) of feebly convex surface and considerable number (~12 on most complete shell without protoconch). Shell outline cyrtoconoidal but post-juvenile whorls almost cylindrical. On adult shell, diameter of last whorl may be somewhat smaller than that of penultimate whorl. Suture nearly flush and visible as weak groove. Periphery of base rounded angular, base itself convex and anomphalous. Peristome and aperture elongate (drop-shaped) in direction from suture to foot of columella; broken surface suggests presence of rudimentary siphonal outlet. Inner lip, visible as callosity, continuous from suture to foot of columella.

S c u l p t u r e — Juvenile shell (first eight whorls on best-preserved specimen = lectotype) ribbed; five, regularly repeating, strong, suture to suture, collabral ribs of feebly parasigmoidal shape found on all whorls, which became pentagonal in cross-section (perpendicular to axis). Ribs develop slightly smaller than 72° periodicity therefore five gently twisted axial rows formed. Ribs rather suddenly disappear on 8th (visible) whorl then only opisthocline growth-lines observable collabrally. Whole shell covered by fine spiral threads.

R e m a r k s — In lack of protoconch and complete peristome, finding of a systematical place cannot be completely reliable. The inferable siphonal notch on the peristome and the orientation of the growth-lines suggest belonging to more advanced caenogastropod group than Loxonematoidea. Cerithioidean or rissoidean relation seems also conceivable. The habit of the complete shell resembles more to the members of the latter group.

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone); Kratzalpe, Sinemurian.

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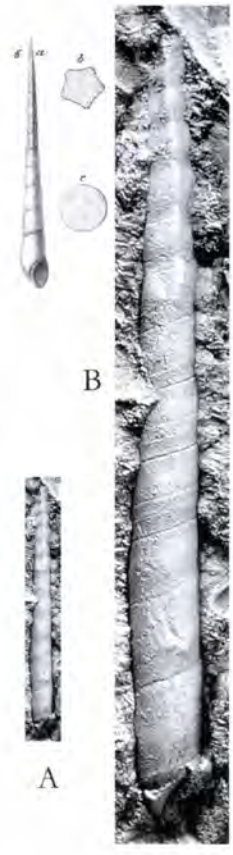


Figure 88 — *Anoptychia acutissima* (HÖRNES, 1853), lectotype. — **6 a–c**: copy of the original figures from STOLICZKA (1861) Tafel I; **A**: the lectotype, ×1; **B**: magnified image of the lectotype, ×2.5.

Superfamily Pseudomelanioidea FISCHER, 1885
Family Pseudomelaniidae FISCHER, 1885
Genus *Oonia* GEMMELLARO, 1879
T y p e s p e c i e s: *Melania abbreviata* TERQUEM, 1855

Oonia pennina (PARONA, 1892)

(Figure 89)

1880: *Chemnitzia sp.* — PARONA, p. 210, pl. 3, fig. 10.
1892: *Pseudomelania pennina* n. sp. — PARONA, p. 12, pl. 1, figs 1–2.
1967: *Anoptychia dubia* (TERQUEM) — SACCHI VIALLI & CANTALUPPI, p. 119, pl. 18, figs 3 a-b.
1983: *Oonia pennina* (PARONA, 1892) — SZABÓ, p. 35, pl. 3, fig. 9.

M a t e r i a l — A single specimen with shell of damages (HGM).

Measurements	H	HL	HP	D	W	AA	AL
Figure 89	-	28	19	-	22	45°	35°

S h a p e — Slightly ovate shell with moderately high spire, and feebly convex whorls, having thick spiral fold immediately below suture, separated from other parts of whorl surface by wide, shallow, concave zone. Base convex, and without umbilicus.

S c u l p t u r e — Whorls spirally ornamented with fine striation visible only by magnification. Shell becomes gradually smooth from suture towards periphery, then

striation reappears along inner lip on base. Fine, slightly opisthocyrt growth lines cross spiral lines.

R e m a r k s — There are no marked differences between the Bakony specimens and that figured by PARONA (1892). The slightly smaller spiral angle of the specimen of SACCHI VIALLI & CANTALUPPI (1967) cannot be regarded as significant difference. These latter authors revised the descriptions of PARONA (1892) and wrongly identified *Oonia pennina* as "*Anoptychia*" *dubia* (TERQUEM, 1865). Apart from the markedly different proportions, TERQUEM's species lacks the spiral swelling below the suture, its whorls are more convex, the suture is deeper, and the peristome shows a significant siphonal extension, which is completely missing in *Oonia*. Moreover, in spite of the lack of the juvenile shell, the species surely cannot be ranged into genus *Anoptychia*. The height of the last whorl well exceeds half of the reconstructed total heigh, which is an *Oonia* character, but, in turn, in *Anoptychia* it rarely exceeds slightly a quarter. This very proportional feature served as a basis for ranging this species here into the genus *Oonia*, instead of *Pseudomelania*. The above-discussed value is about 1/3 in this latter genus.

The most similar form is *Oonia dresnayi* BOURROUILH, 1966, but its spiral angles are wider by roughly 10°, and its subsutural fold is markedly weaker.

D i s t r i b u t i o n — Gozzano (Southern Alps), Middle Liassic; Lókút, Kericser (Bakony Mts), Stokesi Zone.

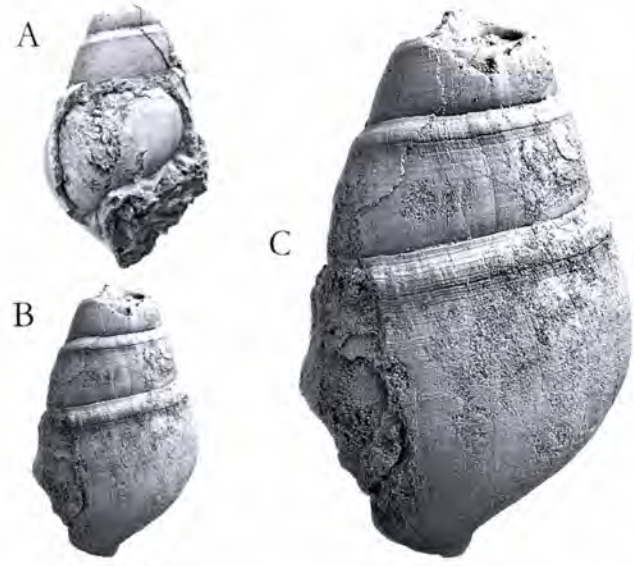


Figure 89 — *Oonia pennina* (PARONA, 1892), refiguration of the single Bakony Mts find. — **A**: "apertural" view, ×1; **B**: dorsal view, ×1; **C**: magnified dorsal view to show details of the ornament, ×2.

Genus *Pseudomelania* PICTET & CAMPICHE, 1862

T y p e s p e c i e s: *Chemnitzia normaniana* D'ORBIGNY, 1850

Pseudomelania turbinata (STOLICZKA, 1861)

(Figure 90)

1861: *Phasianella turbinata* STOL. — STOLICZKA, p. 177, pl. 3, figs. 1–2.

