# Albian stage

(OTTILIA SZIVES)

## Geology and stratigraphy

### Historical background

The Albian stage was introduced by D'ORBIGNY (1842) and named after the Roman name, Alba of Aube. The present type section is located at Aube in the Paris Basin, France. The base of the Albian stage is defined by the first occurrence of a calacareous nannofossil *Prediscosphaera columnata*, the end is defined by the first occurence of a planktonic foraminifer *Rotalipora grobotruncanoides* (GRADSTEIN et al. 2004). According to the latest studies, the Albian stage lasts from 112±1 to 99.6±0.9 Ma (GRADSTEIN et al. 2004 ).

In present monograph the latest report on the suggested standard ammonite zonal sheme for the Albian stage is followed (REBOULET & HOEDEMAEKER, 2006), apart from the Lowermost Albian and the subzonation of the *Stoliczkaia (Stoliczkaia) dispar* Zone.

***Table 4.*** Biozonation of the Albian in the European faunal province after OWEN (1999) and KENNEDY et al. (2000)

| | | Zones (KENNEDY et al. 2000) | Zones (OWEN 1999b) | Subzones (OWEN 1999b; AMÉDRO 2002 in KENNEDY et al. 2008) |
|---|---|---|---|---|
| ALBIAN | Upper Albian (Vraconnian) | Not mentioned | *Stoliczkaia (Stoliczkaia) dispar* | *Arrhaphoceras (Praeschloenbachia) briacensis*<br>*Mortoniceras (Subschloenbachia) perinflatum*<br>*Mortoniceras (Subschoenbachia) rostratum*<br>*Mortoniceras (Mortoniceras) fallax* |
| | | | *Mortoniceras (Mortoniceras) inflatum* | *Callihoplites auritus*<br>*Hysteroceras varicosum*<br>*Hysteroceras orbignyi*<br>*Dipoloceras cristatum* |
| | Middle Albian | | *Euhoplites lautus* | *Anahoplites daviesi*<br>*Euhoplites nitidus* |
| | | | *Euhoplites loricatus* | *Euhoplites meandrinus*<br>*Dipoloceroides subdelaruei*<br>*Dimorphoplites niobe*<br>*Anahoplites intermedius* |
| | | | *Hoplites dentatus* | *Hoplites spathi*<br>*Lyelliceras lyelli* |
| | Lower Albian | | *Otohoplites auritiformis* | *Pseudosonneratia (Isohoplites) steinmanni*<br>*Otohoplites bulliensis*<br>*Protohoplites (Hemisonneratia) puzosianus*<br>*Otohoplites raulinianus* |
| | | | *Sonneratia chalensis* | *Cleoniceras floridum*<br>*Sonneratia kitchini*<br>*Sonneratia (Globosonneratia) perinflata* |
| | | *Leymeriella (E.) regularis* | *Leymeriella tardefurcata* | *Leymeriella regularis* |
| | | *Leymeriella (L.) tardefurcata* | | *Leymeriella acuticostata* |
| | | *Leymeriella (L.) germanica* | | |
| | | *Proleymeriella schrammeni* | | *Leymeriella schrammeni* |

This table is not a correlation chart. Note that KENNEDY merged two Leymeriella subzones to the Aptian.

Zonal schemes for the Albian of the European faunal province were published by OWEN (1984; 1999a, b, c; 2002) and by KENNEDY et al. (2000) for the Latest Aptian/Lowermost Albian of the Tethyan province (Table 4). For historical and practical reasons, the Aptian/Albian boundary on the basis of ammonites, is defined by the first appearance of genus *Leymeriella (Proleymeriella)* by BREISTROFFER (1947). Recent investigations (KENNEDY et al. 2000; HANCOCK 2001) made clear that genus *Leymeriella* is not an eligible marker to determine the exact position of the boundary. A detailed history of the zonal schemes for the Albian is studied by CASEY (1961a), KEMPER (1982), KENNEDY et al. (2000) and OWEN (2002).

BREISTROFFER (1947) merged the Clansayesian substage — JACOB's (1908) original Zone of *Douvilleiceras (Diadochoceras) nodosocostatum* and *Douvilleiceras (Acanthohoplites) bigoureti* — to the Aptian. Ammonite standard zonal scheme for the Albian stage is under a current discussion (REBOULET & HOEDEMAEKER 2006), but the position of the Aptian/Albian boundary is still an outstanding problem. According to the ammonite record, KENNEDY (KENNEDY in KENNEDY et al. 2000) suggested to mark the Aptian/Albian boundary between *Leymeriella germanica* and *Leymeriella tardefurcata* Zones. Here I follow his zonation for the latest Aptian/Lowermost Albian. The most recent study (HANCOCK 2001) proposed the base of *Lyelliceras lyelli* Zone as the base of the Albian — the lower boundary of this subzone currently marks the basal Middle Albian. OWEN (2002) also supported this idea and agreed that the position of the Clansayesian and the Aptian/Albian boundary is problematic since BREISTROFFER (1947). The Aptian/Albian boundary problems are also discussed in the Aptian chapter.

The subdivisions of the *Stoliczkaia (S.) dispar* Zone follows AMÉDRO's (2002) zonation who rise *Mortoniceras (Mortoniceras) fallax* BREISTROFFER as the oldest subzone of the *Stoliczkaia (S.) dispar* Zone (LATIL 1994a, b; AMÉDRO 2002 in KENNEDY et al. 2008).

The Albian/Cenomanian boundary is fully discussed in the last decade (TRÖGER et al. 1996; GALE et al. 1996; KENNEDY et al. 2004) and a Global Boundary Stratotype Section and Point (GSSP) is marked at Mont Risou, France (GALE et al. 1996; KENNEDY et al. 2004; GRADSTEIN et al. 2004) on the base of the first occurence of *Rotalipora globotruncanoides*, a plancton foraminifer. The historical ammonite markers of the basal Cenomanian as genera *Mantelliceras* HYATT, 1903 or *Neostlingoceras* KLINGER & KENNEDY 1978, are not widespread enough or rare (HANCOCK 2001) to mark the base correctly (GALE et al. 1996, KENNEDY et al. 2004).

## Albian record in Hungary

### *Geological setting and stratigraphy*

The Albian age was a stirring period in the history of the future Alps. First movements of Austrian orogeny started in the Early Aptian and culminated around the Aptian/Albian boundary (HAAS 1994) so Late Aptian – Middle Albian strata are often disturbed or even absent in the Western Tethyan area, even as in Hungary. In the Cretaceous, the second huge sedimentary megacycle had been started in the Early Albian and a slow, continuous deepening of the sedimentary basin can be recognized. Albian formations are relatively rare on the surface of Hungary. In the present Pannonian Basin most of the pre-Neogene basement is covered with hundreds, or even thousand metres of Neogene deposits. Mesozoic, consequently Albian sediments are exposed on surface and in boreholes in two areas — in the Transdanubian Range and the Villány Mountains. Hungarian Albian sediments from stratigraphic point of view are represented by several lithostratigraphic units. Albian ammonite bearing sequences listed here from south to north.

#### VILLÁNY MOUNTAINS

In the Villány Mountains Albian ammonites are known only from two sedimentary units, a dark grey aleurolite-marl-sandstone sequence known as Bóly Sandstone and the Bisse Marl Formations. Their geographical position can be seen on.

Cretaceous sediments of the Villány Mountains were first mentioned by PETERS (1863, p. 6) in the Hungarian geological literature. Detailed geological mapping of the area was done by HOFMANN (1876) for the first time. FÜLÖP (1966) realized the Albian age of previously thought-to-be Neocomian dark grey marl on the basis of ammonite evidences.

Bisse Marl Formation is dark grey marl with turbiditic sandstone intercalations, which overlaps the NAGYharsány Limestone or older Jurassic sediments. LÓCZY jr. (1912) published a monograph about the Villányi Cretaceous and he mentioned first a "[…when wet it is a bluish grey, at dry state a yellow coloured marl…]". This deposit was named later as Bisse Marl Formation (HORVÁTH in FÜLÖP 1978, p. 104). It is restricted to the Villány Zone, and known from a single surface outcrop of Tenkes Hill and from several boreholes — the most important are Bóly B–1, Vokány V–4, NAGYbaracska B–28. The marl is hemipelagic sediment (CSÁSZÁR [ed] 1996) with a rich ammonite assemblage of Late Albian age that was found in the Bóly B–1 borehole.

The Bóly Sandstone Formation is poorly known flysch sediment. The only sure record of the Bóly Sandstone is from the upper part of the Bóly B–1 borehole. BODROGI (1998) sutdied the foraminifer assemblage of the Bóly B–1 borehole. A bore-

hole near to Nagybaracska B–28 crossed similar sediment without any ammonite evidence. BUJTOR (1989, 1991) studied intensively the macrofossil assemblage of the borehole, with a special focus on the abundant ammonites. According to the hereby revised ammonite data of the Bóly B–1 borehole, the age of the Bóly Sandstone Formation is restricted in the Late Albian *Stoliczkaia (S.) dispar* Zone.

