



Liassic ammonites from Hierlatz, Austria

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43 Text-Figures, 5 Plates

Northern Calcareous Alps
Hierlatz
ammonites
systematic
revision
new species

Österreichische Karte 1:50.000
 Blatt 96

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Abstract

In the article the author presents a revision of ammonites from the locality Hierlatz. The revised material mostly comes from the preserved collections of HAUER (1853, 1854 and partly 1856) and GEYER (1886) at the GBA. Besides that we also studied own material. The assemblage of ammonites is relatively rich in species as testified by around 40 described species, from which there is one new species. With regard to the fact that at locality Hierlatz the fauna occurs in neptunic dykes, horizoned collections cannot be gathered out here. On the bases of assemblages of ammonites presented here we distinguished five ammonite horizons, which represent the Sinemurian, Lotharingian and Lower Carixian too.

Die Lias-Ammonitenfauna des Hierlatz, Dachsteingebiet, Oberösterreich

Zusammenfassung

Die Ammonitenfauna der klassischen Lokalität Hierlatz wurde revidiert. Die Revision bezog sich vor allem auf das in den Sammlungen der Geologischen Bundesanstalt in Wien noch vorhandene Originalmaterial zu den Arbeiten von HAUER (1853, 1854 und 1856 z.T.) und GEYER (1886) sowie auch auf eigene Aufsammlungen. Die Ammonitenfauna des Hierlatz ist mit etwa 40 Arten ziemlich reich, wobei auch eine neue Art beschrieben wurde. Da die Ammoniten des Hierlatz diversen Generationen von Spaltenfüllungen entstammen, können am locus classicus keine horizontierten Aufsammlungen durchgeführt werden. Die Ammonitenfauna umfaßt fünf Ammonitenzonen, die dem Sinemur, Lotharingium und dem frühen Carixium zugeordnet werden können.

1. Introduction

Without any doubt the Hierlatz locality belongs to the world wide known localities of Alpine Lias, mostly because of its very rich fauna, first of all the brachiopods. Although the ammonites are numerically less significant, in comparison with the above mentioned group, their significance for stratigraphy is decisive. Furthermore, the fauna of ammonites has several peculiarities, which attracted the attention of

ammonitologists as early as in the previous century, which is documented by a number of important studies (HAUER, 1853, 1854; GEYER, 1886). Regarding the fact, that these studies are more than one century old, a need for a revision of ammonites from the point of view of the modern systematic arose.

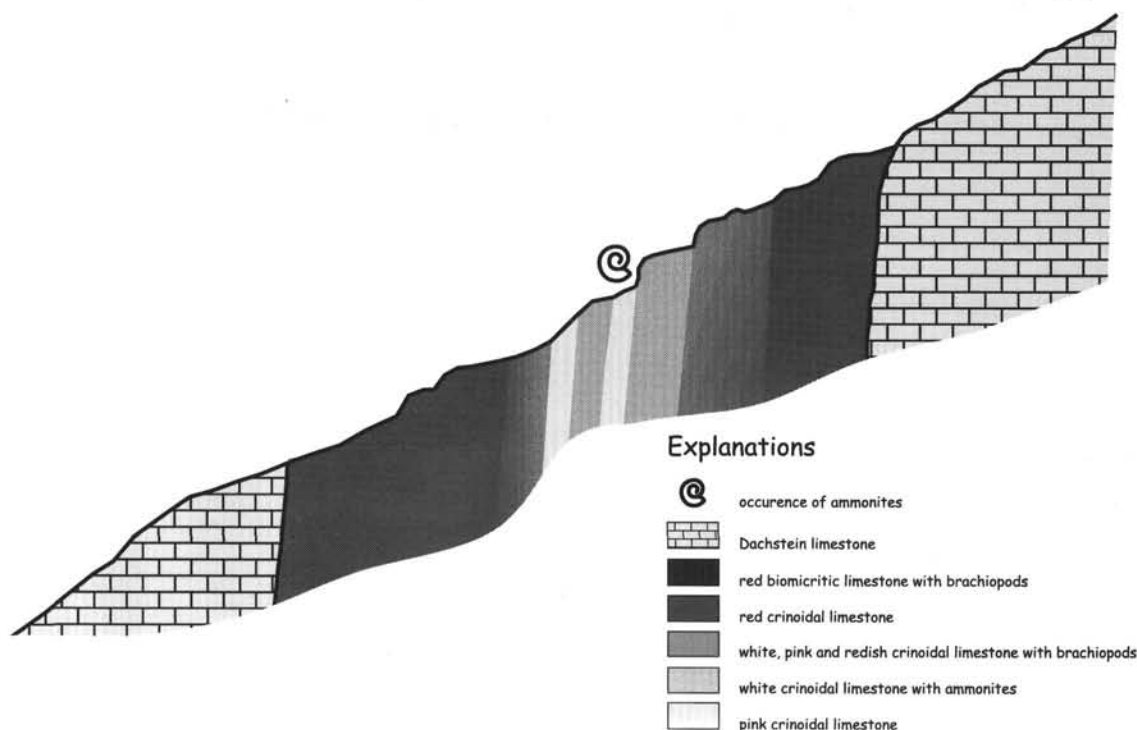
In the Hierlatz locality, the ammonites are found mainly in the white crinoidal to grained limestone, which is also proved by collection materials. The occurrences of ammonites in

LOCALITY HIERLATZ

simplified lithological cross section of main neptunic dyke

S

N



pink crinoidal limestone are rare. They also occur in reddish biomicritic limestone.

In regard to the fact that a very variable lithofacial development of so called Hierlatz limestone at the classic locality fill in neptunic dykes, it is almost impossible to make a horizoned collecting. Yet we distinguished the occurrence of ammonites according to facies and also according to the colour of limestone. It has shown, that there are no significant stratigraphic differences between the single types of limestone.

Material: In this study I had at my disposition the material formerly from HAUER'S (1854) and GEYER'S (1886) collections which is unfortunately not complete, and a lot of specimens were lost including the types. Further some part of studied material comes from the GBA collections (non registered material) and also the material from my own collecting in the Hierlatz locality. It is necessary to mention that despite of repeated collection the number of our specimens, is distinctly smaller than in the past century.

2. Systematic part

(In all text-figures the scale bar is 5 mm)

Juraphyllitidae ARKELL, 1950

Juraphyllites MÜLLER, 1939

Juraphyllites planispiroides RAKÚS, 1994

Text-Fig. 1, Pl. 1, Fig. 1, 2

1994 *Juraphyllites planispiroides* n. sp. – RAKÚS: 301, pl. 1, fig. 3–6 (cum syn.)

1996 *Paradasyceras planispira* (REYNES) – POPA & PATRULIUS: 55, Pl. 21, Fig. 4

Material: one specimen (phragmocone) with partly preserved calcified test

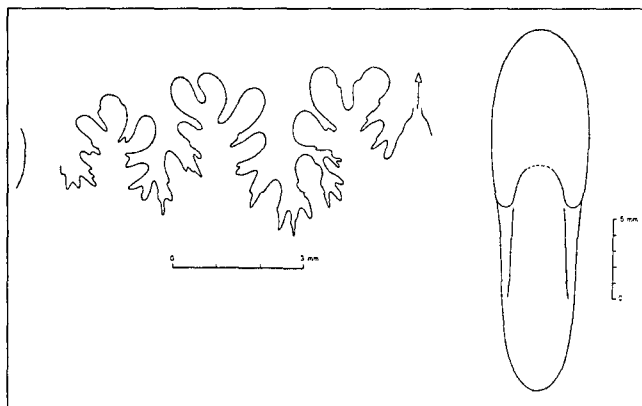
Dimensions:	D	Wh	Wb	O
Lectotype GBA	21,4	10,0	5,3	4,5
1886/2/14(= GEYER, 1886 Pl. 2, Fig. 3)				

Remark: This species was described in detail recently (RAKÚS, 1994: 301–302) and we give here only some supplement observations. This small form has convolute coiling, with laterally compressed elliptical whorl section (Text-Fig. 1). The umbilical "edge" is rounded and umbilicus is relatively open. The suture line (Text-Fig. 1) has typically juraphyllitic shape with robust stems on the saddles, especially in subadult ontogenetic stage. The foliioles are well spatulated. S1 is diphyll, S2 diphyll or irregularly triphyll. The surface of the shell is smooth, but at oblique illumination the fine sigmoidal growth lines are visible.

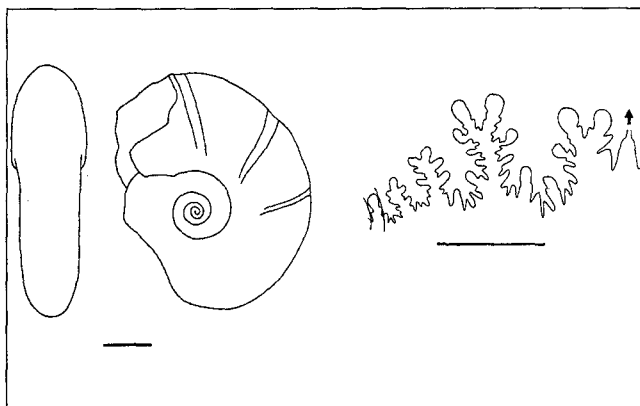
Occurrence: Lotharingian, zone Oxynotum

Juraphyllites cf. *diopsis* (GEMMELLARO, 1884)

Remark: In GEYER'S collection there is one specimen (cf. GEYER, 1886, pl. 1, fig. 20), which represents one part of phragmocone with prominent ribbing on the periventral and ventral region. Because the specimen is incomplete, specific determination is rather uncertain.



Text-Fig. 1
Juraphyllites planispiroides RAKÚS, cross section and suture line.



Text-Fig. 2
Togaticeras stella (SOWERBY), lateral, ventral view and suture line.

Occurrence: Lotharingian ? up to the Lower Carixian.

***Harpophylloceras* SPATH, 1927**

***Harpophylloceras* sp. juv.**

1886 *Rhacophyllites* sp. ind. aff. *lariensis* Men. – GEYER: 226, pl. 2, fig. 1–2

Material: 8 small more or less fragmentary specimens, whose maximal diameter is up to 18 mm only

Dimensions:	D	Wh	Wb	O
GEYER, 1886	10,2	4,0	3,0	3,8

Pl. 2, Fig. 1	18,0	6,8	5,0	6,8
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Remark: All specimens preserved in GEYER's collection are only juvenile stages, with prominent constrictions, which appear from 15 mm of diameter. The fine, prorsiradiate ribs run across the venter without the interruption. The cross section of the last preserved whorl is slightly keeled.

Occurrence: Lotharingian, Oxynotum zone

***Togaticeras* RAKÚS, 1993**

***Togaticeras stella* (SOWERBY, 1833)**

Text-Fig. 2, Pl. 1, Fig. 7

1833 *Ammonites stella* SOWERBY in de la BÈCHE: 333, fig. 63

1854 *Ammonites stella* SOWERBY – HAUER: 879, pl. 3, fig. 1–4

1862 *Ammonites stella* SOW. – OPPEL: 62

1888 *Rhacophyllites stella* SOW. sp. – CANAVARI: 91, pl. 2, fig. 1–5 (cum syn.)

1886 *Rhacophyllites stella* (SOW.). – GEYER: 224, pl. 1, fig. 17–19

1901 *Rhacophyllites stella* SOW. – FUCINI: 68, Pl. 7, Figs. 8, 9, Pl. 8, Fig. 8, Pl. 9, Fig. 1, Pl. 12, Fig. 4

1936 *Rhacophyllites stella* (SOW.). – GUGENBERGER: 157, Pl. 13, Fig. 29

1942 *Rhacophyllites stella* SOWERBY – KOVÁCS: 97, Pl. 2, Fig. 8 (cum syn.)

1993 ?*Paradasyceras stella* (SOWERBY, 1833) – RAKÚS: 923, Text-Fig. 9, Pl. 2, Fig. 8

Material: at least fifteen more or less complete specimens fossilised in white sparitic limestone

Dimensions:	D	Wh	Wb	O
	10,6	4,5	3,0	2,5
	14,2	6,3	4,0	4,4
	14,8	6,3	4,0	4,0
	18,4	7,0	-	5,8
	25,8	11,4	7,5	7,6
	27,3	11,7	8,8	8,0

Hauer, 1854

Pl. 3, Fig. 3 36,6 17,0 11,0 10,0

Pl. 3, Figs. 1–2 49,4 22,8 14,8 12,6

Remark: This relatively abundant species in the Hierlatz locality was in the past frequently confounded with *Paradasyceras uermoesense* (HERB.) from which it is well distinguished due to slanting umbilical wall and numerous prorsiradiate constrictions. In the adult stage the umbilical wall is typically oblique to the plan of symmetry. The suture line (Text-Fig. 2) has juraphyllitic character with diphyllle saddles (S1 and S2).

Occurrence: This long ranged species goes from the Upper Hettangian (Marmorea zone) up to Lotharingian (Oxynotum zone)

PHYLLOCERATIDAE ZITTEL, 1884

***Phylloceras* SUESS, 1865**

***Phylloceras lipoldi* (HAUER, 1854)**

Text-Fig. 3, Pl. 1, Fig. 3

1854 *Ammonites Lipoldi* HAUER. – HAUER: 884, Lp. 3, Fig. 8–10

1886 *Phylloceras Lipoldi* (v. HAUER) – GEYER: 220, Pl. 1, Fig. 13, 14

1942 *Heterophylloceras Lipoldi* HAUER. – KOVÁCS: 61, Pl. 1, Fig. 12, Text-Fig. 27–30 (cum syn)

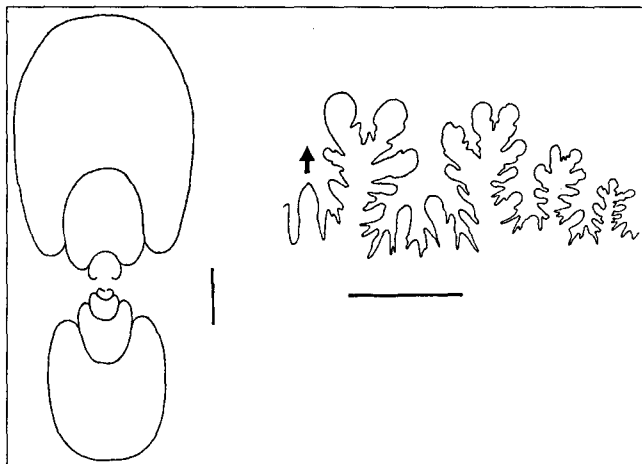
Material: 13 more or less complete specimens from HAUER's collection. Specimens are preserved as stone cores in white or pink limestone

Dimensions:	D	Wh	Wb	O
	9,0	4,0	4,0	-
	12,6	7,0	5,9	2,0
	16,7	9,0	6,8	2,1

HAUER 1854

Pl. 3, Fig. 10 26,0 13,8 11,0 4,0

HAUER 1854



Text-Fig. 3
Phylloceras lipoldi (HAUER), cross section and suture line.

Pl. 3, Fig. 8–9	36,0	16,6	16,5	4,8
=Lectotype	42,8	24,0	21,4	5,5

Remark: This species is characterised by oval section (Text-Fig. 3) with maximum width at middle of height of the whorl. In the internal mould there are 4 or 5 weak prorsiradial constrictions. The surface of the shell is smooth. The suture line (Text-Fig. 3) is typically phylloceratic with diphyll lateral saddles S1 and S2.

Occurrence: Lotharingian

***Phylloceras plicatofalcatum* STUR m. s. in GEYER, 1886**

Text-Fig. 4, Pl. 1, Fig. 4

1886 *Phylloceras plicatofalcatum* STUR m. s. – GEYER: 219, Pl. 1, Fig. 11, 12

Material: About 15 stone cores preserved in white limestone

Dimensions:	D	Wh	Wb	O
	10,0	5,0	-	.
	10,5	5,8	3,6	.
	10,7	6,8	4,0	1,0
	11,6	6,5	-	.
	12,0	7,5	-	1,0
	13,6	7,9	-	1,2
GEYER 1886, Pl. 1, Fig. 11 = Lectotype	14,4	8,0	4,3	0,8
	16,0	8,0	-	1,6
	16,5	9,4	5,9	1,3
	17,7	10,3	-	1,6
GEYER 1886, Pl. 1, Fig. 12	17,8	10,0	-	1,4
	20,4	11,6	-	1,8

Remark: This little particular phylloceratid species is characterised by laterally compressed form with flat and nearly parallel flanks (Text-Fig.4). From the diameter about 10 mm appear the first weak, prorsiradial constrictions (6–7 per whorl) accompanied with fine ribs situated only on the venter (Text-Fig.4). During the ontogeny the fine ribs are more and more prominent and form on the venter the plications in style of "rounded chevrons".

The suture line (Text-Fig. 4) is typical phylloceratoid with prominent spatulation, S1 is diphyll and S2 is triphyll.

Occurrence: Lotharingian, Oxynotum Zone

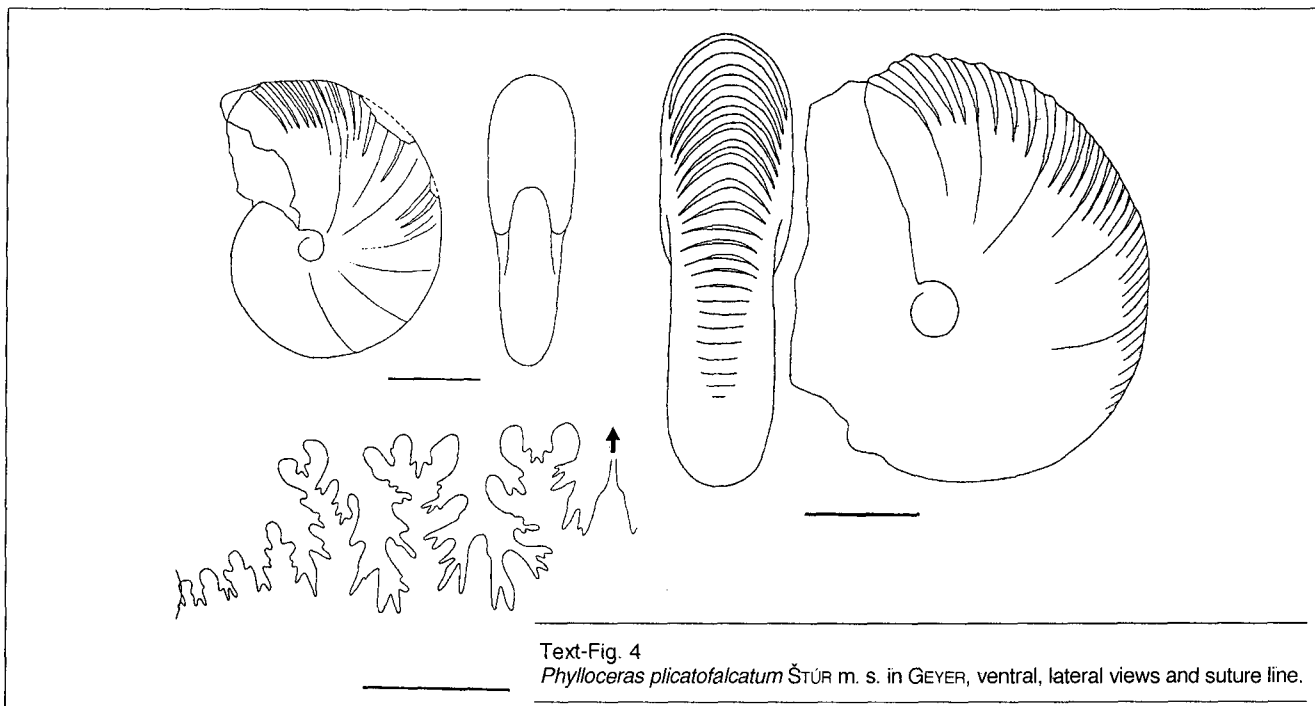
***Phylloceras retrofalcatum* STUR m.s. in GEYER, 1886**

1886 *Phylloceras* sp. indet. – GEYER: 221, Pl. 1, Fig. 16

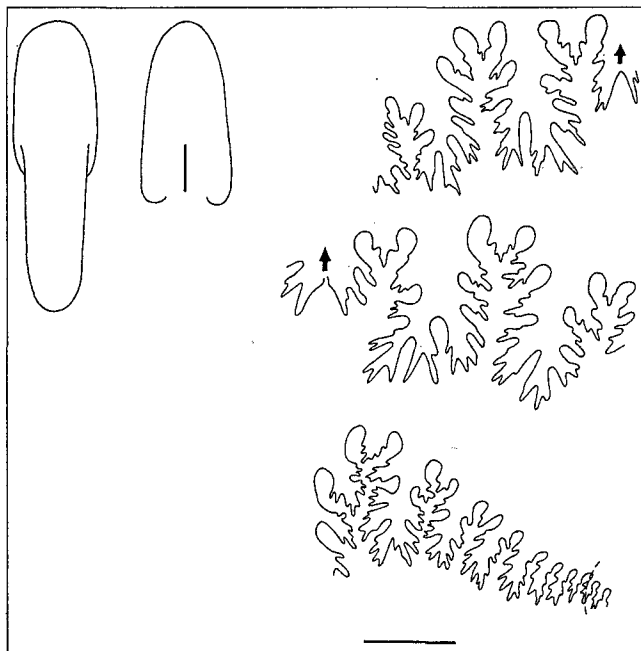
Material: one partly preserved stone core

Dimensions:	D	Wh	Ww	O
GEYER 1886, Pl. 1, Fig. 16 = Lectotype	18,3	9,8	6,0	2,4

Remark: This rare and minute phylloceratitic species is characterised by fine prorsiradial riblets and laterally com-



Text-Fig. 4
Phylloceras plicatofalcatum STUR m. s. in GEYER, ventral, lateral views and suture line.