L e c t o t y p e — GBa 2008/69/26/1 (selected here).

M a t e r i a l — Tree + ?one? "original" specimens twelf further ones; peristome and apex not or partially preserved.

M e a s u r e m e n t s	H	HL	HP	D	W	AA	AL
lectotype	*9.5	*5.5	*3.5	*5	*3.3	33°	33°

S h a p e — Small shells of high conical spire, consisting of feebly convex whorls, separated by slightly impressed suture. Remnants outline subglobular protoconch; its earliest part absent. Periphery rounded, base convex, anomphalous. Peristome not preserved but lack of shell duplication at parietal region suggests its discontinuity. Cross-section of whorls water dropp-shaped.

S c u l p t u r e — Uncertain traces of tiny riblets close to upper suture visible on earliest preserved (protoconch) whorl. On subsequent whorls only fine, feebly sigmoidal growth-lines visible. Lower part of "S" much wider and more curved than upper segment.

R e m a r k s — One of the specimens, though its measurements are not significantly different from that of the others, possibly belongs to another species, because its periphery is rounded angular and the complete shell (post-protoconch whorls and base) are covered by spiral striae. Further material needed to resolve the question.

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Late Sinemurian (Oxynotum Zone); Kratzalpe, Sinemurian.

Figure 90 — *Pseudomelania turbinata* (STOLICZKA, 1861), lectotype and a paralectotype. — **1–2**: copy of the original figures from STOLICZKA (1861) Tafel III; **A–D**: dorsal (A, C) and and apertural (B, D) views of the lectotype, A–B =×1, B–C = ×3; **E–G**: apertural (E) and dorsal (F, G) views of a paralectotype, E–F = ×1, G = ×3.

Naticoidea FORBES, 1838
Family Ampullinidae COSSMANN, 1918
Genus *Naricopsina* CHELOT, 1886
Type species: *Lobostoma guarangeri* DAVOUST, 1855

Naricopsina laevis (STOLICZKA, 1861)

(Figure 91)

1861: *Neritopsis laevis* STOL. — STOLICZKA, p. 179, pl. 3, fig. 6.

Lectotype — GBa 2008/69/30/1 (selected here).

Material — Single specimen in the "originals collection" and four ones in the "background"material of the GBa Museum.

Measurements	H	HL	HP	D	W	AA	AL
lectotype	*10.5	*9.5	7	*10	*7.5	115°	106°

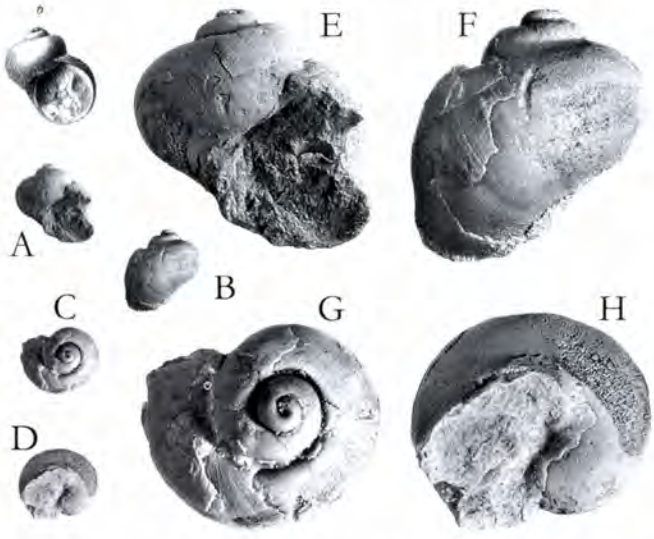


Figure 91 — *Naricopsina laevis* (STOLICZKA, 1861), lectotype. — **6**: copy of the original figures from STOLICZKA (1861) Tafel III; **A–H**: the holotype in apertural(A, E), dorsal (B, F), apical (C, G) and basal (D, H) views, A–D = ×1, E–H = ×3.

Shape — Naticiform shell of thin wall and rather protruding spire; protoconch lacking, but first preserved whorl indicates its flattened shape. Whorls convex and rapidly expanding, deeply impressed-canaliculate suture separate them. Periphery rounded, evenly arched but slightly flattened adaxially near peristome. Aperture and whorl cross-section axially ovate. Peristome damaged, but its tangential position and discontinuous nature well visible; only thin parietal callosity inferable between suture and axial region of base. Columellar lip rather long and almost vertical. Base strongly convex and anomphalous.

Sculpture — Shell smooth, only unequally thin, strongly prosocline growth-lines observable on its surface.

Remarks — The shape and the ornament of this species is rather clearly different from those of *Neritopsis* that has a continuous peristome, thick shell and never smooth shell (disregarding protoconch).

This is the only naticoidean shell, found in the Hierlatz Limestone so far.

Distribution — Hallstatt, Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone).

Superfamily Stromboidea SWAINSON,1840
Family Aporrhaidae ADAMS, 1858
Genus *Pietteia* COSSMANN, 1904
Subgenus *Trietteia* CONTI & SZABÓ, 1987
Type species: *Pietteia trispinigera* SZABÓ, 1983

Pietteia (Trietteia?) fischeri (STOLICZKA, 1861)

(Figure 92)

1861: *Alaria Fischeri* STOL. — STOLICZKA, p. 193, pl. 6, fig. 4.
2003: *Pietteia (Trietteia?) fischeri* (STOLICZKA, 1861) — SZABÓ in VÖRÖS et al., p. 64, pl. 5: 28–30.

Lectotype — NhM 2007/0052/0001 (selected here).

Material — A single, very poorly preserved, mainly inner mould specimen in the GBa "originals collection" and four fragmentary, but shelly specimens in the NhM Schafberg "originals collection".

Measurements	H	HL	HP	D	W	AA	AL
lectotype	-	+14	-	+11.8	-	22°	11°

+ measured just before peristome extending.

Shape — Medium size aporrhaid species with moderately turriculate spire of cyrtoconoidal outline, consisting of (12–13) convex (angular) whorls, separated by slightly impressed suture. Angulation present in full length of shell

at midwhorl. Remnants indicate presence of rather widely enlarged peristome. Lowermost one (in place of siphonal canal) not preserved at all, but remnant of third one found as prolongation of midwhorl angulation between earliers (= specific character of *Trietteia).* Uppermost spine of former peristome present at beginning of penultimate whorl.

S c u l p t u r e — On preserved shelly whorls, sparsely nodosed cord running on midwhorl angulation; nodes belong to "parabolic" type, being traces of former, temporary peristomes. Ribs connected to each node but not reaching sutures. Upwards running ribs seem weaker. All whorls covered by spiral threads; because of subregularly repeating marked growth-lines (growth-riblets), shell covered by irregular network of spiral and collabral lines.