TRANSDANUBIAN RANGE

Heading to north to the Transdanubian Range, Albian sediments are the Vértessomló Aleurolite, Zirc Limestone and Pénzeskút Marl formations that yield rich ammonite assemblages of Early and Latest Albian.

The Vértessomló Aleurolite is restricted to the Vértessomló Basin, the Tatabánya Basin, the western Gerecse foreland and supposedly it appears in the Western Gerecse Mountains (CSÁSZÁR [ed.] 1996). Early Albian ammonites are known from several boreholes and preserved mostly in pyritic state. In the Vértessomló Vs–8 continuous core sampled borehole the transition between crinoidal, underlying Tata Limestone and the covering, dark grey Vértessomló Aleurolite could be well observed with an excellent example of a fault as well.

Zirc Limestone is a rudistid, biogenic limestone which underlies the Pénzeskút Marl sequence. Due to its facies, ammonites are rare in the sediment, hitherto HORVÁTH (1985) mentioned a "*Stoliczkaia dispar"* specimen from the upper part of the Zirc Limestone. According to her data the age of the limestone, or at least the upper part, is Late Albian. Foraminifer data is presented by BODROGI (1993) and supported the Late Albian age of the formation.

The glauconitic Pénzeskút Marl is one of the most extensively studied Cretaceous sedimentary units of Hungary since centuries. The greyish yellow dolomitic marl with an impressive thickness of 350–500 metres, can be interpreted as the closure of the "Mid"-Cretaceous (Aptian–Cenomanian) sedimentary circle (CSÁSZÁR [ed.] 1996). According to its sedimentary features, the marl is divided vertically into three parts. Ammonites occur in all three subunits. Brief summary of the research history of Pénzeskút Marl given below is based on the work of NAGY (1973).

Although RÓMER (1858) mentioned a *Hippurites* from the Bakony Mts, HAUER (1862) made palaeontological interpretation for the first time. Thanks to its impressive macrofauna — ammonites, belemnite rostra, bivalves and gastropods in great abundance —, the age of "Schichten von Pénzeskút" and "Schichten von Nána" (HAUER 1862) was well determinable as "Gaultien" by HAUER (1858, 1862). The Pénzeskút Marl contains two sedimentary units: "Turritenmergel" (STACHE 1862, 1867), a light coloured glauconitic, marly sediment is followed — continuously or more frquently with a gap — by a more dolomitic marl. Since HAUER (1862), the Vraconnian of Hungary was named as "strata of Nána" and "strata of Pénzeskút". "Strata of Nána" can be described as an Upper Albian glauconitic sequence that overlaps, sometimes discordantly to other Albian sediments. "Strata of Pénzeskút" are concordantly overlain by the Nána beds. Separation of the two units was based on mainly lithological characters and could not be well observed according to faunistical peculiarities.

The possible presence of Cenomanian strata was suggested by BÖCKH (1909) "…considering the presence of *Acanthoceras mantelli* and *Discoidea cylindrica*.". TAEGER (1909, 1911, 1914, 1915, 1936) also extensively studied the Bakony area, and considered "Turrilitenmergel" and "Gault limestone" as the "youngest Cretaceous strata of the Bakony". He sent fossils to Henri Douvillé, who also attributed Vraconnian age to the upper turrilitic marl (H. DOUVILLÉ 1933). According to Taeger's ammonite data, TELEGDI ROTH (1935) also accepted the Vraconnian age of the glauconitic and turrilitic marl. NOSZKY JR. (1934) suggested the "Vracconnien glauconitic marl" is very alike to the glauconitic marls of the Tatras and supported the presence of Cenomanian sequences. After HAUER (1858, 1862) and H. DOUVILLÉ (1933), studies on ammonite assemblages were abandoned for a while. SZÖRÉNYI (1955) described echinoids, CZABALAY (1964, 1965) was working on the rich gastropod fauna of the "Turrilitenmergel", both of them regarded the age of the sequence as Late Albian to Mid? Cenomanian. In the meantime, two researchers started working on the ammonite assemblages of the Hungarian Upper Albian. Anna HORVÁTH (1985, 1989) studied extensively borehole faunas, while SCHOLZ (1975, 1979, 1997) was working on surface locality materials — as Bakonynána, Pénzesgyőr Tilos Forest. Horváth especially focussed on Jásd J–36 and Jásd J–42 boreholes, results were summarized in two papers (HORVÁTH 1985, 1989) the rest was left in manuscripts. However, Horváth determined ammonites for the late Prof. FÜLÖP what he used for his monographs (1961, 1964, 1975). NAGY I. Z. (1963, 1971, 1982, 1986) studied the cephalopods from the collection of the Hungarian Natural History Museum of surface localities and concluded "on the basis of the (ammonite) faunal elements that both the *Dispar* and *Substuderi* Zones are represented" and "the presence of the Cenomanian….cannot be justified by the ammonite fauna". NAGY I. Z. (1973) presented a list of 44 taxa and made an accurate historical outline of the "Vraconnian". Previous (ammonite HORVÁTH [1985, 1989], foraminifer [SIDÓ 1966, 1971; CSÁSZÁR et al. 1987], ostracod [MONOSTORI 2000]) studies supported the Late Albian – Middle Cenomanian age determination.

According to the ammonite data presented here, specimens surely known from the Late Albian *Stoliczkaia (S.) dispar* Zone and no Cenomanian taxa are recorded. Ammonite taxa determined previously as Cenomanian (HORVÁTH 1985, 1989) from the Jásd J–42 borehole, are revised here as Late Albian ones.

## Studied sections

Ammonites from the Early Albian are from the *Leymeriella (L.) tardefurcata* Zone and cannot be found in surface outcrops but in continuous core sampled boreholes. There is no ammonite evidence from the Middle Albian in Hungary, in contrast to the abundant and rich Late Albian faunas.

### *Vértes foreland*

#### OROSZLÁNY O–1881 BOREHOLE

The borehole, drilled with continuous core sampling, penetrated the Vértessomló Aleurolite Formation. A representative Early Albian ammonite fauna was found in the core (Table 5) from the *Douvilleiceras mammillatum* Superzone. The cephalopods of the O–1881 borehole, presumably with the designations of SCHOLZ, revised by O. SZIVES.

***Table 5.*** Ammonite data of Oroszlány O–1881 borehole

| Depth | Ammonite data of Oroszlány O–1881 borehole |
|---|---|
| 292.0 | *Beudanticeras beudanti* (BRONGNIART, 1822) |
| 295.5 | *Beudanticeras* sp. |
| 295.5 | *Beudanticeras beudanti* (BRONGNIART, 1822) |
| 321.4 | *Cleoniceras* cf. *cleon* (D'ORBIGNY, 1841) |
| 338.4 | *Douvilleiceras mammillatum* (SCHLOTHEIM, 1813) |
| 338.8 | *Beudanticeras* sp. |

#### TATABÁNYA TA–1383 BOREHOLE

The borehole was drilled with continuous core sampling and penetrated the Vértessomló Aleurolite Formation. Only two specimens of *Beudanticeras beudanti* (BRONGNIART, 1822) were found between 230.0–256.0 metres.

#### TATABÁNYA TA–1423 BOREHOLE

A single specimen of *Parasilesites* sp. were found at 292.4 m depth. Figured at Pl. XXV, Figure 4.

#### TATABÁNYA TA–1428 BOREHOLE

The borehole, drilled with continuous core sampling, crossed Vértessomló Aleurolite Formation. Only a single *Beudanticeras walleranti* (JACOB, 1908) was found in the core at 319.0 metres depth.

#### PUSZTAVÁM PV–980 BOREHOLE

In the Fülöp József Memorial Book (HAAS [ed.] 1997) there is an unfinished manuscript of the Cretaceous sequences of Vértes Foreland and contains a list and photographs of ammonite assemblages of boreholes drilled around Pusztavám. The work was abandoned because of the death of Fülöp. The ammonite material was determined by SCHOLZ, the specimens are housed in the Geological Museum of Hungary. The assemblage of 63 specimens is from the Upper Albian "Turrilitenmergel" and published by HAAS [ed.] (1997).

#### VARIOUS AMMONITE ASSEMBLAGES FROM BOREHOLES

Some ammonites were described by SCHOLZ in manuscripts as *Hamites* sp., *Puzosia* sp. and *Leymeriella (Proleymeriella) revili* JACOB from Tata TVG–55 borehole that penetrated the Vértessomló Aleurolite Formation. The material is at the Geological Museum of Hungary.

#### VARIOUS, APPARENTLY LOST BUT PREVIOUSLY PUBLISHED BOREHOLE MATERIALS

FÜLÖP (1975) mentions several ammonites from borehole sequences as *Leymeriella (Proleymeriella) revili* JACOB, *Kossmatella jacobi* WIEDMANN and *Leymeriella (Proleymeriella) romana* JACOB from Tata TVG–45, Hamites sp. and *Leymeriella (Proleymeriella)* sp. from Tata TVG–59 and *Protanisoceras* sp. from Tata T–15, but we did not reach the track of the specimens.