Text-Fig. 5
Phylloceras costoradiatum ŠTÜR m. s. in GEYER, cross section and suture lines.

pressed cross section. The suture line has typically phylloceratic shape with diphylle saddles..

Occurrence: Lotharingian, Oxynotum zone.

***Phylloceras costoradiatum* ŠTÜR m. s. in GEYER, 1886**
Text.-Fig. 5, Pl. 1, Fig. 5, 6

1886 *Phylloceras costoradiatum* ŠTÜR m. s. – GEYER: 218, Pl. 1, Fig. 10a–c

Material: two incomplete specimens preserved as stone core

Dimensions:	D	Wh	Ww	O
	14,0	8,0	4,3	1,4
GBA 3019	21,0	13,2	-	2,0

Remark: The *Ph. costoradiatum* is medium-size species with high elliptical cross section and flat flanks, convergent to ven-

ter (Text-Fig. 5). The fine, prorsiradial regular ribs covering flanks, cross over the venter. The suture line (Text-Fig. 5) is characterised by diphylle clearly spatulated saddles, whose height decreases downward to the umbilicus.

Occurrence: Lotharingian, Oxynotum zone

***Zetoceras* Kovács, 1939**

***Zetoceras pseudozetes* (FUCINI, 1908)**

Text-Fig. 6, Pl. 1, Fig. 8

1886 *Phylloceras zetes* (D'ORB.) – GEYER: 222, Pl. 1, Fig. 15

1908 *Phylloceras pseudozetes* n. sp. – FUCINI: 12 (partim)

1974 *Phylloceras (Zetoceras) pseudozetes* FUCINI, 1908 – FANTINI-SESTINI: 227

1977 *Zetoceras pseudozetes pseudozetes* (FUCINI, 1908) – WIEDENMAYER: 21, Text-Fig. 3d, e, Pl. 5, Fig. 9, 10 (cum syn.)

Material: one stone core fossilised in white limestone from GEYER's collection and four more or less complete fragments from depository

Dimensions:	D	Wh	Wb	P
	22,0	12,6	-	2,6
GBA 3015 =				
GEYER, 1886, Pl. 1, 23,0	12,3	5,8	2,0	
Fig. 15				

Remark: This *Zetoceras*-like species is relatively common in the Lower Liassic of Tethyan territory, but its reliable distinction from the other species of *Zetoceras* is difficult, what is confirmed by prolific number of species. After our opinion the reliable determination is possible only from the advanced grown stages. It seems that the best character for determination is suture line. Our species is characterised by quadriphylle external saddles (Text-Fig. 6).

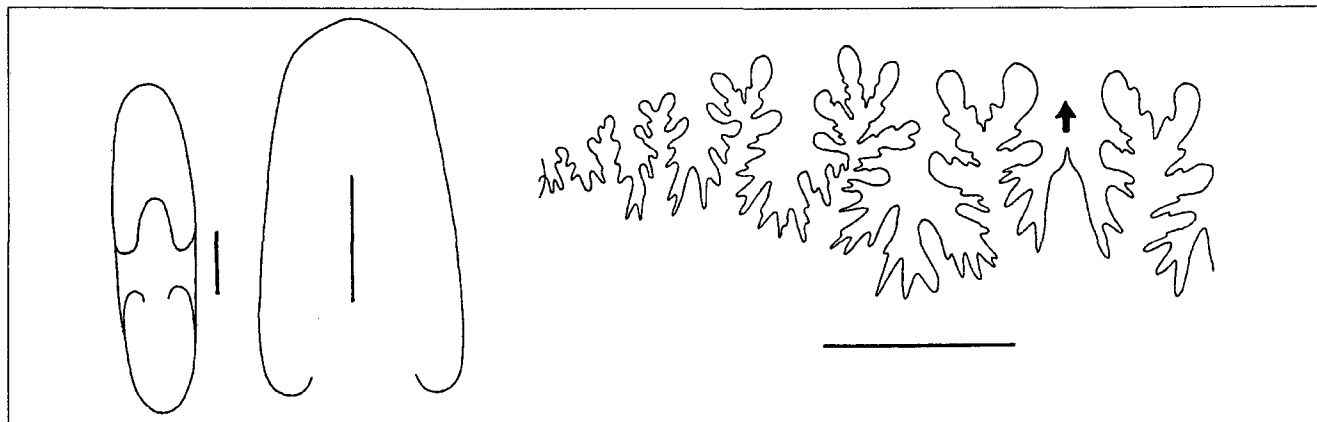
Occurrence: Lotharingian, Oxynotum zone.

***Geyerocheras* HYATT, 1900**

***Geyerocheras cylindricum* (SOWERBY, 1831)**

Text-Fig. 7

1831 *Ammonites cylindricus* SOWERBY in de la BECHE: 318, Fig. 54



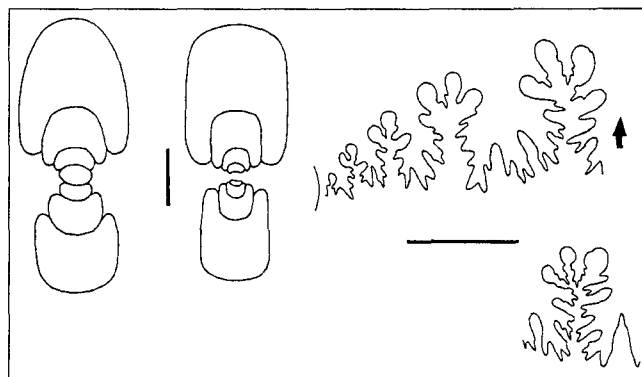
Text-Fig. 6
Zetoceras pseudozetes (FUCINI); cross section and suture line.

- 1854 *Ammonites cylindricus* SOWERBY. – HAUER: 876, Pl. 3, Fig. 5–7
 1862 *Ammonites cylindricus* SOW. – OPPEL: 62
 1886 *Phylloceras cylindricum* (SOW.). – GEYER: 215, Pl. 1, Fig. 3–5
 1942 *Geyeroceras cylindricum* SOWERBY – KOVÁCS: 27, Fig. 1, 2
 1969 *Geyeroceras cylindricum* (SOWERBY, 1831). – FANTINI-SESTINI: 99, Text-Fig. 2, Pl. 1, Figs. 1 and 4 (cum syn.)
 1993 *Geyeroceras cylindricum* (SOWERBY, 1831) – RAKÚS: 923, Text-Fig. 8, Pl. 1, Fig. 1, 2, Pl. 2, Fig. 1

Material: 11 specimens from HAUER's collection preserved in white and pink limestones and 1 specimens from GEYER's collection preserved in white limestone too

Dimensions:	D	Wh	Ww	O
	10,0	6,0	4,4	-
	12,8	8,0	6,0	1,0
	13,0	7,0	5,6	1,0
	20,0	11,0	9,0	2,4
HAUER 1854 Pl. 3, Fig. 5–6	28,0	14,0	11,0	2,0
	29,0	16,2	13,4	3,6
	31,0	18,0	16,0	2,8
	42,4	23,0	20,0	4,0
	43,0	23,0	19,0	4,0
GEYER 1886, Pl. 1 Fig. 5	46,3	28,6	22,0	-

Remark: This species was object of numerous studies in the past and also in present time. Due to its very characteristic whorl section (Text-Fig. 7) this species is easy to recognise between the other liassic phylloceratids. On the



Text-Fig. 7
Geyeroceras cylindricum (SOWERBY), cross section and suture line.

other hand this species is very typical for the Tethyan region from which it was described many times. For this we refer the reader on the references mentioned in the synonymy.

Occurrence: Upper Hettangian (Marmorea zone) to the Lotharingian (Oxynotus zone).

Partschiceras FUCINI, 1923

Partschiceras striatocostatum (MENEHINI, 1853)
 Text-Fig. 8, Pl. 1, Fig. 9, 10, 11

- 1851 *Ammonites Partschi* STUR – STUR: 21 (non KLIPSTEIN, 1843) = nomen nudum
 1853 *Ammonites striatocostatum* MGH. – MENEHINI: 28
 1854 *Ammonites Partschi* STUR. – HAUER: 881 (partim), Pl. 4, Fig. 1, 3, 4–8
 1862 *Ammonites Partschi* STUR. – OPPEL: 62
 1886 *Phylloceras Partschi* (STUR). – GEYER: 216, Pl. 1, Fig. 6a, b, 7, 9
 1964 *Partschiceras monestieri* BREISTROFFER, 1947 – RAKÚS: 96, Pl. 16, Fig. 4–6
 1971 *Partschiceras striatocostatum* (MENEHINI, 1853). – FANTINI-SESTINI: 386, Pl. 31, Fig. 2 (Lectotype), 3, Pl. 32, Fig. 1, 2, 3, Pl. 33, Fig. 3, 4 (cum syn.)
 1977 *Partschiceras striatocostatum* (MENEHINI, 1853) – WIEDENMAYER: 15, Text-Fig. 2, Pl. 4, Fig. 5–8 (cum syn.)

Material: 7 more or less complete stone cores in white and pinky limestone

Dimensions:	D	Wh	Wb	O
GBA 3018c	16,3	7,0	5,0	3,3
GBA 3018b	21,2	11,4	7,1	3,3
coll. HAUER	23,8	11,0	8,0	3,8
coll. HAUER	24,3	14,0	8,6	4,8
HAUER 1854, Pl. 3, Fig. 1	27,0	18,4	7,4	3,2
HAUER 1854, Pl. 3, Fig. 4	40,0	22,8	12,4	6,0
GEYER 1886, Pl. 1, Fig. 6 = Lectotype				
GBA 3018/6	56,3	28,7	18,6	6,6

Remark: This species was described in detail by FANTINI-SESTINI (1971) and also by WIEDENMAYER (1977). We present here several complementary details concerning the juvenile stage and suture only.

The ovoid protoconch is small ($d = 0,75$ mm). Two first whorls have a cross section depressed (Text-Fig. 8) From the 4th whorl the cross section is elliptic and this form of section persists up to the end of the adult stage (Text-Fig. 8). The ornamentation is particularly characteristic. The primary prominent ribs on periventral and ventral regions are recovered by fine regular "ribblets".

Suture line has a typically phylloceratitic shape (Text-Fig. 8) with diphyllite S1 and S2.

Occurrence: Sinemurian, mainly Lotharingian, Oxynotum zone.

Lytoceras HYATT, 1889

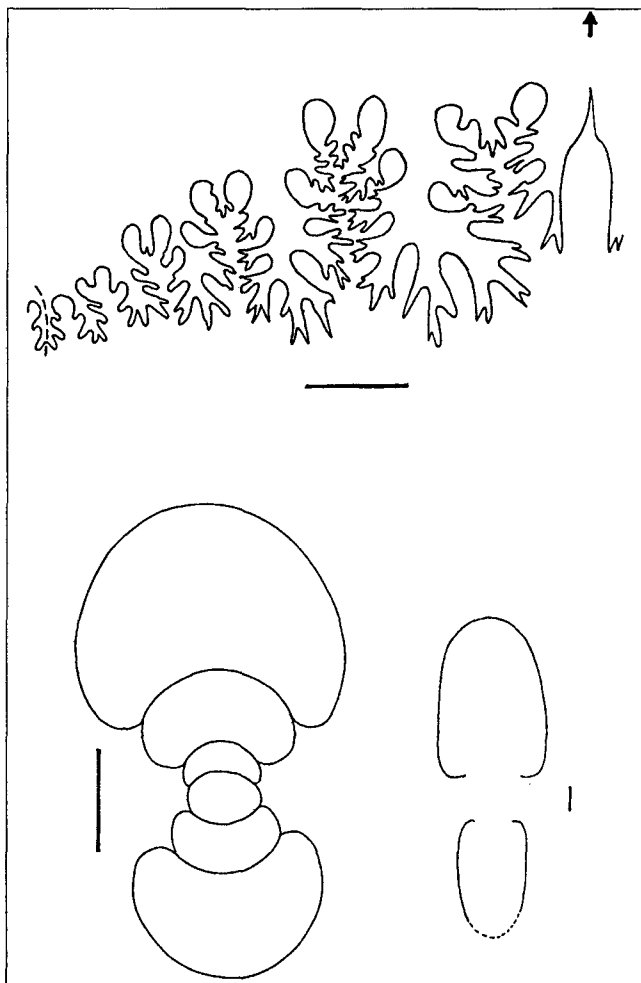
Lytocerataceae NEUMAYR, 1875

Ectocentritidae SPATH, 1926

Lytoconites WIEDMANN, 1970

Lytoconites hierlatzicus (GEYER, 1886)
 Text-Fig. 9

- 1886 *Lytoceras hierlatzicum* nov. sp. – GEYER: 230, Pl. 2, Figs. 10, 11
 1900 *Lytoceras hierlatzicum* (GEYER). – BONARELLI: 68, Pl. 8, Fig. 11
 1970 *Lytoconites hierlatzicus* (GEYER) – WIEDMANN: 1006, Text-Fig. 9c, 30F, Pl. 7, Fig. 3
 1994 "*Lytoceras*" cf. *hierlatzicum* GEYER, 1886 – DOMMERGUES et al.: 24, Pl. 2, Fig. 5



Text-Fig. 8
Partschiceras striatocostatum (MENECHINI), cross section of juvenile and subadult stage and suture line.

Material: one specimen – stone core with partly preserved calcified shell in white limestone

Dimensions:	D	Wh	Ww	O
GEYER 1886, Pl. 2, Fig. 10 = Lectotype	25,6	6,7	8,8	19,0

Remark: This little and serpentine species is characterised first of all by particular triple constrictions on the internal mould (Text-Fig. 9). The first constriction appears in the second whorl and it is simple, prorsiradiate. At the end of the same whorl the simple constriction is followed by a triple constriction. This type of constriction appears regularly each a half of whorl. If the calcified shell is preserved we can see dense, simple, slightly prorsiradiate ribs crossing without interruption the venter.

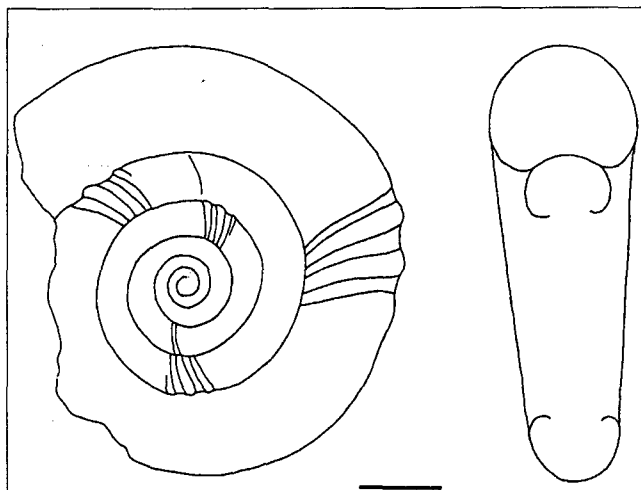
Occurrence: Sinemurian, Semicostatum zone to ? Lotharingian, Oxynotum zone

Adnethiceras WIEDMANN, 1970

Adnethiceras adnethicum (HAUER, 1853)

Text-Fig. 10, Pl. 4, Fig. 2

1854 *Ammonites Adnethicus* HAUER. – HAUER: 101, Pl. 1, Fig. 1–3



Text-Fig. 9
Lytoconites hierlatzicus (GEYER), lateral view and cross section.

1886 *Aegoceras Adnethicum* (v. HAU.). – GEYER: 261, Pl. 4, Fig. 2, 3

1970 *Adnethiceras adnethicum* (HAUER) – WIEDMANN: 998, Text-Fig. 25, 27b, 30K, 30L, Pl. 8, Fig. 1 (cum syn.)

1995 *Adnethiceras adnethicum* (HAUER, 1854) – DOMMERGUES et al.: 171, Pl. 2, Fig. 1, 6

1999 *Adnethiceras adnethicum* (HAUER, 1854) – RAKÚS: in BÖHM et al.: 187, Pl. 28, Fig. 4

Material: one immature specimen from white limestone (GEYER'S collection)

Dimensions:	D	Wh	Wb	O
GBA 1886/2/49=				
GEYER, 1886, Pl. 4, 26, 3		9,0	10,0	11,0

Fig. 3

Remark: In the GEYER'S collection there is a subadult specimen which is very interesting for ontogeny of this species, due to the preservation of its juvenile stage. The juvenile stage (1st or 1 and half of whorl) is smooth, but suddenly the first ribs appear. From the beginning they are prominent, prorsiradiate with minute periventral tubercles/spines. On the 3rd whorl (Text-Fig. 10) also periumbilicale tubercles appear, but they are unclear. In the adult stage they disappear.

Occurrence: Sinemurian (Semicostatum zone) to ? Lotharingian (Oxynotum zone)

Lytoceratidae NEUMAYR, 1875

Audaxlytoceras FUCINI, 1923

Audaxlytoceras serorugatum (STUR m. s. in GEYER, 1886)

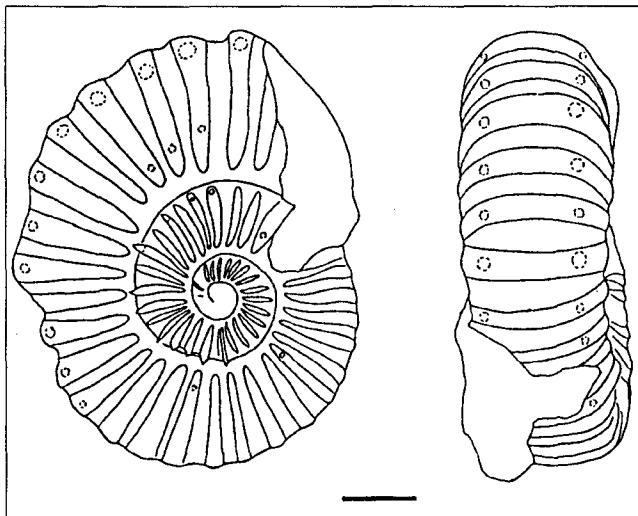
Text-Fig. 11, 12, Pl. 2, Fig. 5, 8

1886 *Lytoceras* nov. sp. indet. (*Lyt. serorugatum* STUR m. s.) – GEYER: 229, Pl. 2, Fig. 7–9

1909 *Lytoceras serorugatum* STUR – ROSENBERG: 251

1973 *Audaxlytoceras serorugatum* (STUR in GEYER, 1886) – FANTINI-SESTINI: 494

non 1901 *Lytoceras serorugatum* STUR – FUCINI: 76, Pl. 12, Fig. 9, 10 = *Audaxlytoceras fucinii* FANTINI-SESTINI, 1973



Text-Fig. 10
Adnethiceras adnethicum (Hauer), lateral and ventral view of sub-adult stage.