R e m a r k s — The whorls show characters of a *Pietteia*, but without better preserved peristome, more precise identification is not possible. The morphology of the shells resembles *Pietteia trispinigera* SZABÓ, 1983, on which subgenus *Trietteia* CONTI & SZABÓ, 1987 has been established. *Trietteia* has three peristomal digitation instead of two of subgenus *P. (Pietteia)*.

The number of nodes on the midwhorl cord seems to be rather variable: 10–12 on the penultimate whorl of a specimen and 18–20 on another shell. The nodes are lacking from the last whorl.

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone); Schafberg over St. Wolfgang, (Austria), ? Upper Pliensbachian.

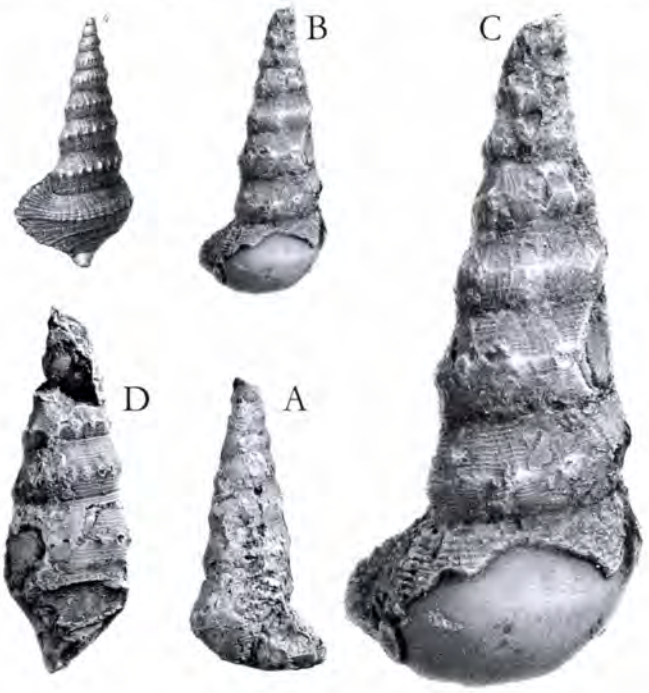


Figure 92 — *Pietteia (Trietteia?) fischeri* (STOLICZKA, 1861), lectotype and a paralectotype. — **4**: copy of the original figures from STOLICZKA (1861) Tafel V; **A–C**: lectotype in apertural (A) and dorsal (B, C) views A–B = ×1, C = ×2.2 magnification; **D**: a paralectotype with much denser nodes than lectotype, ×1.5.

Superfamily ?Turritelloidea CLARCK, 1851

Family ?Turritellidae CLARCK, 1851

Gen. Turritellidae? *striata* (HÖRNES, 1853)

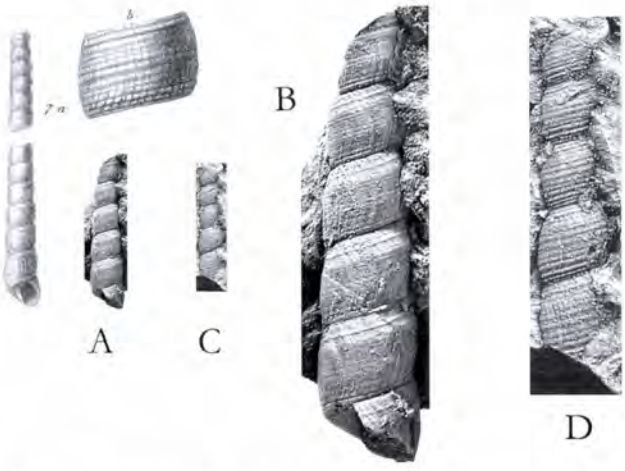
(Figure 93)

1853: *Chemnitzia striata* HÖRN. — p. 757.
1861: *Chemnitzia striata* HÖRN. — STOLICZKA, p.165, pl. 1, fig. 7.

L e c t o t y p e — GBa 2008/69/7/1 (selected here).

M a t e r i a l — Six fragmentary specimens of different growth stages in the "originals collection" and 15–20 fragments in the "background" material, however earliest (protoconch and juvenile) shell parts and entire peristome not found.

Measurements	H	HL	HP	D	W	AA	AL
lectotype	-	-	-	*4.5	-	-	4.5°



⇐

Figure 93 — Gen. Turritellidae? *striata* (HÖRNES, 1853), lectotype and a paralectotype. — **7 a–b**: copy of the original figures from STOLICZKA (1861) Tafel I; **A–B**: the lectotype, A = ×1, B = ×3; **C–D**: a more markedly ornamented paralectotype, C = ×1, D = ×3 (D).

S h a p e — Extremely high, needle-like, turriculate shell, composed of numerous slightly convex whorls, having almost double height than diameter; suture moderately impressed. Top of convexity, corresponding also periphery, situated at midwhorl. Lower rim of whorls angulate and, on most specimens, also carinate. Suture follows angulation, carina may be either exposed or overlapped by the

subsequent whorl. Base wall concave but changing into convex when last peristome developed.

S c u l p t u r e — Spiral threads cover whorls and also base. Strongly opisthocyrt growth-lines cross them, some of them riblet-like (irregularly). All ornamental elements less distinct on last whorl.

R e m a r k s — Supposing the same early coiling mode as observed on the available fragments, a complete adult shell must have consisted of about 22–25 whorls of about 10 cm height.

Because no early shell (protoconch) are found, that might support the generic attribution, even belonging to Turritellidae is highly doubtful. Placing into the genus *Turritella* itself, validity of the species name should be also investigated. In such an uncertain situation, the best solution is to let the genus attribution problem pending. From the shape, a Zygopleurid relation could be also concluded, but more uncertain than the place in Turritellidae. The simply opisthocyrt growth-lines do not belong to the character set of the Zygopleuridae.

The two figured specimens have rather different ornament beside very similar shape; the spiral threads of the paralectotype are prominently stronger in the same growth stage (size) than on the lectotype. Because the matrices of the two specimens are also different a stratigraphical age difference may be the reason. Transitions between the two ornament types are found amongst the paralectotypes.

D i s t r i b u t i o n — Hierlatz Alpe, Upper Sinemurian (Oxynotum Zone); Schafberg at St. Wolfgang (Austria), Sinemurian.

Subclass ?Heterostropha FISCHER, 1885
Order ?Allogastropoda HASZPRUNAR, 1985
Superfamily ?Mathildoidea DALL,1889
Family ?Mathildidae DALL,1889
Genus ? *Clathrobaculus* COSSMANN, 1912
T y p e s p e c i e s: *Cerithium zigzag* J. A. EUDES-DESLONGCHAMPS, 1842

Clathrobaculus? fistulosus (STOLICZKA, 1861)
(Figure 94)

1861: *Chemnitzia fistulosa* STOL. — STOLICZKA, p. 166, pl. 1, fig. 9.

L e c t o t y p e — GBa 2008/69/8/1 (selected here).

M a t e r i a l — A single fragment in the "originals collection", selected as lectotype and five other specimens of similar state of preservation in the "background" material.