### *Bakony Mountains*

#### JÁSD 1 QUARRY

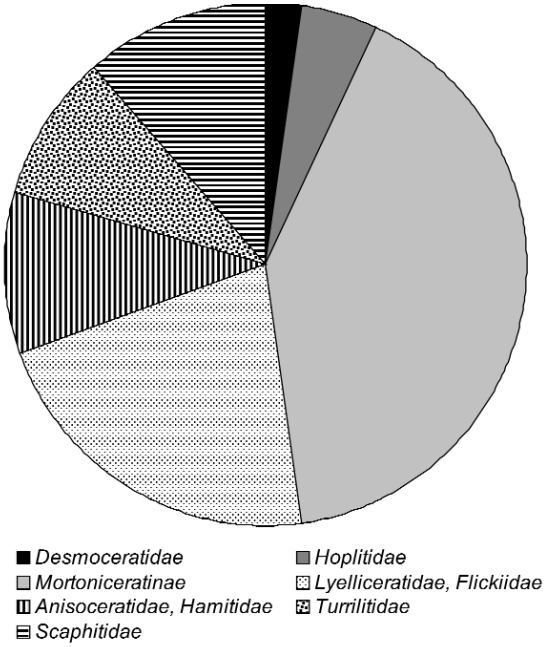
Jásd 1 quarry (Text-Figure 45) is nearby the village of Jásd in the Bakony Mts. There are two quarries in one yard; ammonite material is collected from the smaller one. On account of the oxidation, the originally grey coloured marl became yellowish, with massive marly limestone banks on the base. There is no sign of the condensed basal pockets, so presumably ammonites were not accumulated in pockets at the base but found in the section and collected bed-by-bed.

A brief outline of the section and the ammonite assemblage was given by HORVÁTH (1985, 1989). The exact collecting strata of the fossils cannot be reconstructed according to the original designations; therefore just the numerical and taxonomically revised ammonite data is presented here (Table 6).

***Text-Figure 45.*** View of Jásd 1 quarry with G. Császár. The hammer indicates the lower boundary of the Late Albian "Turrilitenmergel"

***Table 6.*** Ammonite data of Jásd 1 quarry

| Ammonite data | Number of specimens |
|---|---|
| *Puzosia (Puzosia) mayoriana* (D'ORBIGNY, 1841) | 1 |
| *Puzosia (Puzosia) planulata* (J. de C. SOWERBY, 1827) | 1 |
| *Discohoplites* sp. | 3 |
| *Hyphoplites* sp. | 1 |
| *Mortoniceras* sp. | 2 |
| *Cantabrigites cantabrigense* SPATH, 1933 | 34 |
| *Graysonites horvathi* n. sp. | 1 |
| *Stoliczkaia* sp. | 3 |
| *Stoliczkaia (Stoliczkaia) dispar* (D'ORBIGNY, 1841) | 10 |
| *Anisoceras armatum* (J. SOWERBY, 1817) | 6 |
| *Stomohamites subvirgulatus* (SPATH, 1941) | 2 |
| *Stomohamites virgulatus* (BRONGNIART, 1822) | 1 |
| *Lechites (Lechites) gaudini* (PICTET & CAMPICHE, 1859) | 4 |
| *Mariella* sp. | 5 |
| *Turrilitoides* sp. | 3 |
| *Scaphites* sp. | 4 |
| *Scaphites hugardianus* (D'ORBIGNY, 1841) | 6 |




***Text-Figure 46.*** Faunistic composition at family and subfamily level of the ammonite assemblage of Jásd 1 quarry

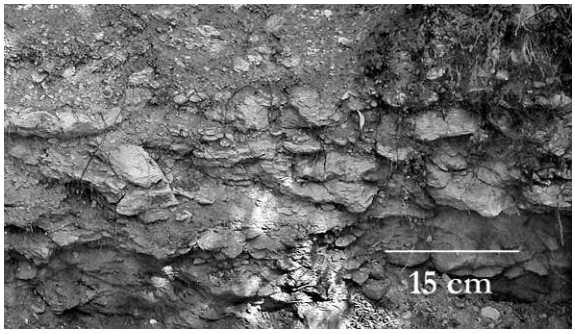
The faunistic composition of the ammonite assemblage (Text-Figure 46) suggests Late Albian age, with typical *Stoliczkaia (S.) dispar* Zone forms. The composition of the assemblage does not let us to determine the exact subzonal age.

TILOS FOREST

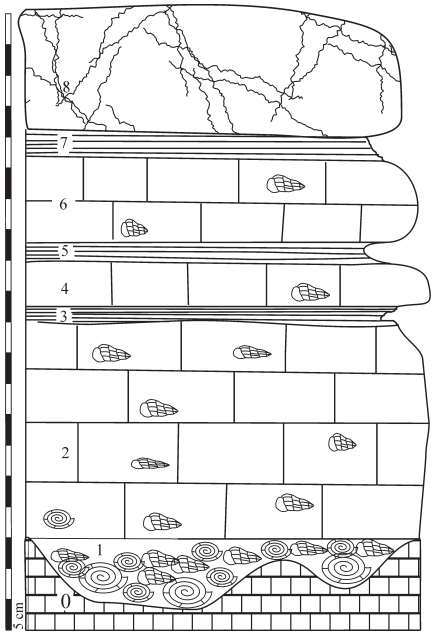
The Tilos Forest (Text-Figure 47) is one of the richest fossil collecting outcrop of Hungary, located nearby the village of Pénzesgyőr. Centuries ago, the surroundings of Tilos Forest were the part of the church forests and got its name after the forbidden entry for the locals. The fossiliferous locality is known since one and a half century (RÓMER 1858, 1860). The most accurate and well-known systematic work of the Hungarian Late Albian condensed sequence without giving any stratigraphic data is SCHOLZ's (1979), although his material is from various localities besides the Tilos Forest, and restricted in the basal pockets. In 2003, Főzy and Szives made a bed-by-bed collection which provided useful data not just from the basal pockets but from the overlying sedimentary unit that belongs to the lower subdivision of the Pénzeskút Marl.

The bed-by-bed collecting (Text-Figure 48) made clear that besides the well-documented condensed basal bed, the excavated 1.5 metres thick section (Text-Figure 49) above is also belongs to the *Stoliczkaia (S.) dispar* Zone with the high domi-

***Text-Figure 47.*** View of Tilos Forest locality. Small pits are the collecting holes of the condensed basal pockets digged by private collectors




***Text-Figure 48.*** The upper part of the bed-by-bed collected section at Tilos Forest




***Text-Figure 49.*** Sequence of Tilos Forest. Thick black line indicates the lower boundary of the Late Albian "Turrilitenmergel". 0 — Zirc Limestone Formation; 1 — condensed basal pockets; 2, 4, 6 — limy marl; 3, 5, 7 — loose aleuritic marl

***Table 7.*** Ammonite data of Tilos Forest section sorted bed-by-bed

| Ammonite record of Tilos Forest | Number of specimens of Tilos Forest bed-by-bed | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Base | Bed no. | | | | | | |
| | (1) | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| *Phylloceras seresitense* PERVINQUIÉRE, 1907 | 2 | | | | | | | |
| *Tetragonites* sp. | 2 | | | | | 1 | 2 | |
| *Tetragonites timotheanus* (PICTET, 1847) | 2 | | | | | | | |
| *Puzosia* sp. | 14 | | 1 | 1 | 2 | 6 | | |
| *Puzosia (P.) mayoriana* (D'ORBIGNY, 1841) | 15 | | | | | | | |
| *Beudanticeras* sp. | 11 | | | | | | | |
| *Beudanticeras beudanti* (BRONGNIART, 1822) | 9 | | | | | | | |
| *Desmoceras* sp. | 45 | | | | | | | |
| *Desmoceras latidorsatum* (MICHELIN, 1838) | 2 | | | | | | | |
| *Discohoplites* sp. | 6 | | | | | | | 1 |
| *Hyphoplites* sp. | | | | | | | | 2 |
| *Engonoceras duboisi* LATIL, 1989 | 3 | | | | | | | |
| *Mortoniceras* sp. | 3 | | | | | | | |
| *Hysteroceras binum* (J. SOWERBY, 1815) | 3 | | | | | | | |
| *Cantabrigites* sp. | 5 | | | | | 1 | | |
| *Cantabrigites cantabrigense* SPATH, 1933 | 5 | | | | | | | |
| *Neophlycticeras blancheti* (PICTET & CAMPICHE, 1861) | 13 | | | | | | | |
| *Stoliczkaia* sp. | 23 | | | 2 | | 4 | | |
| *Stoliczkaia (Stoliczkaia) dispar* (D'ORBIGNY, 1841) | 10 | | | | | | | |
| *Stoliczkaia (Stoliczkaia) notha* (SEELEY, 1865) | 10 | | | | | | | |
| *Stoliczkaia (Stoliczkaia) clavigera* (NEUMAYR, 1875) | 16 | | | | | | | |
| *Stoliczkaia (Stoliczkaia) tenuis* RENZ, 1968 | 3 | | | | | | | |
| *Salaziceras (Salaziceras) salazacense* (HÉBERT & MUNIER-CHALMAS, 1875) | 11 | | | | | | | |
| *Zuluscaphites orycteropusi* VAN HOEPEN, 1955 | 7 | | | | | | | |
| *Zuluscaphites helveticus,* KENNEDY & DELAMETTE, 1994 | 2 | | | | | | | |
| *Salaziceras (Noskytes) bakonyense* SCHOLZ, | 6 | | | | | | | |
| *Ficheuria kiliani* PERVINQUIÉRE, 1910 | 1 | | | | | | | |
| *Anisoceras armatum* (J. SOWERBY, 1817) | 25 | | | | | | 1 | |
| *Anisoceras pseudo-elegans* PICTET & CAMPICHE, 1861 | 5 | | | | | | | |
| *Stomohamites virgulatus* (BRONGNIART, 1822) | 8 | | | | | | | 2 |
| *Stomohamites subvirgulatus* (SPATH, 1941) | 6 | | | | | | | |
| *Helicohamites duplicatus* (PICTET & CAMPICHE, 1861) | 2 | | | | | | | |
| *Ostlingoceras puzosianum* (D'ORBIGNY, 1842) | | 9 | 3 | 2 | 7 | 1 | | 1 |
| *Mariella (Mariella) bergeri* (BRONGNIART, | 12 | | | | | | 1 | |
| *Paraturrilites* sp. | 7 | | | | | | | |
| *Turrilitoides hugardianus* (D'ORBIGNY, 1841) | 14 | | | 1 | | 3 | 1 | 1 |
| *Lechites (Lechites) gaudini* (PICTET & CAMPICHE, 1859) | 12 | | 5 | 7 | 2 | 1 | 2 | 3 |
| *Lechites (L.) moreti* BREISTROFFER, 1936 | 2 | | | | | | | |
| *Lechites (L.) communis* SPATH, 1941 | 1 | | | | | | | |
| *Sciponoceras* sp. | | | 2 | | | 2 | | |
| *Scaphites hugardianus* (D'ORBIGNY, 1841) | 31 | | | | | | 3 | |