Material: three more or less complete specimens from GEYER'S collection

Dimensions:	D	Wh	Wb	O
GEYER 1886, Pl. 2,				
Fig. 7	15,5	4,6	-	5,8
Pl. 2, Fig. 8	16,4	5,0	4,9	6,7
Pl. 2, Fig. 9 =				
Lectotype	28,4	8,6	8,8	13,0

Remark: The juvenile stage is characterised by evolute coiling with oval whorl section. The first prorsiradial constriction appear at the beginning of the 4th whorl. (Text-Fig. 11). Also the whorl section is gradually changing from the oval to the sub rectangular. At the same time the ventrolateral area is covered with fine, slightly sigmoidal ribs. At the end of the 4th whorl, the section of the whorl is rectangular, with tabulate or depressed venter (Text-Fig. 12). The venter of the last preserved whorl (? body chamber) shows relatively coarse slightly prorsiradial ribs, which are curved apically.

Our species is very close to *Audaxlytoceras etruscum* (FUCINI, 1901) from which it differs in apically curved ribs on the venter. The species *Audaxlytoceras varicosum* VENTURI, 1978 has denser and finer ribs.

(Note: the choice and designation of the type species in the Treatise (cf. ARKELL, 1957, L 194, Fig. 224,1) is not correct. It should be replaced by GEYER's figuration from 1886, pl. 2, Fig. 9, which demonstrate whole principal characters of the species).

Occurrence: Sinemurian, Semicostatum zone to ? Lotharingian, Oxynotum zone

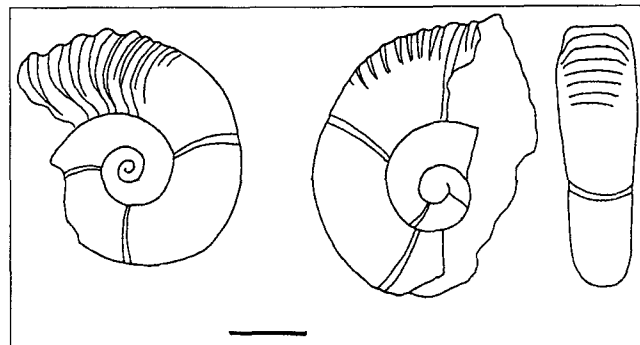
Psilocerataceae HYATT, 1867

Schlotheimiidae SPATH, 1923

Angulaticeras QUENSTEDT, 1883

Angulaticeras angustisulcatum (GEYER, 1886)

1886 *Schlotheimia angustisulcata* nov. spec. – GEYER: 258, Pl. 3, Fig. 24, 25



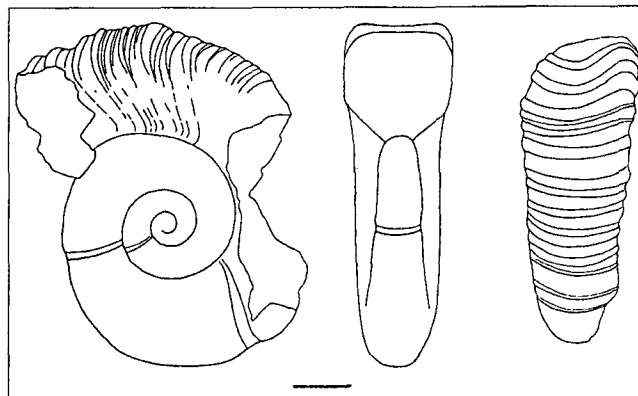
Text-Fig. 11
Audaxlytoceras serorugatum (ŠTÚR m. s. in GEYER), lateral and ventral view of juvenile stage.

Material: 5 more or less complete specimens fossilised in white limestone

Dimensions:	D	Wh	Ww	O
GEYER 1886, Pl. 3,				
Fig. 25=Lectotype	21,0	11,5	6,4	4,0
Pl. 3, Fig. 24	27,4	15,0	-	4,8

Remark: This species is characterised by laterally compressed whorl section with narrow and sulcate venter. The umbilic is small with relatively sharp but rounded umbilical edge. The ornamentation is composed of fine, regular and sigmoidal ribs.

Occurrence: Lotharingian, Oxynotum zone



Text-Fig. 12
Audaxlytoceras serorugatum (ŠTÚR m. s. in GEYER), lateral and ventral view of adult specimen.

ARIETITIDAE HYATT, 1874

Arnioceratinae SPATH, 1924

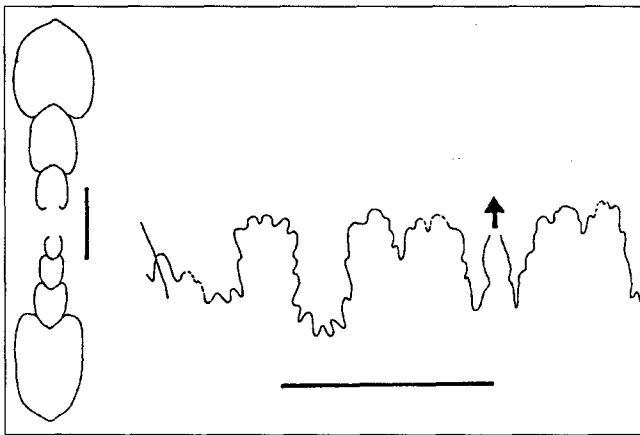
Arnioceras HYATT, 1867

Arnioceras ambiguum (GEYER, 1886)

Text-Fig. 13, Pl. 2, Fig. 1,7

1886 *Arietites ambiguum* nov. spec. – GEYER: 252, Pl. 3, Fig. 11, 12

Material: 13 stone cores more or less complete, fossilised in the white limestone



Text-Fig. 13
Arnioceras ambiguus (GEYER), cross section and suture line.

Dimensions:	D	Wh	Ww.	O
	8,5	4,8	-	3,4
	9,0	3,0	2,6	3,0
	9,4	3,0	2,2	4,0
	10,0	3,0	-	4,3
	11,2	4,4	-	5,3
	13,4	4,3	-	5,8
GEYER 1886, Pl. 3, Fig. 11	15,6	4,3	-	8,0
	16,5	5,0	-	8,0
GEYER 1886, Pl. 3, Fig. 12	26,5	6,0	-	13,8

Remark: This little form is entirely smooth (4 whorls), with oval section of the whorls (Text-Fig. 13). The flanks are slightly parallel. The venter is fastigate with a blunt keel. The suture line (Text-Fig. 13) is slightly dissected with narrow lateral lobe (L). The first lateral saddle S1 is robust and simple with weak incisions. S2 is slender with minute terminal incisions. Both saddles have the same height.

Occurrence: Sinemurian (Semicostatum zone ?) to Lotharingian

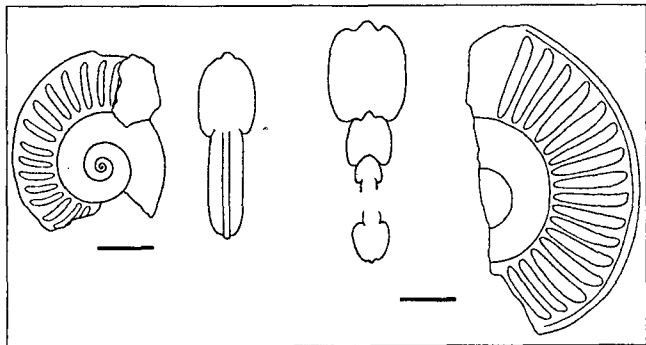
Arnioceras semilaeve (HAUER, 1853)

Text-Fig. 14, 15, Pl. 2, Fig. 3

- 1853 *A. semilaevis* HAU. – HAUER: 753
 1856 *Ammonites multicostatus* SOW. – HAUER: 27, Pl. 7, Fig. 7–10
 1856 *Ammonites difformis* EMMRICH. – HAUER: 29, Pl. 7, Fig. 11–14
 1886 *Arietites semilaevis* (v. HAUER). – GEYER: 249, Pl. 3, Fig. 7, 9
 1902 *Arnioceras semilaeve* (HAUER) – FUCINI: 188, Pl. 24, Fig. 11–13
 1927 *Arnioceras* cf. *semilaeve* HAU. – SCHRÖDER: 166
 1965 *Arnioceras semilaeve* (HAUER, 1853) – BREMER: 135, Pl. 12, Fig. 2 (cum syn.)

Material: three more or less complete phragmocones preserved as stone core and several fragments

Dimensions:	D	Wh	Wb	O
	14,2	4,6	-	7,6
	21,6	6,8	-	10,0

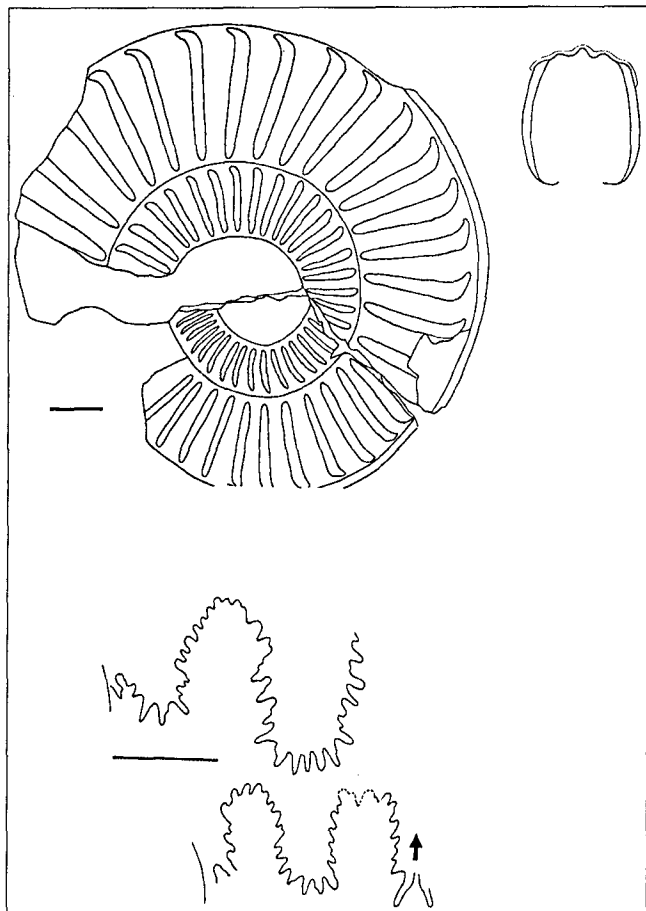


Text-Fig. 14
Arnioceras semilaeve (HAUER), lateral view and cross sections of juvenile and subadult stage

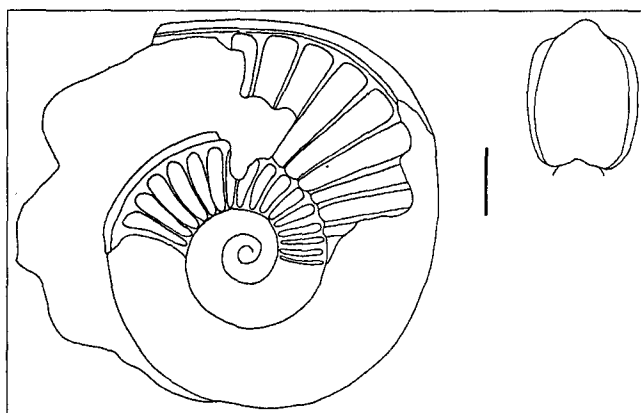
GBA 3037

GEYER, 1886, Pl. 3,
Fig. 7 44,0 13,4 12,0 21,8

Remark: This species is characterised by long (more than 3 and half whorl) smooth stage. The whorl section of this stage is ogival with minute keel, which is gradually accompanied with indistinct furrows. The subadult stage has subrectangular whorl section with bisulcate and tricarinate venter. This type of cross section persist during the entire development (Text-Fig. 14). The first ribs appear at the end of the 4th whorl. They are minute, prorsiradiate and dense. The subadult stage has the strong, prominent, ra-



Text-Fig. 15
Arnioceras semilaeve (HAUER), lateral view, cross section and suture line.



Text-Fig. 16
Arnioceras sp., lateral view and cross section.

diate to rursiradiate ribs with short peristomal projection. The intercalar spacing is double the width of ribs. If the shell is preserved the ribs are robust and intercalar spaces are minute. The suture line (Text-Fig. 15) has relatively narrow external lobe (E) and the lateral saddles S1 and S2 are at the same height.

A. semilaeve (HAU.) is relatively common species in the Hierlatz locality. Our species is close to the group of *Arnioceras semicostatum* (Y. & B.), which is divided into numerous species (see FUCINI, 1902), especially in the Mediterranean region. We note that reliable distinction of them is confused.

Occurrence: Sinemurian, Semicostatum zone

***Arnioceras* sp.**

Text-Fig. 16, Pl. 2, Fig. 12

1886 *Arietites semilaevis* (v. HAU.). – GEYER: 249, Pl. 3, Fig. 8 only!

Material: two more or less complete specimens preserved in the pink limestone and one fragment

Dimensions:	D	Wh	Wb	O
	13,0	5,0	3,0	7,3
	28,6	9,5	-	11,5
GEYER, 1886, Pl. 2, Fig. 8	24,8	8,6	7,0	9,8

Remark: The species is characterised by a long (3 whorls) smooth stage, followed by costate stage. The ribs appear suddenly at the end of the 3rd whorl. Rapidly they get prominent but not sharp. The ribs are slightly rursiradiate, cuneiform and “shouldered” on the venter. The intercostal spaces are clearly narrower as the width of ribs (Text-Fig. 16). The keel is large and blunt accompanied with minute grows. The suture line is unknown. This species is similar to *A. semilaeve* (HAU.) from which it differs in robust ribs.

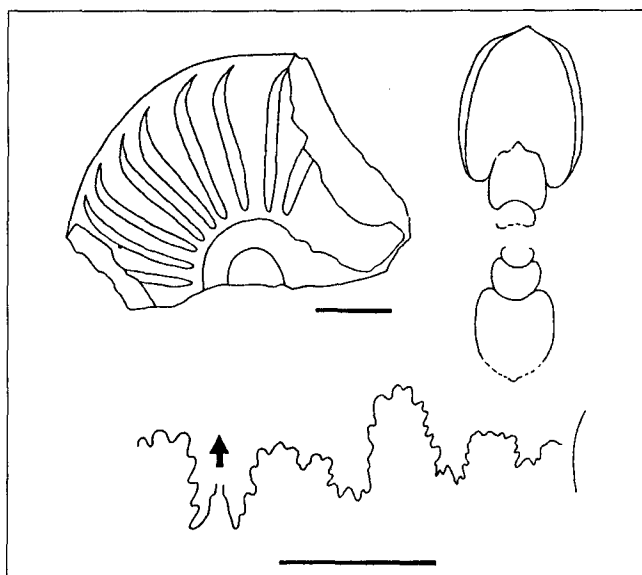
Occurrence: Sinemurian, Semicostatum zone

Asteroceratinae SPATH, 1946

***Asteroceras* HYATT, 1867**

***Asteroceras* sp. juv.**

Text-Fig. 17, Pl. 2, Fig. 9



Text-Fig. 17
Asteroceras sp. juv., Lateral view, cross section and suture line.

Material: two fragments of the whorls

Remark: In the GEYER's collection there are two fragments which GEYER ranged to species *A. stellare* (SOW.). Because our material is represented only by uncomplete and juvenile specimens the specific determination is uncertain. In their whorl section as well as in the suture line (Text-Fig. 17) our specimens seem to be close to the species *A. stellare* (SOW.).

Occurrence: Lotharingian, Obtusum zone

Oxynoticeratidae HYATT, 1875

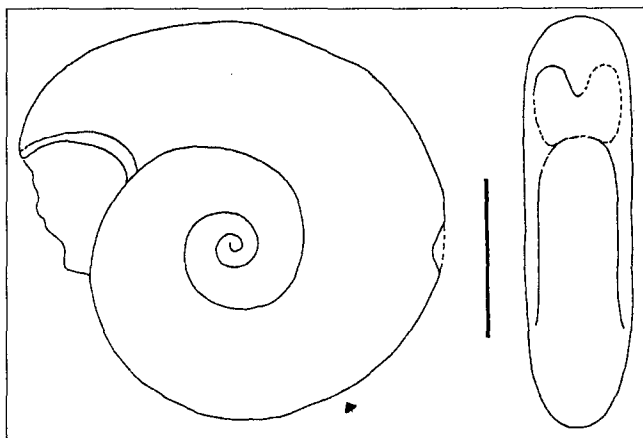
Cymbitinae BUCKMAN, 1919

***Cymbites* NEUMAYR, 1878**

***Cymbites laevigatus* (SOWERBY, 1827)**

Text-Fig. 18, Pl. 5, Fig. 9

1827 *Ammonites laevigatus* J. De SOWERBY: 570, Pl. 570, Fig. 3



Text-Fig. 18
Cymbites laevigatus (SOWERBY), lateral and peristomal view.

1886 *Cymbites globosus* (SCHÜBLER). – GEYER: 257, Pl. 3, Fig. 26

1961 *Cymbites laevigatus* (J. De Sow.) – SCHINDEWOLF: 208, Text-Fig. 11, 12, Pl. 29, Fig. 17, Pl. 30, Fig. 1–7 (cum syn.)

Material: one complete specimen with peristome, preserved in white limestone

Dimensions:	D	Wh	Wb	O
	12,4	3,8	3,0	5,4

Remark: This little and smooth form of micromorphic character is characterised by laterally compressed whorl section and eccentric coiling of the last whorl (Text-Fig. 18). The peristome is simple, retracted with ventral rostrum. The suture line is unsatisfactorily preserved.

From Hierlatz GEYER (1886) mentioned the *C. globosus* (SCHÜBLER) which after our opinion should be ranged rather to species *C. laevigatus* (Sow.) as to *C. globosus* (ZIET.)

Occurrence: This long ranged species occurs from Lotharingian (Turneri zone) up to Lower Domerian (Margaritatus zone)

Paracymbites TREUMAN & WILLIAMS, 1927

Paracymbites gr. *dennyi* (SIMPSON, 1843)

Text-Fig. 19, Pl. 3, Fig. 8

1843 *Ammonites Dennyi* SIMPSON 1843: 9

1886 *Oxynotoceras* sp. *indet.* – GEYER: 238, Pl. 2, Fig. 22

1966 *Paracymbites denneyi* (SIMPSON) – DONOVAN: 315, Text-Fig. 2, Pl. 53, Fig. 5–12 (cum syn.)

Material: one complete specimen with peristome partly preserved in white limestone and one juvenile stage

Dimensions:	D	Wh	Wb	O
	9,6	5,0	4,4	-
GEYER, 1886,	15,2	8,3	5,0	2,0
Pl. 2, Fig. 22				

Remark: For this small species of micromorphic appearance is typical convolute coiling, laterally compressed whorl section and blunt convex ribs (Text-Fig. 19). The cross section has "oxynoticeratitic" shape with blunt keel on the body chamber. On the flanks of the body chamber there are distant, convex and weak ribs. The peristome is simple and seems to lack the rostrum. The suture line (Text-Fig. 19) has relatively large external lobe with moderately dissected lateral saddles.

Occurrence: Lotharingian, Oxynotum zone up to lower part of Raricostatum zone

Oxynotoceras HYATT, 1875

Oxynotoceras hierlatzicum PIA, 1914

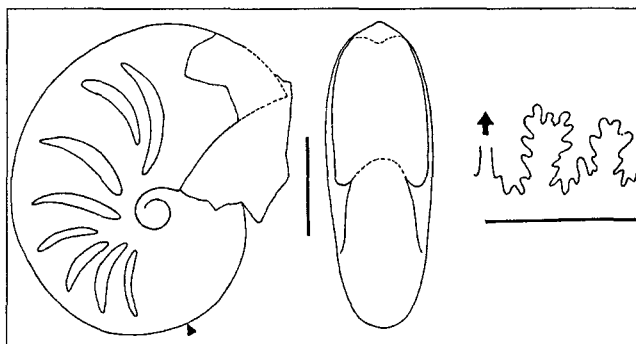
Text-Fig. 20, 21, 22, Pl. 3, Fig. 1, 2, 4, 6, 9

1886 *Oxynotoceras oxynotum* (QUENSTEDT). – GEYER: 231, Pl. 2, Fig. 12–15 (not Pl. 4, Fig. 24)

1914 *Oxynotoceras oxynotum* QUENST. spec. var. *Hierlatzica* nov. var. – PIA: 26–29 (cum syn.)

