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Some hitherto Undescribed Liassic Ammonites from the Adnet Formation in Austria

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12 Text-Figures, 3 Plates

Northern Calcareous Alps
Adnet Formation
Liassic
Ammonites
New Species
Systematics

Österreichische Karte 1:50.000
Blatt 94

Contents

Abstract

In this article ŠTÚR's collection of ammonites from the Adnet locality is revised. The revision showed that the collection comprises interesting ammonites from the Lotharingian and Carixian in which four previously undescribed species of ammonites occur. Although ŠTÚR had already designated three of them as new species, they were never published. There is also a lectotype of the species originally described as *Ammonites altus* (HAUER), which enabled its new and more precise definition. A lectotype of *Paroxynoticeras salisburgense* (HAUER) is also newly depicted here.

Einige bislang unbeschriebene Ammoniten des Lias von Adnet, Österreich

Zusammenfassung

Im Laufe der Revision der Ammonitenfauna des Lias von Adnet stellte sich heraus, daß die Sammlung STUR im Depot der Geologischen Bundesanstalt auch vier bislang unbeschriebene Arten des Lotharingiums bzw. Carixiums umfaßt. Obwohl STUR drei von diesen Exemplaren bereits als neue Arten designiert hatte, wurde ihre Beschreibung nie veröffentlicht. Die Sammlung umfaßt auch einen Lektotypus jener Art, die ursprünglich als *Ammonites altus* (HAUER) beschrieben wurde, der nun eine wesentlich präzisere Arten-Diagnose erlaubt. Außerdem wird ein Lektotypus von *Paroxynoticeras salisburgense* (HAUER) designiert.

1. Introduction

In the present study some little known species of ammonites from the Adnet locality are treated. They were rediscovered in the GBA depository in Vienna. It is mainly the collection of the former director of the Geologische Reichsanstalt D. ŠTÚR, who in the seventies of the past century created an extraordinary collection of ammonites from the classic locality Adnet. The material (apart from small exception revised by J. PIA in 1914) has not been paleontologically studied and accessible to ammonitologists until now. Two species from the collection of HAUER are also depicted here.

Already the preliminary look showed that the collection contained some very interesting species, either new ones, or

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those that have not been described in Austria until now. By the revision of ŠTÚR'S material a lectotype of *Exomiloceras altum* (HAUER) was found. It was taken for lost.

Although this collection and an other one from that period do not represent any exactly horizoned collection, a precision by older authors enables their considerably accurate stratigraphic ranging. The species described in the following are possible to treat as stratigraphically well positioned.

Material: All species described here occur in the Adnet limestone and generally they are well preserved as stone cores. Sometimes also the structures and sutures are preserved too. In some cases the stone cores are partially corroded or tectonically deformed.

2. Systematic part

Juraphyllitidae ARKELL, 1950

Harpophylloceras SPATH, 1927

Harpophylloceras cristatum (STUR m.s., 1875)

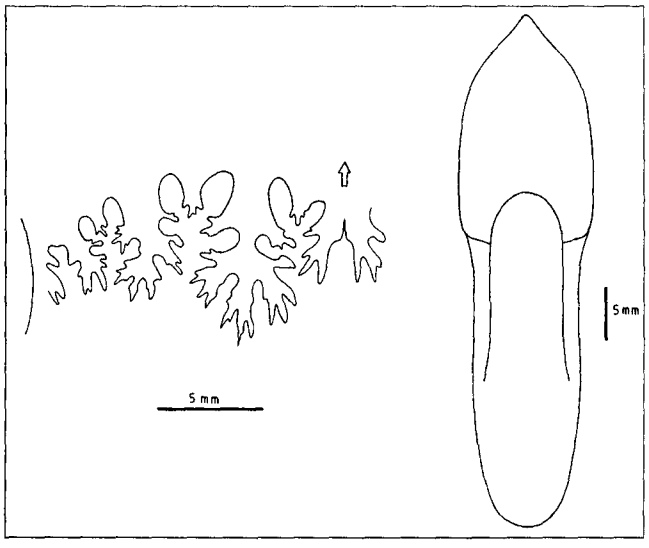
Text–Fig. 1, Pl. 3, Fig. 2, 3

Lectotype: specimen figured here on the Plate 3, Fig. 2, 3 and Text–Fig. 1

Locus et Stratum typicum: Adnet, Austria, Lotharingian, Oxynotum zone

Material: one stone cast with a partly preserved body chamber

Dimensions:	D	Wh	Wb	O
GBA n. 553 = Lectotype	43.4	20.0	12.4	13.0



Text–Fig. 1.
Cross section and suture line of *Harpophylloceras cristatum* (STUR m.s., 1875), lectotype. Scale bar 5 mm.

Diagnosis: A little, convolute, laterally compressed form with very sharp keel on the body chamber.

Description: This little and convolute form is characterised mainly by an acute keel on the body chamber. The whorl section is "lanceolate" (Text–Fig. 1) with parallel sides, prominent umbilical edge and oblique umbilical wall. Four prorsiradiate constrictions are on the last whorl. At the end of the body chamber appear fine sigmoidal ribs on the flanks.

The suture line (Text–Fig. 1) has a typical Juraphyllitid character with diphyllic saddles with large follioles.

Remark: The ŠTÚR'S new species has up today been practically unknown. It is easily distinguished from all other species of *Harpophylloceras* by its acute keel.

Occurrence: Lotharingian, Oxynotum zone.

Analytoceratidae SPATH, 1927

Remark: First of all it is necessary to mention that in spite of some progress achieved, our knowledge of the first representatives of the Lytoceratina in the early Jurassic is still uncomplete and there are a lot of gaps in it. Only in some cases we know the ontogeny of taxa, and that is necessarily reflected in poor information on phylogenetic relationships in this group and its systematic as well. In the seventies WIEDMANN (1970: 946 and 1006) and also WIEDENMAYER (1977: 67 and 1979: 826) proposed a new approach or rather ranging the Analytoceratidae SPATH, 1927 based exclusively on the suture line and on the arrangement of suture elements in the umbilical area. With regard to the fact that in the majority of cases we do not know the ontogeny of the suture lines of the taxa of this group, this method is hardly applicable without the risk of mistakes.