***Text-Figure 50.*** Palaeosurface on the top of the Zirc Limestone Formation, just below the condensed basal pockets of the Pénzeskút Marl Formation. Hammer shows the place of a gigantic *?Puzosia* specimen

***Text-Figure 51.*** A huge *?Puzosia* sp. found on the base of the "Turrilitenmergel"

nance of genus *Ostlingoceras* and *Stoliczkaia* species. The bed-by-bed ammonite data (Table 7) of the ammonite assemblage suggest Late Albian age, with typical *Stoliczkaia (S.) dispar* Zone forms in the basal bed and the overlying two metres as well. The composition of the assemblage does not let us to determine the exact subzonal age.

The faunistic composition of the sequence can be divided into two parts. The upper 150 cm is the yellowish grey marl contain mostly turriliticone ammonites, sometimes aleurolitic intercalations can be detected. It is characterized by the monospecific dominance of *Ostlingoceras puzosianum* (D'ORBIGNY, 1841) which can be caused mainly by palaeoecologic reasons. The other part is the basal bed that shows the dominance of genera *Stoliczkaia, Desmoceras, Puzosia* and *Scaphites*. The recent collection also made clear that the condensed basal "bed" is restricted to local deepenings of the palaeosurface (Text-Figure 50) and not exist as a distinct strata or layer. On the very base, a gigantic ?*Puzosia* specimen was found (Text-Figure 51) which is presumably belonged to the underlying zirc Limestone Formation of the same Late Albian age.

EVANICS COLLECTION

Zoltán Evanics, an amateur fossil hunter, spent 23 years with collecting a marvellous fossil assemblage from the basal pockets of the Pénzeskút Marl from Tilos Forest. His collection contains unique forms: three of *Engonoceras*, from which two are published by BUJTOR (1990a), and beautiful *Salaziceras, Zuluscaphites, Scaphites* and *Ficheuria* specimens. The best of his material is partly documented and photographed here; designations follow the collector's originals. Due to the collecting method, the material is sorted according to rarity, beauty etc. and therefore not an appropriate basis neither for qualitative nor for quantitative analisys.

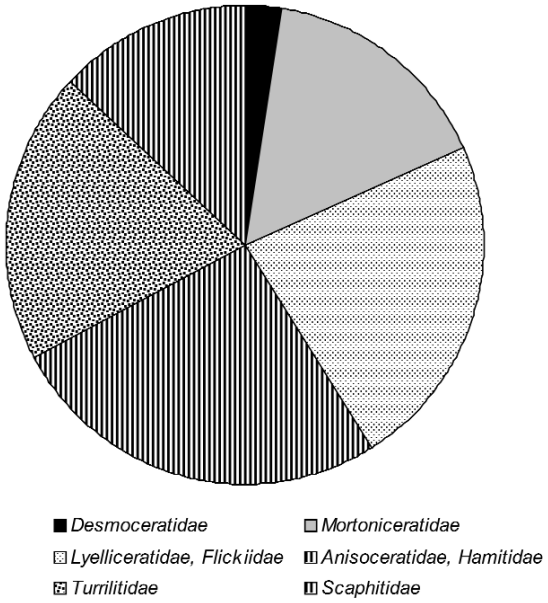
***Text-Figure 52.*** Section of Bakonynána, Zsidó Hill. Hammer indicates the boundary between the massive Albian Zirc Limestone Formation and the overlying Late Albian Pénzeskút Marl "Turrilitenmergel" Formation

BAKONYNÁNA — ZSIDÓ HILL

A classic locality of the Late Albian "Turrilitenmergel" called Zsidó Hill or Gaja Valley road section (Text-Figure 52) is near to Bakonynána. This is the reference section of the lower boundary of the Pénzeskút Marl Formation (CSÁSZÁR [ed.] 1996). In this section the basal condensed pockets were cannot been detected, probably this indicate more equalized palaeosurface. The rock is yellowish grey massive marl with siltstone intercalations. A

***Table 8.*** Ammonite data of Bakonynána, Zsidó Hill section

| Ammonite record of Bakonynána, Zsidó Hill | Number of specimens of Bakonynána, Zsidó Hill bed-by-bed | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | above |
| *Kossmatella muhlenbecki* (FALLOT, 1885) | | | | | | | 1 | | |
| *Puzosia* sp. | | | | 1 | 1 | | | | |
| *Puzosia (Puzosia) mayoriana* (D'ORBIGNY, 1841) | | | | | 1 | | | | |
| *Beudanticeras* sp. | | | | 3 | 2 | | | | |
| *Desmoceras latidorsatum* (MICHELIN, 1838) | | | 14 | | 5 | | 3 | | |
| *Dipoloceras* sp. | | 1 | | | | | | | |
| *Mortoniceras* (M.) sp. | 1 | | | 20 | 1 | | 7 | | |
| *Mortoniceras (M.)* cf. *inflatum* (J. SOWERBY, 1817) | | | | | | | | 1 | |
| *Mortoniceras (M.)* cf. *rostratum* (J. SOWERBY, 1817) | | | | 1 | | | | | |
| *Cantabrigites cantabrigense* SPATH, 1933 | | 7 | 9 | 7 | 8 | | | | |
| *Stoliczkaia (Stoliczkaia) dispar* (D'ORBIGNY, 1841) | | | | 11 | 5 | | 2 | 1 | |
| *Stoliczkaia notha* (SEELEY, 1865) | | | | 4 | | | | 1 | |
| *Neophlycticeras blancheti* (PICTET & CAMPICHE, 1859) | | | 3 | 23 | 4 | | | 1 | |
| *Ficheuria kiliani* PERVINQUIÉRE, 1910 | | | | | 1 | | | | |
| *Anisoceras* sp. | | | | 1 | | | | | |
| *Anisoceras armatum* (J. SOWERBY, 1817) | | 5 | 8 | 28 | 15 | | 1 | 1 | |
| *Anisoceras pseudo-elegans* PICTET & CAMPICHE, 1859 | | | | 10 | | | | | |
| *Hamites* sp. | | | | 2 | | | | | |
| *Stomohamites virgulatus* (BRONGNIART, 1822) | | 1 | | 3 | 2 | 3 | | | |
| *Stomohamites subvirgulatus* (SPATH, 1941) | | | | 5 | 4 | | | | |
| *Mariella (M.)* sp. | | | | 2 | 1 | | | | |
| *Mariella (Mariella) bergeri* (BRONGNIART, 1822) | | 2 | 2 | 27 | 2 | | 1 | | |
| *Turrilitoides hugardianus* (D'ORBIGNY, 1842) | | | 2 | 4 | 15 | | | | |
| *Lechites (Lechites) gaudini* (PICTET & CAMPICHE, 1861) | | | 14 | | 1 | | 2 | | 1 |
| *Lechites (L.) communis* SPATH, 1941 | | | | | | | | | 1 |
| *Scaphites hugardianus* (D'ORBIGNY, 1841) | | | 11 | 22 | 12 | | | | |




***Text-Figure 53.*** Faunistic composition at family and subfamily level of the ammonite assemblage of Bakonynána

brief description of the section is given by MONOSTORI et al. (1989), which focusses on micropalaeontological data.