Material: more than 42 partly preserved specimens in white but also in red biomicritic limestone

Dimensions:	D	WH	Wb	O
	11,3	4,8	3,3	1,7



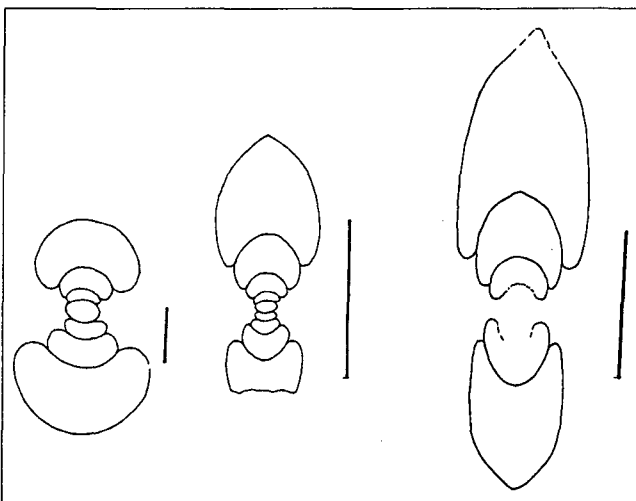
Text-Fig. 19

Paracymbites gr. *dennyi* (SOWERBY), lateral, peristomal view and suture line.

12,0	6,4	3,6	2,4
14,0	6,5	4,2	3,0
14,5	6,5	-	2,0
15,4	6,8	4,3	4,0
16,6	8,0	4,4	4,0
18,2	9,0	3,6	4,8
19,5	9,0	-	4,6
19,8	10,0	-	4,0
24,5	11,0	-	3,0
26,0	13,0	6,0	4,6
33,0	18,0	-	4,6
41,3	21,4	-	6,0
73,6	38,6	14,0	10,0

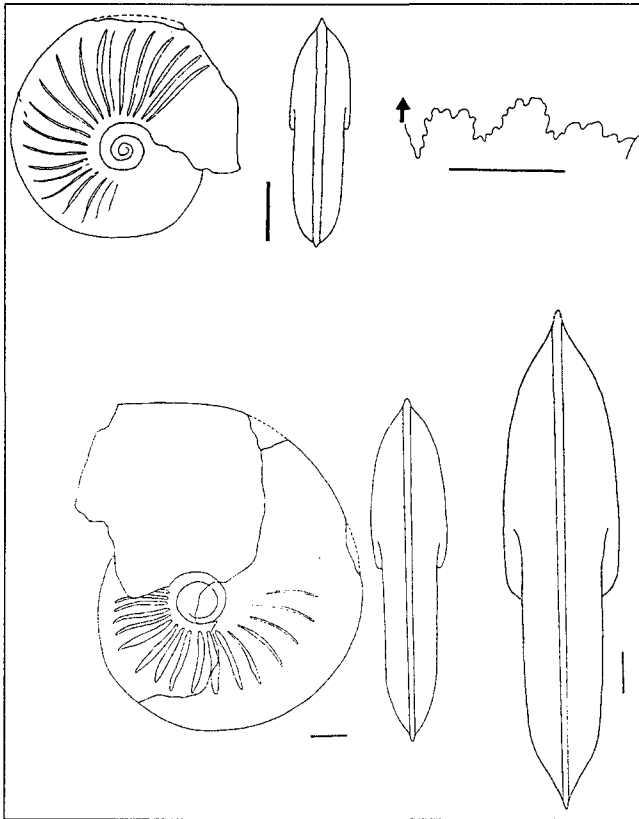
Remark: The juvenile stage (Text-Fig. 20) has depressed whorl section but from the 3rd whorl the height of the whorl is greater as width. The flanks are vaulted and ventrum is keeled but keel is not yet clearly separated. The subadult stage (Text-Fig. 21) has typically oxynoticeratitic shape with acute keel and subparallel flanks. The ornamentation is composed of fine, radiate or prorsiradiate slightly sigmoidal ribs which are developed only on the flanks (Text-Fig. 21). Their ventral projection is very short incomparable with those on the true species *oxynotum*. The suture line (Text-Fig. 21, 22) is typically oxynoticeratitic in shape with large external lobe and pyramidal S2.

From the species *Oxynotoceras oxynotum* QUENSTEDT our



Text-Fig. 20

Oxynotoceras hierlatzicum PIA, cross sections of juvenile and subadult stages.



Text-Fig. 21
Oxynoticeras hierlatzicum PIA, cross section, ventral view and suture line.

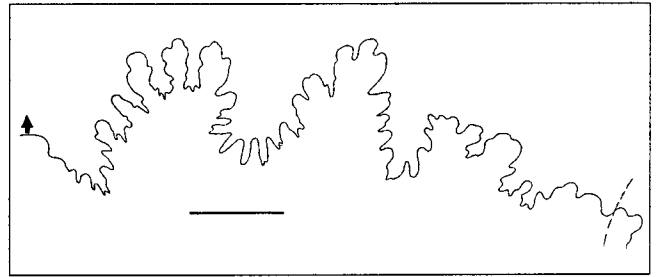
species was distinguished by PIA (1914) as a new variety. Although the species *Ox. hierlatzicum* is close to nominal species it still differs from it in a narrower umbilicus of subadult stages and less prominent ribs.

Occurrence: Lotharingian, Oxynotum zone

***Oxynoticeras collenoti* (D'ORBIGNY, 1844)**
Text-Fig. 23, Pl. 3, Fig. 10

1844 *Ammonites Collenoti* D'ORBIGNY, 1844. – D'ORBIGNY: 306, Pl. 95, Fig. 6–9

1886 *Oxynoticeras* cf. *Collenoti* D'ORB. – GEYER: 235, Pl. 2, Fig. 19, 20



Text-Fig. 22
Oxynoticeras hierlatzicum PIA, suture line of a subadult specimen.

1914 *Oxynoticeras Collenoti* ORB. spec. – PIA: 43

1994 *Oxynoticeras collenoti* (D'ORBIGNY, 1844) – GUÉRIN-FRANATTE in FISCHER: 85, Pl. 17, Fig. 3, 4

Material: two incomplete specimens fossilised in white limestone

Remark: This species is characterised first of all by more evolute coiling as well as by dense and prominent ribs. The whorl section of the subadult stage is lanceolate, laterally compressed with sharp keel (Text-Fig. 23). The ornamentation is composed of dense, regular slightly prorsiradial ribs with weak ventrolateral projection. The suture line (Text-Fig. 23) is relatively simple with little external lobe. The first lateral saddle S1 is smaller than S2.

Occurrence: Lotharingian, Oxynotum zone

***Oxynoticeras* aff. *scalpellum* PIA, 1914**

Text-Fig. 24, Pl. 3, Fig. 5,7

1886 *Oxynoticeras oxynotum* (QUENSTEDT). – GEYER: 321, Pl. 4, Fig. 24 (only!)

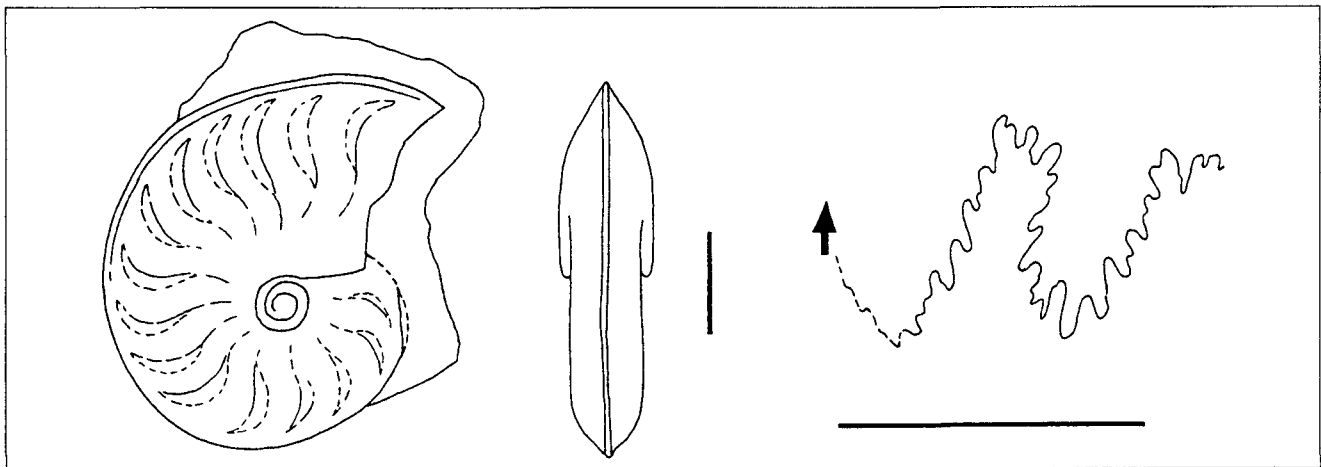
Material: one specimen (phragmocone) fossilised in the white limestone

Dimensions:	D	Wh	Wb	O
GBA 1886/2/19=				
GEYER, 1886,	18,0	10,4	4,8	1,4
Pl. 4, Fig. 24				

Remark: The GEYER'S collection comprises one specimen which was by GEYER referred to species *Ox. oxynotum*. This little specimen has lanceolate whorl section with pa-



Text-Fig. 23
Oxynoticeras collenoti (D'ORBIGNY), lateral view, cross section and suture line



Text-Fig. 24
Oxynoticeras aff. *scalpellum* PIA, lateral, ventral view and suture line.

parallel flanks, rounded umbilical edge and a sharp but not detached keel (Text-Fig. 24). On the flanks we observe at oblique illumination the fine indistinct and sigmoidal ribs. The suture line (Text-Fig. 24) is characterised by large external lobe and slender, oblique first lateral saddle S₁. Our species is very close to *Ox. scalpellum* PIA but at same diameter it has sigmoidal ribs.

Occurrence: Lotharingian, Oxynotum zone (together with *Microderoceras* sp.)

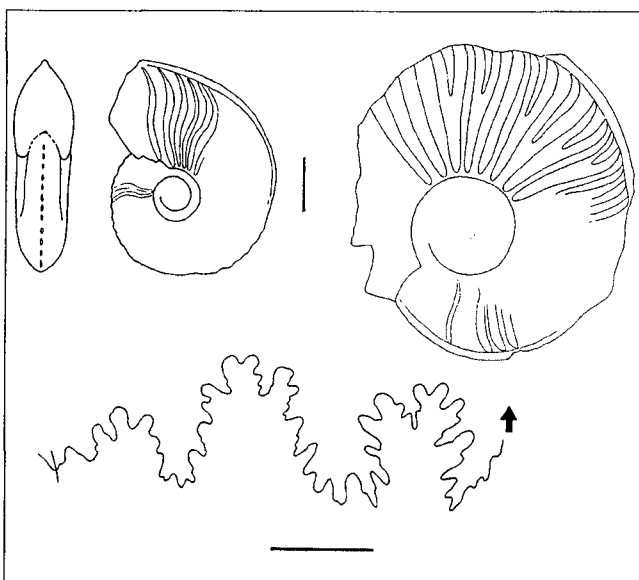
***Gleviceras* BUCKMAN, 1918**

***Gleviceras lotharingiforme* (PIA, 1914)**

Text-Fig. 25, Pl. 3, Fig. 11

1886 *Oxynoticeras Guibalianum* (D'ORB.). – GEYER: 233, Pl. 2, Fig. 18 (only)

1914 *Oxynoticeras lotharingiforme* nov. nom. – PIA: 24, 39, Pl. 3, Fig. 3, Pl. 6, Fig. 13, Pl. 9., Fig. 4



Text-Fig. 25
Gleviceras lotharingiforme (PIA), peristomal, lateral views and suture line.

? 1886 *Oxynoticeras* nov. sp. indet. – GEYER: 238, Pl. 4, Fig. 25

Material: 6 incomplete specimens preserved as stone core in white limestone

Dimensions:	D	Wh	Ww	O
	8,0	3,5	3,0	2,0
	22,0	14,0	8,0	5,9

GEYER 1886, Pl. 2, Fig. 18	31,6 46,0	13,6 22,0	- 10,8	8,0 10,3
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Remark: The juvenile stage is convolute with lanceolate cross section and fine sigmoidal growth lines. The ventrum of the subadult stage (Text-Fig. 25) shows a crenulation which is replaced by a true keel. The cross section is lanceolate with indications of "shoulders" at the passage to the flanks. The ribs are well developed but not prominent. They are slightly sigmoidal, simple and bifurcated (Text-Fig. 25). The suture line (Text-Fig. 25) has relatively narrow external lobe (E). The first lateral saddle S₁ is lesser than S₂.

Occurrence: Lotharingian Oxynotum zone

? *Gleviceras geyeri* n. sp.

Text-Fig. 26, Pl. 4, Fig. 1

1886 *Arietites* ? nov. sp. indet. – GEYER: 253, Pl. 3, Fig. 13

Derivatio nominis: after G. GEYER Austrian outstanding ammonitologist, specialist in ammonites from Hierlatz

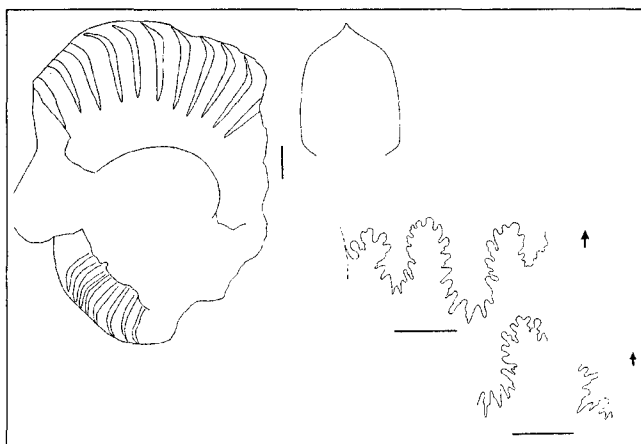
Locus et stratum typicum: Hierlatz locality in the Dachstein region, Northern Calcareous Alps, Lotharingian

Lectotype: designated herein is a specimen depicted by Geyer 1886, Pl. 3, Fig. 13, deposited in GBA collection num. 1886/2/36 and refigured on the Pl. 4, Fig. 1.

Material: one uncompleted specimen (phragmocone) fossilised in the white limestone

Dimensions:	D	Wh	Ww	O
GEYER 1886, Pl. 3, Fig. 13 = Lectotype	49,4	20,0	15,0	13,0

Remark: This species was formerly ranged by GEYER to the *Arietites* with ?. The new species has convolute coiling



Text-Fig. 26

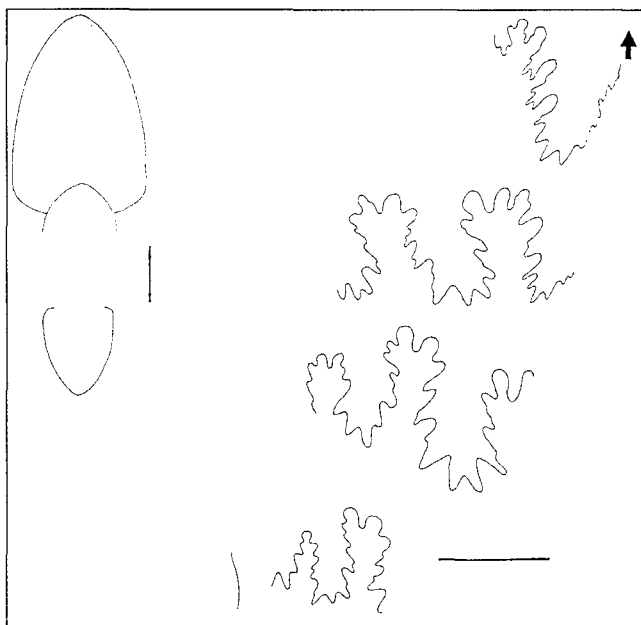
?*Gleviceras geyeri* n. sp., Lateral view, cross section and suture line.

with "subrectangular" whorl section (Text-Fig. 26). The flanks are slightly vaulted and gently convergent toward the ventrum. The ventrum is fastigate with acute keel. The ornamentation is composed by radiate to slightly sigmoidal ribs which are prominent only in the second half of height of the whorl. On the passage of the flanks to the ventrum they are curving forwards and rapidly reduced.

The suture line (Text-Fig. 26) is observable only partly. The external lobe is unknown. The first lateral saddle S_1 is large and bifid. The second lateral saddle S_2 has the same height as the first one but it is slender.

The type of venter, the ribbing as well as the suture line indicate that this new species is morphologically closer to the group of Oxynoticeratids, especially to *Gleviceras* than to the Arietitids. In contrast to *Gleviceras* our species is more evolute and its whorl section is characterised by flat flanks, slightly convergent towards the venter. The subadult stage shows a type of ornamentation which is similar to that of Harpoceratinae. It is not excluded that this new species could be the ancestor of the Harpoceratinae.

Occurrence: Lotharingian, Oxynotum zone



Text-Fig. 27

Gleviceras sp. cross section and suture line

Gleviceras sp.

Text-Fig. 27, Pl. 3, Fig. 3

1886 *Oxynoticerias* sp. nov. indet. – GEYER: 238, Pl. 3, Fig. 13

Material: one incomplete specimen

Dimensions:	D	Wh	Wb	O
GBA1886/2/22	37,0	18,0	11,8	8,0
= GEYER, 1886				
Pl. 3, Fig. 13				

Remark: The systematic position of this specimen is rather unclear but is no doubt that it must be ranged to *Gleviceras*. The whorl section (Text-Fig. 27) has "lanceolate" shape but without the sharp keel. The flanks are slightly vaulted with maximum width near the umbilic. The umbilical wall is oblique. On the flanks there are weak, slightly sigmoidal ribs. The suture line (Text-Fig. 27) has oxynoticeratitic shape.

Occurrence: Lotharingian, Oxynotum zone

Echioceratidae BUCKMAN, 1913

Gagaticeras BUCKMAN, 1913

Gagaticeras sp.

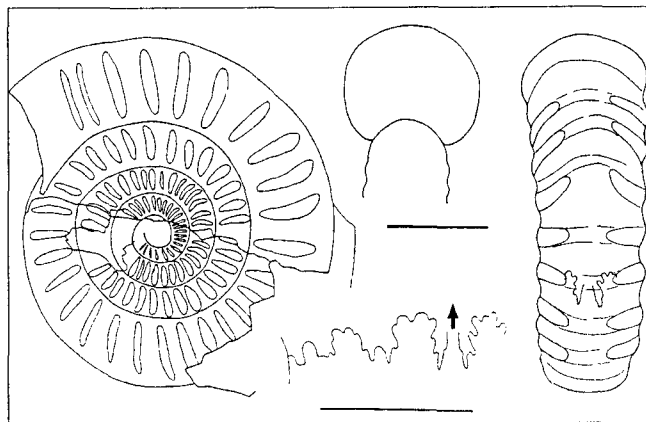
Text-Fig. 28, Pl. 2, Fig. 4

1886 *Arietites raricostatus* (ZIET.). – GEYER: 248, Pl. 3, Fig. 5
(non Fig. 4 = *Paltechioceras* sp. juv.)

Material: one incomplete specimen fossilised in the white limestone

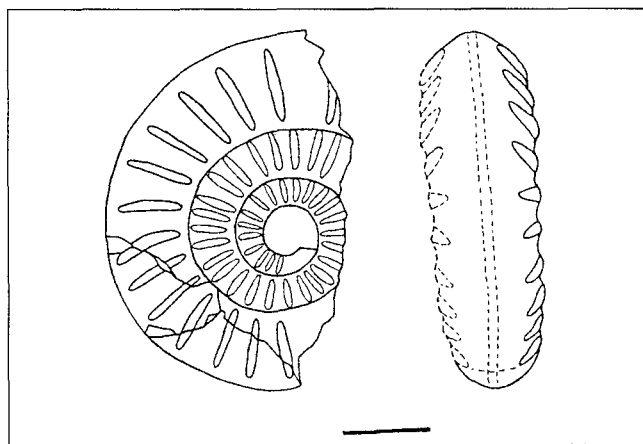
Dimensions:	D	Wh	Ww	O
GEYER 1886, Pl. 3, Fig. 4	20,0	6,0	6,4	10,0

Remark: In the GEYER'S collection there is a small specimen which was originally labelled by Geyer as *Arietites raricostatus* (ZIET.). This subadult specimen has depressed whorl section (Text-Fig. 28). The ribs are rursiradiate/prorsiradiate well developed only on the flanks. They cross the venter, but they are clearly weaker. The suture line (Text-Fig. 28) is difficult to interpret in spite of their early ontogenetic state. The first lateral saddle S_1 slightly incised and S_2 is a little oblique. External lobe is shallow.



