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New data on the Hettangian brachiopod fauna of the Northern Calcareous Alps (Austria, Bavaria)

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15 Text-Figures and 4 Plates

Österreich
Bayern
Nördliche Kalkalpen
Hettang
Brachiopoden
Taxonomie

Österreichische Karte
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Contents

Neue Daten zur Brachiopodenfauna des untersten Lias (Hettang) in den Nördlichen Kalkalpen (Österreich, Bayern)

Zusammenfassung

Von 11 Lokalitäten des untersten Lias der Nördlichen Kalkalpen werden neue Ergebnisse zur Brachiopodenfauna mitgeteilt. Vier Taxa, davon eine Gattung und drei Arten, werden neu beschrieben: *Saubachia* gen. n. *inflata* sp. n., *Homoeorhynchia solitaria* sp. n. und *Tetrarhynchia inopinata* sp. n. Weiters wird die Gattung *Grestenella* gen. n. aufgestellt mit der Typusart *Rhynchonella austriaca* SUESS, 1854 aus den Grestener Schichten.

Abstract

New material of the Hettangian brachiopods is described, and 4 new taxa (*Saubachia* gen. n. *inflata* sp. n., *Homoeorhynchia solitaria* sp. n., and *Tetrarhynchia inopinata* sp. n.) are established. Moreover, a new genus *Grestenella* gen. n. is erected for *Rhynchonella austriaca* SUESS, 1854 from the Gresten Beds.

1. Introduction

This paper was preceded by a short review of the Early Liassic brachiopods of the Northern Calcareous Alps (SIBLÍK, 1993), where it was stated that Hettangian brachiopod fauna has its own character and importance, and that it differs substantially from the younger "Hierlatz-type" fauna. The present study confirms this preliminary statement and offers new, more detailed information on this interesting fauna. The attention has been focused on some localities of the Hettangian grey beds – Kendlbach Formation – of the Osterhorn block and on similar outcrops W of it – localities Eiberg and Ampelsbach in Tyrol, and Mittenwald in Bayern ("Grauer Basiskalk" sensu FABRICIUS (1966, p. 47) in the Karwendel syncline).

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GOLEBIOWSKI (1990, p. 179–182) studied several Triassic/ Jurassic boundary sections in detail, and stated that despite their appurtenance to different tectonic units they show strong lithological and biofacial similarities. He determined the characteristic terebratulid species from the Lowermost Liassic beds as *Lobothyris* sp. or *Lobothyris punctata* (SOWERBY), and spiriferid species as *Spiriferina* cf. *walcotti* or *Spiriferina walcotti* (SOWERBY). This material is determined in the present paper as *Lobothyris delta* (NEUMAYR) and *Spiriferina* ex gr. *walcotti* (SOWERBY). In the meantime, studies of the Middle and Upper Hettangian brachiopods from Steinplatte and Adnet were finished (SIBLÍK, 1993a; SIBLÍK in BÖHM et al., 1999).

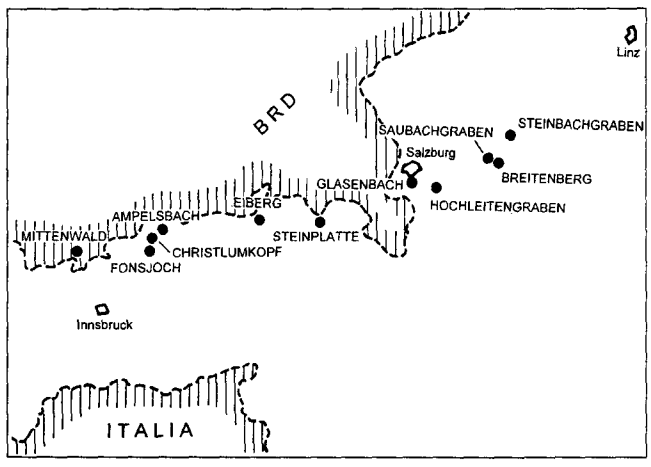
In the following text the characteristic or new Hettangian species are dealt with, badly preserved material and some other finds are only shortly mentioned. Most specimens described in this publication come from my own samplings and these will be deposited partly in the Museum of the Geological Survey in Vienna, and partly in the Institute of Geology and Palaeontology of the University Innsbruck. Some other specimens were borrowed for the study from the Institute of Palaeontology, University of Vienna (coll. KRYSTYN and GOLEBIOWSKI from Saubachgraben, Ampelsbach, Steinplatte and Eiberg) and from the Institute of Geology and Palaeontology, University of Innsbruck (coll. SPIELER).

Moreover, the specimens of *Rhynchonella austriaca* SUESS from the Gresten Beds (coll. SUESS and ZUGMAYER) housed in the Geological Survey and in the Institute of Palaeontology, University of Vienna were at disposal for the comparison with my rhynchonellid material. Based on these old collections only, a new genus *Grestenella* gen. n. was established.

2. Localities

In the present paper described brachiopod fauna comes from the following localities (localities 1–7 are developed in the Lower Hettangian grey facies; brachiopods from the localities 10 and 11 are listed only):

1. **Breitenberg** – SW of St. Wolfgang, Salzkammergut (SUESS & MOJSISOVICS, 1868; NEUMAYR, 1879; BLIND, 1963; BÖHM, 1992, p. 131). Grey limestones and marls of the *Planorbis* Zone with rich pelecypod fauna yielded: *"Rhynchonella"* sp., *Liospiriferina* cf. *pichleri* (NEUMAYR), *Lobothyris delta* (NEUMAYR), *Zeilleria* sp. (? sp. n.). Overlying yellowish-brown micrites (*Megastoma* Zone according to KRYSTYN, pers. comm., his sample 91/126) contained *Zeilleria* aff. *batilla* (GEYER) (Pl. 3, Fig. 7).



Text-Fig. 1.
Hettangian localities referred to in the text.

2. **Saubachgraben** – on western side of Zwölferhorn (PLÖCHINGER, 1975; BÖHM, 1992, p. 129). The material comes partially from KRYSTYN's samples S 1/2, S 1/8, S 1/12, S 4/15 (= *Planorbis* Zone, pers. comm.). Kendlbach Beds – grey thin-bedded limestones and marls: *Piarorhynchia* aff. *juvenis* (QUENSTEDT), *Saubachia inflata* sp. n., *Lobothyris delta* (NEUMAYR), *Zeilleria* sp. (? sp. n.).

3. **Hochleitengraben** near Gaissau, Salzburg (BÖHM, 1992, p. 122, Text-Fig. 44). Kendlbach Formation, brachiopods come from the grey marls and marly limestones, and from lower parts of a massive packstone bed with yellow cherts (? Lower Hettangian according to BÖHM): *Tetrarhynchia inopinata* sp. n., *Callospiriferina haueri* (SUESS), *Zeilleria* aff. *subnumismalis* (DAVIDSON) and *Zeilleria* sp. (? sp. n.).

4. **Glasenbachklamm** on southern margin of city of Salzburg (BÖHM, 1992, p.110): the sample of grey marly limestone (? Kendlbach Beds) with 3 specimens of *Lobothyris delta* (NEUMAYR) housed in the Institut für Geologie und Paläontologie der Universität Innsbruck.

5. **Eiberg,** the quarry S of Kufstein, Tyrol (GOLEBIOWSKI, 1991). The complete collection was made by GOLEBIOWSKI and KRYSTYN in the grey beds (sample no. 34 of *Psiloceras johnstoni* age, according to KRYSTYN, pers. comm.): *Saubachia inflata* sp. n., *Spiriferina* ex gr. *walcotti* (SOWERBY), *Callospiriferina haueri* (SUESS) and *Lobothyris delta* (NEUMAYR).

6. **Vorderer (Unterer) Ampelsbach** N of Achenkirch, Tyrol (HAHN, 1911; QUENSTEDT, 1951). Some specimens come from KRYSTYN's sample no. 84/5/6 (*Planorbis* Zone, KRYSTYN's pers. comm.). Grey limestones with sandy admixture ("Grestener Fazies" in QUENSTEDT, 1951) and marls with pelecypods yielded: *Tetrarhynchia inopinata* sp. n., *Callospiriferina haueri* (SUESS), *Lobothyris andleri* (OPPEL), *Zeilleria perforata* (PIETTE), *Zeilleria* sp.(? sp. n.).

7. **Mittenwald** – "Marmor Graben" on the right bank of the Isar, NE of Mittenwald, Bavaria (ULRICH, 1960; FABRICIUS, 1966, Text-Fig. 19). The greyish and rusty-brown marls and higher up also thin-bedded marly limestones belong according to SPIELER (pers. comm.) to the uppermost parts of the Tiefengraben Member and to the lowermost parts of the Breitenberg Member. The limestones just underlying the bed with psiloceratids yielded: *Piarorhynchia* aff. *juvenis* (QUENSTEDT), *Saubachia inflata* sp. n. and *Lobothyris andleri* (OPPEL).

8. **Steinplatte** – Kammerköhralm area, Salzburg, near Waidring (RAKÚS & LOBITZER, 1993, Text-Figs. 4-5).Two brachiopod specimens coming from the *"Cardinia"* coquina, NNE of the Steinplatte top (1869 m) were at disposal only (coll. KRYSTYN, his sample no. 11 = *Megastoma* Zone, pers. comm.): *Homoeorhynchia solitaria* sp. n.

9. **Fonsjoch** W of Achensee, Tyrol (VORTISCH, 1926; LANGE, 1952; BLIND, 1963). Variegated – yellow, ochreous and red – compact micritic limestones. The brachiopods are rare, coming mostly from the *Megastoma* Zone (according to SPIELER, pers. comm.): *Calcirhynchia* (?) cf. *plicatissima* (QUENSTEDT), *Lobothyris andleri* (OPPEL) and *Zeilleria* sp.

10. **Christlumkopf.** The locality is situated about 350 m SW of Christlumkopf (1758 m), SW of Achenkirch, Tyrol, and can be well reached from the Moosenalm. About 40 cm thick bed of red biomicritic and crinoid-bearing limestones underlying Adnet Limestone yielded the brachiopod fauna very similar to that of *Marmorea* Zone of Steinplatte described by SIBLÍK (1993a), and most probably of the same age (SPIELER, pers. comm.): *Prionorhynchia greppini* (OPPEL), *Homoeorhynchia* (?) *prona* (OPPEL), *Piarorhynchia* aff. *juvenis* (QUENSTEDT) (Pl. 2, Fig. 6), *Cuneirhynchia retusifrons* (OPPEL),

Liospiriferina cf. *obtusa* (OPPEL), *Linguithyris aspasia* (ZITTEL), *Linguithyris* sp., *Bakonyithyris apenninica* (ZITTEL) and *Zeilleria mutabilis* (OPPEL).

11. **Steinbachgraben** – Langbath Zone, SW of Neukirchen, Upper Austria (SIBLÍK, 1993, 1997). The locality was inaccurately named by SIBLÍK (1993, p. 129) after the near-by Klausgraben. It is situated SE of the Forellenhof, along the forest road to Oberes Kirchbergmoos, near to Steinbachgraben. Up to 40 cm thick bed of red micrites with crinoid fragments just above the Dachstein Limestone yielded the following brachiopod fauna which is most probably of the *Marmorea* Zone age: *Cirpa planifrons* (ORMÓS), *Prionorhynchia greppini* (OPPEL), *Cuneirhynchia retusifrons* (OPPEL), *Furcirhynchia emmrichi* (OPPEL), *Liospiriferina alpina* (OPPEL), *Lobothyris* sp. juv., *Linguithyris aspasia* (ZITTEL) (Pl. 2, Fig. 4), *Bakonyithyris* aff. *apenninica* (ZITTEL) and *Zeilleria mutabilis* (OPPEL).

3. Systematic descriptions

Order: **Rhynchonellida KUHN, 1949**
Superfamily: **Rhynchonellacea GRAY, 1848**
Family: **Wellerellidae LIKHAREV in RZHONSNITZKAYA, 1956**
Genus: ***Calcirhynchia* BUCKMAN, 1918**

Calcirhynchia (?) cf. *plicatissima* (QUENSTEDT, 1852)

(Pl. 2, Fig. 8, Text-Fig. 2)

cf. 1852 *Terebratula plicatissima* – QUENSTEDT, p. 451, Pl. 36, Fig. 3.

Material: 1 slightly damaged specimen measuring ?11.5 x 13.4 x 8.0 mm (figured) and a juvenile (?) specimen most probably belonging to the same species (12.0 x 12.5 x 5.6 mm, sectioned).

Remarks: The figured specimen agrees well with that figured by GEYER (1889) on Pl. 7, Fig. 3 and with several specimens of this variable species figured by HAAS (1885, Pls. 2 and 3). Because its pedicle umbo has not been preserved, is the specimen referred to as cf. *plicatissima*. Very similar specimens could be found also in *Rhynchonella latifrons* GEYER (1889, Pl. 6, Figs. 25-31) differing by the character of umbonal parts, and in *Rhynchonella zugmayeri* GEMMELLARO (1878, Pl. 31, Figs. 50-60).