Because the author of this study succeeded in the previous years in assembling some new information about the ontogeny of several taxa from the family Analytoceratidae, we suggest here a ranging different from that proposed by the above mentioned authors. This division is based on the general morphogenetic development of the species, or rather their morphological stages and so it is not only based on the suture line. We have noted that in some cases, that means when we still do not have sufficient information at our disposal, the ranging of the particular taxa is facultative.

Based upon the principle mentioned, we could divide the Analytoceratidae family as follows:

Subfamily **Analytoceratinae SPATH, 1927**
Subfamily **Ectocentritinae SPATH, 1926**
Subfamily **Bouhamidoceratinae nov. subfam.**

Analytoceratinae: Into the nominal subfamily we include only one genus namely ***Analytoceras* HYATT, 1900.**

Ectocentritinae: The second, largest and morphologically most complicated is the subfamily Ectocentritinae comprising eight genera. We include here: ***Ectocentrites* CANAVARI, 1882**, ***Exomiloceras* WIEDENMAYER, 1979**, ***Lytotropites* SPATH, *1924*, *Fucinites* GUGENBERGER, 1936** (note: the ranging of the two latter genera among Ectocentritinae is not certain because the juvenile stages of both genera have the typical "Knötchen" stage while in all the other members of the family it is missing. By this character they approach to the Pleuroacanthitidae. On the other hand the more adult stages are morphologically closer to Ectocentritinae!), ***Adnethiceras* WIEDMANN, 1970**, ***Peltolytoceras* SPATH, 1924**, ***Tragolytoceras* SPATH, 1924** and ***Lytoconites* WIEDMANN, 1970.** The latter genera with the exception of *Lytoconites* create a separate group of ribbed ectocentritids for which an expressive ribbing of the adult stages is characteristic. With some reserve we range here also ***Eolytoceras* FREBOLD, 1967.** Its juvenile stage is evolute and probably with constrictions, rapidly replaced by prorsiradiate ribs with indications of ventrolateral tubercles. The

Plate 1

Fig. 1: ***Exomiloceras altum* (HAUER, 1856), LECTOTYPE.** This specimen was found in the STUR's collection. On its back side is written with Indian ink XI 7–8. The style of writing is similar to the HAUER'S handwriting. The numbers 7–8 correspond to numbers on the plate XX in HAUER'S monograph from 1856. Also the general shape corresponds well to HAUER'S depiction (cf. Pl. XX, Fig. 7–8. Only the whorl section of HAUER'S depiction (Fig. 8) is narrower than that of our specimen (after our observation). This difference is due to corrosion and also to the draughtsmans mistake, loc. Adnet, Lotharingian, Oxynotum zone, slightly diminished.

Fig. 2: ***Exomiloceras* sp.**, a polished specimen from HAUER'S collection formerly denoted as *Ammonites altus* HAUER, loc. Adnet, Lotharingian, Oxynotum zone, slightly enlarged.

Fig. 3: ***Paroxynoticeras salisburgense* (HAUER, 1856), LECTOTYPE**, this specimen with body chamber was found in the HAUER'S collection and corresponds well to the HAUER'S figuration (1856, Pl. 13, Fig. 1,2), loc. Adnet, Lotharingian, Oxynotum zone, natural size.

Fig. 4: ***Exomiloceras altum* (HAUER, 1856)**, a specimen (phragmocone) from ŠTÚR'S collection, loc. Adnet, Lotharingian, Oxynotum zone, natural size.

subadult stage has fine prorsiradiate ribs interrupted on the venter with minute ventrolateral tubercles. The adult stages show weak flat ribs and occasional constrictions. The presence of ventrolateral tuberculation evokes the relationships with Ectocentritinae.

Exomiloceras WIEDENMAYER, 1979

Remark: Originally WIEDENMAYER (1979: 862) included this genus in the family Analytoceratidae SPATH sensu novo. As we mentioned above, it seems more natural to place it into the subfamily Ectocentritinae. WIEDENMAYER (1979) considered this new genus as monotypic, what according to our opinion is not in accordance with the reality (see following).

Exomiloceras altum (HAUER, 1956)

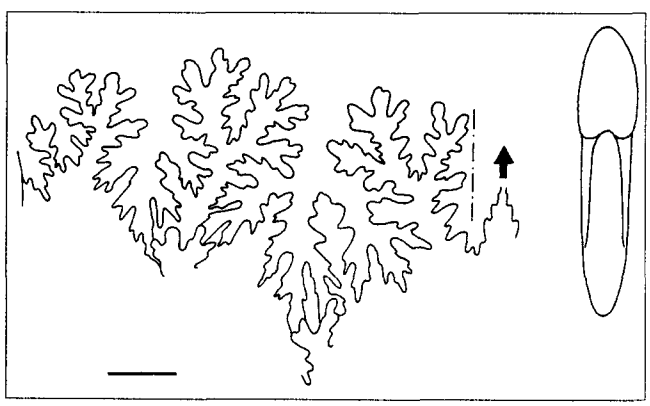
Text-Fig. 2, 3, Pl. 1, Fig. 1,3

1856 *Ammonites altus* HAU – HAUER: 66, Pl. 20, Fig. 7–8 (non Fig. 9)
1863 *Ammonites altus* F. von HAUER. – OOSTER: 34, Pl. 15, Fig.14–17
1879 Ammonites altus HAUER – REYNES: Pl. 30, Fig. 6, 7 only
1979 *Exomiloceras altum* HAUER 1856 – WIEDENMAYER: 860, Fig.1–2
1980 *Exomiloceras altum* (HAUER) – WIEDENMAYER: 173, Fig. 53a, d, e
non 1867 *Ammonites altus* (Von HAUER) – DUMORTIER: 150, Pl. 28, Fig.4–6
non 1900 *Ectocentrites (?) altiformis* n. f. – BONARELLI: 73, Pl. 9, Fig. 4–6
non 1901 *Ectocentrites altiformis* BON – FUCINI: 86, Pl. 14, Fig. 1–9