Measurements	H	HL	HP	D	W	AA	AL
lectotype	-	*10	*5	*7.5	*4.5	-	6°

S h a p e — Extremely turriculate shell of almost cylinrical coiling, which consisting of rather high, convex, bicarinate whorls and deeply impressed suture. Periphery of whorls coinciding with adapical carina at midwhorl; carinate angulation also at rim of base (line of suture). Base surface feebly concave; shell anomphalous. Peristome probably rounded. Columella thin and simple (cut to study by STOLICZKA), no trace of fold visible within shell interior.

S c u l p t u r e — Four marked carina visible on whorls; one little below suture, another on periphery of whorls (at midwhorl), third one halfway between latter and fourth that running along outer rim of base and visible just above suture on earlier whorls. One additional carina visible on the base, near to peripheral angulation; other part of base badly damaged. Growth-lines rather strongly opisthocyrt and feebly opisthocline.

R e m a r k s — The habit of shell similar to that of Turritellidae? *striata,* main differences are in the number and strength of the dominantly spiral ornament. Further, better preserved material needed to find reliably the systematical place.

D i s t r i b u t i o n — Hallstatt, Hierlatz Alpe, Late Sinemurian (Oxynotum Zone).

⇒

Figure 94 — *Clathrobaculus? fistulosus* (STOLICZKA, 1861), lectotype. — **9 a–b**: copy of the original figures from STOLICZKA (1861) Tafel I; **A**: lectotype in natural size; **B**: lectotype in ×3 magnification to display the ornament.

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Table 2 — A summary of results of the revision, and an inventory help to find the type specimens in STOLICZKA's (1861) gastropod "originals collections". — In the GBa inventory, he first three numbers, selected by slashes, indicate the species by the original order in STOLICZKA's (1861) paper; next number (if there is) indicate species, selected from the syntypes; last number without slash on its right side indicate specimen (like in the text above); № 1 in each inventory unit is given to lectotypes/holotypes or other figured specimens.

STOLICZKA's (1861) species names	New names	depository	New inventory №
Chemnitzia undulata Benz	*Pseudokatosira?* aff. *undulata* (BENZ)	GBa	2008/69/1/1/
	Katosira periniana (D'ORBIGNY, 1853)	GBa	2008/69/1/2/
Chemnitzia suessi Stoliczka	*Katosira suessii* (STOLICZKA, 1861)	GBa	2008/69/2/
Chemnitzia hierlatzensis Stoliczka	*Katosira? hierlatzensis* (STOLICZKA, 1861)	GBa	2008/69/3/
Chemnitzia multicostata Stoliczka	*Proconulus? multicostatus* (STOLICZKA, 1861)	GBa	2008/69/4/
Chemnitzia turgida Stoliczka	*Anoptychia turgida* (STOLICZKA, 1861)	GBa	2008/69/5/
Chemnitzia acutissima Hörnes	*Anoptychia acutissima* (HÖRNES, 1853)	GBa	2008/69/6/
Chemnitzia striata Hörnes	Gen. Turritellidae? *striata* (HÖRNES, 1853)	GBa	2008/69/7/
Chemnitzia crenata Stoliczka	*Anoptychia crenata* (STOLICZKA, 1861)	NhM	1861/0034/0008
Chemnitzia fistulosa Stoliczka	*Chlatrobaculus? fistulosus* (STOLICZKA, 1861)	GBa	2008/69/8/
Chemnitzia margaritacea Stoliczka	*Eucyclus (Eucyclus) margaritaceus* (STOLICZKA, 1861)	GBa	2008/69/9/1/
	Eucyclus (Eucyclus) sandrae n. sp.	GBa	2008/69/9/2/
	Eucyclus (Eucyclus) sp.	GBa	2008/69/9/3/
Trochus epulus d'Orbigny	*Epulotrochus acteon* (D'ORBIGNY, 1852)	GBa	2008/69/10/1/
	Epulotrochus tuberculatus n. sp.	GBa	2008/69/10/2/
Trochus laeviusculus Stoliczka	*Ataphrus? laeviusculus* (STOLICZKA, 1861)	NhM.	1861/0034/0011
Trochus lateumbilicatus d'Orbigny?	*Anticonulus acutus* n. sp.	GBa	2008/69/11/
Trochus lautus Stoliczka	*Anticonulus lautus* (STOLICZKA, 1861)	NhM.	1856/0047/0168
Trochus carinifer Hörnes	*Epulotrochus carinifer* (HÖRNES, 1853)	GBa	2008/69/12/
Trochus morpheus Stoliczka	*Epulotrochus? morpheus* (STOLICZKA, 1861)	GBa	2008/69/13/
Trochus simonyi Hörnes	*Dimorphotectus simonyi* (HÖRNES, 1853)	GBa	2008/69/14/
Trochus torosus Stoliczka	*Anticonulus? torosus* (STOLICZKA, 1861)	GBa	2008/69/15/
Trochus plectus Stoliczka	*Plectotrochus plectus* (STOLICZKA, 1861)	GBa	2008/69/16/
Trochus attenuatus Stoliczka	*Dimorphotectus? attenuatus* (STOLICZKA, 1861)	GBa	2008/69/17/
Trochus granuliferus Stoliczka	*Trypanotrochus granuliferus* (STOLICZKA, 1861)	GBa	2008/69/18/
Trochus kneri Stoliczka	*Proconulus? kneri* (STOLICZKA, 1861)	GBa	2008/69/19/
Trochus avernus Stoliczka	*Proconulus avernus* (STOLICZKA, 1861)	GBa	2008/69/20/
Trochus rotulus Stoliczka	*Guidonia rotula* (STOLICZKA, 1861)	GBa	2008/69/21/
Trochus aciculus Hörnes	*Ataphrus aciculus* (HÖRNES, 1853)	GBa	2008/69/22/
Trochus latilabrus Stoliczka	*Ataphrus latilabrus* (STOLICZKA, 1861)	GBa	2008/69/23/
Trochus cupido d'Orbigny	*Eucyclomphalus hierlatzensis* VON AMMON, 1892	GBa	2008/69/24/
	Eucyclus (Eucyclus) mitterseensis n. sp.	NhM	1861/0001/0028
Eucyclus alpinus Stoliczka	*Eucyclus (Eucyclus) alpinus* STOLICZKA, 1861	GBa	2008/69/25/
Turbo orion d'Orbigny	*Eucyclus (Lokuticyclus) spinnerinensis* n. sp.	NhM	1861/0001/0028
Turbo hörnesi Stoliczka	*Hamusina? hoernesi* (STOLICZKA, 1861)	NhM	1859/0019/0051
	Scaevola? suissenseensis n. sp.	NhM	1859/0019/0009
Phasianella turbinata Stoliczka	*Pseudomelania turbinata* (STOLICZKA, 1861)	GBa	2008/69/26/
Loxonema haidingeri Stoliczka	*Trochopsidea haidingeri* (STOLICZKA, 1861)	GBa	2008/69/27/
Pitonillus conicus d'Orbigny	*Lewisiella stoliczkai* n. sp.	GBa	2008/69/28/
Rotella macrostoma Stoliczka	*Crossostoma macrostoma* (STOLICZKA, 1861)	GBa	2008/69/29/
Neritopsis laevis Stoliczka	*Narcopsina laevis* (STOLICZKA, 1861)	GBa	2008/69/30/
Neritopsis elegantissima Hörnes	*Neritopsis (Neritopsis) elegantissima* HÖRNES, 1853	GBa	2008/69/31/
Discohelix orbis Reuss	*Discohelix orbis* (REUSS, 1852)	GBa	2008/69/32/1/
	Discohelix ornata (HÖRNES, 1853)	GBa	2008/69/32/2/
	Discohelix pseudornata n. sp.	GBa	2008/69/32/3/
	Discohelix hallstattensis n. sp.	GBa	2008/69/32/4/
Discohelix reticulata Stoliczka	*Discohelix reticulata* STOLICZKA, 1861	GBa	2008/69/33/
Discohelix excavata Reuss	*Discohelix excavata* (REUSS, 1852)	GBa	2008/69/34/1/
	Discohelix sima n. sp.	GBa	2008/69/34/2/
	Discohelix stoliczkai n. sp.	GBa	2008/69/34/3/
Discohelix reussi Hörnes	*Pentagonodiscus reussi* (HÖRNES, 1853)	GBa	2008/69/35/
	Discohelix aff. *ornata* (HÖRNES, 1853)	GBa	2008/69/35/2/
Discohelix spinicosta Stoliczka	*Asterohelix spinicosta* (STOLICZKA, 1861)	GBa	2008/69/36/
Pleurotomaria expansa J. Sowerby	*Ptychomphalus expansus* (SOWERBY, 1821)	GBa	2008/69/37/
Pleurotomaria heliciformis Deslongchamps	*Ptychomphalus heliciformis* (J. A. EUDES-DESLONGCHAMPS, 1849)	GBa	2008/69/38/
Pleurotomaria foveolata Deslongchamps	*Wortheniopsis (Wortheniopsis) urkutensis* n. sp.	GBa	2008/69/39/1/
	Wortheniopsis (Sisenna) hierlatzensis n. sp.	GBa	2008/69/39/2/
Pleurotomaria hierlatzensis Hörnes	*Laevitomaria hierlatzensis* (HÖRNES, 1853)	GBa	2008/69/40/
Pleurotomaria coarctata Stoliczka	*Laevitomaria coarctata* (STOLICZKA, 1861)	NhM	1861/0034/0029
Pleurotomaria buchi Deslongchamps	*Pleurotomaria debuchii* J. A. EUDES-DESLONGCHAMPS, 1849	GBa	2008/69/41/
Pleurotomaria intermedia Münster	*Pleurotomaria deshayesii* J. A. EUDES-DESLONGCHAMPS, 1849	GBa	2008/69/42/
Pleurotomaria princeps Koch & Dunker	? *Pleurotomaria princeps* KOCH, 1837	GBa	2008/69/43/1/
	Pyrgotrochus? cf. *precatoria* (J. A. EUDES-DESLONGCHAMPS, 1849)	GBa	2008/69/43/2/
	Pleurotomaria sp.	GBa	2008/69/43/3/
Pleurotomaria anglica J. Sowerby	*Pleurotomaria* aff. *anglica* (SOWERBY, 1818)	GBa	2008/69/44/
Pleurotomaria suessii Hörnes	*Pleurotomaria suessii* HÖRNES, 1853	GBa	2008/69/45/1
	Pleurotomaria debuchii J. A. EUDES-DESLONGCHAMPS, 1849	GBa	2008/69/45/2–3
	Anodomaria stojaspali SZABÓ, 2008	GBa	2008/69/45/4/
	Trochotomaria lobitzeri SZABÓ, 2008	GBa	2008/69/45/5/
Trochotoma striatum Hörnes	*Leptomaria striata* (HÖRNES, 1853)	GBa	2008/69/46/1
	Pleurotomaria aff. *eplenyensis* (n. sp.)	NhM	1859/0019/0054
Rimula austriaca Hörnes	*Austriacopsis (Austriacopsis) austriaca* (HÖRNES, 1853)	GBa	2008/69/47/
Alaria fischeri Stoliczka	*Pietteia (Trietteia?) fischeri* (STOLICZKA, 1861)	GBa	2008/69/48/1
		NhM	2007/0052/0001