The sectioned flat, most probably conspecific specimen has the following inner characters: Lateral umbonal cavities more or less semicircular. Dental lamellae relatively short, convergent ventrally. Hinge teeth straight, slightly expanded dorsally, without crenulation. Small, sharp denticula present. Hinge plates subhorizontal, clearly separated from inner socket ridges. Septalium and ridge-like dorsal septum very short. Crural bases developed dorsally at distal ends of hinge plates. Crura curved, prefalciform. The inner characters agree well with those of *Calcirhynchia* as defined by AGER (1962, p. 85). On the other hand, well-developed septalium and median septum were ascertained in *Calcirhynchia calcaria* BUCKMAN and *C. renevieri* (ROLLIER) by ALMÉRAS & HANZO (1991, Text-Figs. 5 and 7).

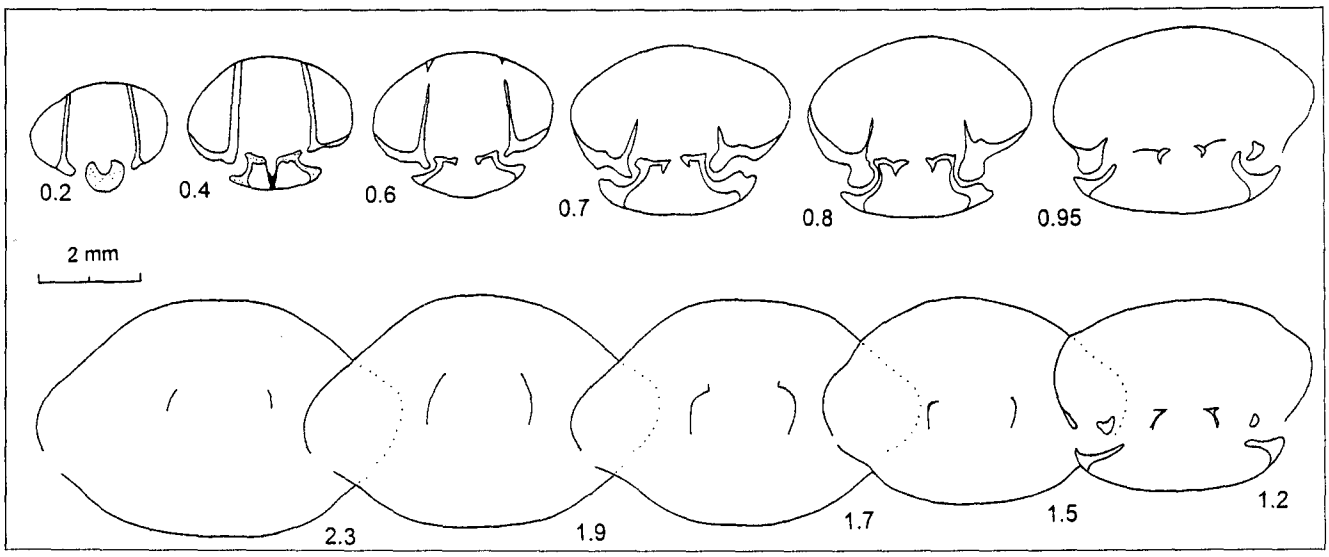
Occurrence: Fonsjoch. *Calcirhynchia* (?) *plicatissima* occurs according to ALMÉRAS (1964) in Upper Hettangian – Upper Sinemurian (Lotharingian).

Genus: ***Saubachia* gen. n.**

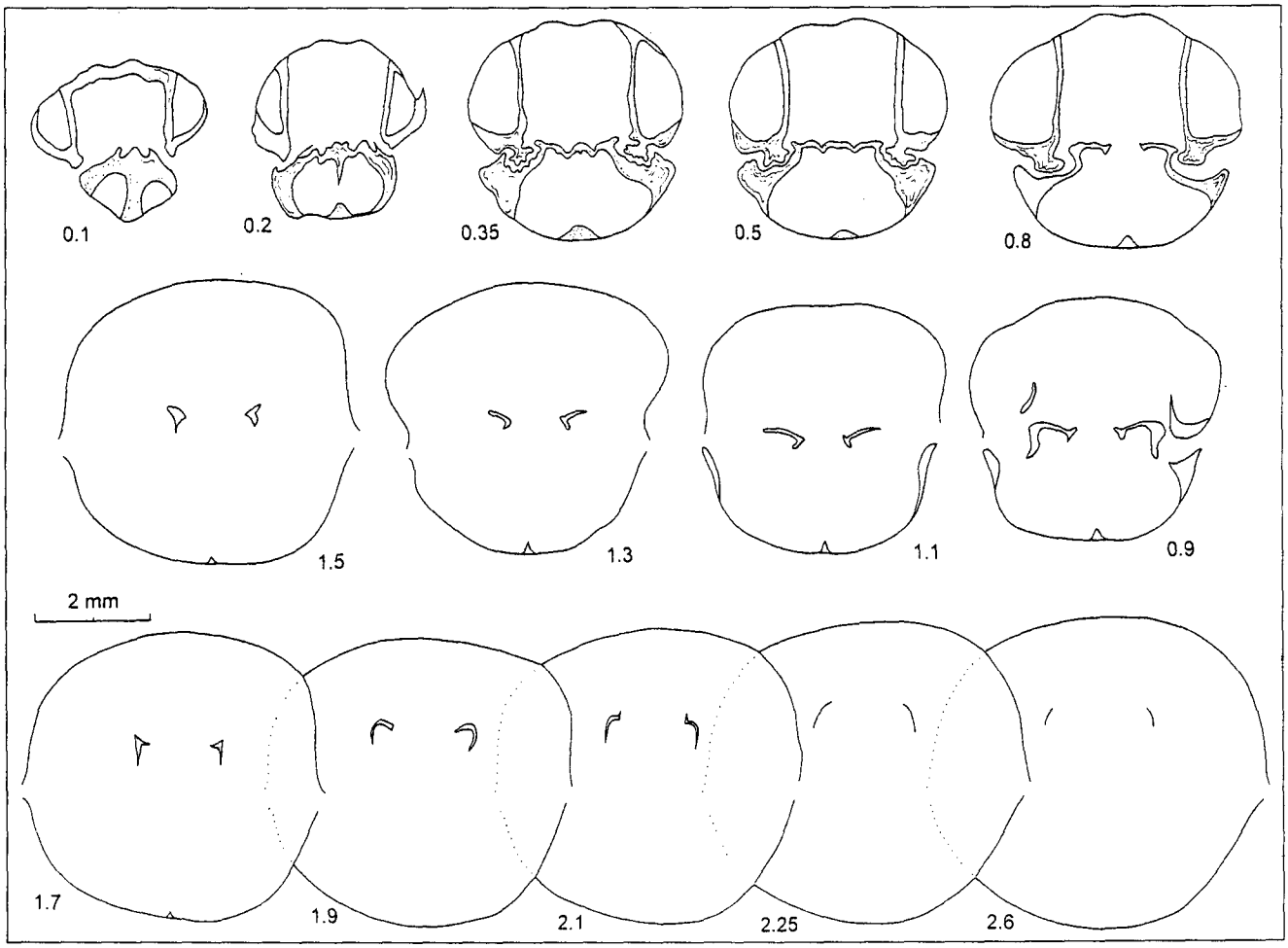
Type species: *Saubachia inflata* sp. n., Hettangian.

Diagnosis: Minute biconvex rhynchonellids, globose, subtrigonal in outline, pronounced smooth stage, initial ribbing or a few rounded costae anteriorly. Strong uniplication, fold slightly elevated, beak strong and low, suberect.

Internal characters: Delthyrial cavity quadrate in cross section between thin subparallel dental lamellae, lateral umbonal cavities semicircular. Pedicle collar not observed. Hinge teeth strongly crenulated, laterally expanded, with hollows for reception of outer and inner socket ridges. Denticula not well distinguishable. No septalium developed. Hinge plates fused, their inner and outer parts characteristically delimited. Median septum developed posteriorly only, and reduced anteriorly to a low ridge. Sockets very large. Raduliform crura somewhat curved in cross section and inclining sharply into pedicle valve.



Text-Fig. 2.
Calcirhynchia (?) cf. *plicatissima* (QUENSTEDT). Fonsjoch. Serial transverse sections through the posterior part of shell. Measured from dorsal umbo. Original length of specimen 12.0 mm. Magnified.



Text-Fig. 3.
Saubachia inflata sp. n. Saubachgraben, KRYSTYN's sample 1/8, coll. PIW. Sections measured from dorsal umbo. Length of specimen ca. 8.8 mm. Another specimen showed extremely short dental lamellae. Magnified.

Included species: For the present, the type species only.
Distribution: Lower Liassic.

Saubachia inflata gen. n., sp. n.

(Pl. 1, Fig. 5, Pl. 2, Figs. 3, 5, 7, Text-Figs. 3-4)

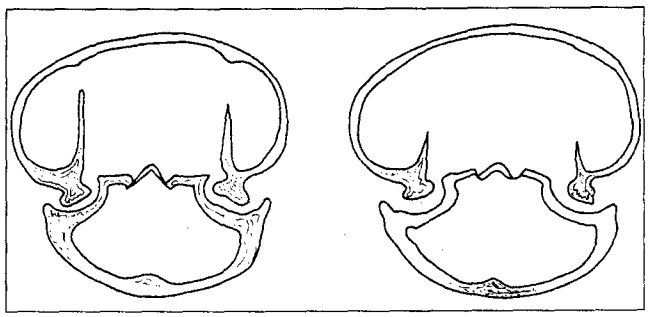
Holotype: The specimen figured on Pl. 2, Fig. 3 and deposited in the collections of the Institute of Palaeontology, University of Vienna.

Stratum typicum: Hettangian – Kendlbach Beds, *Planorbis* Zone (according to KRYSTYN's personal communication).

Locus typicus: Saubachgraben, WSW of Zwölferhorn (Osterhorn Block, SE of Salzburg).

Material: 12 partially damaged specimens with both valves and 2 pedicle valves, up to 10.2 mm long, 10.5 mm wide and 7.0 mm thick. The dimensions of the figured specimens: 9.2 x 9.2 x 6.7 mm (Pl. 1, Fig. 5), 10.1 x 9.8 x 6.5 mm (Pl. 2, Fig. 3 – holotype), 7.8 x 6.7 x 5.3 mm (Pl. 2, Fig. 5) and 9.8 x 10.4 x 6.0 mm (Pl. 2, Fig. 7).

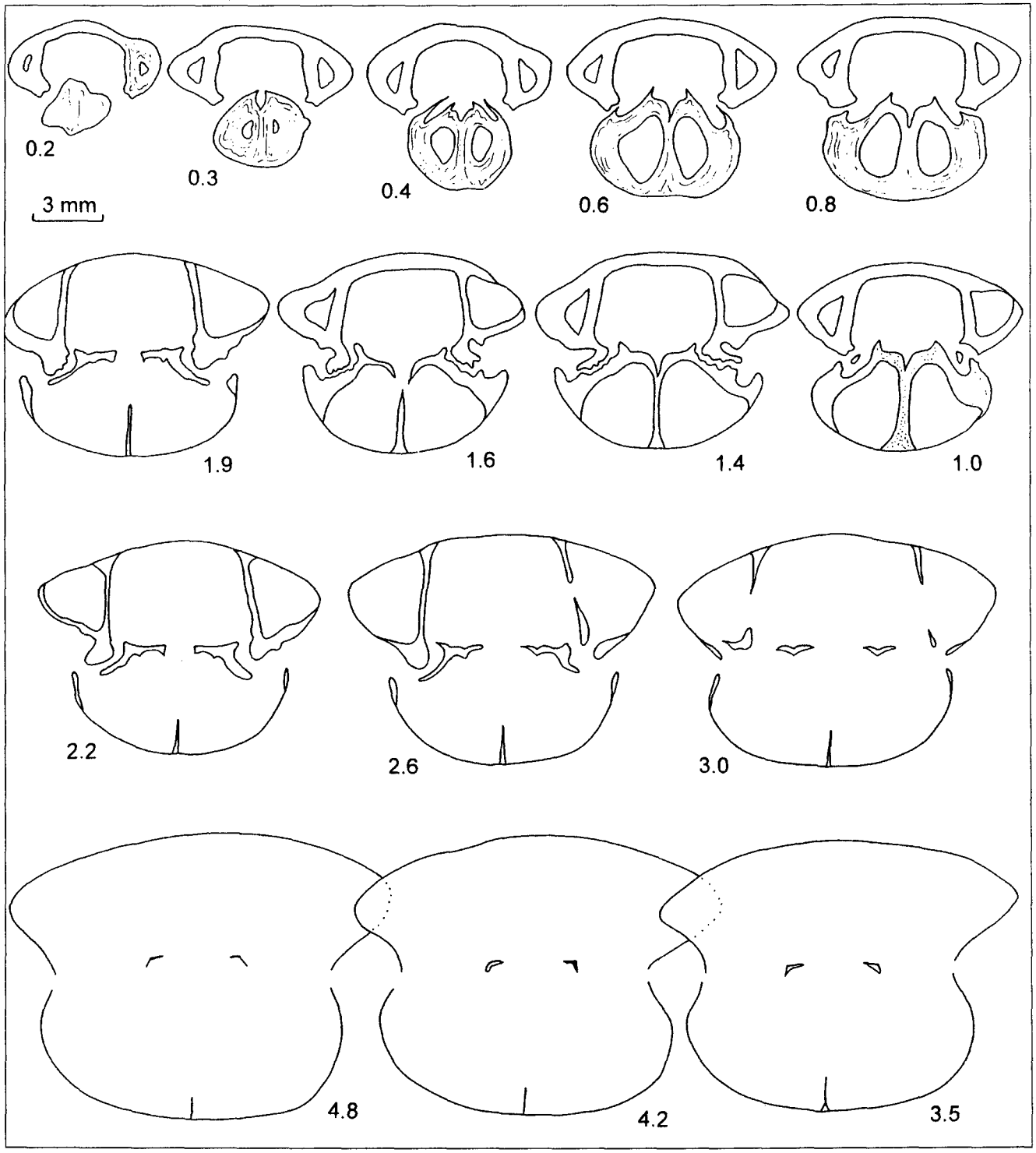
Description: Diminutive globose shells, subtrigonal in outline and tending to be slightly longer than wide. Valves of almost equal convexity but brachial valve usually much thicker than pedicle one. Lateral commissure zigzagged. Uniplication of anterior commissure strong and sharp, giving rise to high, more or less trigonal linguiform extension. Beak strong but low, suberect in orientation. Beak ridges only faintly marked. Apical angle slightly obtuse in most specimens. Both valves smooth posteriorly, few blunt costae of the *grandis* type (sensu AGER, 1956) developed near anterior margin only, 2–4 of them confined to uniplication. Two to three faint lateral costae distinguishable on either side of plication. Fold elevated in anterior third of shell only.
Internal characters as described for the genus.