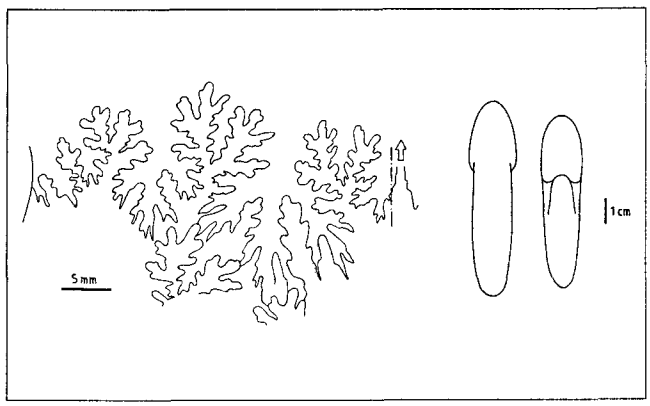
Lectotype: re-designated herein is specimen depicted on the Plate 1, Fig. 1, deposited at GBA collection.
Material: six more or less complete specimens preserved as stone core

Dimensions:	D	Wh	Wb	O	
	78.0	31.4	18.0	23.0	
	78.0	33.6	18.2	–	
	84.5	32.4	–	23.0	Langmoos quarry
	87.0	33.3	18.8	25.0	= Lectotype
	91.8	38.0	21.2	28.5	
num. 1856 GBA	98.0	37.5	19.0	32.0	= syntype

Description: At first look this smooth and medium-sized (the total diameter can reach approx. 120 mm), slightly convolute and laterally compressed form belongs to the so to say "current" Liassic ammonites, which can be confused with some other Lytoceratids.
The subadult stage has an elliptical whorl section with a narrow venter, but always without the true keel (Text–Fig.2 and 3). With the growing diameter , the venter is larger and at the beginning of the body chamber the whorl section is oval with nearly parallel sides. The umbilicus is relatively large. The umbilical wall and edge form one short arc. Prominent ornamentation is lacking.
The suture line (Text–Fig. 2, 3) is asymmetric, strongly divided by thin stems of the saddles. The axe of the first and second lateral saddles (S1 an S2) are oblique and peristomally convergent. The lateral lobe is large and its form reminds of an oak leaf.
Remark: Several problems are connected with the species *E. altum*. The first problem concerns the choice of type. WIEDENMAYER (1979) was the first to revise this species, and as a lectotype he choose a specimen (cf. p. 860) which comes from HAUER'S collection, but its preservation is poor (see l.c. Fig. 1, 2 and 1980, Fig. 53). As we can see from HAUER'S text (1856: 67), he had at his disposal several specimens which are not included in his collection today.
By the revision of the ŠTÚR'S collection (GBA deposit) I found various individuals, which can be, without any doubt included into the *E. altum* (HAU.) species. On the label on the samples *"A. altus* HAU" was written and under it "Haplo (?) XI 7-8, Adneth". On the same label there is attached another label with ŠTÚR'S handwriting saying *"Haploceras* (?) *altus* v. H., orig. Taf. XX, Fig. 7–9, Unterer Lias, Oxynotus Schichten, Adneth". One of the samples was in ink denoted as XI 7–8 ! The manner of writing the numerals is identic with other marks on the ammonites of the HAUER'S collection, which were made by HAUER himself. Because of this fact I conclude that in this case it really is an original piece from HAUER'S collection, which was pictured in his monograph in 1856, Pl. XX, Fig. 7–8 and for this reason we should treat it as a lectotype! Such a nomenclatory status may be also supported by the big similarity with HAUER'S depiction and by the numbers 7–8 coinciding with the numbers on table XX. The fact that this piece was included in the ŠTÚR'S collection is hard to explain nowadays. It is possible that ŠTÚR used it as comparative material. Further, the GBA collections were in part damaged during the war and by the reorganisation it could have come to a wrong place.



Text–Fig. 2.
Cross section and suture line *Exomiloceras altum* (HAUER, 1856), lectotype. Scale bar 5 mm.



Text–Fig. 3.
Cross section and suture line of *Exomiloceras altum* (HAUER, 1856) paratype.

The second problem is in fact that the *Exomiloceras* is monotypical. WIEDENMAYER (1979: 861) included BONARELLI'S species *Ectocentrites* (?) *altiformis* n.f. into the synonymy of *E. altum* (HAU.). For justification he states that "the mistake in ornamentation on the phragmocone is not important". On the basis of well preserved and relatively rich material from the Lotharingian of the West Carpathians I can confirm that the *Exomiloceras altiforme* (BON.) is a separate species, which shows characteristic ornamentation and its including into the *E. altum* is unreasonable. At the same diameter of the phragmocone the *E. altiforme* has visible, sometime even expressive sigmoidal ribs with indication of ventrolateral tubercles, in contrast to *E. altum* which is either smooth or has subtle growth lines.

I did not include the specimens figured by DUMORTIER (1867) and REYNES (1879 pars) into the synonymy of the *E. altum* because in comparison with the true species *altum* they are visibly more involute what rather resembles to the *Bouhamidoceras zizense* DUBAR.

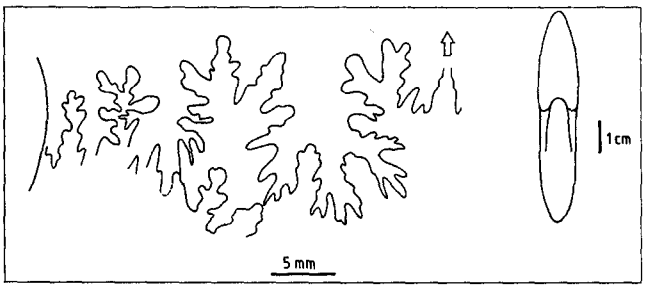
Occurrence: Lotharingian, Oxynotum zone, Adnet.