The well exposed fossiliferous strata are just beside the forest road and provided dozens of ammonites (Table 8) that are from the Upper Albian *Mortoniceras (M.) inflatum* and *Stoliczkaia (S.) dispar* Zones. The dominance of Family Anisoceratidae (mainly genus *Anisoceras*) and Family Lyelliceratidae (mainly the numerous *Stoliczkaia* species) is obvious (Text-Figure 53); but Mortoniceratidae and Turrilitidae are also present in great number. The material was collected bed-by-bed in the 70's but unfortunatelly the absence of the documentation cannot let to reconstruct the exact bed location. Ammonites occur from the bed no. 9 to bed no. 18–25. The richest fossiliferous stratum is the no. 12. The age of the assemblage can be placed into the *Stoliczkaia (S.) dispar* Zone but two fragments of *Mortoniceras (Mortoniceras)* cf. *inflatum* (J. SOWERBY 1817) from bed no. 12, 16 and a fragment of a *Dipoloceras* sp. (bed no. 9) possibly indicates older, *Mortoniceras (M.) inflatum* Zone age.

***Text-Figure 54.*** View of the section of Olaszfalu, Villó Hill. Hammer indicates the boundary between the massive Albian Zirc Limestone Formation and the overying Late Albian Pénzeskút Marl "Turrilitenmergel" Formation

OLASZFALU, VILLÓ HILL

The Albian outcrop of Villó Hill (Text-Figure 54) is nearby to Olaszfalu, situated eastward of Eperkés Hill. The site is recently fenced around and closed for the public. Only two dozens of fossils found here (Table 9), the ammonite data suggest Late Albian age with the presence of typical *Stoliczkaia (S.) dispar* Zone taxa.

JÁSD J–36 BOREHOLE

The Jásd J–36 borehole was drilled near the village of Jásd, with continuous core sampling that contain an assemblage of fossils between 227.8–9.6 metres depth. Cephalopods are flattened and preserved mostly with shells in the grey siltstone and listed below (Table 10).

***Table 9.*** Ammonite data of Olaszfalu, Villó Hill

| Ammonite record | Number of specimens from Villó Hill |
|---|---|
| *Cantabrigites cantabrigense* SPATH, 1933 | 15 |
| *Neophlycticeras blancheti* (PICTET & CAMPICHE, 1859) | 2 |
| *Anisoceras armatum* (J. SOWERBY, 1817) | 5 |
| *Stomohamites subvirgulatus* (SPATH, 1941) | 3 |
| *Lechites* sp. | 5 |
| *Mariella* sp. | 1 |
| *Mariella (Mariella) bergeri* (BRONGNIART, 1822) | 2 |
| *Turrilitoides hugardianus* (D'ORBIGNY, 1841) | 17 |
| *Scaphites hugardianus* (D'ORBIGNY, 1841) | 8 |

Ammonite taxa were originally determined and partly published by HORVÁTH (1985, 1989). In this monograph the whole material is revised.

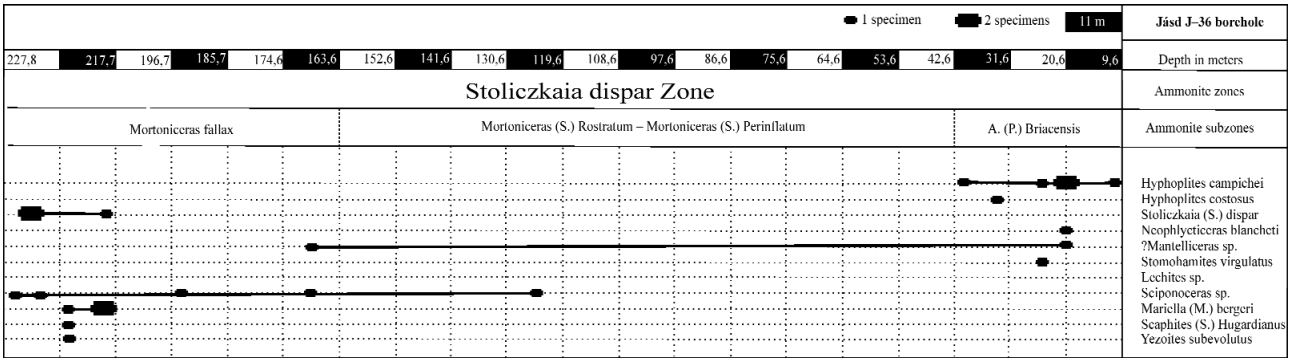
The ammonite occurrences (Table 11) in the borehole show the presence of the Late Albian *Mortoniceras (M.) fallax* and *Arrhaphoceras (Praeschloenbachia) briacensis* subzones of the *Stoliczkaia (S) dispar* Zone.

The ammonite assemblage contains typical Late Albian forms at the full length of the fossiliferous sequence. The presence of *Stoliczkaia (Stoliczkaia) dispar* (D'ORBIGNY 1841), *Mariella (Mariella) bergeri* (BRONGNIART 1822) and *Scaphites (S.) hugardianus* (D'ORBIGNY 1841) clearly place the age of the material into the Late Albian *Stoliczkaia (S.) dispar* Zone. The *Yezoites subevolutus* (BÖSE 1928) and *Hyphoplites campichei* SPATH, 1925a characterize the *Arrhaphoceras (Praeschloenbachia) briacensis* subzone of the *Stoliczkaia (S.) dispar* Zone (KENNEDY et al. 2004).

***Table 10.*** Ammonite data of Jásd J–36 borehole

| Depth (m) | Ammonite data of Jásd J-36 borehole |
|---|---|
| 9.6–12.2 | *Hyphoplites campichei* SPATH, 1925 |
| 15.2–16.9 | *Mantelliceras* sp. |
| 15.2–19.9 | *Neophlycticeras* sp. |
| 16.9–21.0 | *Hyphoplites campichei* SPATH, 1925 |
| 16.9–21.0 | *Hyphoplites campichei* SPATH, 1925 |
| 21.0–25.2 | *Hyphoplites campichei* SPATH, 1925<br>*Hamites virgulatus* BRONGNIART, 1822 |
| 30.0–35.0 | *Hyphoplites costosus* WRIGHT & WRIGHT, 1949 |
| 35.0–39.5 | *Hyphoplites campichei* SPATH, 1925 |
| 112.6–115.0 | *Hyphoplites campichei* SPATH, 1925 |
| 116.0–117.0 | *Sciponoceras* sp. |
| 129.1–137.9 | Ammonoidea sp. |
| 146.9–152.0 | *Lechites* sp. |
| 152.0–157.0 | *Mantelliceras* sp. |
| 152.0–157.0 | *Sciponoceras* sp. |
| 152.0–157.0 | *Desmoceras* sp. |
| 175.7–178.7 | *Sciponoceras* sp. |
| 198.2–201.8 | *Stoliczkaia (Stoliczkaia) dispar* (D'ORBIGNY, 1841) |
| 198.2–201.8 | *Mariella (Mariella) bergeri* (BRONGNIART, 1822) |
| 198.2–201.8 | *Mariella (Mariella)* sp. |
| 207.0–209.0 | *Yezoites subevolutus* (BÖSE, 1928) |
| 207.0–209.0 | *Hyphoplites* sp. |
| 207.0–209.0 | *Mariella (Mariella)* sp. |
| 207.0–209.8 | *Scaphites (Scaphites) hugardianus* (D'ORBIGNY, 1841) |
| 221.6–224.7 | *Sciponoceras* sp. |
| 224.7–227.8 | *Stoliczkaia (Stoliczkaia) dispar* (D'ORBIGNY, 1841) |
| 224.7–227.8 | *Stoliczkaia (Stoliczkaia) dispar* (D'ORBIGNY, 1841) |
| 224.7–227.8 | *Sciponoceras* sp. |

***Table 11.*** Ammonite occurences on the sequence of Jásd J–36 borehole




Summarizing the stratigraphic results of the ammonoid assemblage of Jásd J–36 borehole, we can assure that the whole ammonite assemblage can be placed into the Late Albian *Stoliczkaia (S.) dispar* Zone, and most likely indicates its youngest, *Arrhaphoceras (Praeschloenbachia) briacensis* subzone.

JÁSD J–42 BOREHOLE

The Jásd J–42 borehole was drilled in 1978 with continuous core sampling near the village of Jásd. This grey aleurolitic marly section is the reference section of the Pénzeskút Marl Formation. The ammonite bearing sequence is from 474.5 m to 30.2 m, the cephalopods of the Jásd J–42 borehole are listed below (Table 12). The ammonoid specimens are originally determined and partly published by HORVÁTH (1985, 1989), here the assemblage is fully revised.

Since decades, the Jásd J–42 borehole was interpreted as an Upper Albian – Middle Cenomanian sequence (JUHÁSZ 1979; HORVÁTH 1985, 1989; BODROGI 1989). According to the present ammonite occurrence data, the presence of Late Albian *Arrhaphoceras (Praeschloenbachia) briacensis* subzone is documented (Table 13).