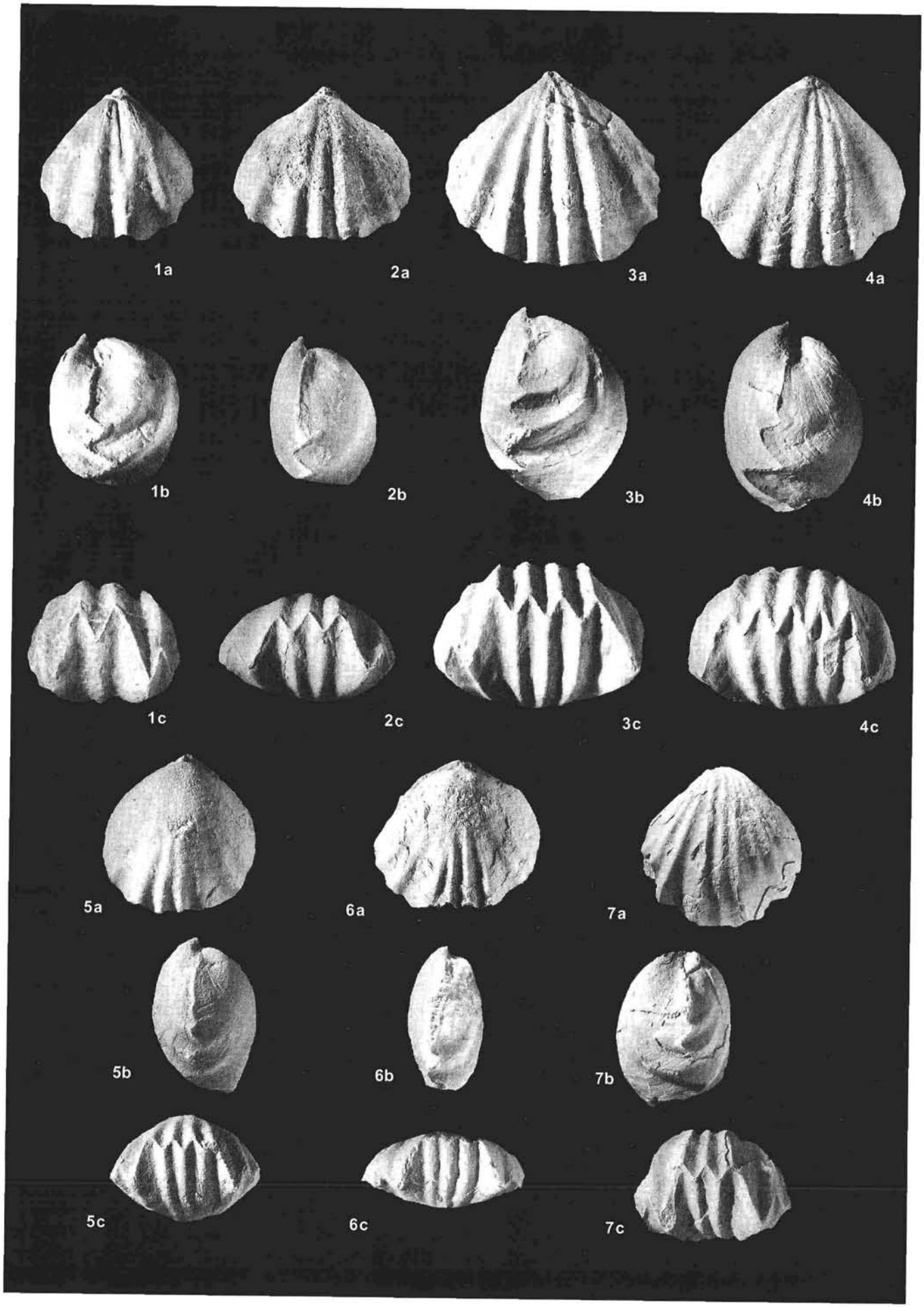
Text-Fig. 4.
Saubachia inflata sp. n. Saubachgraben. Two sections through another specimen showing different shaping of inner and outer hinge plates. Length of specimen 8.0 mm. Magnified.

Remarks: The new species is established above all on account of its small size, globose shells and only initial ribbing. Some of these characters are to be seen in many other species but their combination is unique. Certain resemblance can be found to some small rhynchonellids figured by QUENSTEDT (1871, Pl. 37) as *Terebratula gryphitica juvenis, Terebratula gryphitica pilula, Terebratula rostellata, Terebratula* cf. *Buchii* and *Terebratula* cf. *Buchardii.* They differ, however, from *Saubachia inflata* sp. n. not only externally (lesser convexity) but modern revision revealed their quite different internal structures assigning those species to *Piarorhynchia* BUCKMAN or ? *Stolmorhynchia* BUCKMAN.

Occurrence: Saubachgraben (10 specimens), Eiberg (1 specimen), Mittenwald (3 specimens).



Text-Fig. 5.
Homoeorhynchia solitaria sp. n. Steinplatte, KRYSTYN's sample 11, coll. PIW. Serial transverse sections through the type specimen, measured from dorsal umbo. Section 1.4 shows crenulated hinge teeth and sockets. Due to recrystallization the terminations of crura unclear. Original length of specimen ca. 29.0 mm. Magnified.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Family: **Rhynchonellidae Gray, 1848**
Subfamily: **Rhynchonellinae Gray, 1848**
Genus : ***Homoeorhynchia* Buckman, 1918**

Homoeorhynchia solitaria sp. n.

(Pl. 2, Fig. 1, Text-Fig.5)

Holotype: The specimen figured on Pl.2, Fig. 1 and deposited in the collections of the Institute of Palaeontology, University of Vienna.
Stratum typicum: Hettangian – *Megastoma* Zone (according to Krystyn, personal communication).
Locus typicus: *"Cardinia"* coquina, NNE of the Steinplatte top (1869 m), Salzburg, near Waidring.
Derivatio nominis: *"solitarius"* = solitary (2 specimens have been found only).

Material: In addition to the holotype (? 29.0 x 28.5 x 17.1 mm), an another slightly damaged specimen without posterior part of shell and with dimensions ? x 26.4 x 15.9 mm.
Description: Large shells of subquadrangular outline with rounded lateral angles, convexiplanate in lateral view. The maximum width lying close to mid-length. The pedicle valve almost flat, the brachial one strongly convex, cynocephalous. Anterior commissure sharply uniplicate, fold prominent in anterior third of shell. Fold with 2 fairly sharp costae, 1 rounded lateral rib on either side. Costae developing only just on the fold, both valves smooth posteriorly. Beak small, nearly straight and sharp, beak ridges well developed.
Inner characters agree quite well with the detailed description given for *Homoeorhynchia* by Ager (1956, p. 26-27) except for posterior secondary thickening of pedicle valve occurring often in Ager's material. Our sectioned specimen shows well-developed accessory sockets in brachial valve (sections 1.4 and 1.6).
Remarks: Ager (1956) reported only very short septalium in *Homoeorhynchia*. Even if here described specimen from Steinplatte revealed a large, very well developed septalium, its affiliation to *Homoeorhynchia* seems indubitable. Well-developed septalium was ascertained also by Sučic-Protic (1969) in *Homoeorhynchia cynocephala* (Richard) and *H. crassa* (Sučic-Protic), and by Tchoumatchenco (1989) in *H. almaensis* (Moisseiev). Considerable external resemblances to the newly described species could be found in some variants of Middle-Upper Liassic *Homoeorhynchia meridionalis* (Eudes-Deslongchamps) or of *Homoeorhynchia almaensis* (Moisseiev) as figured by Tchoumatchenco (1989). They differ, however, both from the new species in smaller size. Moreover, the specimens of *almaensis* as figured by Tchoumatchenco (1989) can be distinguished by lesser convexity of their brachial valves and by lower folding, and *H. meridionalis* then by subtrigonal outline, by higher uniplication, by sharper ribs on median fold and by zigzagged lateral commissure. Smaller dimensions, sharper ribs and stronger development of posterior part of pedicle valve are characteristic of the Middle Liassic *Homoeorhynchia steinmanni* (Haas & Petri), another species resembling *Homoeorhynchia solitaria* sp. n. New species has a close resemblances to the similarly sized Domerian *Homoeorhynchia [= Slovenirhynchia] maninensis* (Siblík, 1967). New species differs from *maninensis* in its lower uniplication and fold, in flatter pedicle valve and smaller beak, in straight lateral commissure and in lesser sharpness of ribs (*"grandis"* type sensu Ager, 1956 while *"tetrahedra"* type in *maninensis*). Owing to the limited number of specimens available, it is not possible to get more data on external and internal variability of the new species and to make better comparison to the allied species.
Occurrence: Known from the type locality only (both specimens collected by Krystyn).

Subfamily: **Tetrarhynchiinae Ager, 1965**
Genus: ***Tetrarhynchia* Buckman, 1918**

Tetrarhynchia inopinata sp. n.

(Pl. 1, Figs. 1–4, 7, Text-Figs. 6–7)

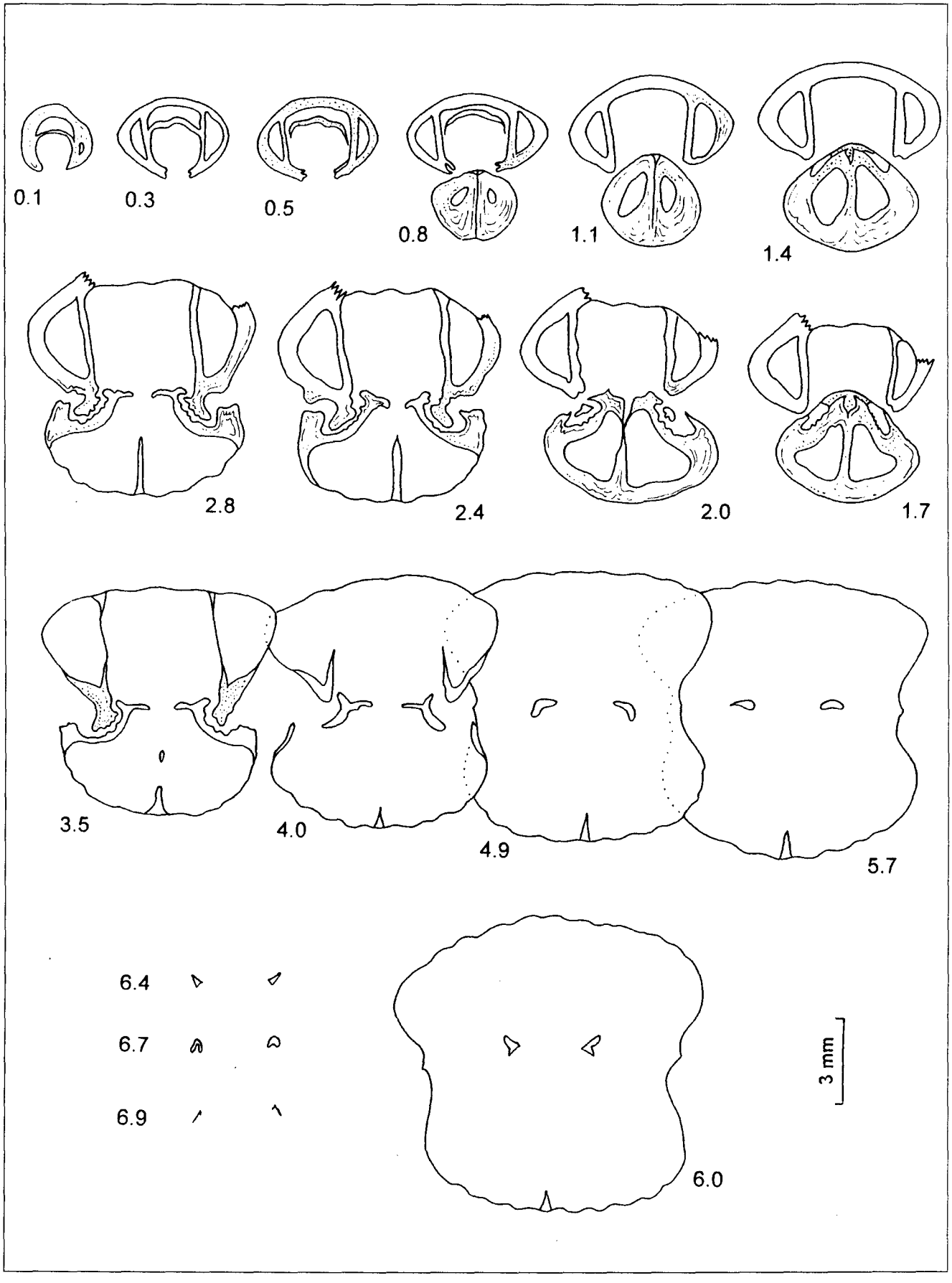
Holotype: The specimen figured on Pl. 1, Fig. 3 and deposited in the collections of the Geologische Bundesanstalt in Vienna.
Stratum typicum: Hettangian.
Locus typicus: Hochleitengraben near Gaissau, Salzburg (locality described by Böhm, 1992, p. 122).
Derivatio nominis: Lat. *"inopinatus, -a, - um"* = unexpected.