Conclusion

This was the first step toward publishing advanced results of a few ten years taxonomical work on the Hierlatz Limestone gastropods. Unfortunately, the unfavourable fossilisation conditions frequently did not permit collecting specimens satisfactorily preserved to precise identification. However, already the available material bears huge amount of information about the survival and the re-colonisation of the Mediterranean Jurassic seas after the Late Triassic mass extinction, which would be unaccesible without these not excellently preserved shells.

A kind of short summary about the taxonomical results from the revision of STOLICZKA's (1861) "originals collections" is collected into Table 2 with some inventory help.

* * *

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References

AMMON, L. VON (1892): Die Gastropodenfauna des Hochfelln-Kalkes und über Gastropoden-Reste aus Ablegerungen von Adnet, Monte Nota und den Raibler Schichten. — *Geognostische Jahreshefte*, **5**: 161–221.

BANDEL, K. (1982): Morphologie und Bildung der frühontogenetischen Gehäuse bei conchiferen Mollusken. — *Facies*, **7**: 1–198.

BANDEL, K. (1988): Repräsentieren die Euomphaloidea eine naturliche Einheit der Gastropoden? — *Mitteilungen aus dem Geologisch-Paläontologischen Institut der Universität Hamburg*, **67**: 1–33.

BANDEL, K. & FRÝDA, J. (1998): Position of Euomphalidae in the system of the Gastropoda. — *Senckenbergiana Lethaea*, **78**(1–2): 103–131.

BENZ 1832 (in ZIETEN).

BLAKE, J. F. (1872): On the Infralias in Yorkshire. — *The quarterly journal of the Geological Society of London*, **28**: 132–147.

BOURROUILH, R. (1966): Gastéropodes du Lias inférieur et moyen du domaine atlasique marocain. — *Notes et mémoires du Service géologique du Maroc*, **196**: 25–72, 37 figs, pls 1–3.

BÖCKH, J. (1874): A Bakony déli részének földtani viszonyai. II. rész. (Die geologischen Verhältnisse des südlichen Theiles des Bakony. II.). — *Annales Instituti Geologici Publici Hungarici*, **3**: 1–180.

BÖHM, J. (1895): Die Gastropoden des Marmolatakalkes. — *Palaeontographica*, **42**: 211–308.

BRÖSAMLEN, R. (1909): Beitrag zur Kentniss der Gastropoden des Schwäbischen Jura. — *Palaeontographica*, **56**: 177–321, pls. 17–22.