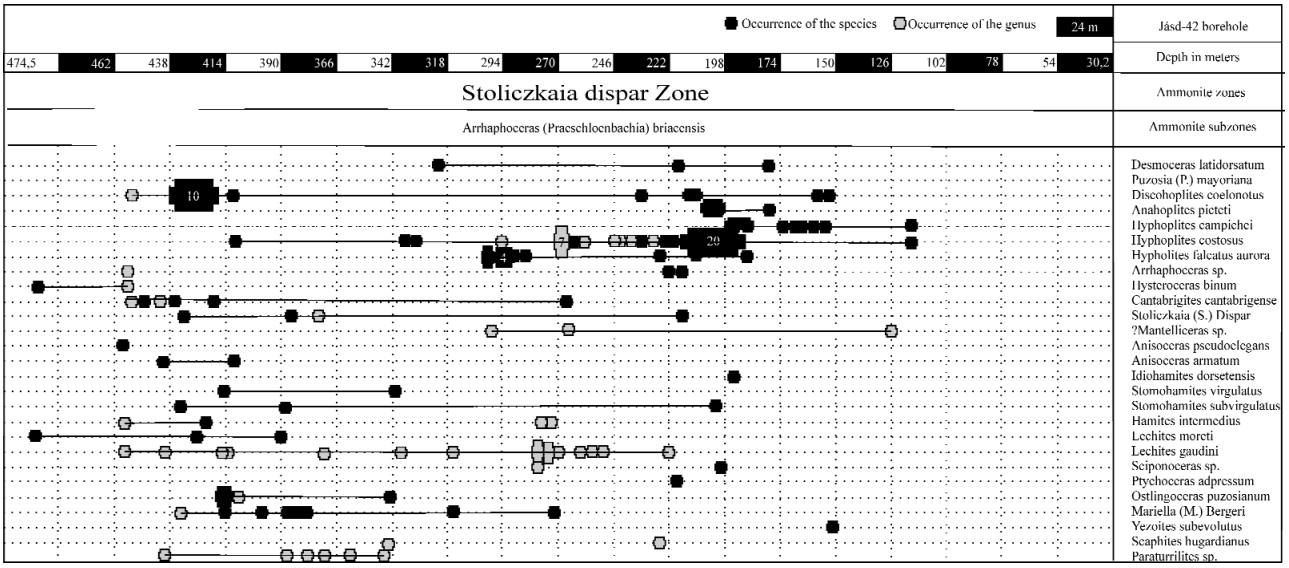
***Table 12.*** Ammonite data of Jásd J–42 borehole

| Depth (m) | Ammonite data of Jásd J-42 borehole |
|---|---|
| 30.2 | *?Mantelliceras* sp. |
| 75.5 | *Lechites* sp. |
| 114.7 | Ammonites indet. |
| 114.7 | *Hyphoplites costosus* WRIGHT & WRIGHT, 1949 |
| 116.0 | *Lechites* sp. |
| 119.2 | *Hyphoplites campichei* SPATH, 1925 |
| 120.2 | *Mariella* sp. juv. |
| 125.8 | *?Mantelliceras* sp. |
| 129.1–137.9 | *Hyphoplites* sp. |
| 133.4 | *Lechites* sp. |
| 149.64 | *Sciponoceras* sp. |
| 151.7 | *Idiohamites* sp. |
| 152.3 | *Yezoites subevolutus* (BÖSE, 1928) |
| 152.3 | *Mariella* sp. |
| 152.7 | *Hyphoplites* sp. |
| 153.5 | *Hyphoplites* sp. |
| 155.2 | *Hyphoplites campichei* SPATH, 1925 |
| 157.2 | *Discohoplites coelonotus* (SEELEY, 1865) |
| 158.3–158.7 | *Hyphoplites* sp. |
| 158.3–158.7 | *Hyphoplites* sp. |
| 158.3–158.7 | *Sciponoceras* sp. |
| 158.3–158.7 | *Hyphoplites campichei* SPATH, 1925 |
| 158.3–158.7 | *Lechites* sp. |
| 159.2 | *Discohoplites coelonotus* (SEELEY, 1865) |
| 159.2 | *Hyphoplites* sp. |
| 170.0–170.3 | *Hyphoplites campichei* SPATH, 1925 |
| 171.3 | *Lechites* sp. |
| 172.9 | *Hyphoplites campichei* SPATH, 1925 |
| 175.4 | *Hyphoplites campichei* SPATH, 1925 |
| 175.5 | *Desmoceras latidorsatum* (MICHELIN, 1838) |
| 176.7 | *Anahoplites picteti* SPATH, 1925 |
| 183.9 | *Hyphoplites falcatus aurora* WRIGHT & WRIGHT, 1949 |
| 184.3 | *Hyphoplites campichei* SPATH, 1925 |
| 187.4 | *Lechites* sp. |
| 192.0 | *Idiohamites* sp. |
| 192.1 | *Hyphoplites campichei* SPATH, 1925 |
| 196.7 | *Hyphoplites costosus* WRIGHT & WRIGHT, 1949 |
| 196.9 2x | *Hyphoplites costosus* WRIGHT & WRIGHT, 1949 |
| 197.2 | *Hyphoplites* sp. |
| 197.5 | *Hyphoplites* sp. |
| 198.0 | *Hyphoplites* cfr. *costosus* WRIGHT & WRIGHT, 1949 |
| 200.7–201.0 | *Hyphoplites costosus* WRIGHT & WRIGHT, 1949 |
| 200.7–201.0 | *Lechites* sp. |
| 201.4 | *Hyphoplites costosus* WRIGHT & WRIGHT, 1949 |
| 201.7 | *Sciponoceras* sp. |
| 202.2 | *Hyphoplites* sp. juv. |
| 203.2 | *Hyphoplites costosus* WRIGHT & WRIGHT, 1949 |
| 203.4 | *Hyphoplites costosus* WRIGHT & WRIGHT, 1949 |
| 203.5 | *Hyphoplites costosus* WRIGHT & WRIGHT, 1949 (3 specimens) |
| 204.3 | *Stomohamites subvirgulatus* (SPATH, 1941) |
| 204.3 | *Hyphoplites costosus* WRIGHT & WRIGHT, 1949 |
| 204.6 | *Hyphoplites* sp. juv. |
| 205.5 | *Hyphoplites costosus* WRIGHT & WRIGHT, 1949 |
| 205.95 | *Hyphoplites costosus* WRIGHT & WRIGHT, 1949 (2 specimens) |
| 206.0 | *Hyphoplites costosus* WRIGHT & WRIGHT, 1949 |
| 206.3 | Ammonites indet. |
| 206.3 | *Hyphoplites* sp. |
| 206.4 | *Hyphoplites* sp. |
| 206.4 | *Hyphoplites* sp. |
| 206.4 | Ammonoidea |
| 207.3 | *Hyphoplites* sp. |
| 207.6 | *Hyphoplites costosus* WRIGHT & WRIGHT, 1949 |
| 208.6 | *Hyphoplites costosus* WRIGHT & WRIGHT, 1949 |
| 208.7 | *Hyphoplites costosus* WRIGHT & WRIGHT, 1949 |
| 209.0 | *Hyphoplites costosus* WRIGHT & WRIGHT, 1949 |
| 209.6 | *Hyphoplites costosus* WRIGHT & WRIGHT, 1949 |
| 209.6 | *Hyphoplites costosus* WRIGHT & WRIGHT, 1949 |
| 210.4 | *Hyphoplites* sp. |
| 210.5 | *Hyphoplites costosus* WRIGHT & WRIGHT, 1949 |
| 211.7 | *Hyphoplites costosus* WRIGHT & WRIGHT, 1949 |
| 212.0 | *Hyphoplites costosus* WRIGHT & WRIGHT, 1949 |
| 212.7–212.9 | *Hyphoplites costosus* WRIGHT & WRIGHT, 1949 |
| 212.7–212.9 | *Discohoplites coelonotus* (SEELEY, 1865) |
| 212.7–212.9 | *Hyphoplites falcatus aurora* WRIGHT & WRIGHT, 1949 |
| 213.9 | *Discohoplites* sp. |
| 215.7 | *Hyphoplites* sp. juv. |
| 216.6 | *Hyphoplites* sp. ind. |
| 216.9 | *Arrhaphoceras* (Praeschloenbachia) sp. |
| 216.9 | *Stoliczkaia* sp. |
| 218.7 | *Gaudryceras* sp. |
| 219.4 | *Ptychoceras adpressum* (PICTET, 1847) |
| 221.5–221.7 | *Hyphoplites falcatus aurora* WRIGHT & WRIGHT, 1949 |
| 221.5–221.7 | *Lechites* sp. |
| 221.5–221.7 | *Hyphoplites campichei* SPATH, 1925 |
| 223.45 | *Hyphoplites campichei* SPATH, 1925 |
| 225.3 | *Hyphoplites* sp. |
| 225.3 | *Lechites* sp. |
| 225.3 | *Hyphoplites* sp. |
| 228.0 | *Hyphoplites falcatus aurora* WRIGHT & WRIGHT, 1949 |
| 228.7 | *Scaphites* sp. |
| 234.1 | *Discohoplites coelonotus* (SEELEY, 1865) |
| 234.1 | Ammonites sp. ind. |
| 234.7 | *Hyphoplites campichei* SPATH. 1925 |
| 237.2–237.4 | *Hyphoplites* sp. |
| 237.2–237.4 | Ammonites |
| 242.9 | *Lechites* sp. |
| 256.0 | Ammonoidea |
| 256.8 | Ammonoidea |
| 258.4 | *Idiohamites dorsetensis* SPATH, 1939 |
| 258.4 | *Hyphoplites* sp. |
| 258.4–258.7 | *Hyphoplites* sp. |
| 258.4–258.7 | *Lechites* sp. |
| 259.8–260.0 | *Lechites* sp. |
| 260.0–260.1 | *Lechites* sp. |
| 260.3 | *Hyphoplites* sp. |
| 260.8 | *?Mantelliceras* sp. |
| 261.9–262.0 | *Hyphoplites campichei* SPATH, 1925 |
| 262.4 | *Hyphoplites* sp. |
| 262.6–262.8 | *Hyphoplites* sp. |
| 262.6–262.8 | *Hyphoplites* sp. |
| 263.0 | *Hyphoplites* sp. |
| 264.4–264.9 | *?Hyphoplites* sp. |