Material: 86 specimens up to 19.5 mm long, 22.0 mm wide and 16.0 mm thick. The figured specimens measure: 13.6 x 13.6 x 11.1 mm (Pl. 1, Fig. 1), 14.3 x 16.0 x 9.4 mm (Pl. 1, Fig. 2), 17.6 x 19.1 x 13.0 mm (Pl. 1, Fig. 3 - holotype), 17.2 x 18.0 x 12.9 mm (Pl. 1, Fig. 4) and ? 14.0 x 14.0 x 10.0 mm (Pl. 1, Fig. 7).
Description: Shells are medium-sized, dorsibiconvex. Outline subpentagonal or subtrigonal with rounded angles. Apical angle between 90°–115°. Brachial valve inflated, semicircular in lateral view, pedicle valve only slightly convex. Posterolateral flattenings or shallow planareas badly defined, situated for the greater part on brachial valve. Anterior commissure with strong uniplication, linguiform extension with steeply raising sides and straight dorsal edge. Corresponding fold raised above general level of valve in the anterior half of shell. About 6–10 moderately

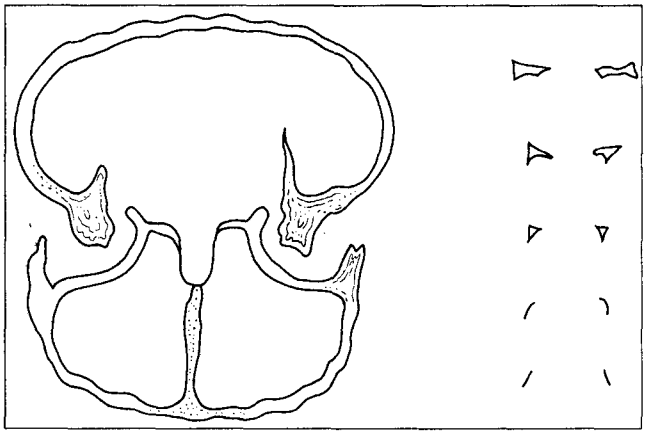
Plate 1

Fig. 1: ***Tetrarhynchia inopinata* sp. n.** Hochleitengraben. GBA. Magnified, x 2.
Fig. 2: ***Tetrarhynchia inopinata* sp. n.** Hochleitengraben. GBA. Magnified, x 2.
Fig. 3: ***Tetrarhynchia inopinata* sp. n.** Holotype. Hochleitengraben .GBA. Magnified, x 2.
Fig. 4: ***Tetrarhynchia inopinata* sp. n.** Hochleitengraben. GBA. Magnified, x 2.
Fig. 5: ***Saubachia inflata* sp. n.** Mittenwald. IGPI. Magnified, x 3.
Fig. 6: ***Piarorhynchia* aff. *juvenis* (Quenstedt).** Saubachgraben, Krystyn's sample S 1/2. IPW. Magnified, x 3.
Fig. 7: ***Tetrarhynchia inopinata* sp. n.** Vorderer Ampelsbach. IGPI. Magnified, x 2.

All specimens in the Plates were coated with ammonium chloride before photographing. Photographs by Mr. J. Brožek (Prague). The specimens are housed in the collections of the Geologische Bundesanstalt, Wien (GBA), of the Institut für Paläontologie (Geozentrum) der Universität, Wien (IPW), and of the Institut für Geologie und Paläontologie der Universität, Innsbruck (IGPI).



Text-Fig. 6.
Tetrarhynchia inopinata sp.n. Hochleitengraben. Median ridge disappears at 7.5 mm from the posterior end. Original length of specimen 19.0 mm. Magnified.

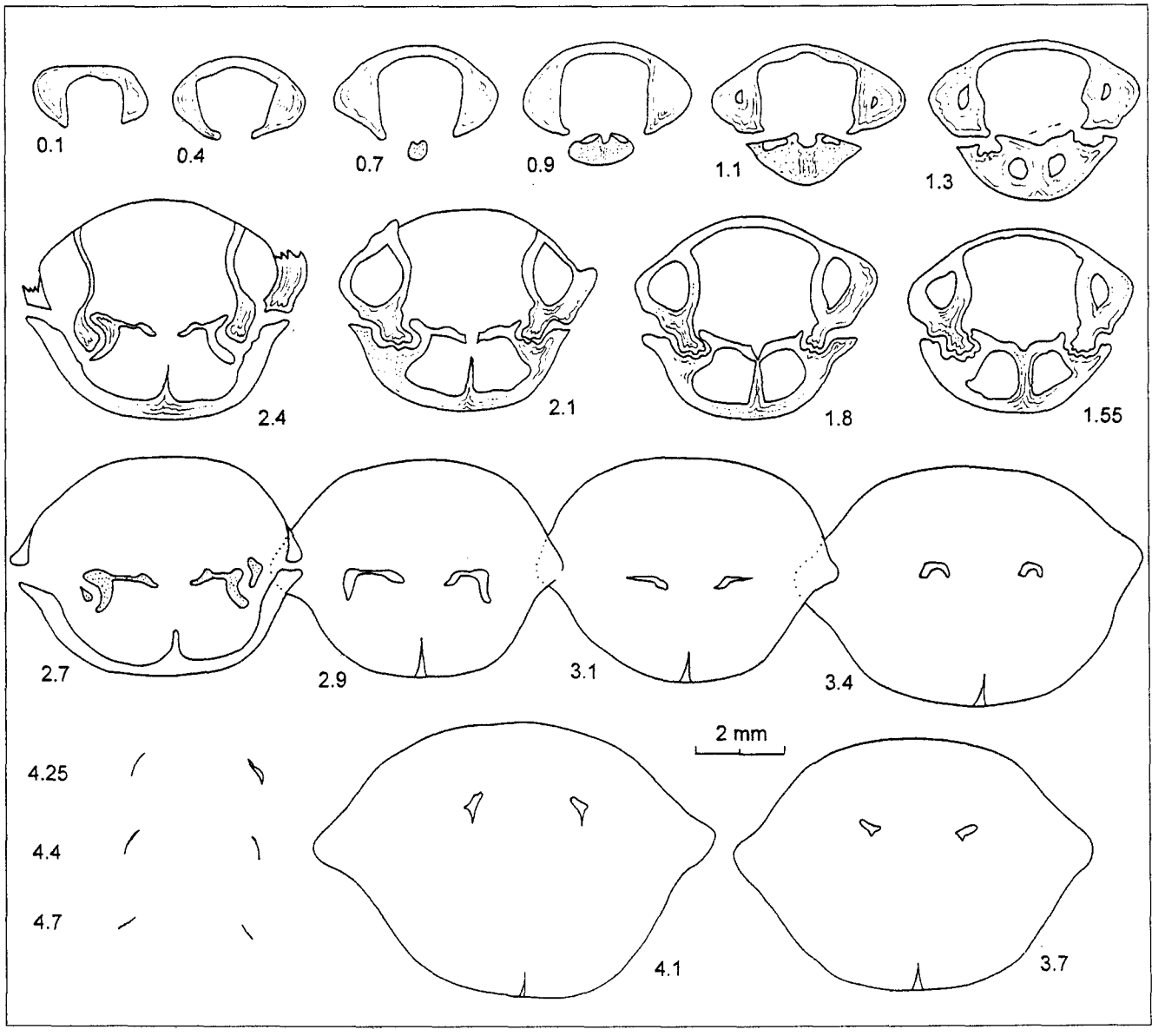


Text-Fig. 7.
Tetrarhynchia inopinata sp. n. Hochleitengraben. Another specimen showing a differently shaped septalium and crura. Magnified.

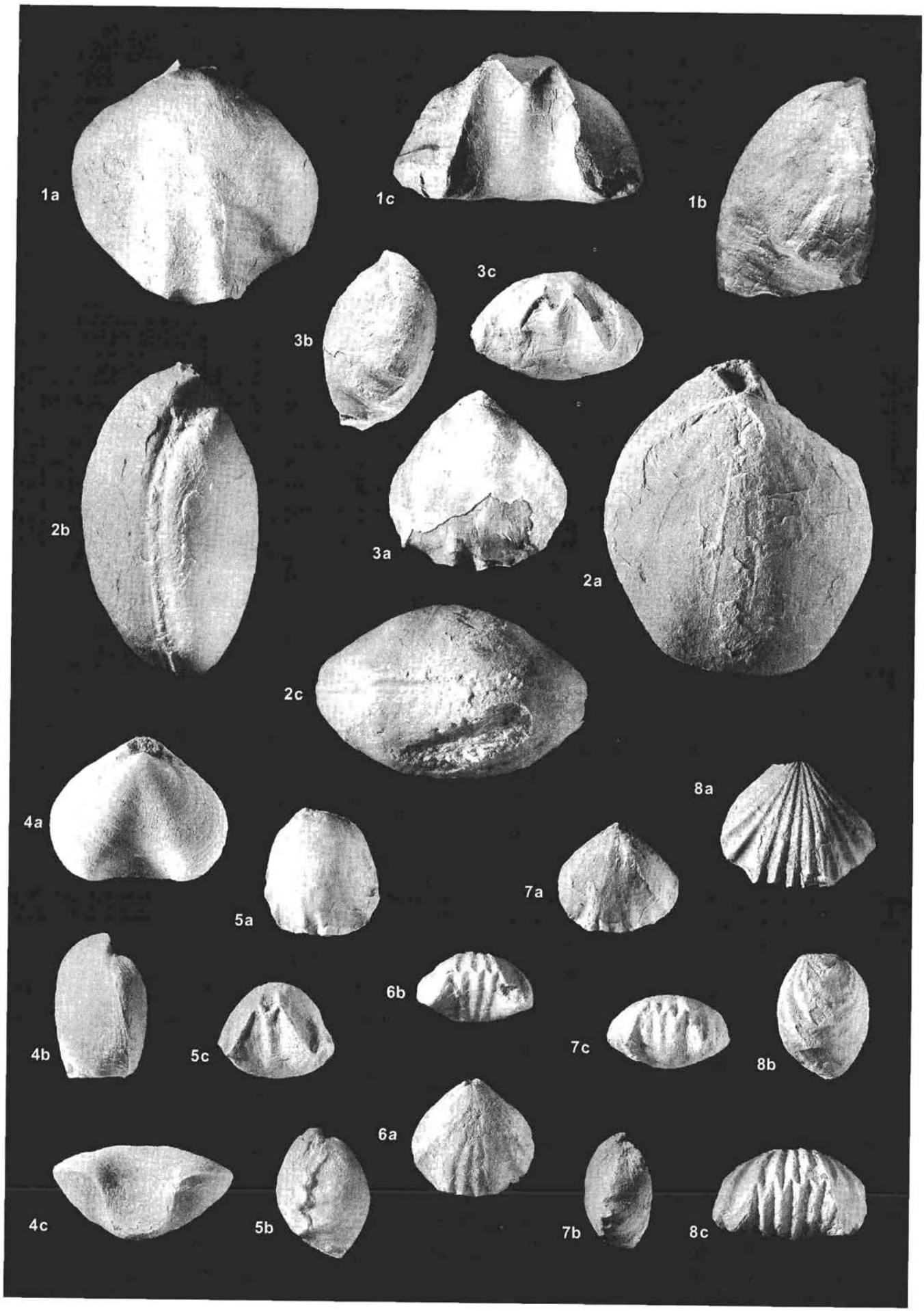
sharp to rounded costae on each valve, of which 2–5 confined to fold. Ribs extending to the posterior margin or leaving small smooth areas around umbones. Beak relatively small, suberect. Beak ridges poorly defined, foramen submesothyridid.