Exomiloceras sp.

Text–Fig. 4, Pl. 1, Fig. 2

Material: one specimen (polished phragmocone).

Dimensions:	D	Wh	Wb	O
GBA1856/01/65(XI)	72.0	32.0	16.2	20.5



Text–Fig. 4.
Cross section and suture line of *Exomiloceras* sp.

Remark: In the HAUER'S collection there is a specimen labelled as *Ammonites altus* HAU. By its general shape the specimen reminds of *E. altum* (HAUER) from which it differs in indication of periventral depressions in subadult stage (Text–Fig. 4). The suture line is slightly asymmetric.

Occurrence: Adnet, Lotharingian, Oxynotum zone.

Adnethiceras WIEDMANN, 1970

Adnethiceras adnethicum (HAUER, 1854)

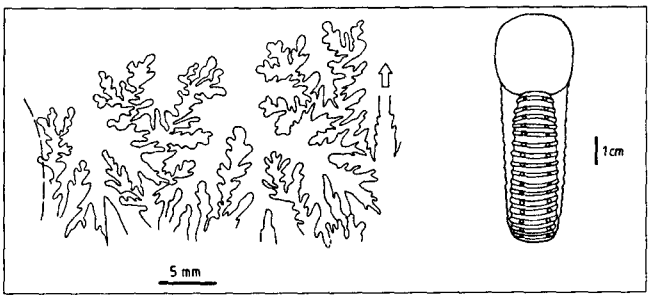
Text–Fig. 5, Pl. 2, Fig. 3

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

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.



Text–Fig. 5.
Cross section and suture line of *Adnethiceras adnethicum* (HAUER, 1854)

Material: one medium–sized specimen with partly preserved body chamber and two fragments of whorls.

Dimensions:	D	Wh	Wb	O
	87.0	25.0	25.4	44.0

Remark: This species is relatively frequent at the base of the Adnet Formation. Unfortunately, due to the type of fossilization we do not know its juvenile stage and the beginning of its subadult stages either. The subadult and adult stages are characterised by very expressive prorsiradiate ribs, crossing the venter with minute ventrolateral tubercles (end of subadult stage; Text–Fig. 5).

The suture line (Text–Fig. 5) has a "microderoceratitic" character and it is strongly divided. The saddles have practically the same height.

Occurrence: Adnet, Rot–Grau Schnöll Quarry, Upper Sinemurian, Semicostatum zone.

Bouhamidoceratinae subfam. nov.

The last and new subfamily of Analytoceratidae we define as follows: small to large forms, laterally compressed, discoid with "oxynoticeratitic shape", but always without acute keel. During ontogeny different types of coiling occure. Juvenile stage is evolute with/or without parabolic lines and with more or less expressed constriction replaced by sigmoidal ribs. Adult stages are convolute to involute with longitudinal periventral depressions and smooth (*Bouhamidoceras*). Sometime the ornamentation on the venter may be coarser (*Galaticeras*). The suture line is very complicated and asymmetric (Upper Hettangian to Carixian).We range here the following genera: ***Bouhamidoceras* DUBAR, 1961**, ***Galaticeras* SPATH, 1938** and two new genera from Tunisia.

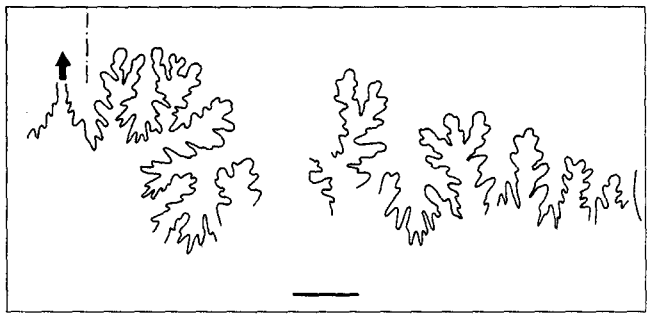
[1]*Note:* Lately I understood the genus *Bouhamidoceras* and relative taxa as belonging to the subfamily Discamphiceratinae (GUEX & RAKÚS, 1991). With regard to the different ontogenic development of juvenile and subadult stages now I am inclined to its exclusion from Discamphiceratinae.

Bouhamidoceras DUBAR, 1961

Bouhamidoceras cf. *zizense* DUBAR, 1961

Text–Fig. 6

Remark: In the ŠTÚR'S collection there are two more or less corroded specimens, which by their whorl section and suture line (Text–Fig. 6) considerably remind of the species *B. zizense* DUBAR.



Text–Fig. 6.
Suture line of *Bouhamidoceras* cf. *zizense* DUBAR, 1961. Scale bar 5 mm.

Occurrence: Adnet, Langmoos Quarry, Lotharingian, Oxynotum zone.

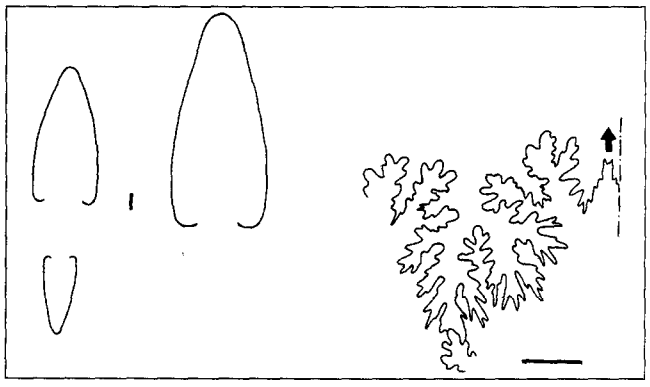
Bouhamidoceras adnethicum (STUR, 1875 m. s.)

Text–Fig. 7, Pl. 2, Fig. 2, 4

1875 *Amaltheus adnethicus* STUR m. s., hand writing on the label.