Continuation of Table 12

| | |
|---|---|
| 264.4–264.9 | *Hyphoplites campichei* SPATH, 1925 |
| 264.4–264.9 | *Hyphoplites* sp. juv. |
| 265.1 | *Cantabrigites cantabrigense* SPATH, 1933 |
| 265.1 | *?Discohoplites* sp. |
| 270.8 | *Lechites* sp. |
| 276.2–276.5 | *Lechites* sp. |
| 276.2–276.5 | *Mariella (Mariella) bergeri* (BRONGNIART, 1822) |
| 276.2–276.5 | *Hamites* sp. |
| 276.2–276.5 | *Lechites* sp. |
| 278.6 | *Lechites* sp. |
| 280.0–280.1 | *?Stoliczkaia* sp. |
| 281.0–281.3 | *Hamites (Idiohamites?)* sp. |
| 281.0–281.3 | *Lechites* sp. |
| 281.3 | *Sciponoceras* sp. |
| 281.3 | *Hyphoplites* sp. |
| 281.7 | *Puzosia (Puzosia) mayoriana* (D'ORBIGNY, 1841) |
| 285.3 | Turrilitidae |
| 287.05 | *Hyphoplites* sp. |
| 288.5 | *Hyphoplites costosus* WRIGHT & WRIGHT, 1949 |
| 288.6 | *Hyphoplites costosus* WRIGHT & WRIGHT, 1949 |
| 291.9 | *Hyphoplites costosus* WRIGHT & WRIGHT, 1949 |
| 292.95 | *Hyphoplites* sp. |
| 292.95 | Turrilitidae |
| 294.4 | *Hyphoplites costosus* WRIGHT & WRIGHT, 1949 |
| 297.8 | *?Mantelliceras* sp. |
| 298.7 | *Hyphoplites costosus* WRIGHT & WRIGHT, 1949 |
| 299.3–299.5 | *Hyphoplites costosus* WRIGHT & WRIGHT, 1949 |
| 304.6 | *Democeras latidorsatum* (MICHELIN, 1838) |
| 316.0 | *Mariella (Mariella) bergeri* (BRONGNIART, 1822) |
| 316.0 | *Lechites* sp. |
| 321.4 | *Desmoceras latidorsatum* (MICHELIN, 1838) |
| 331.6 | *Hyphplites campichei* SPATH, 1925 |
| 333.5 | *?Anisoceras* sp. |
| 333.5 | *Hyphoplites campichei* SPATH, 1925 |
| 335.4 | *Lechites* sp. |
| 340.5 | *Stomohamites* cf. *virgulatus* (BRONGNIART, 1822) |
| 345.4 | *Ostlingoceras puzosianum* (D'ORBIGNY, 1842) |
| 345.4 | *Paraturrilites* sp. |
| 345.4 | *Scaphites* sp. |
| 358.9 | *Paraturrilites* sp. |
| 361.7 | *Lechites* sp. |
| 376.2 | *Paraturrilites* sp. |
| 377.2 | *Paraturrilites* sp. |
| 377.3 | *Stoliczkaia* sp. |
| 382.0 | *Mariella (Mariella) bergeri* (BRONGNIART, 1822) |
| 388.55 | *Mariella (Mariella) bergeri* (BRONGNIART, 1822) |
| 388.6 | *Stoliczkaia (Stoliczkaia) dispar* (D'ORBIGNY, 1841) |
| 388.6 | *Mariella (Mariella) bergeri* (BRONGNIART, 1822) |
| 389.0 | *Stomohamites subvirgulatus* (SPATH, 1941) |
| 391.25 | *Paraturrilites* sp. |
| 394.6 | *Lechites (Lechites) moreti* BREISTOFFER, 1936 |
| 408.7 | *Mariella (Mariella) bergeri* (BRONGNIART, 1822) |
| 411.25 | Ammonites sp. juv. |
| 411.5–411.6 | *Discophoplites coelonotus* (SEELEY, 1865) |
| 411.5–411.6 | *Hyphoplites costosus* WRIGHT & WRIGHT, 1949 |
| 411.5–411.6 | *Anisoceras armatum* (J. SOWERBY, 1817) |
| 413.0 | *Ostlingoceras* sp. |
| 414.05 | *Ostlingoceras puzosianum* (D'ORBIGNY, 1842) |
| 414.25 | *Lechites* sp. |
| 414.25 | *Stomohamites virgulatus* (BRONGNIART, 1822) |
| 414.25 | *Lechites* sp. |
| 414.25 | *Lechites* sp. |
| 416.9 | *Mariella (Mariella) bergeri* (BRONGNIART, 1822) |
| 417.6 | *Ostlingoceras puzosianum* (D'ORBIGNY, 1842) |
| 418.45 | *Discohoplites coelonotus* (SEELEY, 1865) |
| 418.8 | *Hamites cfr. intermedius* J. SOWERBY, 1814 |
| 419.7 | *Cantabrigites cantabrigense* SPATH, 1933 |
| 420.8 | *Lechites (Lechites) moreti* BREISTROFFER, 1936 (K 13754) |
| 423.6 | *Discohoplites coelonotus* (SEELEY, 1865) |
| 424.7 | *Discohoplites coelonotus* (SEELEY, 1865) |
| 424.7 | *Discohoplites coelonotus* (SEELEY, 1865) |
| 424.95 | *Discohoplites coelonotus* (SEELEY, 1865) |
| 428.5 | *Discohoplites coelonotus* (SEELEY, 1865) |
| 428.5 | *Discohoplites coelonotus* (SEELEY, 1865) |
| 428.6 | *Discohoplites coelonotus* (SEELEY, 1865) |
| 429.15 | *Discohoplites coelonotus* (SEELEY, 1865) |
| 429.3 | *Stoliczkaia (Stoliczkaia) dispar* (D'ORBIGNY, 1842) |
| 430.6 | *Mariella* sp. |
| 430.95 | *Stomohamites subvirgulatus* (SPATH, 1941) |
| 434.45 | *Discohoplites coelonotus* (SEELEY, 1865) |
| 437.65 | Hoplitidae |
| 439.7 | *Cantabrigites cantabrigense* SPATH, 1933 |
| 441.0–441.15 | *Cantabrigites* sp. |
| 441.25 | *Lechites (Lechites) communis* SPATH, 1937 |
| 441.4 | *Paraturrilites* sp. |
| 442.35 | *Anisoceras armatum* (J. SOWERBY, 1817) |
| 446.2 | *Cantabrigites* sp. |
| 446.5 | *Cantabrigites cantabrigense* SPATH, 1936 |
| 448.4 | *Discohoplites* sp. |
| 449.3 | Ammonoidea |
| 449.3 | *Hamites* sp. |
| 449.3 | *Lechites* sp. |
| 449.3 | *?Arrhaphoceras (Praeschloenbachia)* sp. |
| 455.45 | Ammonoidea |
| 456.4 | *Hysteroceras* sp. |
| 456.5 | *Anisoceras pseudoelegans* (PICTET & CAMPICHE, 1861) |
| 471.8 | *Hysteroceras binum* (J. SOWERBY, 1815) |
| 474.5 | *Lechites (Lechites) moreti* BREISTROFFER, 1936 |

***Table 13.*** Ammonite occurences on the sequence of Jásd J–42 borehole




In 1983, Anna Horváth proposed the section as an Albian/Cenomanian Boundary Stratotype nominee but "did not received much support…[because] the section belongs to the Boreal faunal province. The boundary would have to be defined on the appearance of a particular species of *Hyphoplites*, which was regarded unsuitable." (BIRKELUND et al. 1984). It is remarkable that BIRKELUND, on the base of the great abundance of Hoplitidae, referred the assemblage to the Boreal faunal province. Surface outcrops of the same age do not show any sign of this northern affinity, which is very strange considering that all the boreholes and surface outcrops both containing *Stoliczkaia (S.) dispar* Zone assemblages and are within a square kilometre in the present geographic position. However, according to the present investigation, the Jásd J–42 borehole does not reach Cenomanian strata on the basis of recent ammonite studies.