Internal characters practically the same as given for *Tetrarhynchia* by AGER (1956, p. 2). Some of my specimens show, however, well-developed pedicle collar and crenulation of teeth and sockets.

Remarks: The new species is attributed to *Tetrarhynchia* BUCKMAN, 1918. Similar internal and external characters could be found also in *Rudirhynchia* BUCKMAN, 1918 but this genus is well separable. Its main external points of distinction from *Tetrarhynchia* are stronger ribbing, and higher and stronger beak. *Tetrarhynchia inopinata* sp. n. is an "ordinary-looking" rhynchonellid and there are a great number of rhynchonellid species that have been recorded from the Liassic and that are similar to my specimens.



Text-Fig. 8.
Piarorhynchia aff. *juvenis* (QUENSTEDT). Saubachgraben. Dorsal septum disappeared at 4.9 mm from the posterior end. Length of specimen 11.4 mm. Magnified.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Many of them were proved later to be *Cirpa, Squamirhynchia, Prionorhynchia* etc., having the internal structures quite different from *Tetrarhynchia inopinata* sp. n. The new species shows a certain similarity to *Rhynchonella zitteli* GEMMELLARO, 1874 but differs from it in having longer and stronger ribs, and in more inflated brachial valve. It is comparable also to *Rhynchonella peristera* UHLIG, 1880 which can be well distinguished from *Tetrarhynchia inopinata* sp. n. by its sharper ribs and by higher, massive beak. In comparison with another similar species *Tetrarhynchia dunrobinensis* (ROLLIER, 1917), *Tetrarhynchia inopinata* sp. n. has broader plication, higher fold and fewer costae.

Occurrence: Hochleitengraben – 76 specimens (35 specimens with both valves, 24 brachial and 17 pedicle valves), Vorderer Ampelsbach – 10 specimens (2, 3, 5).

Subfamily: **Piarorhynchiinae SHI & GRANT, 1993**
Genus: ***Piarorhynchia* BUCKMAN, 1918**

Piarorhynchia aff. *juvenis* (QUENSTEDT, 1852)

(Pl. 1, Fig. 6, Pl. 2, Fig. 6, Text-Fig. 8)

aff. 1852 *Terebratula triplicata juvenis* – QUENSTEDT, p. 451, Pl. 36, Fig. 2.

Material: 5 specimens. The dimensions of the figured ones: 8.9 x 9.4 x 4.6 mm (Pl. 1, Fig. 6) and 9.9 x 10.3 x 5.9 mm (Pl. 2, Fig. 6).

Remarks: These semicostate specimens differ from "average" specimens of *Piarorhynchia juvenis* in having flatter profiles (lesser convexity of valves), lower uniplications and larger suberect beaks. The main internal characters are nearly the same as summarized for *Piarorhynchia* by AGER (1962). The specimen sectioned and figured in Text-Fig. 8 has shown the following characters: Delthyrial cavity quadrate in cross section. Lateral umbonal cavities subtrigonal, and in the specimen figured in Text-Fig. 8 infilled with secondary callus (in contradiction to another sectioned specimen from Saubachgraben). Dental lamellae strong and long. Hinge teeth massive, expanded dorsally and crenulated. Short denticula developed. Hinge plates thick, separated by large, shallow septalium. Outer socket ridges massive. Dorsal septum strong and persisting anteriorly beyond crura. Crura raduliform, somewhat flattened distally. These characters are very similar to those shown by ALMÉRAS & HANZO (1991, Text-Fig. 8) in *Piarorhynchia juvenis* from the Lower Sinemurian.

Occurrence: Saubachgraben (3 specimens), Christlumkopf (1 specimen) and Mittenwald (1 specimen).
Piarorhynchia juvenis occurs in the Hettangian – Upper Sinemurian (Lotharingian).

Order: **Spiriferinida IVANOVA, 1972**

Suborder: **Spiriferinidina IVANOVA, 1972**
Superfamily: **Spiriferinoidea DAVIDSON, 1884**
Family: **Spiriferinidae DAVIDSON, 1884**
Genus: ***Spiriferina* d'ORBIGNY, 1847**

Spiriferina ex gr. *walcotti* (SOWERBY, 1822)

(Pl. 3, Fig. 5)

1993 *Spiriferina* ex gr. *walcotti* (SOW.) – SIBLÍK, Pl. 1, Fig. 7.

Material: Two specimens (coll. IPW). The figured one measures ? 21.5 x 20.3 x 14.0 mm.

Remarks: *Spiriferina walcotti* is highly variable in its external morphology, and this is the cause of difficulties in determination of my material. As shown in the literature, the "average" *walcotti* is represented by specimens of transverse outline, subtriangular brachial valve, wide hinge line, large and low area, coarse costae, and expressive zigzagged anterior commissure. This was confirmed also by 2 specimens of *walcotti* at my disposal, coming from the Lower Sinemurian (*Semicostatum* Zone) of Radstock, Somerset. My specimens show, however, a less transverse outline, subrounded brachial valve, short hinge line and much stronger and narrower beak. The specimen from Roumania described and figured as *Spiriferina walcotti* by RAILEANU & IORDAN (1964) seems to be nearer to *Spiriferina betacalcis* (QUENSTEDT, 1856) or *Spiriferina muensteri* (DAVIDSON, 1851) [this latter mentioned as *Spiriferina walcotti* SOW. sp., var. *Münsteri* DAV. in CORROY, 1927]. Modern revision of *Spiriferina walcotti* is needed to show a range of its external variability in detail. For the present, my material is not sufficient for direct assignment to the species.

Occurrence: Eiberg.
According to ALMÉRAS (1964), *Spiriferina walcotti* occurs in the Lower Sinemurian and Lotharingian (= Upper Sinemurian), and its occurrence in Domerian is doubtful. QUENSTEDT (1871) recorded the specimens from the Lias Alpha, too (Pl. 54, Figs. 71–76).

Genus: ***Callospiriferina* ROUSELLE, 1977**

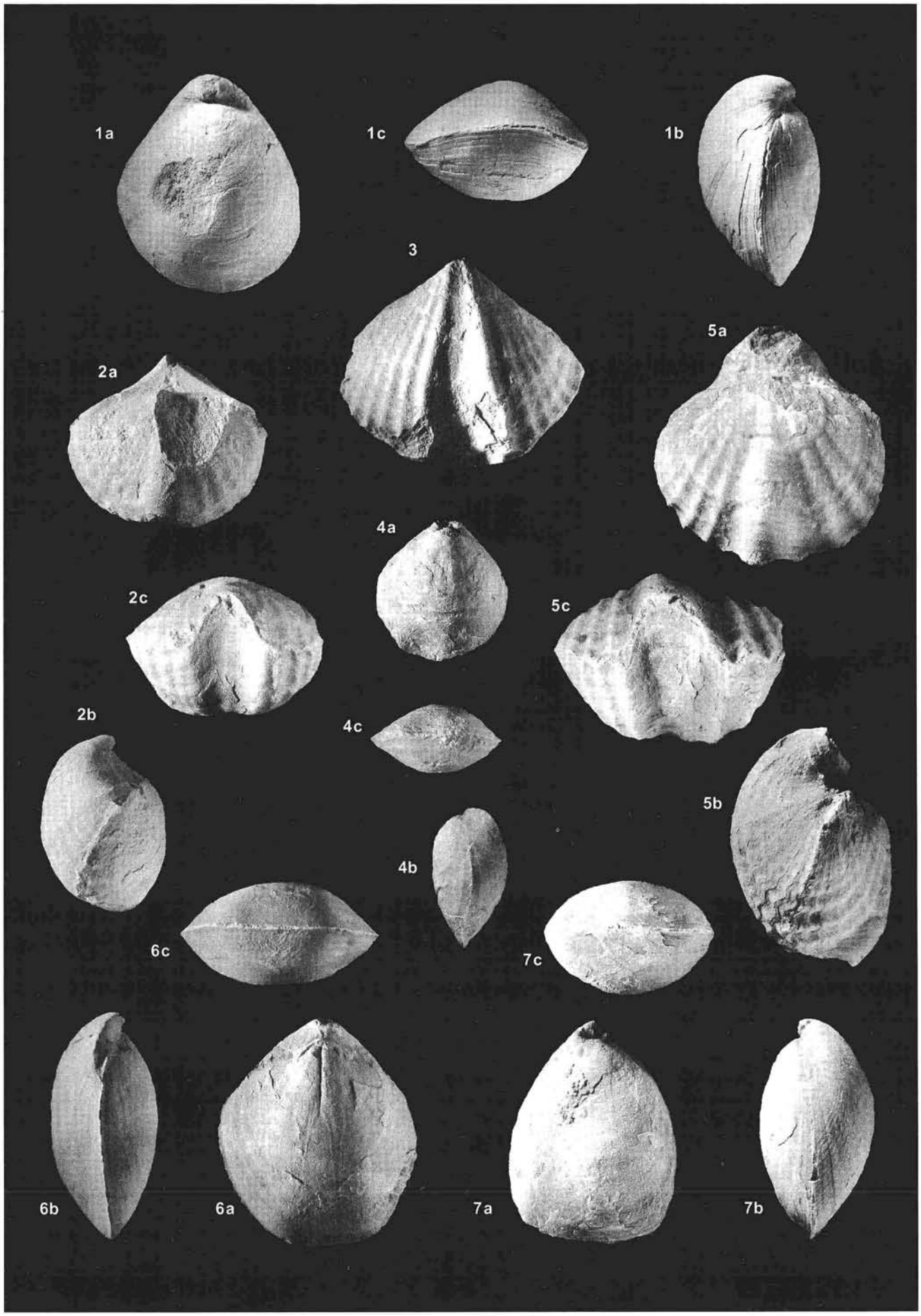
Callospiriferina haueri (SUESS, 1854)

(Pl., Figs. 2–3)

1854 *Spirifer Haueri* SUESS – SUESS, p. 52, Pl. 2, Fig. 6.
1886 *Spiriferina Haueri* SUESS – ROTHPLETZ, p. 162, Pl. 13, Figs. 1–5.
1909 *Spiriferina Haueri* SUESS sp. – TRAUTH, p. 48.
1911 *Spiriferina Haueri* Sss. m. f. *segregata* DI STEF. – HAHN, p. 539, Pl. 20, Fig. 1.
1927 *Spiriferina tumida* v. BUCH sp., var. *Haueri* SUESS – CORROY, p. 19, Pl. 1, Figs. 17–20.
1964 *Spiriferina tumida haueri* SUESS – RAILEANU & IORDAN, p. 12, Pl. 3, Fig. 16.

Plate 2

Fig. 1: ***Homoeorhynchia solitaria* sp. n.**, Holotype. Steinplatte, KRYSTYN's sample 11, coll. IPW. Magnified, x 1.5.
Fig. 2: ***Zeilleria* aff. *subnumismalis* (DAVIDSON)**. Hochleitengraben. GBA. Magnified, x 2.
Fig. 3: ***Saubachia inflata* sp. n.**, Holotype. Saubachgraben, KRYSTYN's sample S 1/2. IPW. Magnified x 3.
Fig. 4: ***Linguithyris aspasia* (ZITTEL)**. Steinbachgraben. Specimen figured by SIBLÍK, 1993 on Pl. 2, Fig.1. GBA no. 1993/7/1. Magnified x 2.
Fig. 5: ***Saubachia inflata* sp. n.**, Saubachgraben, KRYSTYN's sample S 1/2. IPW. Magnified, x 3.
Fig. 6: ***Piarorhynchia* aff. *juvenis* (QUENSTEDT)**. Christlumkopf. IGPI. Magnified x 2.
Fig. 7: ***Saubachia inflata* sp. n.**, Mittenwald. IGPI. Magnified x 2.
Fig. 8: ***Calcirhynchia* (?) cf. *plicatissima* (QUENSTEDT)**. Fonsjoch. Coll. SPIELER, IGPI. Magnified, x 2.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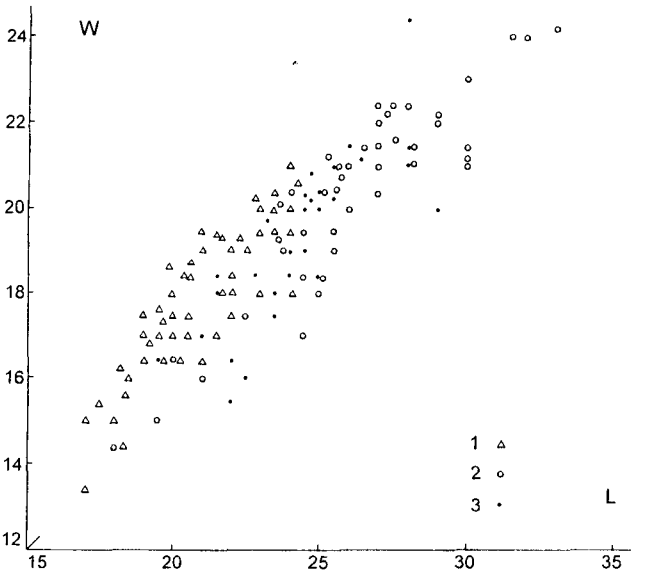
1966 *Spiriferina tumida* (BUCH) var. *haueri* CORROY – SUČIC-PROTIC, p. 81, Pl. 2, Fig. 5.
1994 *Spiriferina haueri* SUESS – UCHMAN & TCHOUMATCHENCO, Pl. 1, Fig. 2d.