Lectotype: designated here is the specimen depicted on Plate 2, Fig. 3, deposited in the collection of GBA.
Locus et stratum typicum: Adnet, Langmoos Quarry, Austria, Lotharingian, Oxynotum zone
Material: six more or less complete phragmocones preserved as stone cores, partly corroded by dissolution

Dimensions: D	Wh	Wb	o
64.6	33.0	11.6	11.0
74.0	40.3	17.2	11.8
82.0	41.5	18.4	15.5
98.2	52.8	21.7	15.2
115.0	55.0	21.7	17.0
142.5	71.0	27.0	22.6



Text–Fig. 7.
Cross section and suture line of *Bouhamidoceras adnethicum* (STUR m.s., 1875), lectotype. Scale bar 5 mm.

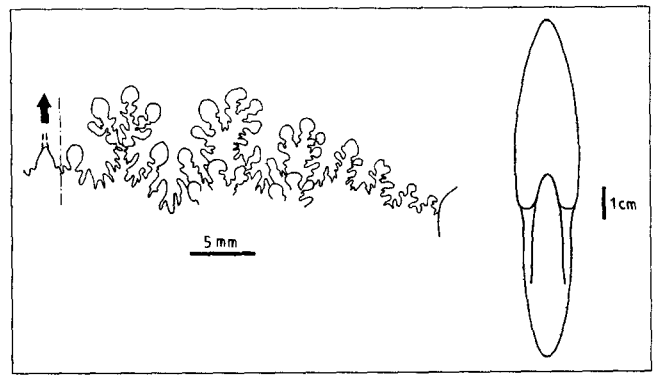
Diagnosis: medium–sized discoidal and laterally compressed form characterised by a relatively narrow umbilic and rounded umbilical edge.
Remark: In its general morphology this form is very close to the species *zizense*. The whorl section (Text–Fig. 7) is characterised by a narrow venter and slightly vaulted flanks. The periventral depressions are scarcely indicated. The umbilical edge and wall form a short bend and they are not depressed as we can see at the species *zizense*.
The suture line (Text–Fig. 7) is clearly asymmetric, with the oblique first lateral saddle (S1)
Occurrence: Adnet, Langmoos quarry, Lotharingian, Oxynotum zone.

?Bouhamidoceras sturi n. sp.

Text–Fig. 8, Pl. 2, Fig. 1

Holotype: designed herein is specimen figured on Plate 2, Fig. 1.

Derivatio nominis: after DIONÝZ ŠTÚR outstanding geologist and former director of Geologische Reichsanstalt in Vienna.
Locus et stratum typicum: Adnet, Austria, probably Sinemurian or Lower Lotharingian(?).
Material: one partly corroded stone core (phragmocone)



Text–Fig. 8.
Cross section and suture line of *? Bouhamidoceras sturi* n.sp., holotype.

Dimensions:	D	Wh	Wb	O
GBA 407=Holotype	97.0	50.0	20.0	9.6

Description: This form with "oxynoticeratitic" shape is characterised by discoidal, involute shell. The whorl section (Text–Fig. 8) is lanceolate without acute keel. The flanks are slightly convex and near the umbilical region almost parallel. The umbilicus is narrow, deep and depressed. Umbilical edge is rounded, but well expressed.
The suture line (Text–Fig. 8) is asymmetric with particular spatulation of the follioles on saddles. The S1 is deeply dissected with narrow and bifide stem. The S2 is robust in comparison with S1.
Remarks: With respect to the general shape as well as the asymmetric suture line of the new species we attach it to the *Bouhamidoceras*. On the other hand we must note that the type of the follioles spatulation still reminds of a paroxynoticeratitic suture line. For this reason we are not definitely sure to range it to the genus *Bouhamidoceras*. From the *B. zizense* DUBAR the new species differs especially in its suture line.
Occurrence: Adnet, unfortunately the exact stratigraphic position is not clear; on the original label there was written in ŠTÚR'S handwriting "Unterer Lias Arieten Schichten, Adneth". As we know that the Adnet Formation begins in the Semicostatum zone only (RAKÚS in BÖHM et al., 1999), *?B. sturi* n. sp. should be younger as the true *Arietites*.