CHAPUIS, F. & DEWALQUE, G. (1854): Description des fossiles des terrains secondaires de la province de Luxenburg. — *Mémoires des savants étrangers, publiés par l' Academie royale Belgique*, **25**: 302 pp., 38 pls.

CONTI, M. A. & FISCHER J.-C. (1984): La Faune a Gastropodes du Jurassique Moyen de Case Canepine (Umbria, Italie), Systématique, Paléobiogéographie, Paléoécologie. — *Geologica Romana*, **21**: 125–183.

CONTI, M. A. & MONARI, S. (1991): Bivalve and Gastropod Fauna from the Liassic Ammonitico Rosso Facies in the Bilecik area (Western Pontides, Turkey). — *Geologica Romana*, **27**: 245–301.

CONTI, M. A. & MONARI, S. (1994): I gasteropodi giurassici dell' Appenino Umbro-Marchigiano (Italia Centrale). — *Studi Geologici Camertini*, **spec. vol.**, "Biostratigrafia dell' Italia centrale": 197–215.

CONTI, M. A. & MONARI, S. (2002): Jurassic discohelicid gastropods from the Reatini Mountains (Central Apennines, Italy) and their stratigraphical significance. — *Geologica Romana*, **36**: 199–213.

CONTI, M. A. & SZABÓ, J: (1987): Comparison of Bajocian gastropod faunas from the Bakony Mts (Hungary) and Umbria (Italy). — *Annales historico-naturales Musei nationalis hungarici*, **79**: 43–59.

COSSMANN, M. (1916): *Essais de Paléoconchologie comparée*. — Volume **10**, 292 pp., 12 pls; Paris.

COX L. R., see in MOORE, R. C. (Ed.) (1960).

DARESTE DE LA CHAVANNE, J. (1920): Fossiles liassiques de la region de Guelma. — *Bulletin du Service de la Carte Géologique de l'Algérie*, [1], **5**: 1–73, pls 1–4.

DUMORTIER, E. (1864–1874): *Etudes paléontologiques sur les dépôts jurassiques du Bassin du Rhône*. — Paris, Savy Ed. — (1864) 1. Infra-lias, 187 pp., 30 pls; (1867) 2. Lias inférieur, 252 pp., 50 pls; (1869) 3. Lias moyen, 349 pp., 45 pls; (1874) 4. Lias supérieur, 336 pp., 62 pls.

DUNKER, W. (1847): Über einige neue Versteinerungen aus verschidenen Gebirgs-formationen. — *Palaeontographica*, **1**: 128–133.

EUDES-DESLONGCHAMPS, E. (1849): Mémoires sur les Pleurotomaries des terrains secondaires du Calvados. — *Mémoires de la Société Linnéenne de Normandie* **8**: 1–157, pls 1–18.

FISCHER, J.-C. (2001): Study of the Gastropods. — In: FISCHER, J.-C., LE NINDRE, Y. M., MANIVIT, J. & VASLET, D. (2001): Jurassic Gastropod Faunas of Central Saudi Arabia — *GeoArabia*, **6**(1): 63–99.

FISCHER J.-C., ROSATI F. & RAFFI S. (2002): Sinemurian gastropods from Monte Cucco (Umbria-Marche Apennines, Central Italy). — *Geobios*, **35**(4): 441–456.

FISCHER, J.-C. & WEBER, C. (1997): *Volume II, Gastéropodes Jurassiques*. — *In*: FISCHER, J.-C. (ed.). *Révision critique de la Paléontologie Française, incluant la réedition de la original*. — pp 300+622, Pls 451; Paris, Masson & Muséum national d'Histoire naturelle.

GEMMELLARO, G. G. (1874): Sopra alcune faune giuresi e liassiche di Sicilia. Studi paleontologici III. Sopra I fossili della zona con Terebratula aspasia Menegh. della provincia di Palermo e di Trapani. — *Giornale di Scienze naturali ed economiche di Palermo*, **10**: 53–112.

GEMMELLARO, G. G. (1879): VIII. Sui fossili del calcare cristallino delle Montagne del casale e di Bellampo nella provincia di Palermo. — *Giornale di Scienze naturali ed economiche Palermo*, **13**: 233–434.

GEMMELLARO, M. (1911): Sui fossili degli strati a Terebratula Aspasia della Contrada Rocca Rosse presso Galati (prov. di Messina). Cephalopodi (fine) – Gasteropodi. — *Giornale di Scienze naturali ed economiche di Palermo*, **28**: 203–246, pls 9–10.

GRÜNDEL, J. (2003a): Gastropoden aus dem Unteren Lias (Ober-Hettangium bis Unter-Sinemurium) Südwestdeutschlands. — *Stuttgarter Beiträge zur Naturkunde*, [B], **340**: 1–55.

GRÜNDEL, J. (2003b): Gastropoden aus dem Bajocium und Bathonium von Sengenthal und Kinding, Franken (Süddeutschland). — *Zitteliana*, **A43**: 45–91.

GRÜNDEL, J. (2004): Gastropoden aus dem oberen Bathonium von Luc-sur-Mer/Calvados (Normandie, Frankreich): I. Archaeogastropoda und Neritimorpha. — *Freiberger Forschungshefte*, **C 502**: 15–50, 6 pls.

GRÜNDEL, J. (2005): The genus Discohelix Dunker, 1847 (Gastropoda) and on the content of the Discohelicidae Schröder, 1995. — *Neues*

Jahrbuch für Geologie und Paläontologie, [Monatshefte] (12): 729–748.

GRÜNDEL, J. (2007): Gastropoden aus dem unteren Pliensbachium von Feugerolles (Normandie, Frankreich). — *Freiberger Forschungshefte*, **C 524**: 1–34.

GRÜNDEL, J. & NÜTZEL, A. (1998): Gastropoden aus dem oberen Pliensbachium (Lias δ2, Zone des Pleuroceras spinatum) von Kalchreuth östlich Erlangen (Mittelfranken). — *Mitteilungen der Bayerische Staatssammlung für Paläontologie und Historische Geologie*, **38**: 63–96, 7 pls.

GÜMBEL, C. W. VON (1861): Geognostische Beschreibung des bayerischen Alpen-gebirges und seine Vorlandes. — In: GÜMBEL, C. W. VON (Ed.) *Geognostische Beschreibung der Königreichs Bayern, Abt. I.* — pp. 950. — Gotha, J. Perthes.

HAAS, O. (1912): Die Fauna des mittleren Lias von Ballino in Südtirol. I.: Brachiopoden, Lamellibranchiaten und Gastropoden. — *Beiträge zur Paläontologie und Geologie Österreich-Ungarns und des Orients*, **25**: 223–285.

HAAS, O. (1953): Mesozoic invertebrate faunas of Peru. — *Bulletin of the American Museum of Natural History*, **101**: 1–328.

HABER, G. (1932–1934): Gastropoda, Amphineura, et Scaphopoda jurassica. — *Fossilium Catalogus*, **53**: 400 pp.