Lectotype (here designated): The specimen figured by SUESS (1854) on Pl. 2, Fig. 6 and deposited in the collections of the Geologische Bundesanstalt in Vienna under no. 1854/6/11.
Stratum typicum: Gresten Beds, Lower Liassic.
Locus typicus: Pechgraben near Weyer, Austria.

Material: 10 complete specimens, 3 brachial and 36 pedicle valves. Specimens have been observed up to 20.0 mm in length, 22.5 mm in width and 12.0 mm in thickness. Figured specimens measure: 16.0 x 17.5 x 11.2 mm (Pl. 3, Fig. 2) and 18.0 x 21.5 mm (Pl. 3, Fig. 3).
Remarks: The most specimens show all main characters given by SUESS (1854) and later by TRAUTH (1909), and differ only in having smaller dimensions and pedicle valve slightly incurved at the apex, with narrower delthyrium. My specimens have up to 14 blunt costae on valve, and posterior parts of valves sometimes smooth or with faint ribs only. Exceptional occurrence of 1–3 radial ribs in sulcus of pedicle valve of some specimens from Ampelsbach was mentioned and compared to *Spiriferina segregata* DI-STEFANO already by HAHN (1911). The occurrence of 1–2 ribblets in the sulcus was confirmed in some specimens also by my recent samplings at this locality. *Spiriferina /=Dispiriferina/ segregata* DI-STEFANO, 1887 has, however, strong ribs and large ribbed sulcus of pedicle valve. In comparison with *Spiriferina* ex gr. *walcotti* from Eiberg are my specimens of *"haueri"* smaller, relatively wider, having wider hinge lines, wider and higher, less incurved beaks and faint ribbing. Some of them resemble *Spiriferina betacalcis* (QUENSTEDT, 1856), which was attributed as a variety to *Spiriferina walcotti* by CORROY in his monograph of the European Liassic spiriferinids (1927, p. 25). TRAUTH's collection (1909) deposited in the Geologische Bundesanstalt in Vienna contains 3 specimens of *"haueri"* coming from Grossau – Eleonoraschacht (inv. no. 1909/01/6). HAHN's specimen (1911, Pl. 20, Fig. 1) deposited in the collections of the Bayerische Staatssammlung für Paläontologie und historische Geologie in Munich under no. AS I 1083 was at my disposal, too.
Occurrence: Vorderer Ampelsbach: 36 specimens (7 complete specimens, 2 brachial and 27 pedicle valves), Eiberg: 5 specimens (3, 1, 1) and Hochleitengraben: 8 specimens (0, 0, 8).

Order: **Terebratulida WAAGEN, 1883**
Superfamily: **Terebratulacea GRAY, 1840**
Family: **Terebratulidae GRAY, 1840**
Genus: ***Lobothyris* BUCKMAN, 1918**

Lobothyris delta (NEUMAYR, 1879)
(Pl. 3, Figs. 1, Pl. 4, Figs. 1–4, Text-Figs. 9–11)



Text-Fig. 9.
Width-length scattergram (in mm) for 51 specimens of *Lobothyris andleri* from Mittenwald (1), 44 specimens of *Lobothyris delta* from Eiberg (2) and for 29 specimens of *Lobothyris delta* from Breitenberg (3).

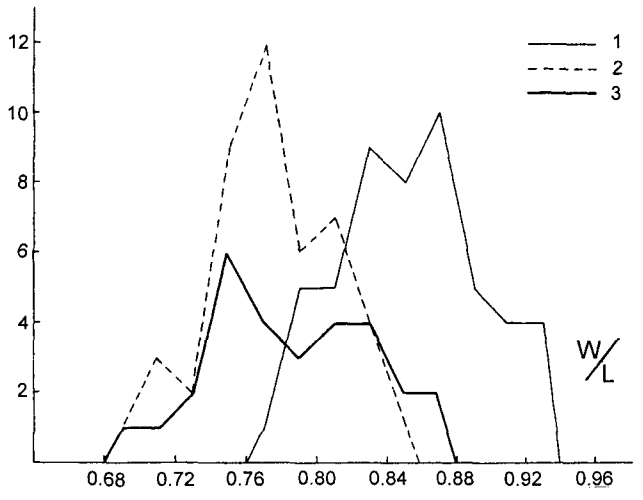
1879 *Terebratula Delta* n. f. – NEUMAYR, p.11, Pl. 1, Fig. 9.
1879 *Terebratula perforata* PIETTE – NEUMAYR, p. 11, Pl. 1, Fig. 7.
? 1879 *Terebratula perforata* PIETTE. Uebergang zu *Ter. Delta* – NEUMAYR, p. 12, Pl. 1, Fig. 8.
? 1879 *Terebratula crassa* n. f. – NEUMAYR, p. 12, Pl. 1, Fig. 10.
1993 *Lobothyris delta* (NEUM.) – SIBLÍK, Pl. 1, Figs. 1–2.

Lectotype (here designated): The specimen depicted by NEUMAYR (1879) on Pl. 1, Fig. 9 (misquated on p. 11 as Fig. 8) and housed in the collections of the Bayerische Staatssammlung für Paläontologie u. historische Geologie in Munich (inv. no. AS XXX 10).
Stratum typicum: "Psilonotenschichten", Hettangian, *Planorbis* Zone.
Locus typicus: Breitenberg, Osterhorngruppe, Austria.

Material: 164 specimens. The figured ones measure: 18.5 x 16.4 x 10.9 mm (Pl. 3, Fig. 1), 28.5 x 22.6 x 15.2 mm (Pl. 4, Fig. 1), 20.6 x 15.8 x 10.9 mm (Pl. 4, Fig. 2), 24.0 x 18.3 x 12.5 mm (Pl. 4, Fig. 3) and 23.1 x 17.9 x 13.2 mm (Pl. 4, Fig. 4).
Diagnosis: Suboval to subpentagonal shells, pedicle valve thicker than brachial one, plane anterior commissure, some specimens with very low, large uniplication. Beak strong and incurved, with short blunt beak "ridges" (in the specimens from Breitenberg). Faint radial ornamentation only rarely present.
Internal characters correspond to the main characters given for *Lobothyris* by AGER (1990, p. 11): Lateral insertion of teeths, hinge plates slightly concave ventrally and gently inclined dorsally, loop near to 0.3 length of valve.

Plate 3

Fig. 1: ***Lobothyris delta* (NEUMAYR)**. Saubachgraben. GBA. Magnified, x 2.
Fig. 2: ***Callospiriferina haueri* (SUESS)**. Vorderer Ampelsbach. KRYSTYN's sample 84/5/6. IPW. Magnified x 2.
Fig. 3: ***Callospiriferina haueri* (SUESS)**. Vorderer Ampelsbach. IGPI. Magnified, x 2.
Fig. 4: ***Zeilleria* sp. (? sp. n.)**. Saubachgraben. Coll. KRYSTYN, sample S 1/12. IPW. Magnified, x 2.
Fig. 5: ***Spiriferina* ex gr. *walcotti* (SOWERBY)**. Eiberg. Specimen figured by SIBLÍK, 1993 on Pl. 1, Fig. 7. IPW. Magnified, x 2.
Fig. 6: ***Zeilleria* sp. (? sp. n.)**. Vorderer Ampelsbach. IGPI. Magnified, x 2.
Fig. 7: ***Zeilleria* aff. *batilla* (GEYER, 1889)**. Breitenberg. KRYSTYN's sample 91/126). IPW. Magnified, x 2.



Text-Fig. 10.
Width-length frequency polygons for 51 specimens of *Lobothyris andleri* from Mittenwald (1), 44 specimens of *Lobothyris delta* from Eiberg (2) and 29 specimens of *Lobothyris delta* from Breitenberg (3).

Cardinal process wide and flat in some our specimens, bilobate. Sometimes cardinal process not ascertainable due to infilling of umbonal parts of shell with secondary callus. Pedicle collar absent.

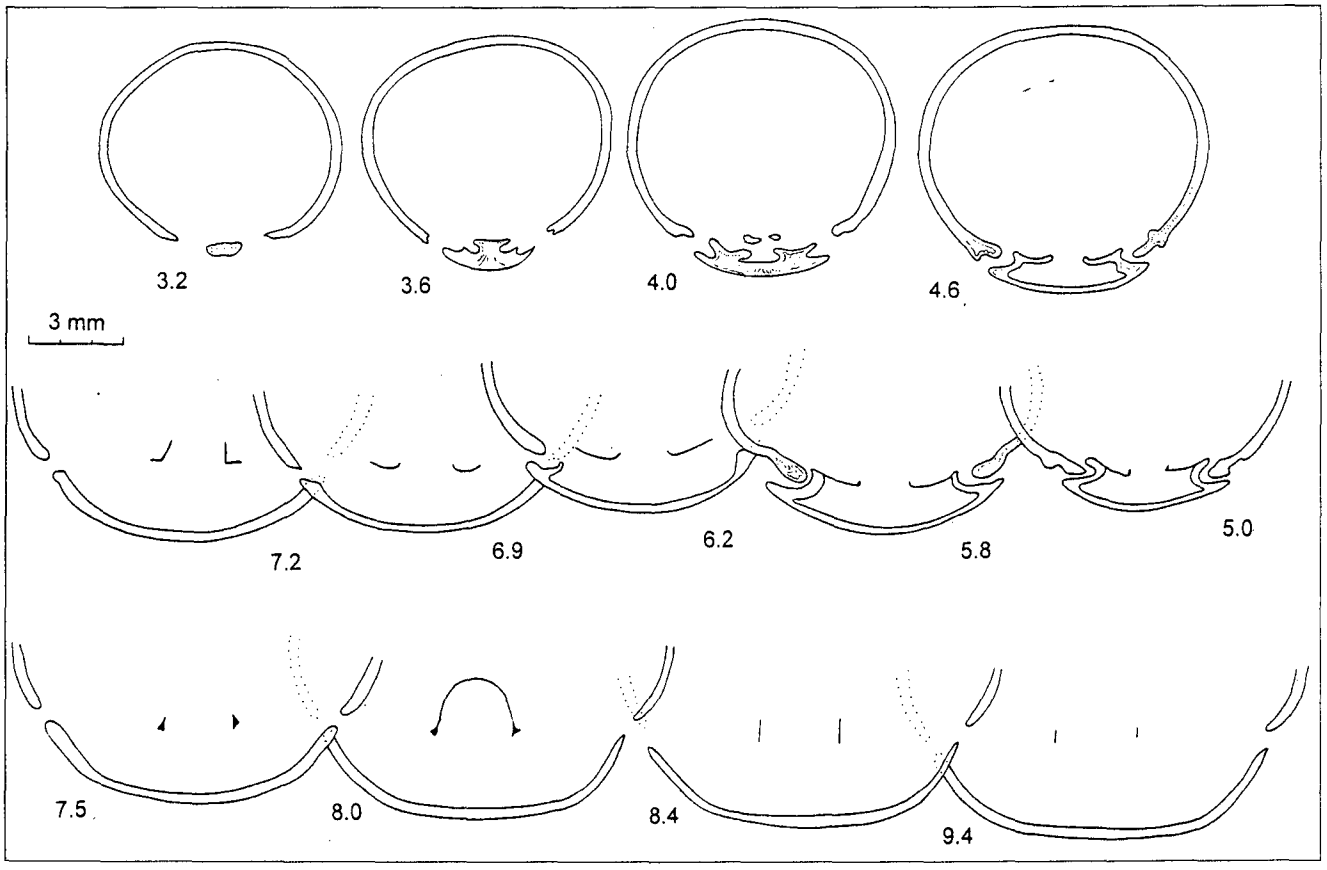
Remarks: Larger material than NEUMAYER's shows a great variability. Most specimens are similar rather to NEUMAYR's Fig. 7 on Pl. 1 (deposited in BSPhG Munich, no. AS XXX 8) which was erroneously identified by NEUMAYR as *Terebratula perforata* PIETTE (species belonging correctly to Zeilleriidae) than to the lectotype. The outline of the lectotype is slightly differing from that in Pl. 1, Fig. 9. This fact was already mentioned by NEUMAYR in his explanation to the plate. The specimen introduced by NEUMAYR as *"Terebratula perforata* PIETTE – Uebergang zu *Ter. Delta "* and figured on Pl. 1, Fig. 8 (deposited in the BSPhG in Munich under no. AS XXX 9) has sharper beak with well-developed ridges, and may differ from the species under consideration. Based on only one specimen, *Terebratula crassa* n. f. was described and figured by NEUMAYR (1879, Pl. 1, Fig. 10) also from Breitenberg. It is deposited in the collections of the Geologische Bundesanstalt in Vienna under no. 1879/3/1. It has strongly convex valves, massive incurved beak and well-developed concentric ornamentation. Similar specimens can be also found in the large material from Breitenberg and Eiberg, and *Terebratula crassa* is thus considered here a probable variant of *Lobothyris delta*. *"Terebratula Delta* NEUMAYR" was incorrectly included into synonymy of *Zeilleria perforata* (PIETTE) by DELANCE (1974).