Text-Fig. 28

Gagaticeras sp., lateral, ventral view and suture line.



Text-Fig. 29
Gagaticeras gr. *neglectum* (SIMPSON), lateral and ventral view.

Occurrence: Lotharingian, Oxynotum/Raricostatum zone

***Gagaticeras* gr. *neglectum* (SIMPSON, 1855)**

Text-Fig. 29, Pl. 5, Fig. 3

1886 *Arietites raricostatus* (ZIET.) – GEYER: 248, Pl. 3, Fig. 5

Material: one incomplete specimen in the white limestone

Dimensions:	D	Wh	Wb	O
GBA 1886/2/31=	20,4	5,8	6,0	9,6
GEYER, 1886, Pl. 3, Fig. 5				

Remark: The type and placement of the ribs indicate that this specimen should be ranged to the *Gagaticeras gageatum/neglectum* group (Text-Fig. 29). Originally this specimen was ranged by GEYER to *Echioceras raricostatum*. It is sure that thrust-worth distinction of the young stages of both genera is very difficult, but we prefer to range our specimen to the *Gagaticeras*.

Occurrence: Lotharingian, Oxynotum/Raricostatum zone.

***Echioceras* BAYLE, 1878**

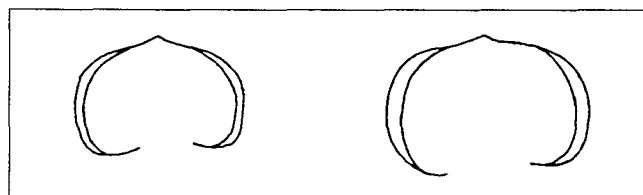
***Echioceras* gr. *raricostatum* (ZIETEN, 1830)**

Text-Fig. 30, Pl. 2, Fig. 2

Material: one partly preserved subadult specimen in the pink limestone

Dimensions:	D	Wh	Wb	O
	24,0	6,8	8,0	11,0

Remark: In the non-registered Hierlatz material at GBA we found a subadult specimen which by its whorl section (Text-



Text-Fig. 30
Echioceras gr. *raricostatum* (ZIETEN), cross sections.

Fig. 30), coiling and type of ribs is close to *Echioceras raricostatum* (ZIET.). This species was mentioned from Hierlatz by GEYER long ago, but we must note that GEYER's designation was partly inexact (e.g. one of them cf. GEYER 1886, Pl. 3, Fig. 5 must be placed to *Gagaticeras*).

Occurrence: Lotharingian, Raricostatum zone

***Plesechioceras* BUCKMAN, 1924**

***Plesechioceras doricum* (SAVI and MENEGHINI, 1851)**

Text-Fig. 31, Pl. 2, Fig. 11

1851 *A. doricus* nob. (arietes) – SAVI and MENEGHINI: 348

1886 *Arietites doricus* (SAVI u. MENEGH.). – GEYER: 247, Pl. 3, Fig. 3

1888 *Arietites doricus* SAVI et MGH. – CANAVARI: 181, Pl. 6, Fig. 8–10 (the first figuration)

Material: six specimens fossilised in the reddish limestone and one fossilised in white limestone

Dimensions	D	Wh	Wb	O
	14,4	5,0	4,8	6,6
	23,0	5,4	5,2	12,4
GBA 1886/2/30=	25,8		7,3	6,4
GEYER, 1886, Pl. 3, Fig. 3	26,8	7,8	6,3	14,8
	29,0	9,0	-	16,8

Remark: The juvenile stage is characterised by short (1/2 whorl approx.) smooth stage. At the end of the 1st whorl appear the fine, dense, prorsiradiate ribs on the flanks (Text-Fig. 31). This type of ribbing persists up to the adult stage. The cross section is oval with slightly vaulted flanks (Text-Fig. 31). The ventrum is flat with blunt keel without furrows. Sometime we observe there minute bands, but never the furrows.

The suture line (Text-Fig. 31) is characterised by deep external lobe and robust first lateral saddle S_1 and slender S_2 . Both lateral saddles have approximately the same height. After our opinion the specimen depicted by GEYER (1886, Pl. 3, Fig. 16) as *Arietites* sp. ind. aff. *nodotianum* D'ORB. belongs to our species, too. We would emphasise that the distinction of the species *P. pierrei* (SPATH, 1956) and *P. delicatum* (BUCKMAN, 1914) from the species *doricum* is very delicate.

Occurrence: Lotharingian, Oxynotum zone

***Paltechioceras* BUCKMAN, 1924**

***Paltechioceras hierlatzicum* (HAUER, 1856)**

Text-Fig. 32, Pl. 2, Fig. 10

1853 *A. Hierlatzicus* HAU. – HAUER: 754

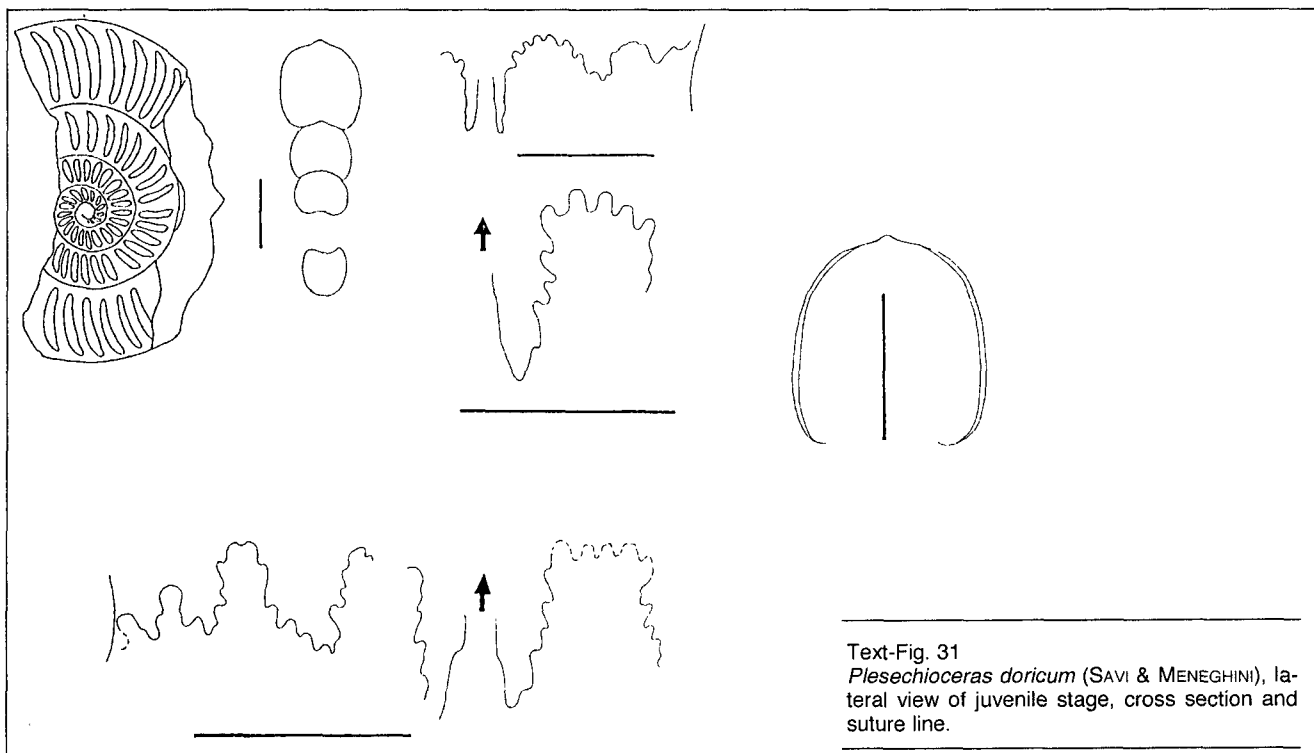
1856 *Ammonites Hierlatzicus* HAU. – HAUER: 28, Pl. 7, Fig. 4–6

1886 *Arietites Hierlatzicus* (v. HAUER). – GEYER: 246, Pl. 3, Fig. 1, 2

1902 *Vermiceras hierlatzicum* HAUER. – FUCINI: 145, Pl. 17, Fig. 10, 11

1965 *Paltechioceras* cf. *hierlatzicum* (HAUER, 1856) – BREMER: 144, Pl. 13, Fig. 3

Lectotype: depicted by HAUER, 1856, Pl. 7, Fig. 4–6, SD GETTY, 1973



Text-Fig. 31
Plesechioceras doricum (SAVI & MENECHINI), lateral view of juvenile stage, cross section and suture line.

Material: twentyfour partly preserved specimens in the white limestone

Dimensions:	D	Wh	Ww	O
	10,8	3,0	3,7	5,4
	11,3	3,8	3,8	5,8
	12,4	4,4	4,0	6,0
	12,8	4,2	3,8	5,6
	17,0	4,8	-	8,0
	18,3	5,0	-	9,3

GBA 1856/01/14

= HAUER, 1856,

Pl. 7, Fig. 4–6

R/2 D = 5,0/15, D = 9,8/22, D = 24,8/21

24,8	7,0	6,5	9,8
31,6	8,0	-	17,0

Remark: The juvenile stage has 1 and half of the whorl smooth. After the fine, dense and prorsiradial ribs appear. In the subadult stage they are slightly sigmoidal with very short ventral projection. The cross section is subrectangular fasti-

gate with keel, accompanied with shallow furrows (Text-Fig. 32). The advanced subadult stage has cross section more or less oval with narrower venter and it is tricarinate/bisulcate. The suture line (Text-Fig. 32) is typically echioceratitic with narrow external lobe. The first lateral saddle S_1 has "subrectangular" shape and it is robuster than S_2 .

We note that the juvenile/subadult stages of our species are very similar to *Plesechioceras doricum*.

Occurrence: Lotharingian, Oxynotum zone

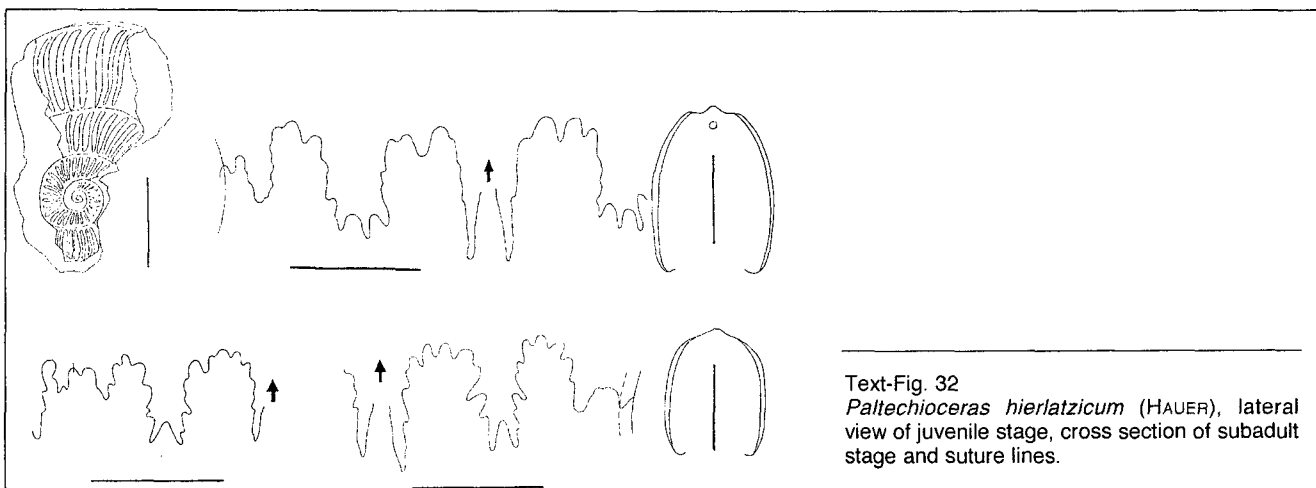
Tmaegophioceras SPATH, 1925

Tmaegophioceras laevis (STUR m. s. in GEYER, 1886)

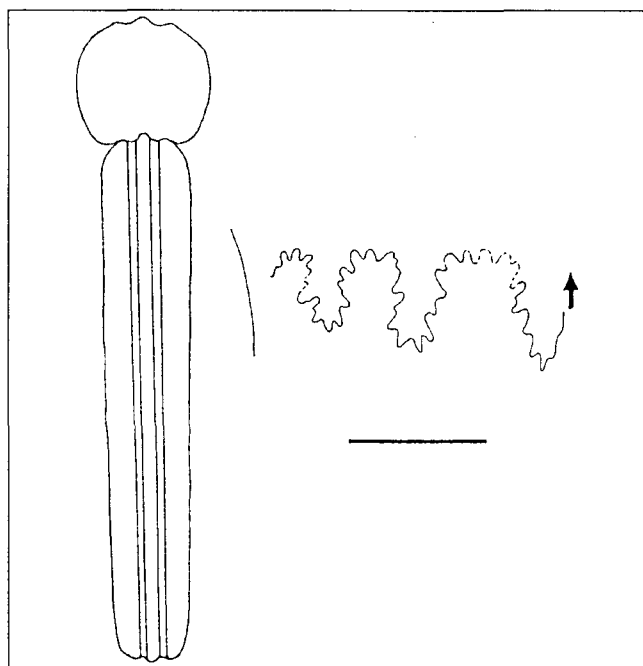
Text-Fig. 33, Pl. 2, Fig. 6

1886 *Arietites laevis* STUR m. s. – GEYER: 252, Pl. 3, Fig. 10
1973 *Tmaegophioceras laevis* GEYER – GETTY: 25

Material: two more or less complete stone cores



Text-Fig. 32
Paltechioceras hierlatzicum (HAUER), lateral view of juvenile stage, cross section of subadult stage and suture lines.



Text-Fig. 33
Tmaegophioceras laevis (ŠTÚR m. s. in GEYER), peristomal view, cross section and suture line.

Dimensions:	D	Wh	Ww	O
	16,6	4,8	4,0	8,3
GEYER 1886, Pl. 3, Fig. 10 = Lectotype	46,0	9,8	9,4	29,0
cf. GETTY, 1973: 25				

Remarks: This particular species of Echioceratids is characterised by very evolute – serpenticone coiling. The whorl section (Text-Fig. 33) is “subquadrate” with flat tricarbonate/bisulcate venter. Scarcely indicated ribs are spaced and situated only on the flanks.

Suture line: (Text-Fig. 33) is characterised by little incised saddles which have the same height.

Occurrence: ? Sinemurian – Lotharingian

Eoderocerataceae SPATH, 1929

Eoderoceratidae SPATH, 1929

Xiphoceratinae SPATH, 1925

Bifericeras BUCKMAN, 1913

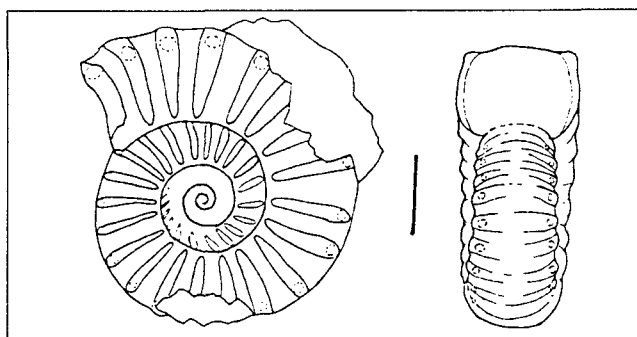
Bifericeras cf. *subplanicosta* (OPPEL, 1856)

Text-Fig. 34, Pl. 2, Fig. 2

Material: 5 more or less complete specimens preserved in the white limestone

Dimensions:	D	Wh	Wb	O
	6,6	2,2	3,0	2,0
	7,4	3,0	3,2	2,8
	8,4	3,0	3,0	2,6
	10,0	3,8	4,0	4,4
	19,3	6,4	7,2	8,0

Remark: This species was originally ranged by GEYER (1886:



Text-Fig. 34
Bifericeras cf. *subplanicosta* (OPPEL), lateral and peristomal view.

260, Pl. 3, Fig. 18, 19) to species *B. bifer* (QU.). The whorl section (Text-Fig. 34) as well as the presence of only one row of ventrolateral tubercles shows that this specimen is closer to species *Bifericeras subplanicosta* (OPPEL, 1856). In contrast of species *subplanicosta* our species has ribs less prominent on the venter.

Occurrence: Lotharingian

Eoderoceratinae SPATH, 1929

Eoderoceras SPATH, 1925

Eoderoceras gr. *milles* (SIMPSON, 1855)

Pl. 4, Fig. 5

Material: two partly preserved specimens from pink limestone. One of them was depicted by GEYER in 1886

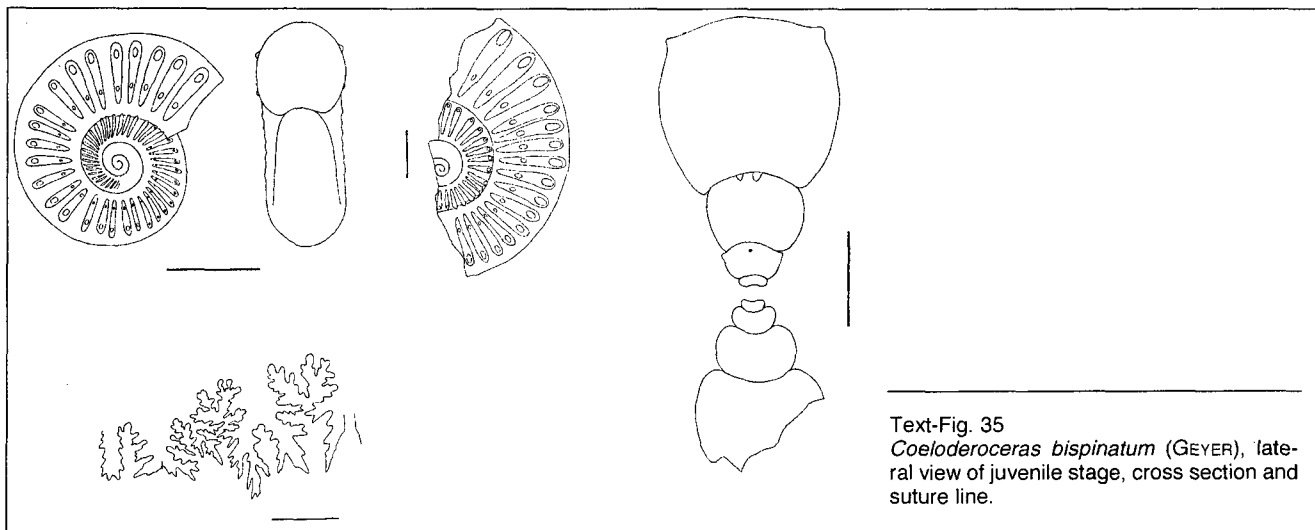
Dimensions:	D	Wh	Wb	O
GEYER, 1886, Pl. 4, Fig. 20	45,0	13,0	16,2	23,0

Remark: In the depository of GBA there is a specimen which corresponds well to HAUER's figuration (cf. Pl. 4, Fig. 20). Unfortunately the preservation is mediocre but we can see the spaced, blunt prorsiradiate ribs with one row of ventrolateral tubercles on the flanks. The principal ribs do not cross the venter. Beside the principal ribs there are also fine ribs which are present also on the venter. The poorly preserved suture line shows very dissected lateral saddles. Our species is close to *E. postarmatum* HOFFMANN, 1950 and its mutual distinction is delicate.

Occurrence: Lotharingian, probably Raricostatum zone.

Coeloderoceras SPATH, 1923

Note: In present ammonite literature there are rather controversial points of views concerning the systematic of the family Eoderoceratidae. This situation results first of all from the fact that our knowledge about ontogeny of individual taxa ranged here is still unsatisfactory. On the other hand the homeomorphic phenomena do not make easier this situation, either. The reliable distinction of the genera is illusory without any knowledge of their individual ontogeny (e. g. *Microderoceras*/*Coeloderoceras*, *Epideroceras*/*Villania* etc.).