HÄGELE, G. (1997): *Juraschnecken*. — Fossilien, Sonderband, **11**: 1–144.

HÄGELE, G. (2004): The gastropod genus Ataphrus in the Bajocian (Middle Jurassic) of Normandy (France). — *Neues Jahrbuch für Geologie und Paläontologie*, [Monatshefte], (10): 617–628.

HAUER, F. VON (1853): Über die Gliederung der Trias-, Lias- und Juragebilde in den nordöstlichen Alpen. — *Jahrbuch der kaiserlich-königlichen Geologischen Reichsanstalt*, **4**: 715–784.

HÖRNES, M. (1853): Gastropoden. — In: HAUER (1853): pp. 757–764.

HUDLESTON, W. H. (1894): A monograph of the British Jurassic Gasteropoda. Part I, N. 7, Gasteropoda of the Inferior Oolite. — *Monographs of the Palaeontographical Society*, **48**: 325–390.

ICZN (1999): see below as "International Commission.."

INESTA, M., SZABÓ, J. & SZENTE, I. 1990: A Pliensbachian gastropod and bivalve faunula from the Mola Hill (Betic Cordilleras, Spain). — *Annles historico-naturales Musei nationalis hungarici*, **92**: 19–23.

INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE (1999): International Code of Zoological Nomenclature. — Fourth Edition, XXIX+306 pp., London (International Trust for Zoological Nomenclature); http://www.iczn.org/iczn/index.jsp.

JAITLY, A. K., SZABÓ, J. & FÜRSICH, F. T. (2000): Contributions to the Jurassic of Kachchh, western India. VII. The gastropod fauna. Part I. Pleurotomarioidea, Fissurelloidea, Trochoidea and Eucycloidea. — *Beringeria* **27**: 31–61, 3 text–figs., 6 pls.

KAIM, A. (2004): The Evolution of Conch Ontogeny in Mesozoic Open Sea Gastropods. — *Palaeontologia Polonica*, **62**: 1–183.

KNIGHT et al. (1960) see in: MOORE, R. C. (ed.) (1960).

KOCH, F. C. L. & DUNKER, W. (1837): *Beiträge zur Kentniss des norddeutschen Oolithgebildes und dessen Versteinerungen*. — 64 pp, 7 pls, Braunschweig.

KOKEN, E. (1897): Die Gastropoden der Trias um Hallstatt. — *Abhandlungen der Kaiserlich-königlichen geologische Reichsanstalt*, **17**(4): 1–112, pls 1–23.

MAUGERI, P. G. (1924): *Il lias di Grotte presso S. Teresa in Riva (prov. Messina)*. — pp. 79, pls 3, Catania.

MONARI, S., CONTI, M. A. & SZABÓ, J. (1996): Evolutionary systematics of Jurassic Trochoidea: the family Colloniidae and the subfamily Proconulinae. — In: TAYLOR, J. (Ed.): *Origin and evolutionary radiation of the Mollusca*, Oxford University Press, 392 pp.: 199–204.

MOORE, R. C. (ed.) (1960). *Treatise on Invertebrate Paleontology. Part I, Mollusca 1*. — XXIII + 351 pp.; New York & Lawrence, Kansas (Geological Society of America & Kansas University Press).

MORRIS, N. J. & CLEEVELY, R. J. (1981): *Phanerotinus ceistatus* (Philips) and the nature of euomphalacean gastropods. — *Bulletin of the British Museum (Natural History)*, [Geology], **35**(3): 195–212.

MÜNSTER in GOLDFUSS A. (1841–44): *Petrefacta Germaniae*. — (1) 1–20, Pls 166–171 [1841]; (2) 21–28, Pls 172–195 [1844]; (3) 29–128, Pls 196–200 [1844]; Düsseldorf (Arnz).

NÜTZEL, A. (2002): An Evaluation of the Recently Proposed Palaeozoic Gastropod Subclass Euomphalomorpha. — *Palaeontology*, **45(**2): 209–419.

NÜTZEL, A. & GRÜNDEL, J. (2007): Two new gastropod genera from the Early Jurassic (Pliensbachian) of Franconia (South Germany). — *Zitteliana*, [A], **47**: 59–67.

NÜTZEL, A. & HORNUNG, T. (2002): *Katosira undulata* (Benz) aus dem Lias Frankens und eine Gastropoden-Assoziation des oberen Pliensbachiums. — *Geologische Blätter für Nordost Bayern*, **52**(1–4): 55–62.

D'ORBIGNY, A. (1850–60): *Paléontologie Française. Terrain Jurassique II. Gastéropodes*. — Paris, Masson, 622 pp., 451 pls.

PARONA, C. F. (1880): Il calcare liassico di Gozzano e i suoi fossili. — *Atti della Reale Accademia nazionale dei Lincei, Memorie della Classe di Scienze Fisiche, Matematiche e Naturali*, **8**: 187–216, pls 1–3.

PARONA, C. F. (1892): Revisione della fauna liassica di Gozzano in Piemonte. — *Memorie Reale Accademia del Scienze di Torino*, [2], **43**: 1–59, pls 1–2.

PARONA, C. F. (1894): I fossili del Lias inferiore di Saltrio in Lombardia. Parte 2. Gasteropoda di Saltrio. — *Bolletino di Società Malacologia Italiana*, **18**: 161–184.

PCHELINCEV, V. F. (1937): The Gastropoda and Pelecypoda from the Tethyan Lias and Lower Dogger in the limits of the USSR (the Crimea and Caucasus). — *Paleontology of USSR monographs*, **48**(1): 1–85, pls 1–5.

QUENSTEDT, F. A. (1856–1858): *Der Jura*. — 1856: pp. 1–576, pls 1–72; 1857: pp. 577–824, pls 73–100; 1858: pp. 825–842., Tübingen, Laupp.

QUENSTEDT, F. (1881–84): *Petrefactenkunde Deutschlands. Band 7: Gastropoden*. — 867 pp., pls 185–218; Leipzig, Fues's.

REUSS, A. (1852): Ueber zwei neue Euomphalusarten des alpinen Lias. — *Palaeontographica*, **3**: 113–116, pl. 16.

SACCHI VIALLI, G. (1964): Revisione delle fauna di Saltrio. — *Atti dell Istituto Geologico della Università di Pavia*, **15**: 3–23.

SACCHI VIALLI, G. & CANTALUPPI, G. (1967): I nuovi fossili di Gozzano (Prealpi Piemontesi). — *Memorie della Societa Italiana di Scienze Naturali*, **16**(2): 63–127.

SCHAFHÄUTL, K. E. (1854): Beiträge zur näheren Kentnis der Bayern'schen Voralpen. — *Neues Jahrbuch für Mineralogie, Geognosie, Geologie und Petrefactenkunde*. — pp. 513.

SCHRÖDER, M. (1995): Frühontogenetische Schalen Jurassischer und Unterkretazischer Gastropoden aus Norddeutschland und Polen. — *Palaeontographica*, [A] **238**: 1–95., pls 15.