Occurrence: Breitenberg (80 specimens), Saubachgraben (16 specimens), Glasenbachklamm (3 specimens) and Eiberg (65 specimens).

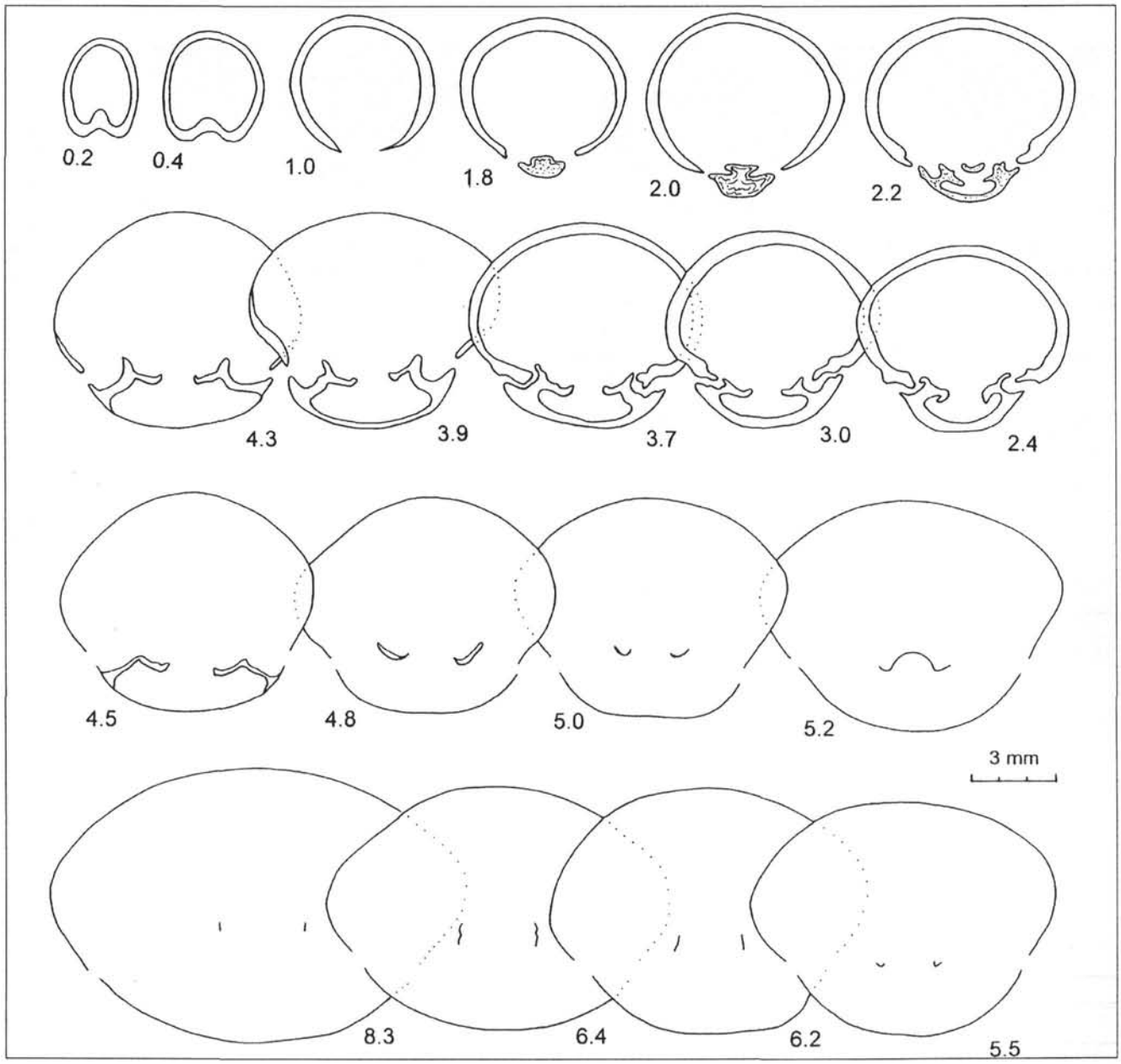
Lobothyris andleri (OPPEL, 1861)

(Pl. 4, Fig. 5, Text-Figs. 9–10, 12)

1861 *Terebratula Andleri* OPP. – OPPEL, p. 536, Pl. 10, Fig. 4.



Text-Fig. 11.
Lobothyris delta (NEUMAYR). Eiberg, coll. PIW. Transverse sections through the specimen 26.4 mm long. Magnified.



Text-Fig. 12.
Lobothyris andleri (OPPEL). Mittenwald. Original length of specimen 21.0 mm. Magnified.

1889 *Terebratula punctata* SOW. Var. *Andleri* OPP. – GEYER, p. 3, Pl. 1, Figs. 3–8, 11, 13, 15–16.
1993 *Lobothyris andleri* (OPPEL) – DULAI, p. 37, Pl. 2, Fig. 4, Text-Figs. 11–12 (cum syn.).
1999 *Lobothyris andleri* (OPPEL) – SIBLÍK in BÖHM et al.,p. 201, Pl. 30, Fig. 7.

Material: 87 specimens. The figured specimen measures 23.5 x 19.8 x 12.5 mm.
Internal characters similar to those of *Lobothyris delta*.

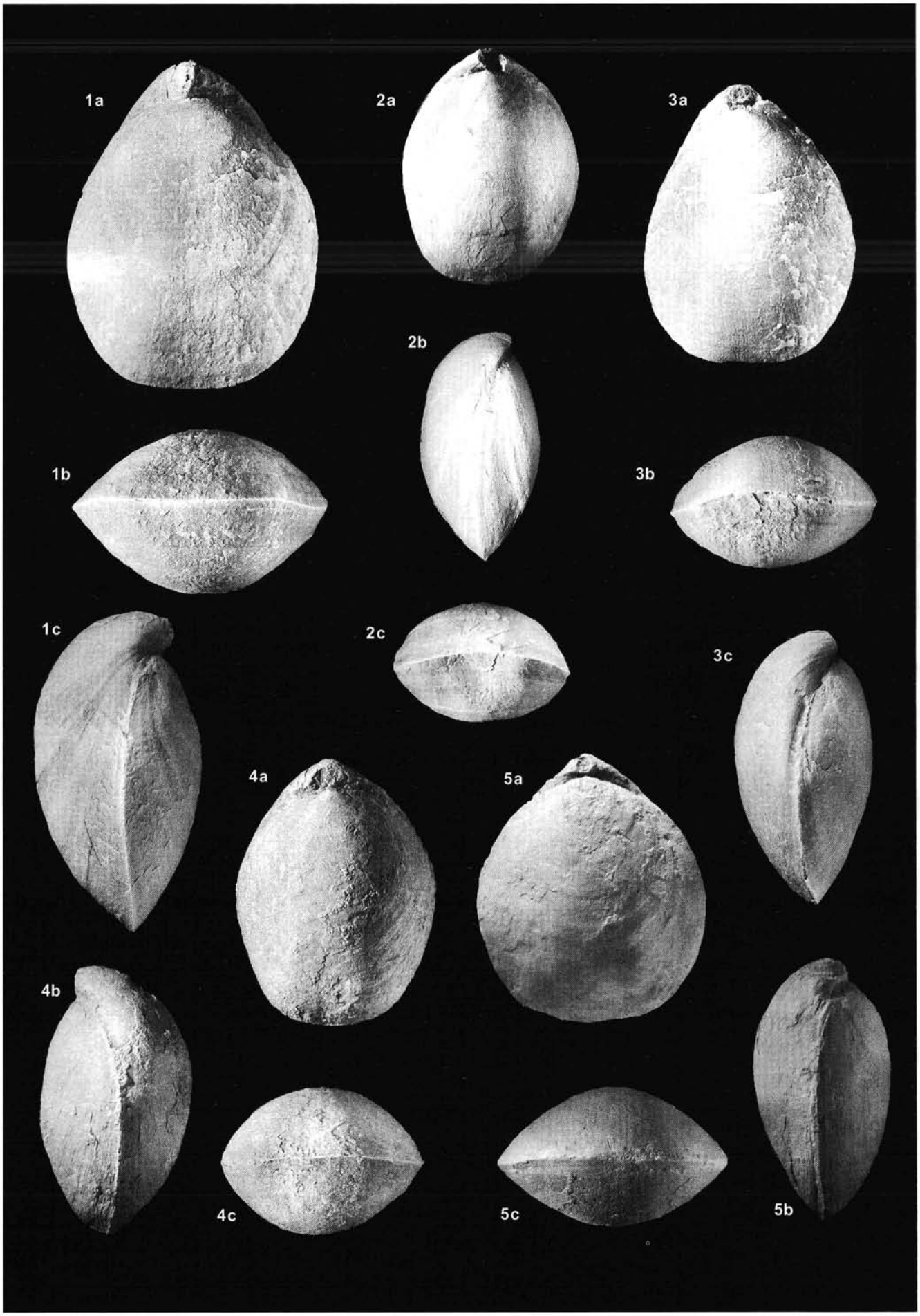
Remarks: Shells are mostly of subrounded to subpentagonal outline, with a length/width ratio over 1, and with their maximum width in the mid-length. My material is referred to this well-known, variable OPPEL's species even if certain similarity to other species seems apparent. Sometimes it is difficult to separate elongated specimens from *Lobothyris delta* (NEUMAYR). *Lobothyris andleri* can, however, be distinguished by its smaller, subcircular shells, both valves of the same thickness and convexity, and lower and weaker beak.

Occurrence: Mittenwald (70 specimens), Vorderer Ampelsbach (16 specimens) and Fonsjoch (1 specimen). The species occcurs from Hettangian to Upper Sinemurian – Lotharingian (ALMÉRAS, 1964).

Superfamily: **Zeilleriacea ALLAN, 1940**
Family: **Zeilleriidae ALLAN, 1940**
Genus: ***Zeilleria* BAYLE, 1878**

Zeilleria perforata (PIETTE, 1856)

1856 *Terebratula perforata* – PIETTE, p. 206, Pl. 10, Fig. 1.
non 1879 *Terebratula perforata* PIETTE – NEUMAYR, p. 11, Pl. 1, Fig. 7 [= *Lobothyris delta* (NEUMAYR)]
1974 *Zeilleria (Zeilleria) perforata* (PIETTE) – DELANCE, p. 75, Pl. 1, Figs. 1–7, Text-Figs. 6–1 to 6–9 (cum syn.).
1993 *Zeilleria perforata* (PIETTE) – SIBLÍK, Pl. 1, Fig. 6.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1993a *Zeilleria perforata* (PIETTE) – SIBLÍK, p. 973, Pl. 2, Fig. 4, Text-Fig. 7.
1999 *Zeilleria perforata* (PIETTE) – SIBLÍK in BÖHM et al., p. 203.

Material: One slightly damaged specimen ca. 20.0 mm long, 14.7 mm wide and 9.5 mm thick.
Remarks: The specimen is due to its elongated, subpentagonal outline and strong beak quite well comparable to the specimens figured by DELANCE (1974) on Pl. 1, Figs. 3–4 as variant *"utriforme"*. Its maximum width is situated at mid-length, however. The specimen figured from the Hettangian of the Bakony Mts. by DULAI (1993) on Pl. 2, Fig. 6 as *Zeilleria* ? sp. 2 has similar outline but much smaller beak.
Occurrence: Vorderer Ampelsbach.
According to DELANCE (1974) Hettangian to *Obtusum* Zone.

Zeilleria aff. *subnumismalis* (DAVIDSON, 1851)
(Pl. 2, Fig. 2)

aff. 1974 *Zeilleria (Zeilleria) subnumismalis* (DAVIDSON) – DELANCE, p. 202, Pl. 3, Figs. 16–17.

Material: One slightly damaged specimen. Its dimensions are ? 27.5 x 23.6 x 15.8 mm.
Remarks: The zeilleriid brachiopods show considerable variation and single specimens are difficult to determine. The specimen from Hochleitengraben appears to be much more similar to *Zeilleria subnumismalis* than to any other Liassic species. It differs from DAVIDSON's species in its slightly higher beak and in better developed flattening along lateral and anterior commissures. It also occupies a much lower stratigraphical position. Another name, which has to be considered here, is *Zeilleria perforata* (PIETTE) var. *"allongé"* from the Hettangian as figured by DELANCE in his very detailed monograph of the Liassic zeilleriids (1974, Pl. 1, Fig. 2). This variant has narrower beak than my specimen and is devoid of any flattening around the commissure. Similar outline as my specimen is shown in *"Waldheimia mutabilis* OPP. Uebergang in *W. subnumismalis* DAV." and in *"Waldheimia* cf. *subnumismalis* DAV." figured by GEYER from Hierlatz (1889, Pl. 3, Figs. 5 and 31–32). However, they all have subtle beaks and much smaller dimensions.
Occurrence: Hochleitengraben.
Zeilleria subnumismalis (DAVIDSON) is a Domerian species (DELANCE, 1974).