Text-Fig. 35
Coeloderoceras bispinatum (GEYER), lateral view of juvenile stage, cross section and suture line.

***Coeloderoceras bispinatum* (GEYER, 1886)**

Text-Fig. 35, Pl. 4, Fig. 4

1886 *Aegoceras bispinatum* nov. spec. – GEYER: 266, Pl. 4, Fig. 4–13

Material: more than twenty specimens (phragmocons) and fragments in the white limestone

Dimensions:	D	Wh	Wb	O
	8,4	3,6	5,6	2,4
	8,7	3,8	5,6	3,0
	9,8	4,0	-	3,4
	10,0	4,0	5,5	4,0
	16,2	6,0	6,8	5,0
	17,6	5,4	8,4	8,0
	20,0	7,0	8,8	8,0
	20,0	7,0	8,8	8,6
	21,6	8,2	8,0	9,4
	24,0	9,6	9,6	10,6

Remark: The measurements show that our specimens are only subadult stages. The juvenile stage has depressed – cadicone whorl section (Text-Fig. 35). This type of section is approximately 3 and a half or 4 whorls. Then the cross section is sub-circular to oval during the whole ontogeny. The first ribs rise up from the second whorl and they are prorsiradial (Text-Fig. 35). The first row of ventrolateral tubercles appears from the beginning of the 3rd whorl. The periumbilical row appears a little later but the 4th whorl is bituberculate. At the subadult stage the tubercles/spines are separate. This bituberculation persists up to the adult stage (cf. GEYER, 1886, Pl. 4, Fig. 15). The suture line (Text-Fig. 35) has typical “xiphaeroceratic” shape with very deep incisions.

Occurrence: Lotharingian, Oxynotum zone

***Miltoceras* WIEDENMAYER, 1980**

? *Miltoceras* sp.

Text-Fig. 42, Pl. 5, Fig. 10

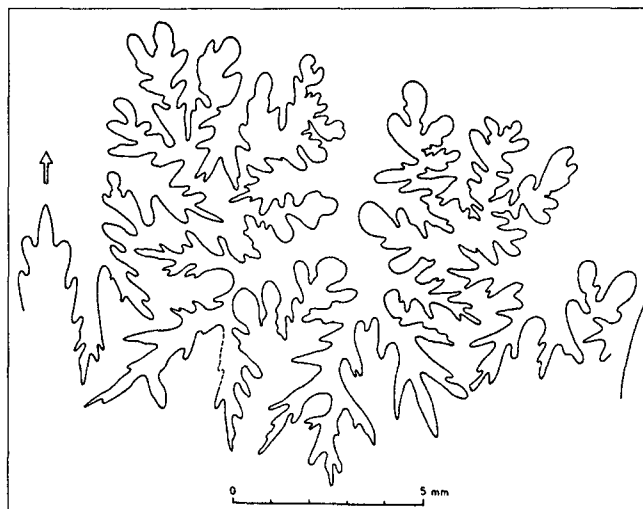
1886 *Aegoceras* ? sp. indet. – GEYER: 269, Pl. 4, Fig. 18

Material: one fragment of whorl (stone cast) from GEYER’s collection, num. 1886/2/55 (= GEYER, 1886, Pl. 4, Fig. 18)

Remark: The species presents oval cross section with

slightly vaulted flanks. The ornamentation is formed by prominent radial ribs with indistinct ventrolateral tubercles. After tubercles the main ribs are splitting into 3 or 4 secondary ribs, which cross the venter. The intercalary space of the main ribs is distinctly narrower than ribs. The suture line (Text-Fig. 42) is complicated and deeply dissected.

Occurrence: Lower Carixian



Text-Fig. 42
? *Miltoceras* sp., suture line

***Phricodoceras* HYATT, 1900**

***Phricodoceras taylori* (SOWERBY, 1826)**

Text-Fig. 36, Pl. 4, Fig. 3

1826 *Ammonites Taylori* – SOWERBY: Pl. 514, Fig. 1–2

1886 *Aegoceras* aff. *Taylori* SOW. – GEYER: 262

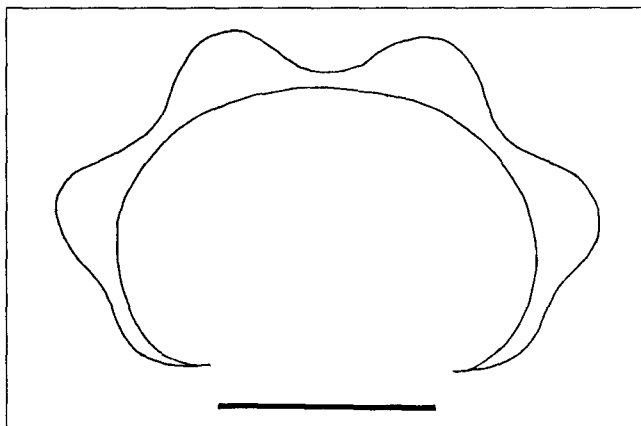
1978 *Phricodoceras taylori* J. De C. SOWERBY, 1826 – DOMMERGUES: 41 (cum syn.)

1991 *Phricodoceras taylori* (J. de C. SOWERBY) – COPE: 312

1998 *Phricodoceras taylori* (SOWERBY, 1826) – GÉCZY: 11, Text-Fig. 3, Pl. 13, Fig. 1–4 (cum syn.)

Material: two fragments of the whorls, fossilised in the white limestone

Remark: In the depository of the GBA there are two frag-



Text-Fig. 36
Phricodoceras taylori (SOWERBY), cross section of subadult stage.

ments of whorls of the subadult stage which represent the characteristic marks of the species. The section of the whorl (Text-Fig. 36) is depressed. On the surface of the whorl, prominent ribs with four blunt nodes are present.

Occurrence: Lower Carixian, basal subzone of the Jamesoni zone.

Polymorphitidae HAUG, 1887

Platypheuroceras HYATT, 1867

Platypheuroceras oblongum (QUENSTEDT, 1845)

Text-Fig. 37, Pl. 5, Fig. 11

1845 *Ammonites natrix oblongus* F. A. QUENSTEDT: 85f, Pl. 4, Fig. 16, a, b, c (non d)

1886 *Aegoceras* nov. spec. ind. – GEYER: 268, Pl. 4, Fig. 14, 16, 17

1980 *Platypheuroceras oblongum* (QUENSTEDT, 1845) – SCHLATTER: 98, Pl. 8, Fig. 2, Pl. 9, Fig. 1, Beil. 5, Fig. c-d, Beil. 17, Fig. c (cum syn.)

Material: one subadult specimen preserved in pink/reddish limestone from GEYER'S collection

Dimensions:	D	Wh	Wb	O
GBA 1886/2/53=	28,0	8,8	7,7	13,3
GEYER, 1886, Pl. 4, Fig. 14				

Remark: This medium sized form has evolute coiling with la-

terally compressed whorl section. The last preserved whorl has subrectangular/oval cross section with flat flanks (Text-Fig. 37). The first ribs appear at the diameter 6 mm and their number per 1/2 whorl is 6. They are prorsiradiate, cuneiform. At the diameter of approximately 13 mm the ribs are dense (20 per 1/2 a whorl), prorsiradiate with periventral row tubercles/spines. The last preserved whorl has the same type of ribs but they are bituberculate and their number is a little lesser (16 per a half of whorl). The ribs do not cross the ventrum. The suture line (Text-Fig. 37) is very complicated and dissected.

Occurrence: Carixian, Jamesoni zone

Gemmellaroceras HYATT, 1900

Gemmellaroceras abnorme (HAUER, 1853)

Text-Fig. 38, Pl. 5, Fig. 1

1853 *A. abnormis* HAU. – HAUER: 575

1854 *Ammonites abnormis* HAUER: 406, Pl. 1, Fig. 11–17

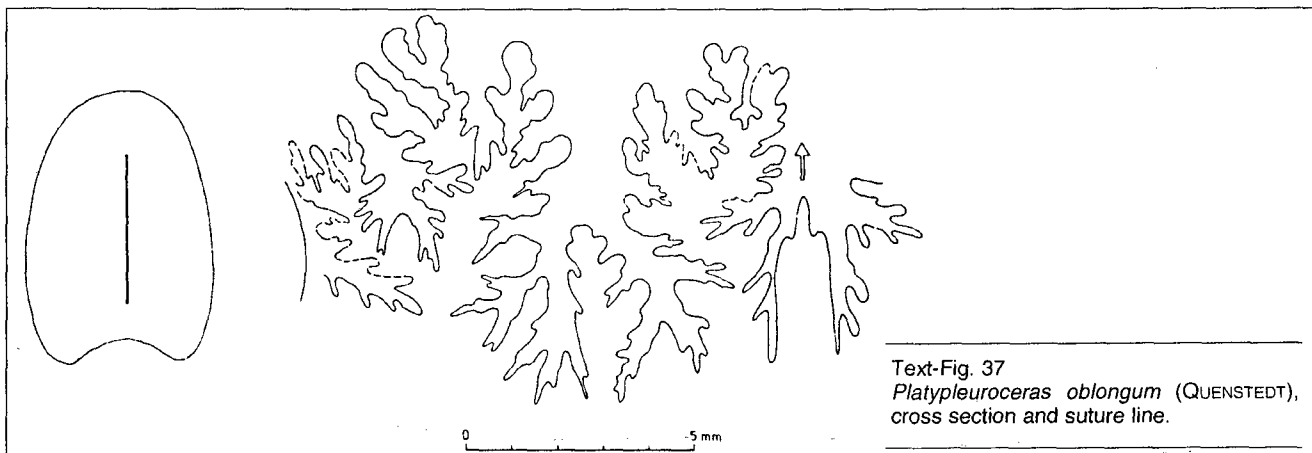
1856 *Ammonites abnormis* HAU. – HAUER: 68

1886 *Psiloceras abnorme* (v. HAUER). – GEYER: 240, Pl. 2, Fig. 24–26

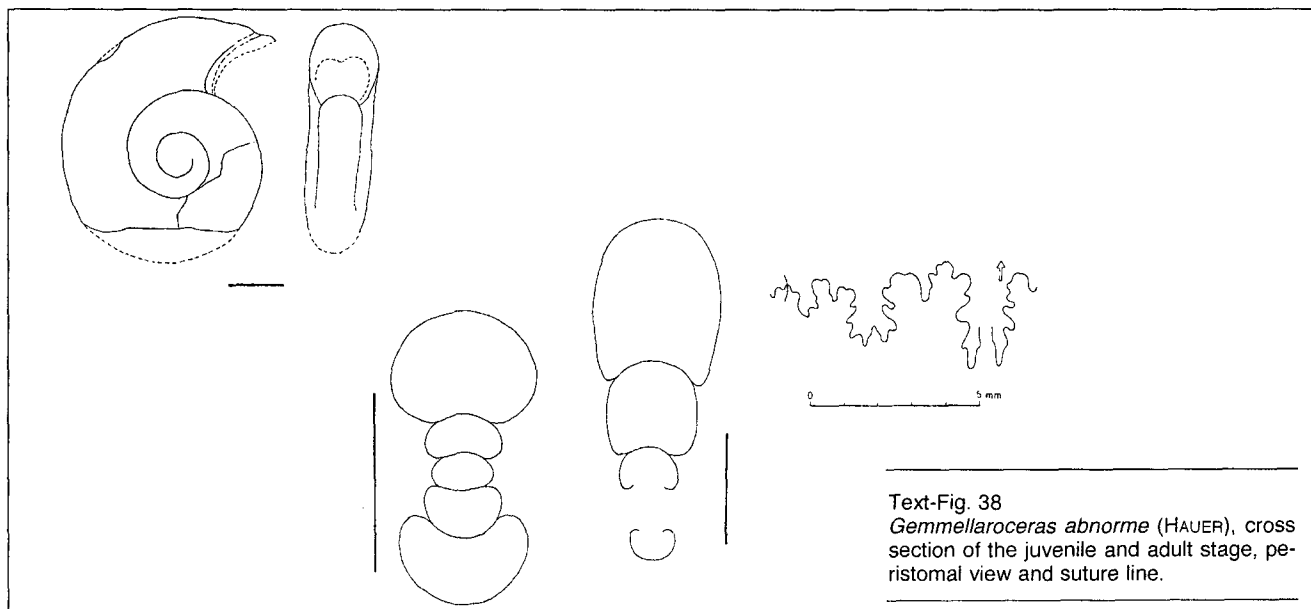
Material: 13 specimens from HAUER'S collection and 2 specimens from GEYER'S collection

Lectotype: designed herein is specimens figured by HAUER, 1854, Pl. 1, fig. 13–14, and by GEYER, 1886, Pl. 2, Fig. 24 and here Pl. 5, Fig. 1

Dimensions:	D	Wh	Ww	O
HAUER, 1854, Pl. 1, Fig. 11	12,2	5,7	5,0	6,6
	12,9	5,0	4,7	5,0
HAUER syntype	14,6	5,2	4,8	5,0
	16,0	5,6	5,0	6,0
	16,6	7,0	-	6,2
	17,9	6,3	5,0	6,7
GEYER, 1886, Pl. 2, Fig. 26	19,2	6,8	4,8	7,5
GEYER, 1886, Pl. 2, Fig. 25	19,8	7,6	5,5	8,8
	20,0	8,2	-	8,4
	22,0	7,0	5,8	8,6
HAUER, 1854, Pl. 1, Fig. 15–16	22,4	7,6	5,4	9,0
GEYER, 1886, Pl. 2, Fig. 24 = Lectotype	24,4	7,3	6,0	10,8
GBA 1886/02/26	25,3	7,6	6,0	16,6



Text-Fig. 37
Platypheuroceras oblongum (QUENSTEDT), cross section and suture line.



Text-Fig. 38

Gemmellaroceras abnorme (HAUER), cross section of the juvenile and adult stage, peristome view and suture line.

Remarks: This small Polymorphitid species with evolute coiling has oval whorl section during subadult and also adult stage (Text-Fig. 38). The flanks are gently vaulted nearly parallels. Generally ornamentation is drab, formed by radiate to slightly sigmoidal weak and spaced ribs. On the body chamber ornamentation start to be irregular. The peristome is simple with peristomal constriction.

Suture line (Text-Fig. 38): is gently asymmetric with large S_1 , generally few incised.

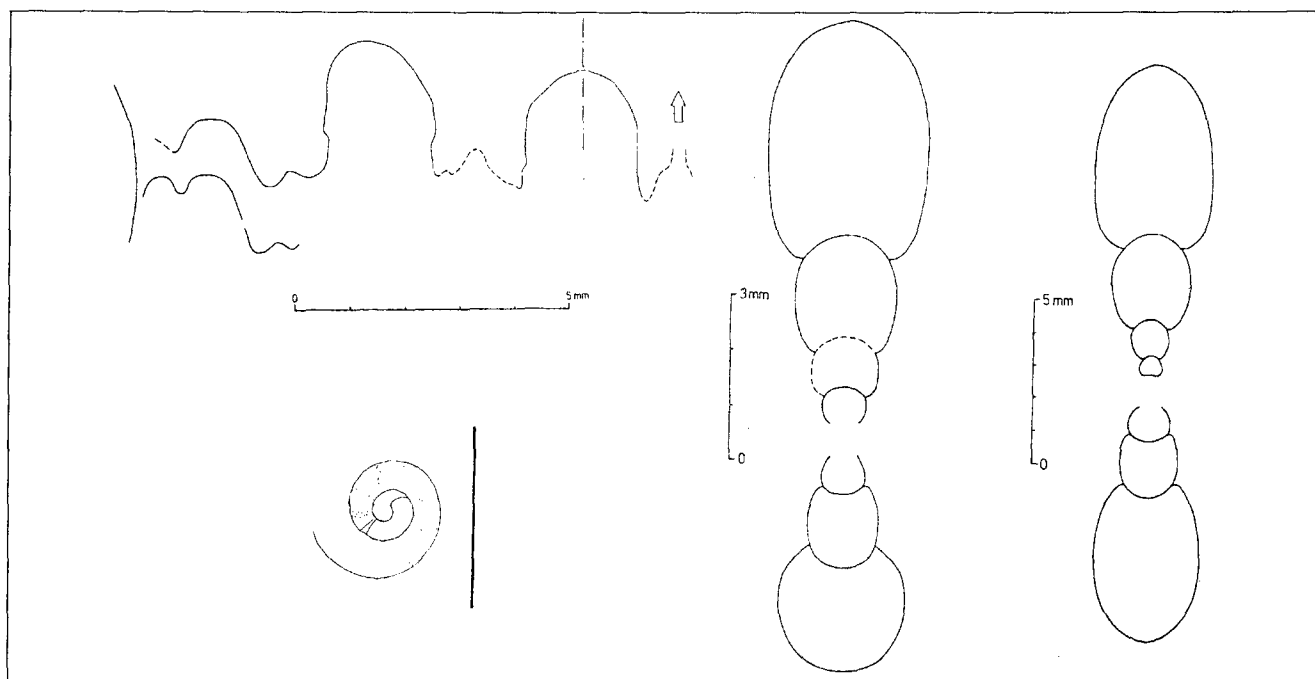
Stratigraphic range: ? Lotharingian or Carixian

incerte sedis

Dudresnayiceras RAKÚS, 1994

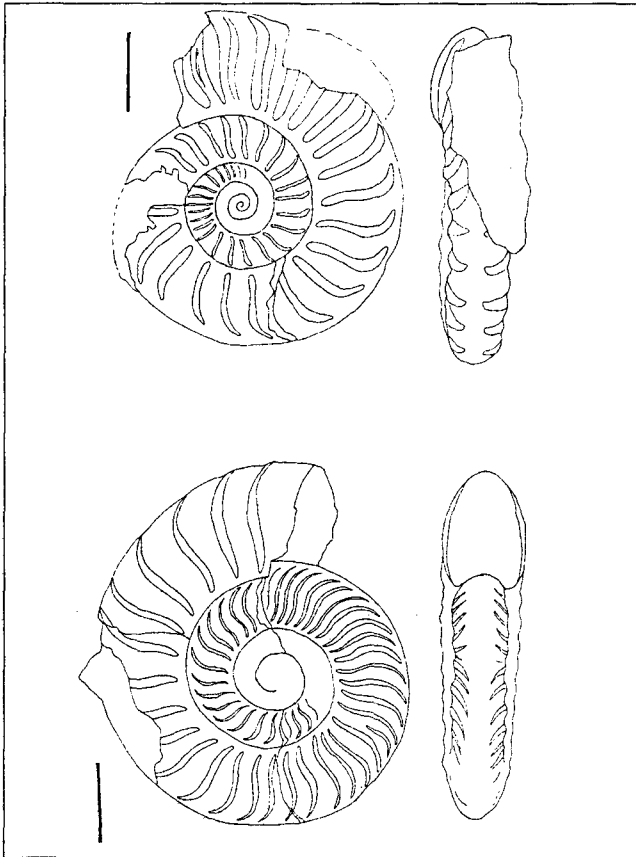
Remark: The origin of *Dudresnayiceras* is rather obscure, without clear relations to the other lotharingian genera. The juvenile stage of micromorphic species *D. suessi* (HAU.) is evolute, smooth with oval whorl section. In one case (see the following) the indistinct "constrictional phase" is not excluded. The subadult and adult stages of micro and macro-morphic forms are evolute coiling, laterally comprimed. The general shape of ornamentation suggests more or less the *Polymorphitids* (*Uptonia*), but the suture line is aberrant – "ceratitic" and it is very difficult to interpret.

The DOMMERGUES' note (in LACHKAR et al., 1998: 610) that RAKÚS (1994) link phylogenetically the *Dudresnayiceras* with *Discamphiceratinae* is not appropriate. The placement of this genus just after the *Bouhamidoceras* (see RAKÚS l. c.) is due to redaction mistake and not to author's opinion!



Text-Fig. 39

Dudresnayiceras suessi (HAUER), protochonc and first whorl, cross section of adult stage and suture line.



Text-Fig. 40
Dudresnayiceras suessi (HAUER), lateral and peristomal view.