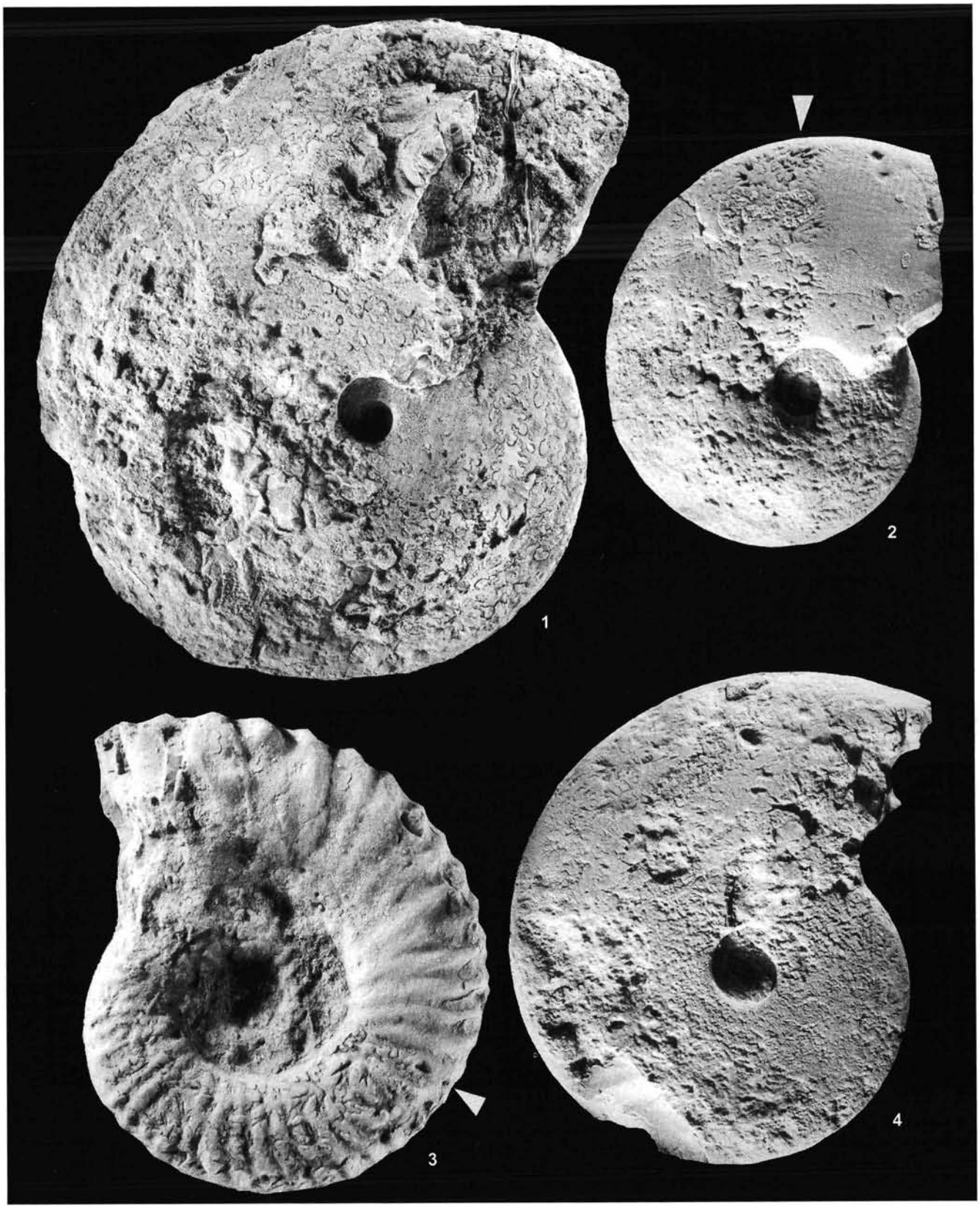


Plate 2

Fig. 1: ***?Bouhamidoceras sturi* n. sp., HOLOTYPE**, ŠTÚR's coll. num. GBA 407, loc. Adnet, probably Sinemurian or Lower Lotharingian (?), 0,3x enlarged.

Fig. 2: ***Bouhamidoceras adnethicum* (STUR m. s., 1875)**, paratype with body chamber partly preserved, ŠTÚR's coll., loc. Adnet, Lotharingian, Oxynotum zone, natural size.

Fig. 3: ***Adnethiceras adnethicum* (HAUER, 1854)**, specimen with body chamber partly preserved, ŠTÚR's collection, loc. Adnet, Lower Sinemurian, Semicostatum zone, natural size.

Fig. 4: ***Bouhamidoceras adnethicum* (STUR m.s., 1875), LECTOTYPE**, specimen (phragmocone) from the ŠTÚR's collection, loc. Adnet, Langmoos Quarry, Lotharingian, Oxynotum zone, slightly diminished.

Schlotheimiidae Spath, 1923

Angulaticeras Quenstedt, 1883

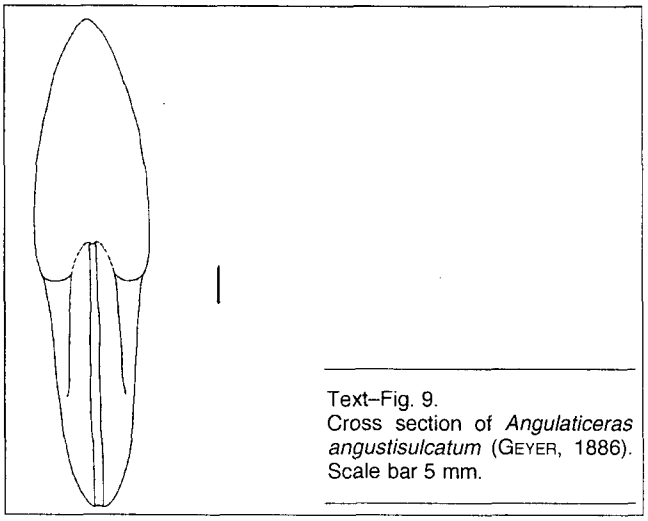
Angulaticeras angustisulcatum (Geyer, 1886)

Text–Fig. 9, Pl. 3, Fig. 4

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

Material: one specimen (phragmocone).

Dimensions:	D	Wh	Wb	O
Stur's Coll. 567	63.0	33.4	14.2	8.3



Text–Fig. 9.
Cross section of *Angulaticeras angustisulcatum* (Geyer, 1886). Scale bar 5 mm.

Remark: This laterally compressed Lotharingian schlotheiminid is characterised first of all by a ventral furrow in the juvenile stage, which disappears at 42 mm of diameter. Then the cross section is highly elliptical with a narrow venter (Text–Fig. 9). The second characteristic feature is ornamentation which is composed of fine, sigmoidal, slightly prorsiradiate, regular and bifurcated ribs. The species *A. lacunatum* (Buckman) is similar to our species, it differs from it in more prorsiradiate ribs.

Occurrence: Adnet, probably Lotharingian, Oxynotum zone.