Zeilleria sp. (? sp. n.)
(Pl. 3, Figs. 4, 6)

Material: 16 partially incomplete specimens. The figured ones measure 20.0 x 17.7 x 9.6 mm (Pl. 3, Fig. 6) and ? 12.0 x 11.1 x 6.5 mm (Pl. 3, Fig. 4).
Diagnosis: Specimens of very variable outline, from subpentagonal to subcircular, maximum width at about mid-length, profile evenly biconvex, anterior commissure rectimarginate, pedicle umbo large and low. Internal structures include dental lamellae and dorsal septum persisting for about one-third of length of valve.
Remarks: Liassic zeilleriids already described in the literature show a wide range of variation in outline, profile and anterior view. There are a number of Liassic species that have specimens very similar to the studied material. My specimens show various outlines: ovate, elongate, subcircular or subpentagonal. The specimen of subpentagonal outline (Pl. 3, Fig. 6) can be well compared to *Waldheimia mutabilis* OPPEL from the Sinemurian figured by GEYER (1889) on Pl. 3, Figs. 4 (according to GEYER a variant similar to *W. Sarthacensis* d'ORB.) and 5 (according to GEYER "Uebergang in *W. subnumismalis* DAV."), to *Zeilleria perforata* (PIETTE) figured by DELANCE (1974) on Pl. 1, Fig. 2 (variant *"allongé"*) and Fig. 7 (variant *"pentagonal-large"*), etc. A very similar outline can be found also in *Zeilleria?* sp. 2 figured by DULAI (1993, Pl. 2, Fig. 6) from the Hettangian of the Bakony Mts. Range of shell outline in my material distinguishes it clearly from that of both *Zeilleria perforata* (PIETTE) and *Zeilleria mutabilis* (OPPEL). Much more data are needed about the range of external variability in existing zeilleriid species. For the present, all my specimens are considered here representatives of a highly variable species. Under these circumstances it seems to be too speculative to place my scanty material definitively to some already described species.
Occurrence: V. Ampelsbach (11 specimens), Saubachgraben (1 specimen), Breitenberg (2 specimens) and Hochleitengraben (2 specimens).

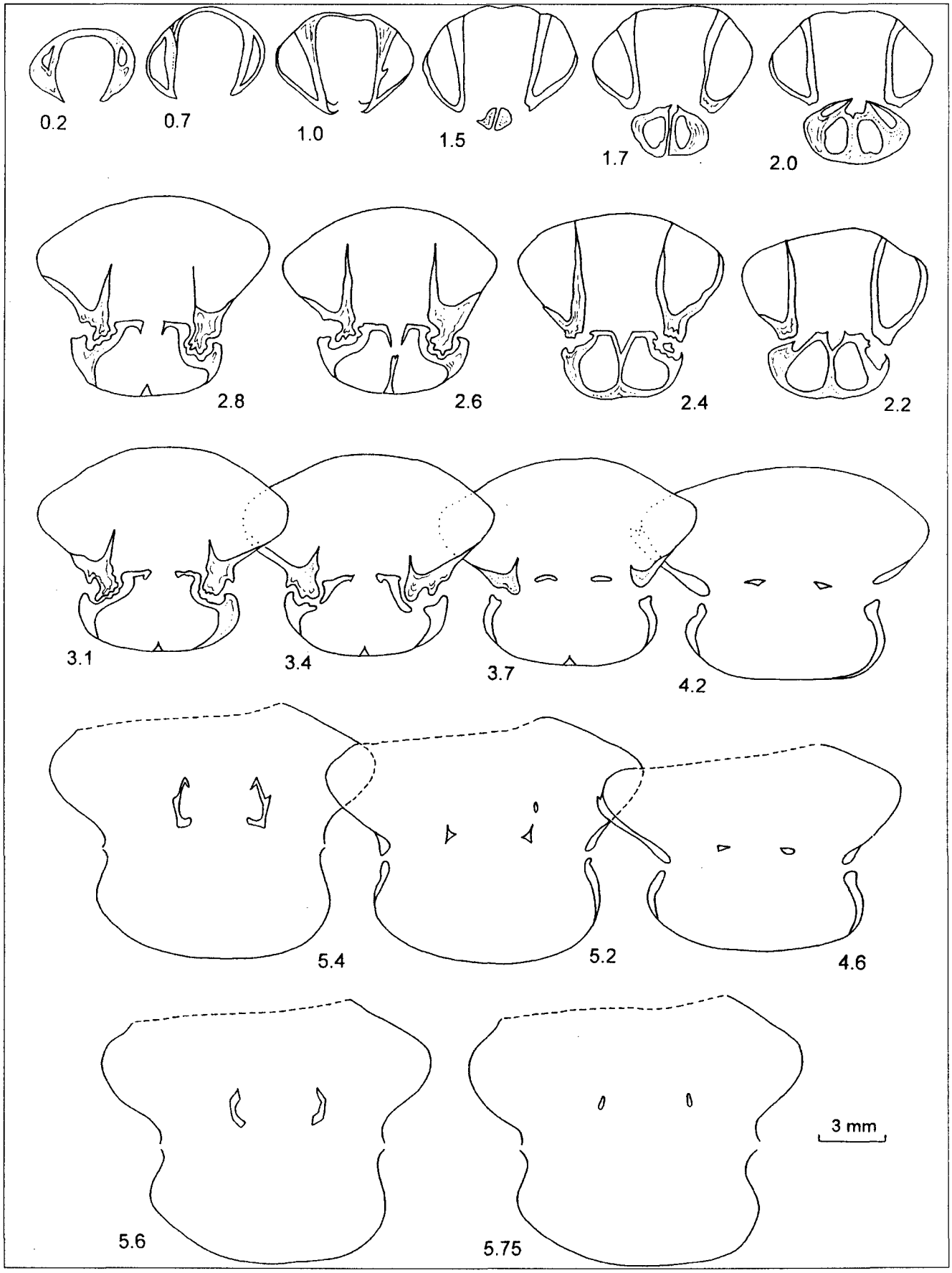
Appendix

Family: **Rhynchonellidae GRAY, 1848**
Genus: ***Grestenella* gen. n.**

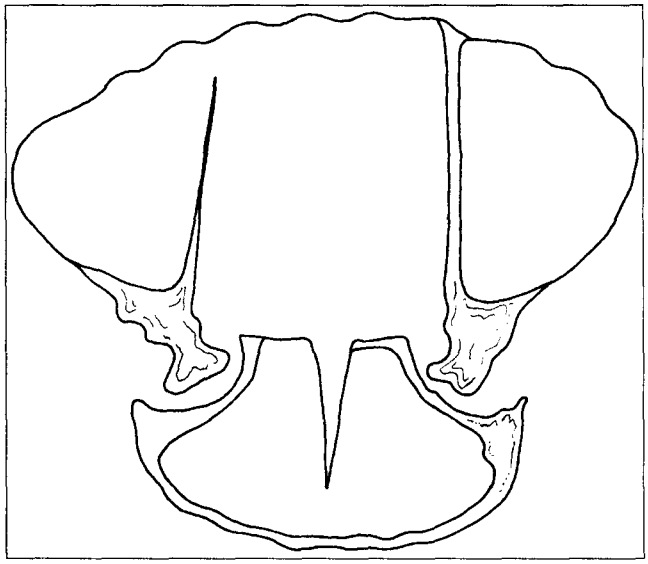
Type species: *Rhynchonella austriaca* SUESS, 1854. Gresten Beds, Liassic.
Diagnosis: Medium sized rhynchonellids, subtrigonal to subcircular in outline, dorsibiconvex. Strong uniplication in anterior commissure, high fold well developed in anterior half of shell. Multicostate, sharp costae of *grandis* to *tetrahedra* type (sensu AGER, 1956), rarely short smooth area around umbones. Beak usually high and strong, some globulous specimens with lower, slightly incurved beak. Beak ridges delimiting small impressed planareas.
Delthyrial cavity subquadrate in cross section, lateral umbonal cavities subtrigonal. Dental lamellae subparallel or slightly diverging ventrally. Some specimens with pedicle collar and double deltidial plates. Hinge teeth strong, straight and crenulated. Clear V-shaped septalium between subhorizontal hinge plates. Sockets large. Crura distally curving towards pedicle valve, with strongly expanded ventral parts.
Remarks: Unusual development of the crural terminations is the main reason of establishing the new genus. The cross section of crura is different from a diabolo shape ascertained in *Squamirhynchia* BUCKMAN, 1918 by AGER (1967, Text-Fig. 90).This shaping was due according to AGER et

Plate 4

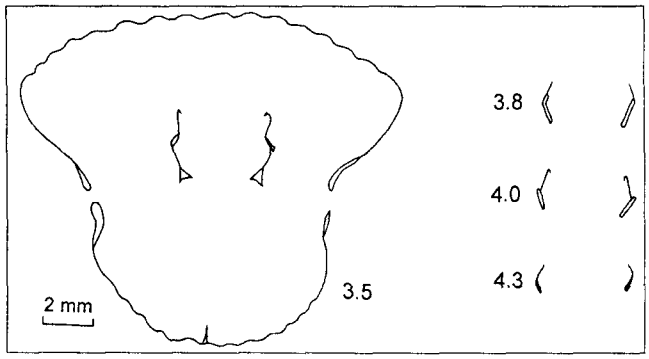
Fig. 1: ***Lobothyris delta* (NEUMAYR)**. Eiberg. Specimen figured by SIBLÍK, 1993 on Pl. 1, Fig. 1. IPW. Magnified, x 2.
Fig. 2: ***Lobothyris delta* (NEUMAYR)**. Saubachgraben. KRYSTYN's sample S 4/5. IPW. Magnified, x 2.
Fig. 3: ***Lobothyris delta* (NEUMAYR)**. Breitenberg. Specimen figured by SIBLÍK, 1993 on Pl. 1, Fig. 2. IPW. Magnified, x 2.
Fig. 4: ***Lobothyris delta* (NEUMAYR)**. Glasenbach. IGPI. Magnified, x 2.
Fig. 5: ***Lobothyris andleri* (OPPEL)**. Mittenwald. IGPI. Magnified, x 2.



Text-Fig. 13.
Grestenella austriaca (SUESS). Pechgraben, coll. GBA. Transverse sections through the posterior part of shell. Original length of specimen 20.0 mm. Magnified.



Text-Fig. 14.
Grestenella austriaca (SUESS). Pechgraben, coll. IPW. A section through another specimen showing different shaping of septalium. Length of specimen 18.8 mm. Magnified.



Text-Fig. 15.
Grestenella austriaca (SUESS). Pechgraben, coll. GBA. Transverse sections through another specimen better showing termination of crura. This specimen revealed a strong pedicle collar and clear double deltidial plates. Original length of specimen 17.5 mm. Magnified.

al. (1972, p. 185) to unusual recurvature of the crura. High uniplication and subcynocephalous character of some shells of the type species are, on the other side, most characteristic external features.

Included species: For the present, only the type species is recognized as belonging to *Grestenella* gen. n.

Distribution: Liassic.

Grestenella austriaca (SUESS, 1854)

(Text-Figs. 13–15)

1852 *Terebratula tetraedra austriaca* – QUENSTEDT, p. 453 (nomen nudum).

1854 *Rhynchonella Austriaca* SUESS – SUESS, p. 53, Pl. 3, Figs. 10–15.

1856 *Terebratula tetraedra austriaca* – QUENSTEDT, p. 180, Pl. 222, Figs. 13–14.

1871 *Terebratula tetraedra Austriaca* – QUENSTEDT, p. 60 (1868), Pl.37, Figs. 124–125.

1909 *Rhynchonella Austriaca* SUESS – TRAUTH, p. 55.

Lectotype (here designated): The specimen figured by SUESS (1854) on Pl. 3, Fig. 11 and deposited in the collections of the Geologische Bundesanstalt in Vienna, no. 1854/6/13. It derives from the Gresten Beds of Pechgraben near Weyer. Paralectotypes figured by SUESS on Pl. 3, Figs. 10, 12-15 are missing in the mentioned collections.

Remarks: Internal characters as described for the genus. In addition to the lectotype, only several specimens deposited in the collections of the Institute of Palaeontology, University of Vienna, and those from the TRAUTH's collection deposited in the Geologische Bundesanstalt in Vienna were at disposal to my study. No substantional additions are necessary to detailed descriptions by SUESS (1854) and TRAUTH (1909). High plication and fold, maximum thickness situated near anterior margin, strong beak, and occurrence of subcynocephalous shells can be considered characteristic of the species. AGER (1956, p. 2) referred the species under consideration to *Tetrarhynchia* and mentioned QUENSTEDT, 1868 as the author of the species.

Occurrence: Gresten Beds, Lower Liassic.

4. Conclusion

The present study has shown that the characteristic members of the low-diversity brachiopod assemblages of the Lower Hettangian grey facies are the following species: *Saubachia inflata* gen. n., sp. n., *Tetrarhynchia inopinata* sp. n., *Lobothyris delta* (NEUMAYR), spiriferinids are represented by *Spiriferina* ex gr. *walcotti* (SOWERBY) or *Callospiriferina haueri* (SUESS), and zeilleriids by *Zeilleria* ex gr. *perforata* (PIETTE).

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