***Dudresnayiceras suessi* (HAUER, 1854)**

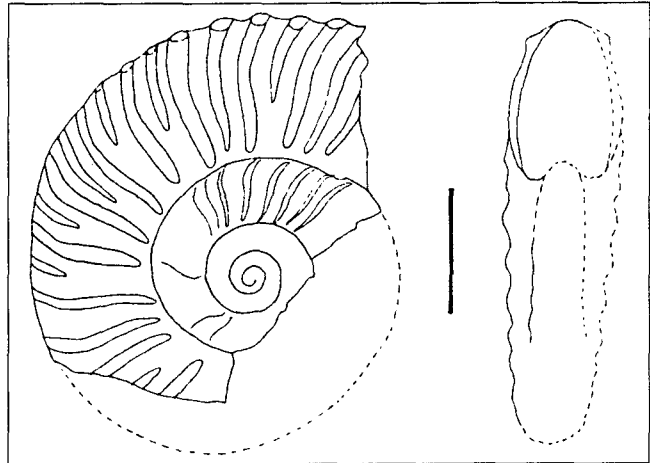
Text-Fig. 39, 40 Pl. 5, Fig. 6, 7, 8

- 1854 *Ceratites subcostatus* m. – SCHAFFHÄUTL: 548, Pl. 8, Fig. 18
 1854 *Ammonites Suessi* v. HAUER – HAUER: 401, Pl. 1, Fig. 3–6
 1862 *Ammonites subcostatus* SCHAFFH. – OPPEL: 62
 1862 *Amm. Suessi* HAU. – OPPEL: 62
 1886 *Psiloceras Suessi* (von HAUER). – GEYER: 243, Pl. 2, Fig. 27, 28, 30–34
 1903 *Gemmellaroceras* (?) *Suessi* HAUER. – FUCINI: 164, Pl. 26, Fig. 2

Lectotype: Designated here is specimen depicted by GEYER, 1886, Pl. 2, Fig. 28 deposited in the collection of GBA num. 3035 and refigured here on the Pl. 5, Fig. 7 (on the little square label num. 28)

Material: 15 specimens from HAUER'S and GEYER'S collections more or less complete.

Dimensions:	D	Wh	Ww	O
GBA 3035/13	9,0	3,1	2,4	3,8
8	10,0	3,5	-	4,5
3	11,4	4,0	-	5,0
6	14,8	5,1	-	6,0
5	15,4	5,0	-	6,6
4	15,4	4,7	-	7,0
14	16,0	5,0	3,8	7,3
33	16,6	5,6	3,6	7,1
	16,7	5,0	-	8,2
	17,0	4,5	3,0	8,4
1	17,6	5,6	3,6	7,6
12	18,2	5,5	-	7,4



Text-Fig. 41
Dudresnayiceras suessi tuberculatum n. subspec., lateral and peristomal view.

GEYER, 1886, Pl. 2,

Fig. 2 = Lectotype	19,6	5,5	-	8,4
29	20,0	5,5	-	7,3
27	21,5	6,6	3,6	9,8
2	22,2	7,0	4,5	9,4

Remarks: The juvenile stages are evolute with circular whorl section. On the first whorl there are very weak prorsiradiate constrictions (Text-Fig. 39). The subadult stage has an elliptical or oval whorl section (Text-Fig. 39). At this stage the ornamentation is composed of prorsiradiate and sigmoidal ribs (Text-Fig. 40). Just before the venter they are curving strongly forwards and reduced to striae. Sometime in place of bending we observe indications of minute tubercles. In general the ribs do not cross the venter. The number of ribs varies between 25 to 27 per whorl at the diameter of 20 mm. Also the magnitude of ribs can vary from weak to prominent.

Suture line (Text-Fig. 39) has very characteristic, asymmetric shape with monophylle saddles and "ceratitiform" lobes.

Occurrence: Lotharingian, Oxynotus zone

***Dudresnayiceras suessi tuberculatum* n. subspec.**

Text-Fig. 41, Pl. 5, Fig. 5

Material: one incomplete specimen in white crinoid limestone

Dimensions:	D	Wh	Wb	O
GBA 3035	28,4	5,8	-	8,0

Lectotype: designated here is specimen deposited in GBA collection num. 3035

Derivatio nominis: after the presence of tubercles on the ribs
Locus et stratum typicum: Hierlatz, Lotharingian, Oxynotum zone

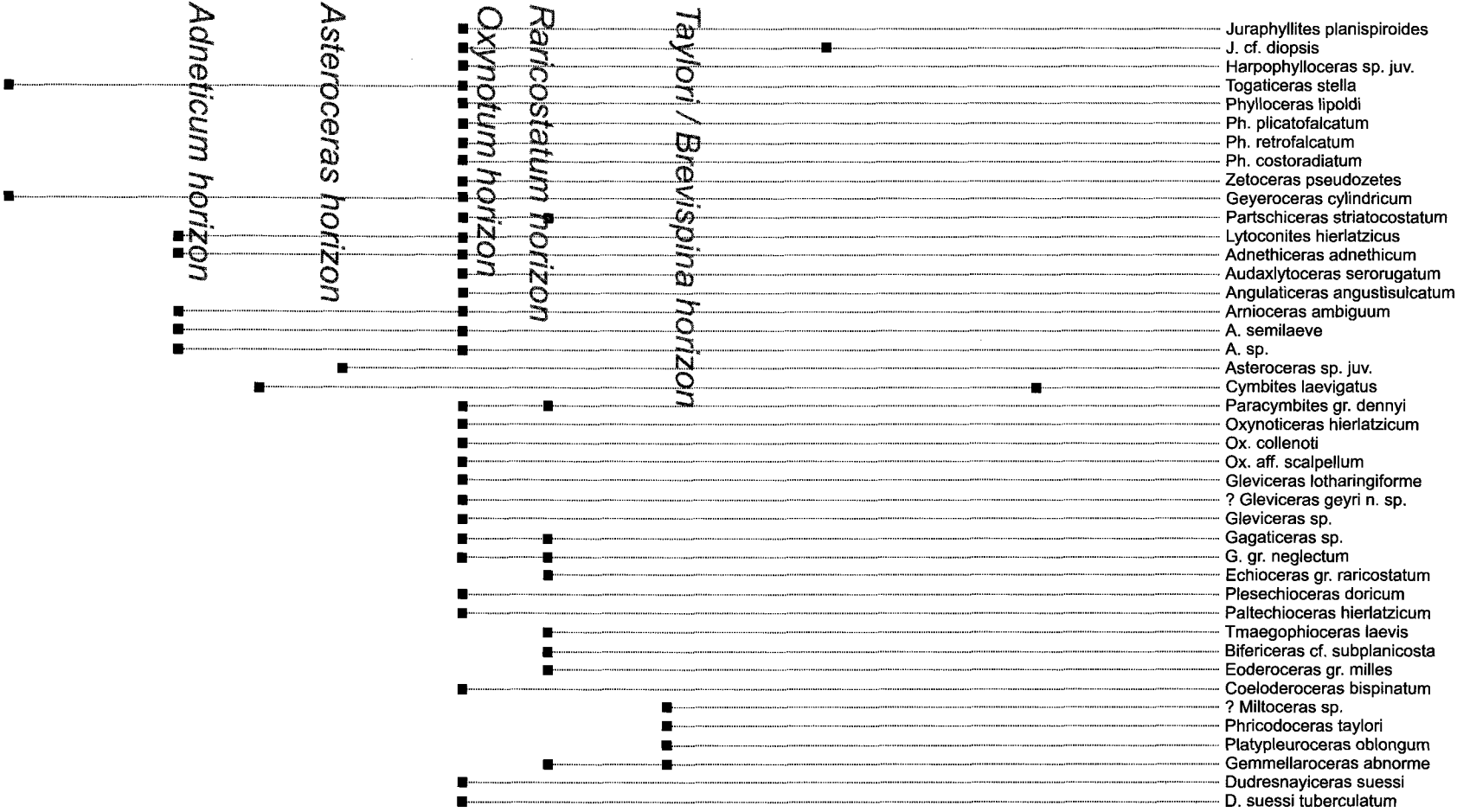
Remark: The new subspecies differs from the nominal species mostly in the presence of ventrolateral tubercles on the ribs. Further the ribs are more prominent and also intercalate ribs occur.

Occurrence: Lotharingian, Oxynotum zone

3. Age of ammonite fauna

As it was mentioned in the introduction, the Hierlatz locality was already well known in the past century and many

SINEMURIAN										CARIXIAN							DOMERIAN			Stages / Substages						
BUCKLANDI		SEMICOSTAT.		TUR.	OBTUSUM		OXYNOT.	RARICOSTATUM			JAMESONI		IBEX		DAVOEI			MARGARITATUS		SPINATUM	Zones					
Conybeari	Bucklandi	Charlesi	Sauzeanum	Turneri	Obtusum	Stellare	Denotatus	Simpsoni	Oxynotum	Densinodulum	Raricostatum	Macdonneli	Aplanatum	Taylori	Masseanum	Valdani	Lundum	Maculatum	Capricornus	Figulinum	Stokesi	Subnodosus	Gibbosus	Apyrenum	Hawskerense	Subzones



Text-Fig. 43

authors discussed its age (see GEYER, 1886: 277–286). The majority of them considered this locality as Lotharingian in age, belonging mainly to the Oxynotum zone. GEYER's monograph shows that he recognised the sedimentological relations between the Hierlatz limestones and underlying Dachstein limestone formation. He pointed out to the fact that the ammonite fauna was found in the several "Kluftausfüllung", what in modern geology we call the neptunian dykes. The fact shows that the elaboration of precise zonal succession is rather a wish than a reality. As the sedimentological studies show, the neptunian dykes are filled repeatedly, what is confirmed by stratigraphically different ammonite fauna.

The first ammonite zonation was proposed by GEYER (1886: 277). He recognises here the zones: Obtusum, Oxynotum and Raricostatum. He did not consider the stratigraphic levels as Obtusum, although the presence of *Arnioceras* was known to him.

From our studies it follows that the oldest stratigraphic level registered here is the Sinemurian horizon with *Adnethiceras adnethicum* (HAU.). In our opinion it belongs to the Semicostatum zone, probably the subzone Scipionianum – Sauzeanum. DOMMERGUES et al. (1995) ranged the adnethicum horizon formerly to the Bucklandi zone. Our observation in the vicinity of Adnet (Rot-Grau Schnöhl and Lienbacher quarries) permit us to precise that the adnethicum horizon overlying the condensed horizon number III. the so called "fence stylolite" (see RAKÚS in BÖHM, 1999). From these layers comes the first *Arnioceras* gr. *cuneiforme* HYATT which characterises the Semicostatum zone (GUERIN-FRANCIATTE, 1966). Further in the adnethicum horizon there was never found true *Arietites* (e. g. *Coroniceras rotiforme*) as it is in the Enzesfeld locality. Upon this we conclude that the adnethicum horizon should be situated in the Semicostatum zone. This stratigraphic range is supported also by the fact that the first representatives of the Ectocentritids did not appear earlier as in the Semicostatum zone.

At the Hierlatz locality we can recognise on the basis of ammonite fauna the following stratigraphic horizons:

1) the lowest is the **adnethicum horizon** with the following species: *Adnethiceras adnethicum* (HAU.), *Arnioceras semilaeve* (HAU.), *A. ambiguum* (GEY.), *A. sp.*, *Lytoconites hierlatzicus* (GEY.), *Audaxlytoceras serrorugatum* (STUR in GEY.) and ? *Tmaegophioceras laevis* (GEY.). We range this horizon to the Sinemurian, Semicostatum zone.

2) **horizon with *Asteroceras***: only one species (*Asteroceras* sp. juv. probably *A. stellare* (SOW.)) seems to prove this Obtusum zone, subzone Stellare (Lower Lotharingian).

3) **Oxynotum horizon**: from this horizon comes the maximum of ammonite species described from Hierlatz. We range here: *Oxynoticeras hierlatzicum* PIA, *Ox. collenoti* (D'ORB.), *Ox. aff. scalpellum* PIA, *Gleviceras lotharingiforme* (PIA), *Gleviceras* sp. ? *Gleviceras geyeri* n. sp., *Plesechioceras doricum* (SAVI & MENECH.), *Paltechioceras hierlatzicum* (HAU.), *Eoderoceras* gr. *milles* (SIMP.), *Coeloderoceras bispinatum* (GEY.), *Dudresnayiceras suessi* (HAU.), *D. suessi tuberculatum* n. subsp., *Angulaticeras angustisulcatum* (GEY.), probably also *Gagaticeras* gr. *neglectum* (SIMP.) and *Gagaticeras* sp. (but these species can range up to the Raricostatum zone).

To this horizon we range also the majority of Phylloceratids described here as: *Juraphyllites planispiroides* RAK., *J. cf. diopsis* (GEMM.), *Harpophylloceras* sp., *Togaticeras stella* (SOW.), *Phylloceras lipoldi* (HAU.), *Ph. plicatofalcatum* STUR in GEYER, *Ph. costoradiatum* STUR in GEY., *Ph. retorfalcatum* STUR in GEY., *Geyeroceras cylindricum* (SOW.), *Zetoceras pseudozetes* FUC., *Partschiceras striatocostatum* (MENECH.).

4) **Raricostatum horizon**: this horizon is confirmed by the presence of *Echioceras* gr. *raricostatum* (ZIETEN).

5) **Taylori horizon**: The presence of a younger horizon as Raricostatum was firstly supposed by STÜR (1871: 435), however the trustworthy evidence was presented by GEYER (1886: 275) who described from here *Aegoceras* aff. *Taylori* SOW. We range here the following species: *Phricodoceras taylori* (SOW.), *Platypleuroceras oblongum* (QUENSTEDT), ? *Mitloceras* sp., *Gemmellaroceras abnorme* (HAU.) and probably *Cymbites laevigatus* (SOW.). This assemblage refers to Jamesoni zone, subzone Taylori – Brevispina.

We note that younger stratigraphic levels as Lower Carixian were not found in the filling of neptunian dykes.

The total span of time, which we can prove in the filling of the neptunian dykes on Hierlatz locality by ammonites is above 6,2 Ma approximately (see GRADSTEIN et al., 1994) and range from Sinemurian to Lower Carixian. As follows from Text-Fig. 43 this record is discontinuous with many interruptions of faunal successions.

Taphonomic note: The total set of ammonites from Hierlatz locality which we have studied was about 250 specimens including the fragments. The size sifting of ammonites according to their total diameter was following:

total diameter more than 70 mm	1 specimen
total diameter between 50–60 mm	1 specimen
total diameter between 40–50 mm	7 specimens
total diameter under 40 mm (average 30,56 mm)	241 specimens

This division shows a clear maximum below 40 mm of diameter, what could be caused by current activity. Due to this current activity the ammonites (and probably also other fossil groups) were accumulated in opened dykes, which functioned as "traps".

Acknowledgements

The work was funded within of bilateral co-operation between the Austrian Geological Survey (GBA; Vienna) and Dionyz Stür Institute (Bratislava). My thanks are due to Dr. H. LOBITZER and Dr. F. STOJASPAL for their help during my several stays at GBA.

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Plate 1

- Fig. 1, 2 ***Juraphyllites planispiroides* RAKÚS, 1994, Lectotype**, coll. GBA 1886/2/14, (= GEYER, 1886, Pl. 2, Fig. 3), Lotharingian, Oxynotum zone, Hierlatz, 1,2x enlarged
- Fig. 3 ***Phylloceras lipoldi* (HAUER, 1854), Lectotype**, coll. GBA 1854/03/10, Lotharingian, Hierlatz, 0,5x enlarged
- Fig. 4 ***Phylloceras plicatofalcatum* STUR m. s. in GEYER, 1886, Lectotype**, coll. GBA 1886/2/7, (= Geyer, 1886, Pl. 1, Fig. 4), Lotharingian, Oxynotum zone, Hierlatz, 1,2x enlarged
- Fig. 5, 6 ***Phylloceras costoradiatum* STUR m. s. in GEYER, 1886**, coll. GBA 3019, Lotharingian, slightly enlarged
- Fig. 7 ***Zetoceras pseudozetes* (FUCINI, 1908)**, coll. GBA, Lotharingian, Oxynotum zone, 1,2x enlarged
- Fig. 9, 10, 11 ***Partschiceras striatocostatum* (MENEHINI, 1853), Lectotype**, coll. GBA 3018 (= GEYER, 1886, Pl. 1, Fig. 6), Lotharingian, Oxynotum zone, Hierlatz, natural size
-

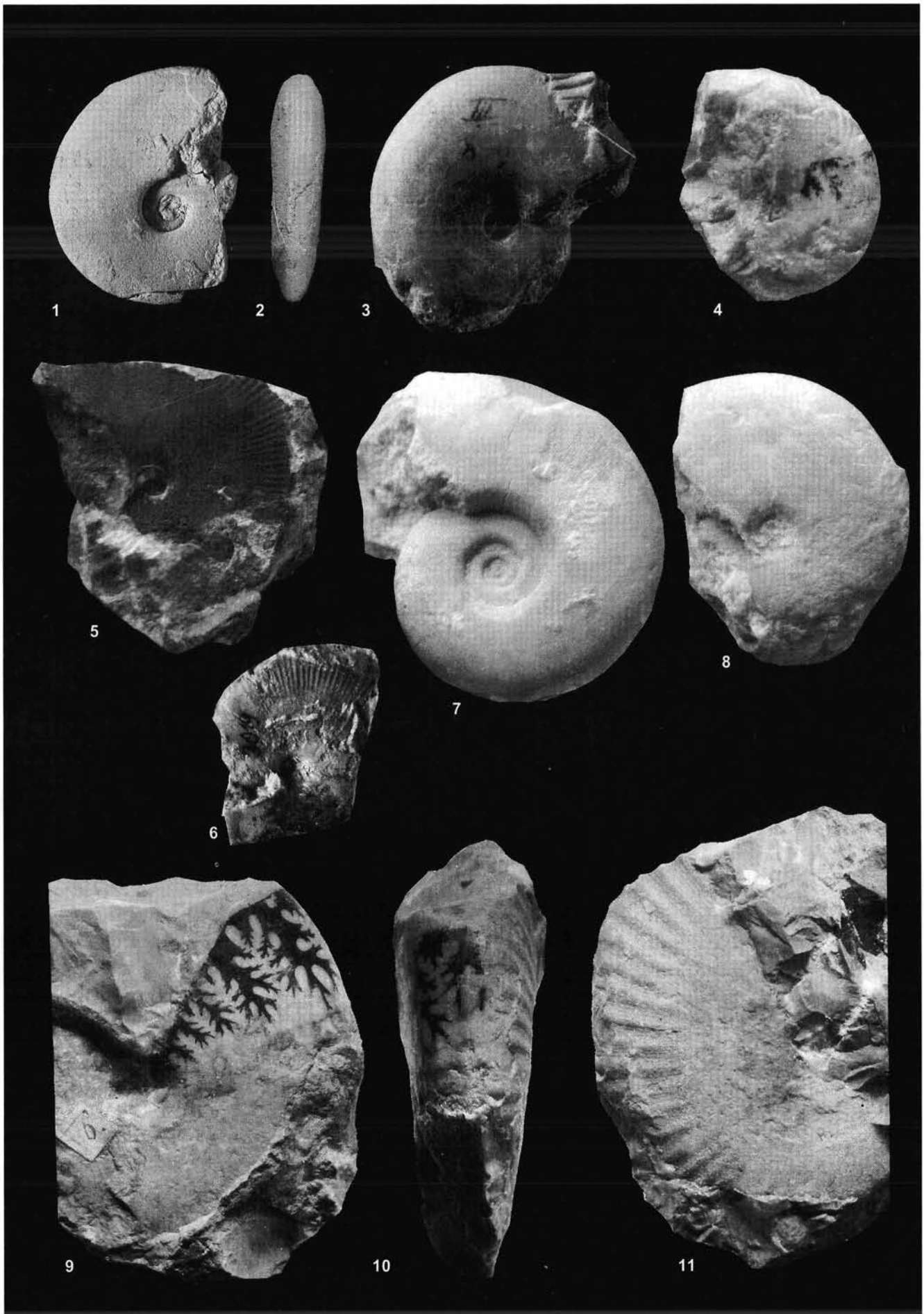


Plate 2

- Fig. 1 *Arnioceras ambiguum* (GEYER, 1886), **Lectotype**, coll. GBA 1886/02/35, (= GEYER, 1886, Pl. 3, Fig. 12), Sinemurian, Semicostatum zone, Hierlatz, 1,2x enlarged
- Fig. 2 *Echioceras* gr. *raricostatum* (ZIETEN, 1830), coll. GBA, Lotharingian, Raricostatum zone, Hierlatz, 1x enlarged
- Fig. 3 *Arnioceras semilaeve* (HAUER, 1853), coll. GBA 3037, (= GEYER, 1886, Pl. 3, Fig. 7), Sinemurian, Semicostatum zone, 0,6x enlarged
- Fig. 4 *Gagaticeras* sp., coll. GBA 1886/2/31, (= GEYER, 1886, Pl. 3, Fig. 4), Lotharingian, ?Oxynotum/Raricostatum zones, Hierlatz, 1,6x enlarged
- Fig. 5 *Audaxlytoceras serorugatum* (STUR m. s. in GEYER, 1886), **Lectotype**, coll. GBA 1886/2/17, (= GEYER, 1886, Pl. 2, Fig. 9), Lotharingian, Oxynotum zone, Hierlatz, 1x enlarged
- Fig. 6 *Tmaegophioceras laevis* (STUR m. s. in GEYER, 1886), **Lectotype**, coll. GBA 1886/2/34, (= GEYER, 1886, Pl. 3, Fig. 10), Lotharingian, Hierlatz, 0,2x enlarged
- Fig. 7 *Arnioceras ambiguum* (GEYER, 1886), coll. GBA 1886/02/35, (= GEYER, 1886, Pl. 3, Fig. 11), subadult stage, Sinemurian, ?Semicostatum zone, Hierlatz, 1x enlarged
- Fig. 8 *Audaxlytoceras serorugatum* (STUR m. s. in GEYER, 1886), coll. GBA 1886/2/11, (= GEYER, 1886, Pl. 2, Fig. 7), Lotharingian, Oxynotum zone, Hierlatz, 1x enlarged
- Fig. 9 *Asteroceras* sp. *juv.*, coll. GBA 1886/2/32, (= GEYER, 1886, Pl. 3, Fig. 6), Lotharingian, Obtusum zone, Hierlatz, 1,1x enlarged
- Fig. 10 *Paltechioceras hierlatzicum* (HAUER, 1856), **Lectotype**, coll. GBA 1856/01/14, (= HAUER, 1856, Pl. 7, Fig. 4-6), Lotharingian, Oxynotum zone, Hierlatz, 1x enlarged
- Fig. 11 *Plesiochioceras doricum* (SAVI & MENEGHINI, 1851), coll. GBA 1886/2/30, (= GEYER, 1886, Pl. 3, Fig. 3), Lotharingian, Oxynotum zone, Hierlatz, 0,6x enlarged
- Fig. 12 *Arnioceras* sp., coll. GBA, (= GEYER, 1886, Pl. 3, Fig. 8 only), Sinemurian, Semicostatum zone, Hierlatz, 1,2x enlarged
-