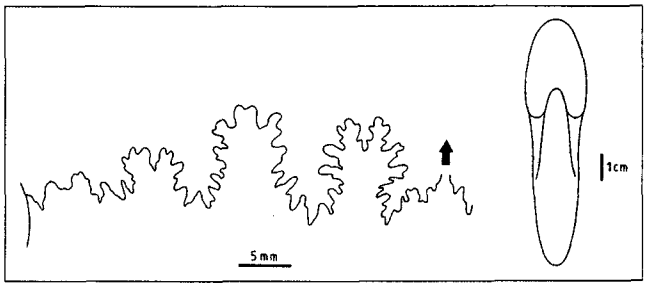
Oxynoticeratidae Hyatt, 1875

Paroxynoticeras Pia, 1914

Paroxynoticeras salisburgense (Hauer, 1856)

Text–Fig. 10, Pl. 1, Fig. 3

1856 *Ammonites Salisburgensis* Hau – Hauer: 47, Pl. 13, Fig.1, 2 (?3)
1914 *Paroxynoticeras Salisburgense* Hauer spec. – Pia: 18, Text–Fig.1, Pl. 1, Fig. 2a–f, p. 73, Pl. 7, Fig. 22, Pl. 13, Fig. 12a–c,e–h(cum syn.)
1924 *Paroxynoticeras salisburgense* (Hauer) – Spath: 206
1957 *Paroxynoticeras salisburgense* (Hauer) – Arkell: L242, Fig. 267, 9
1970 *Paroxynoticeras salisburgense* (Hauer) – Rakús & Biely: 57
1993 *Paroxynoticeras* aff. *salisburgense* (Hauer) – Dommergues: 127, Pl. 6, Fig. 1



Text.–Fig. 10:
Cross section and suture line of Paroxynoticeras salisburgense (Hauer, 1856), lectotype.

Lectotype: refigured herein on Plate 1, Fig. 3 is a specimen from Hauer's collection, designated by Donovan & Forsey in 1973, p. 9.

Material : one specimen from Hauer collection with its body chamber partly preserved.

Dimensions:	D	Wh	Wb	O
GBA, Lectotype =HAUER,1856, Pl. 13, Fig. 1, 2	98.0	42.0	22.0	18.7

Remark: *Paroxynoticeras salisburgense* (Hauer) and related species represent important correlative elements of the Western Tethys in the Lotharingian. In spite of this fact its nomenclatorial status as well as its morphological development are poorly known.

Spath (1924) denoted Pia's depiction (Pl. 1, Fig. 2f) as genolectotype. This figure was copied by Arkell (1957) in Treatise (Part L, Fig. 267, 9). However, this specimen is not one of Hauer's syntypes as it was correctly mentioned by Donovan & Forsey (1973: 9)! As the Hauer's original was found and exists in GBA collection, we give here its figuration, its suture line, and cross section as well.

On the basis of maghrebian material we can deduce that the species *P. salisburgense* underwent during ontogeny a rather complicated morphological development in comparison with other species of Oxynoticeratids. The juvenile and subadult stages are typical oxynoceratitic in shape, with acute keel. At the total diameter of about 60–70 mm the ventral area becomes more and more rounded and at diameter of approximately 100 mm the whorl section is oval (Text–Fig. 10). The adult stage is characterised by uncoiling last whorl (body chamber). The ornamentation is in general poor, composed of prorsiradiate distant plications.

The suture line (Text–Fig. 10) is typically oxynoceratitic. Our suture line is different from that figured by Hauer in Plate 13, Fig. 3. We suppose that Hauer's figuration belongs to another syntype.

Occurrence: Adnet, Lotharingian Oxynotum zone.

Eoderoceratidae Spath 1929

Alloderoceras Wiedenmayer, 1980

Alloderoceras instabile (Fucini, 1903)

Text–Fig. 11, Pl. 3, Fig. 1

1903 *Deroceras instabile* n. sp. – Fucini: 166, Fig. 93, Pl. 27, Fig. 1
1979 *Alloderoceras instabile* (Fucini, 1903) – Wiedenmayer: 862