SCHUBERT, S., GRÜNDEL, J. & NÜTZEL, A. (2008): Early Jurassic (Upper Pliensbachian) gastropods from the Herforder Liasmulde (Bielefeld, Northwest Germany). — *Paläontologische Zeitschrift*, **82**(1): 17–30.

SIEBERER, X. (1907): Die Pleurotomarien des Schwäbischen Jura. — *Palaeontographica*, **54**: 1–68.

SIMONY, F. (1850): Bericht über die Arbeiten der Section V. — *Jahrbuch der Kaiserlich-königlichen geologische Reichsanstalt*, **1**(4): 651–657.

SOWERBY, J. 1812–1822. The Mineral Conchology of Great Britain. — **1**: i–vii, 9–32, Taf. 1–9 [1812]; 33–96, Taf. 10–44 [1813]; 97–178, Taf. 45–78 [1814]; 179–236, Taf. 79–102 [1815]; **2**: 1–28, Taf. 103–114 [1815]; 29–116, Taf. 115–150 [1816]; 117–194, Taf. 151–186 [1817]; 195–239, Taf. 187–203 [1818]; **3**: 1–40, Taf. 204–221 [1818]; 41–98, Taf. 222–253 [1819]; 99–126, Taf. 254–271 [1820]; 127–186, Taf. 272–306 [1821]; **4**: 1–16, Taf. 307–318 [1821]; 17–104, Taf. 319–327 [1822]; London (J. SOWERBY).

STEFANI, C. DE (1887): Lias inferiore ad arieti dell' Appenino settentrionale. — *Atti della Società Toscana di scienze naturali*, **8**(1): 9–76, pl. 1.

STOLICZKA, F. (1861): Über die Gastropoden und Acephalen der Hierlatz-Schichten. — *Sitzungsberichte der matematisch-naturwissenschaftliche Classe der kaiserlich-königlichen Akademie der Wissenschaften*, **43**: 157–204, pls. 1–7.

STOLICZKA, F. (1868): The Cretaceous fauna of southern India. Vol. II: The Gastropoda. — Memoirs of the Geological Survey of India, *Palaeontologia Indica*, **5**: 1–498.

SUESS, E. (1852): Ueber die Brachiopoden der Hierlatzer-Schichten. — *Jahbuch der Kaiserlich-königlichen geologische Reichsanstalt*, **3**(2): 171.

SZABÓ, J., (1979): Lower and Middle Jurassic Gastropods from the Bakony Mountains (Hungary). Part I. Euomphalidae (Archaeogastropoda). — *Annales historico-naturales Musei nationalis hungarici*, **71**: 15–31.

SZABÓ, J. (1980): Lower and Middle Jurassic Gastropods from the Bakony Mountains (Hungary). Part II. Pleurotomariacea and Fissurellacea (Archaeogastropoda). — *Annales historico-naturales Musei nationalis hungarici*, **72**: 49–71.

SZABÓ, J., (1981): Lower and Middle Jurassic Gastropods from the Bakony Mountains (Hungary). Part III. Patellacea and Trochacea (Archaeogastropoda). — *Annales historico-naturales Musei nationalis hungarici*, **73**: 55–67.

SZABÓ, J., (1982): Lower and Middle Jurassic Gastropods from the Bakony Mountains (Hungary). Part IV. Neritacea, Craspedostomatacea, Amberleyacea (Archaeogastropoda). — *Annales historico-*

naturales Musei nationalis hungarici, **74**: 17–33.

SZABÓ, J., (1983): Lower and Middle Jurassic Gastropods from the Bakony Mountains (Hungary). Part V. Supplement to Archaeogastropoda; Caenogastropoda. — *Annales historico-naturales Musei nationalis hungarici*, **75**: 27–46.

SZABÓ, J. (1984): Two new archaeogastropod genera from the Tethyan Liassic. — *Annales historico-naturales Musei nationalis hungarici*, **76**: 65–71.

SZABÓ, J. (1995): Eucyclidae (Eucycloidea, Gastropoda) as a Liassic palaeoecological index in the Transdanubian Central Range (Hungary) — *Hantkeniana*, **1**: 67–74, pl. 7.

SZABÓ, J. (2008): A nomenclatorial revision of *Pleurotomaria suessii* HÖRNES, 1853 and *Cyclostomaria* SZABÓ, 1980 (Pleurotomarioidea, Gastropoda). — *Neues Jahrbuch für Mineralogie und Paläontologie*, [Abhadlungen], **250**(2): 167–176.

SZABÓ, J., CONTI, M. A. & MONARI, S. (1994): Jurassic gastropods from Sicily; new data to the classification of Ataphridae (Trochoidea) — *Scripta Geologica*, [Special Issue], **2**: 406–416.

TATE, R. (1876): Gastropoda, pp. 331–356 — in: TATE, R. & BLAKE, I. F.: *The Yorkshire Lias*. — London, van Woorst, pp. 475.

TERQUEM, O. (1855): Paléontologie de l'étage inférieur de la formation liasique de la province de Luxembourg, Grand-Duche (Hollande), et de Hettange, du département de la Moselle. — *Mémoires de la Société géologique de France*, [2], **5**(2) (mém. № 3): 219–343, pls 12–26.

TONI, A., DE (1912): La fauna liassica di Vedana (Belluno), p. 2 Molluschi. — *Mémoires de la société paléontologique suisse*, **38**: 31–52, pl. 2.

VÖRÖS, A. (1991): Hierlatzkalk — a peculiar Austro-Hungarian Jurassic facies. — In: LOBITZER, H. & CSÁSZÁR, G. (eds): *Jubiläumsschrift 20 Jahre Geologische Zusammenarbeit Österreich – Ungarn*. — Wien, 145–154.

VÖRÖS, A., SZABÓ, J., DULAI, A., SZENTE, I., EBLI, O. & LOBITZER, H. (2003): Early Jurassic fauna and facies of the Schafberg area (Salzkammergut, Austria). — *Fragmenta Palaeontologica Hungarica*, **21**: 51–82.

WENDT, J. (1968): Discohelix (Archaeogastropoda, Euomphalacea) as an index fossil in the Tethyan Jurassic. — *Palaeontology*, **11**: 554–575.

WENZ, W. (1938–44): *Gastropoda. Teil 1: Allgemeiner Teil und Prosobranchia*. — In: SCHINDEWOLF, O. H.: *Handbuch der Paläozoologie*, Band **6**: 1639 pp. — Berlin, Borntraeger.

ZIETEN, C. H. (1830–32): *Die Versteinerungen Würtembergs*. — Stuttgart, pp. 102, pls. 72.

YOCHELSON, E. L., WHITE, J. S. & GORDON, M. (1967): Aragonite and calcite in Molluscs from the Pennsylvanian Kendrick Shale (of Jillson) in Kentucky. — *Professional Papers, U. S. Geological Survey*, **575 D**: D76–D78.

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