Plate 3

- Fig. 1 *Oxynoticeras hierlatzicum* PIA, 1914, **Lectotype**, coll. GBA 3027, (= GEYER, 1886, Pl. 2, Fig. 13, Lotharingian, Oxynotum zone, Hierlatz, natural size
- Fig. 2 *Ox. hierlatzicum* PIA, coll. GBA, Lotharingian, Oxynotum zone, Hierlatz, 0,8x enlarged
- Fig. 3 *Gleviceras* sp., coll. GBA 1886/2/22, (= GEYER, 1886, Pl. 2, Fig. 21), Lotharingian, Oxynotum zone, Hierlatz, 0,8x enlarged
- Fig. 4 *Ox. hierlatzicum* PIA, coll. GBA, juvenile specimen, Lotharingian, Oxynotum zone, Hierlatz, 2,8x enlarged
- Fig. 5 *Oxynoticeras* aff. *scalpellum* PIA, 1914, coll. GBA 1886/2/19, (= GEYER, 1886, Pl. 4, Fig. 24), Lotharingian, Oxynotum zone, Hierlatz, 2,5x enlarged
- Fig. 6 *Ox. hierlatzicum* PIA, coll. GBA, subadult specimen, Lotharingian, Oxynotum zone, Hierlatz, 0,3x enlarged
- Fig. 7 *Ox. aff. scalpellum* PIA, coll. GBA, Lotharingian, Oxynotum zone, Hierlatz, 1,2x enlarged
- Fig. 8 *Paracymbites* gr. *dennyi* (SIMPSON, 1843), coll. GBA, (= GEYER, 1886, Pl. 2, Fig. 22), Lotharingian, Oxynotum/Raricostatum zone, Hierlatz, 2,5x enlarged
- Fig. 9 *Ox. hierlatzicum* PIA, coll. GBA, juvenile specimen, Lotharingian, Oxynotum zone, Hierlatz, 2,5x enlarged
- Fig. 10 *Oxynoticeras collenoti* (D'ORBIGNY, 1844), coll. GBA, subadult specimen, Lotharingian, Oxynotum zone, Hierlatz, 2,5x enlarged
- Fig. 11 *Gleviceras lotharingiforme* PIA, 1914, coll. GBA 1886/2/20 and *Oxynoticeras* sp., Lotharingian, Oxynotum zone, Hierlatz, slightly enlarged
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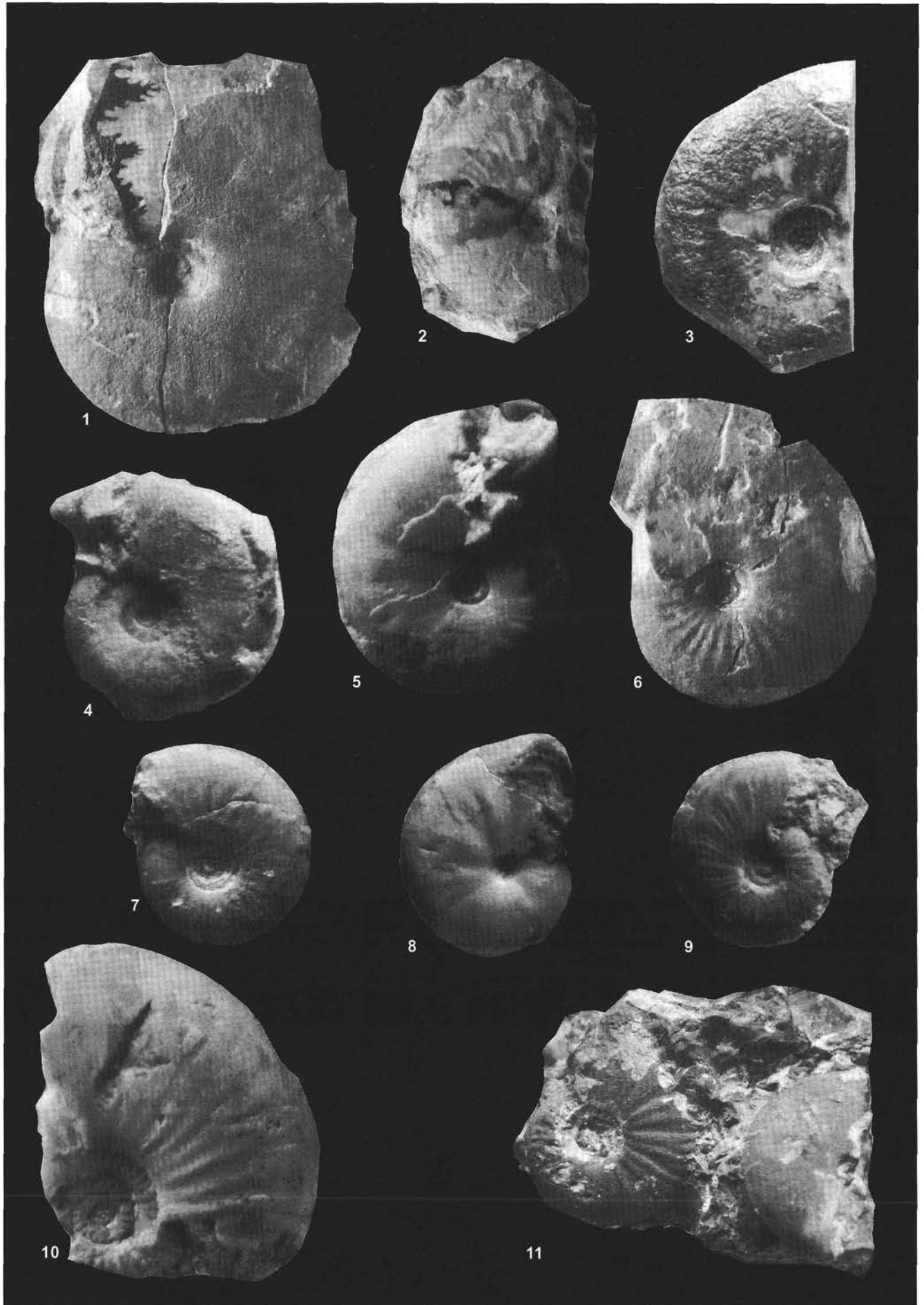


Plate 4

- Fig. 1 ? *Gleviceras geyeri* n. sp., Holotype, coll. GBA 1886/2/36, (= GEYER, 1886, Pl. 3, Fig. 13), Lotharingian, Oxynotum zone, Hierlatz, 0,4x enlarged
- Fig. 2 *Adnethiceras adnethicum* (HAUER, 1853), coll. GBA 1886/2/49, (= GEYER, 1886, Pl. 4, Fig. 13), Sinemurian, Semicostatum zone, Hierlatz, 2,8x enlarged
- Fig. 3 *Phricodoceras taylori* (SOWERBY, 1826), coll. GBA, Lower Carixian, Jamesoni zone, Hierlatz, 2,5x enlarged
- Fig. 4 *Coeloderoceras bispinatum* (GEYER, 1886), *Juraphyllites planispiroides* RAK. and *Paltechioceras* sp., coll. GBA, Lotharingian, Oxynotum zone, Hierlatz, 0,4x enlarged
- Fig. 5 *Eoderoceras* gr. *milles* (SIMPSON, 1855), coll. GBA, (= GEYER, 1886, Pl. 4, Fig. 20), Lotharingian, Oxynotum zone, 0,2x enlarged
- Fig. 6 *Coeloderoceras bispinatum* (GEY.), *Partschiceras striatocostatum* (MGH.) and *Paltechioceras hierlatzicum* (HAU.), coll. GBA, Lotharingian, Oxynotum zone, 0,2x enlarged
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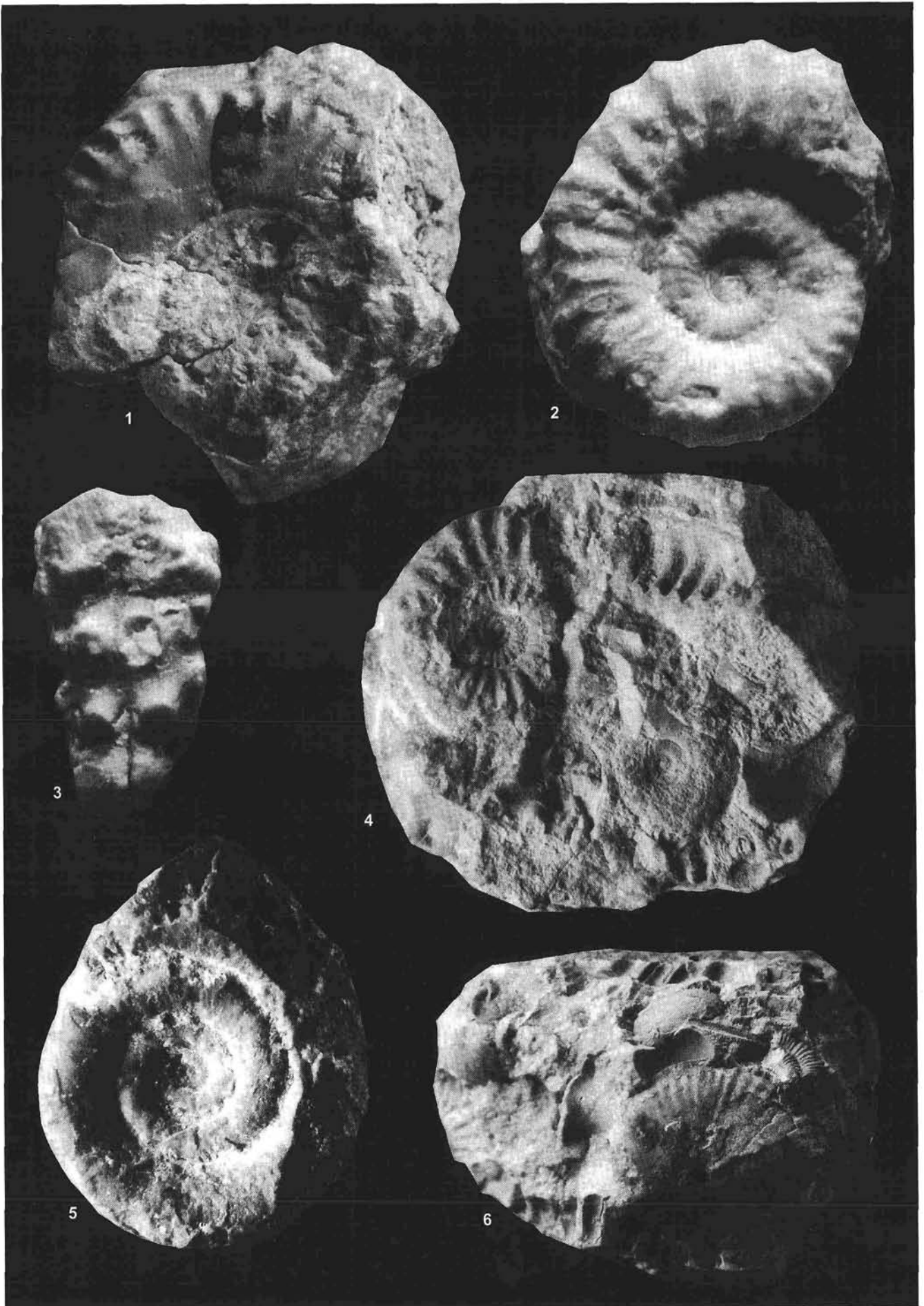
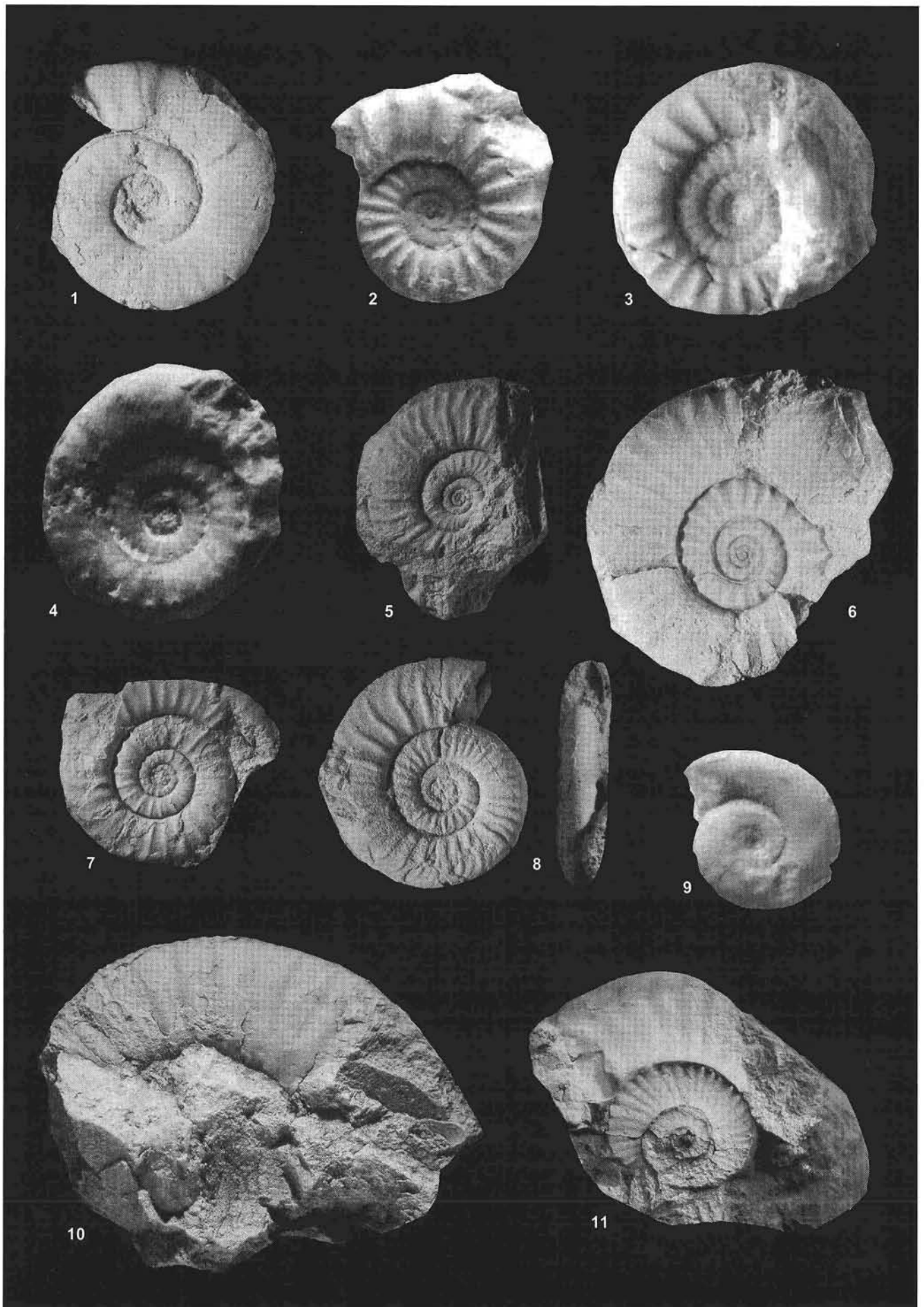


Plate 5

- Fig. 1 *Gemmellaroceras abnorme* (HAUER, 1853), **Lectotype**, coll. GBA 1886/2/27, (= GEYER, 1886, Pl. 2, Fig. 24), ?Lotharingian/Carixian, Hierlatz, 1x enlarged
- Fig. 2 *Bifericeras cf. subplanicosta* (OPPEL, 1856), coll. GBA 1886/2/47, (= GEYER, 1886, Pl. 3, Fig. 18), Lotharingian, Hierlatz, 1,2x enlarged
- Fig. 3 *Gagaticeras gr. neglectum* (SIMPSON, 1855), coll. GBA 1886/2/31, (= GEYER, 1886, Pl. 3, Fig. 5), Lotharingian, Oxynotum/Raricostatum zone, Hierlatz, 1,2x enlarged
- Fig. 4 *Coeloderoceras bispinatum* (GEYER, 1886), coll. GBA, juvenile specimen, Lotharingian, Oxynotum zone, Hierlatz, 2,5x enlarged
- Fig. 5 *Dudresnaiceras suessi tuberculatum* n. subspec., **Holotype**, coll. GBA 3035, Lotharingian, Oxynotum zone, Hierlatz, 1x enlarged
- Fig. 6 *Dudresnaiceras suessi* (Hauer, 1854), coll. GBA 1886/2/27, (= GEYER, 1886, Pl. 2, Fig. 27), Lotharingian, Oxynotum zone, Hierlatz, 3x enlarged
- Fig. 7 *D. suessi* (HAU.), **Lectotype**, coll. GBA 3035, Lotharingian, Oxynotum zone, Hierlatz, 1,2x enlarged
- Fig. 8 *D. suessi* (HAU.), coll. GBA 1886/2/27, (= GEYER, 1886, Pl. 2, Fig. 27), Lotharingian, Oxynotum zone, Hierlatz, 1,2x enlarged
- Fig. 9 *Cymbites laevigatus* (SOWERBY, 1827), coll. GBA, Lotharingian to Pliensbachian, Hierlatz, 1,2x enlarged
- Fig. 10 ? *Miltoceras* sp., coll. GBA 1886/2/55, (= GEYER, 1886, Pl. 4, Fig. 18), Carixian, Jamesoni zone, Hierlatz, 1,2x enlarged
- Fig. 11 *Platyleuroceras oblongum* (QUENSTEDT, 1845), coll. GBA. 1886/2/53, (= GEYER, 1886, Pl. 4, Fig. 14), Carixian, Jamesoni zone, Hierlatz, 0,5x enlarged
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