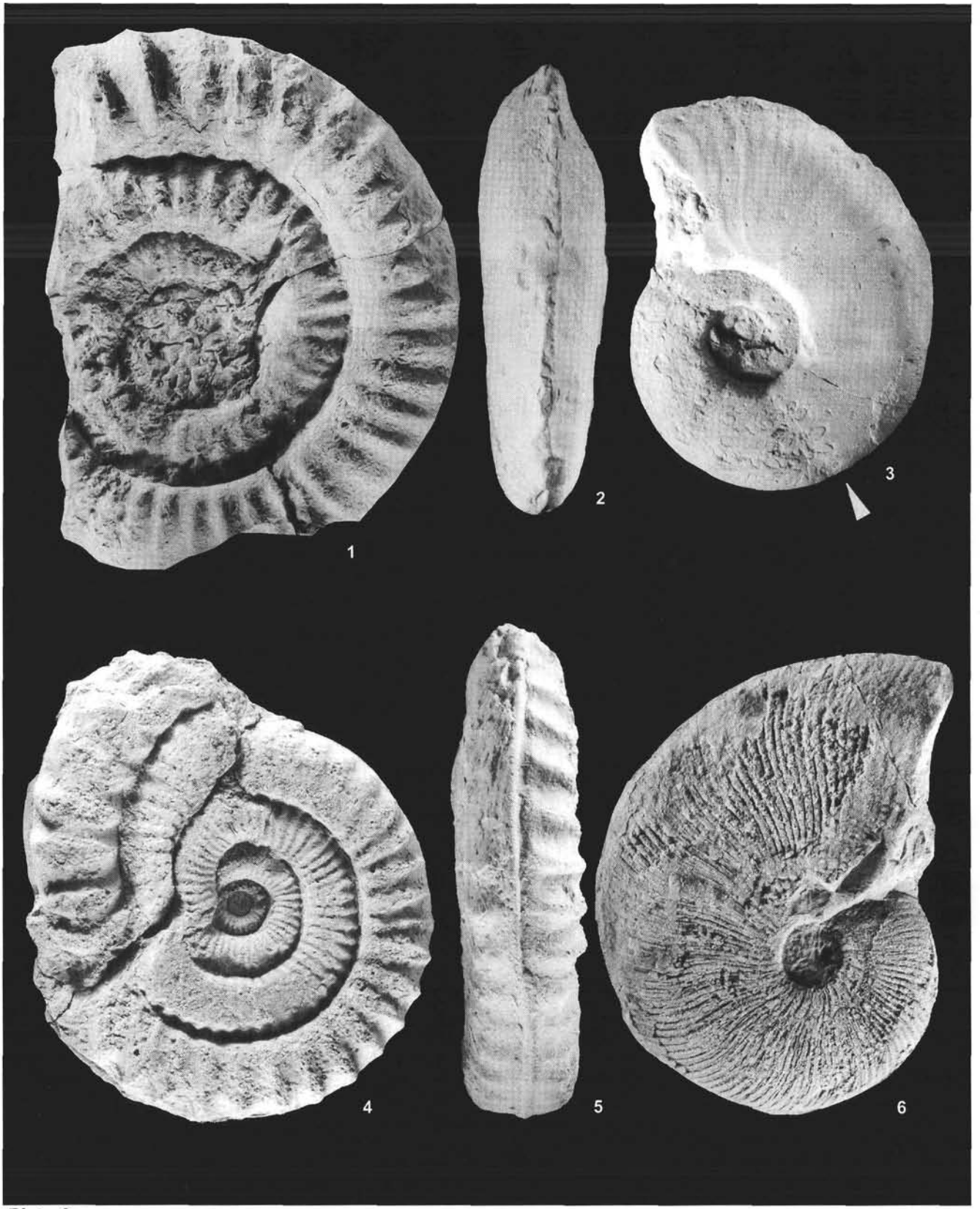


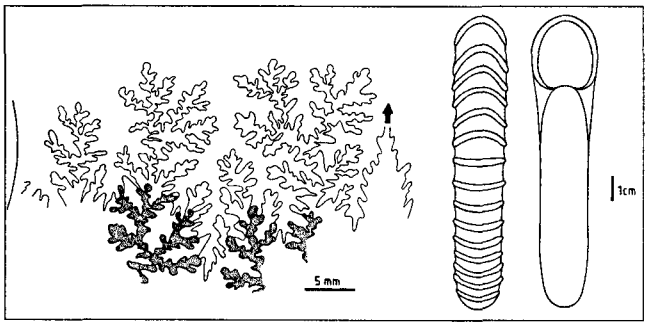
Plate 3

Fig. 1: ***Alloderoceras instabile*** **(Fucini, 1903)**, specimen with body chamber partly preserved, Štúr's collection, loc. Adnet, Lotharingian, Oxynotum zone, diminished 0,4x.

Figs. 2, 3: ***Harpophylloceras cristatum*** **(Stur m. s., 1875), Lectotype**, an adult specimen with body chamber preserved, Štúr's collection, loc. Adnet, Lotharingian, Oxynotum zone, 0,6x enlarged.

Figs. 4, 5: ***Polymorphites mutans*** **(Stur m. s., 1875), Lectotype**, specimen from the Štúr's collection with body chamber partly preserved, loc. Adnet, ? Carixian, 0,3x enlarged.

Fig. 6: ***Angulaticeras angustisulcatum*** **(Geyer, 1886)**, specimen from the Štúr's collection, loc. Adnet, Lotharingian, Oxynotum zone, 0,3x enlarged.



Text–Fig. 11.
Cross section and suture line of *Alloderoceras instabile* (FUCINI, 1903).

1980 *Alloderoceras instabile* (FUCINI, 1903) – WIEDENMAYER: 146, Fig. 52d

Material: one stone cast more or less complete (phragmocone and quarter of body chamber.

Dimensions:	D	Wh	Wb	O
	120.5	31.6	26.8	75.5

Remark: This rare species is characterised by an evolute, laterally compressed shell and strong radiate ribs crossing the venter without interruption. The whorl section is oval with slightly vaulted flanks.

The suture line (Text–Fig. 11) has typically microderoceratitic shape with very divided saddles.

Occurrence, Adnet, Lotharingian, Oxynotum zone.

Polymorphitidae HAUG, 1887

Polymorphites HAUG, 1887

Polymorphites mutans (STUR m. s., 1875)

Text–Fig. 12, Pl. 3, Fig. 3

Lectotype: designated herein is specimen depicted on Plate 3, Fig. 3 and deposited in GBA coll. num. 311.

Locus et stratum typicum: Adnet, Austria, probably Pliensbachian.

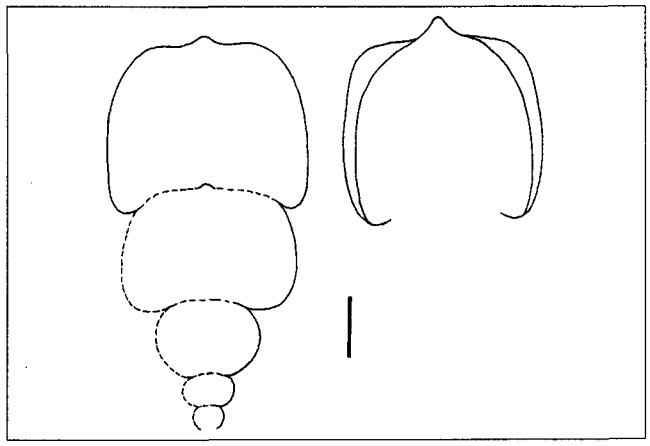
Material: one more or less complete, partly deformed specimen with body chamber (stone cast) from red Adnet limestone.

Dimensions:	D	Wh	Wb	O	
GBA STUR'S coll.	66.4	13.0	16.6	39.0	phragmocone
num. 311	70.0	17.0	15.4	43.0	body chamber

Remark: This large form of a Polymorphitid is characterised by evolute coiling, depressed whorl section and expressive ornamentation. The whorl section of the subadult stages is oval to ventrally depressed (Text–Fig. 12). The ventrum is large, flat and from the 4th–5th whorl with blunt keel. At the end of the subadult stage the keel is accompanied by shallow furrows. The whorl section of the body chamber is laterally compressed and the keel is more acute than on the phragmocone (Text–Fig. 12)

Ornamentation: it is characterised by simple, dense and radiate ribs (subadult stage). At the end of the phragmocone and also on the body chamber the ribs are scarce, with indication of ventrolateral tubercles. The intercalar space is twice the width of ribs. The suture line is unknown.

Occurrence: Adnet, Pliensbachian.



Text–Fig. 12.
Cross section of *Polymorphites mutans* (STUR m.s., 1875), lectotype. Scale bar 5 mm.

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