A great abundance of *Ostlingoceras, Mariella, Anisoceras* and *Discohoplites* dominates the ammonoid fauna of the Jásd J–42 borehole, with additional occurrence of *Hamites, Cantabrigites, Mortoniceras, Salaziceras* and *Stoliczkaia.* The ammonite assemblage defines the Late Albian *Stoliczkaia (S.) dispar* Zone. However, HORVÁTH (1985) mentions a *Tegoceras* sp. from 167.8 m which is much older and currently not found. The last surely *Stoliczkaia* species is found at 429.3 m in the borehole.

At 333.5 m a *Hyphoplites campichei* SPATH occurs for the first time, while the first *Mantelliceras* (?) sp. is at 297.8 m. There are several questionable specimens of *Mantelliceras* (?) sp. (30.2 m; 125.8 m; 260.8 m; 280.1 m; 297.8 m) which resembles none of the *Stoliczkaia* species as far as I know. However, LÓPEZ-HORGUE et al. (1999) published similar sculptured forms from the *Arrhaphoceras (Praeschloenbachia) briacensis* subzone of Northern Spain. Supposedly these heavily sculptured forms are transitions between genera *Stoliczkaia* and *Mantelliceras*. These forms can be determined as *Mantelliceras* on the basis of *Mantelliceras couloni* (D'ORBIGNY 1850) – like sculpture, but if considering the startigraphic range it would be better to refer them into the genus *Stoliczkaia.* Here I prefer the first option. At 125.8 m a *Mantelliceras* (?) sp. occurs with well visible ventral and ventrolateral tubercles.

At 152.3m, a *Yezoites subevolutus* (BÖSE 1928) was found. The same species occurs 10 metres below the A/C boundary at the Mont Risou section (KENNEDY et al. 2004; GALE et al. 2006) as the Global Boundary Stratotype Section (KENNEDY et al. 2004) but the species mostly reported from the *Mantelliceras mantelli* Zone.

There are also two fragments of *Arrhaphoceras (Praeschloenbachia)* sp. (449.5 and 216.9 m) which genus occurs in the topmost Late Albian.

According to the overall faunistic composition, the sequence of Jásd J–42 borehole contain ammonites of the dispar Zone, precisely from *Arrhaphoceras (Praeschloenbachia) briacensis* subzone. The typical ammonite assemblage of the Cenomanian is not present; however, even the Albian/Cenomanian boundary doesn't penetrate.

## *Villány Mountains*

### BÓLY B–1 BOREHOLE (OTTILIA SZIVES & LÁSZLÓ BUJTOR)

The ammonite data of Bóly B–1 borehole is based on the unpublished MSc thesis of L. BUJTOR (1989), the ammonite data and the conclusions are revised.

The Bóly B–1 borehole was drilled in 1983 with continuous core sampling from 1204.9 m to 582.9 m. The lowermost penetrated sediment is a grey marly siltstone (Bisse Marl Formation) which gradually changes upward into a pale, yellowish grey sandstone, the transition is between 828–987 metres (Bóly Sandstone Formation). A representative Late

Albian ammonite fauna was found (Table 14) in the 540 metres long part of the core, besides gastropods, bivalves and trace fossils. Fossiliferous section is between 570.4–1211.0 metres. The detailed stratigraphic and faunistic description was given by BUJTOR (1989) in Hungarian. According to the ammonite assemblage of the Bóly B–1 borehole, BUJTOR (loc. cit) placed the age of the fauna from the early Late Albian to late Early Cenomanian, exactly from the older,

***Table 14.*** Ammonite data of Bóly B–1 borehole

| Depth (m) | Ammonite record of Bóly B-1 borehole |
|---|---|
| 582.9 | – |
| 596.5 | Baculitidae sp. |
| 604.5 | Ancyloceratina sp. |
| 611.8 | Ancyloceratina sp. |
| 612.0 | Ancyloceratina sp. |
| 620.4 | Ammonoidea |
| 850.0 | *Tetragonites* sp. |
| 858.7 | Desmoceratidae sp. |
| 859.5 | Ancyloceratina sp. |
| 861.8 | *Sciponoceras* sp. |
| 872.2 | Desmoceratidae sp. |
| 878.5 | Desmoceratidae sp. |
| 907.2 | *Stoliczkaia* sp. |
| 919.5 | *Kossmatella* sp. |
| 943 | ?Ancyloceratina sp. |
| 948.4 | ?Ammonoidea sp. |
| 961.7 | Ammonoidea sp. |
| 962.7 | *Ostlingoceras puzosianum* (D'ORBIGNY, 1842) |
| 962.7 | *Puzosia (Puzosia)* sp. |
| 971.4 | *Puzosia (Puzosia)* sp. |
| 973.3 | Ammonoidea sp. |
| 975.1 | Ammonitina juv. sp. |
| 975.4 | Ammonitina juv. sp. |
| 975.4 | Ancyloceratina sp. |
| 976.7 | Turrilitinae sp. |
| 977.0 | Ammonitina juv. sp. |
| 977.0 | Ammonoidea fragment |
| 977.0 | Ancyloceratina sp. |
| 977.0 | Turrilitinae sp. |
| 977.2 | Ammonitina juv. sp.<br>Ancyloceratina juv. sp. |
| 977.9 | Baculitidae sp. |
| 982.1 | Ancyloceratina sp. |
| 982.3 | Turrilitinae sp. |
| 983.1 | *Tetragonites* sp. |
| 983.9 | Plant remain |
| 984.4 | *Desmoceras* cf. *latidorsatum* (MICHELIN, 1838) |
| 984.6 | Desmoceratidae sp. |
| 984.9 | ?Ammonitina sp. |
| 987.4 | *Lytoceratina* sp. |
| 988.35 | Turrilitinae sp. |
| 988.4 | *Puzosia (Puzosia) mayoriana* (D'ORBIGNY, 1841) |
| 988.7 | Turrilitinae sp. |
| 989.2 | Desmoceratidae sp. |
| 990.6 | *Puzosia* sp. |
| 992.1 | ? Ancyloceratina sp. |
| 992.3 | Ammonoidea sp. |
| 992.5 | *?* Phylloceratina sp. |
| 992.5 | *Scaphites* sp. |
| 993.1 | *Puzosia (Puzosia) mayoriana* (D'ORBIGNY, 1841) |
| 995.5 | ? Ammonitina sp. |
| 995.5 | Ammonitina juv. sp. |
| 996.5 | *Desmoceras* cf. *latidorsatum* (MICHELIN, 1838) |
| 997.5 | Ammonitina sp. |
| 997.5 | *Ostlingoceras* cf. *puzosianum* (D'ORBIGNY, 1842) |
| 997.5 | *Ostlingoceras puzosianum* (D'ORBIGNY, 1842) |
| 997.6 | Ammonitina juv. sp. |
| 997.6 | Ammonoidea sp. juv. |
| 997.6 | *Anagaudryceras* sp. |
| 997.9 | Ammonoidea juv. sp. |
| 998.0 | *Kossmatella romana* WIEDMANN, 1962 |
| 998.0 | *Lechites* sp. |
| 998.0 | *Scaphites simplex* (JUKES-BROWNE, 1875) |
| 998.1 | Ammonitina juv. sp. |
| 998.2 | *Helicohamites* cf. *duplicatus* (PICTET & CAMPICHE, 1861) |
| 998.2 | *Scaphites hugardianus* (D'ORBIGNY, 1841) |
| 998.4 | Ammonitina juv. sp. |
| 998.45 | *Scaphites* sp.<br>Turrilitinae sp.<br>Ammonitina sp. |
| 999.8 | *Phylloceras (Hypophylloceras)* sp. |
| 1000.3 | *Anahoplites gracilis* SPATH, 1926 |
| 1001.2 | *Ostlingoceras puzosianum* (D'ORBIGNY, 1842) |
| 1001.4 | Turrilitinae sp. |
| 1001.5 | Ammonitina juv. sp. |
| 1001.5 | Turrilitinae sp. |
| 1001.65 | *Kossmatella* sp. |
| 1001.8 | *Aucellina* sp. |
| 1001.8 | *Kossmatella romana* WIEDMANN, 1962 |
| 1002.0 | *Lechites* sp. |
| 1004.15 | *Lechites* sp. |
| 1005.3 | Turrilitinae sp. |
| 1005.7 | *Mariella (Mariella)* sp. |
| 1006.2 | *Puzosia (P.) mayoriana* (D'ORBIGNY, 1841) |
| 1008.4 | *Ostlingoceras puzosianum* (D'ORBIGNY, 1842) |
| 1010.2 | *Puzosia (Puzosia)* sp. |
| 1013.6 | *? Puzosia (Puzosia)* sp. |
| 1017.7 | Cephalopoda |
| 1021.8 | *Lechites* sp. |
| 1021.8 | *Lechites* sp. |
| 1022.2 | *Lechites* sp. |
| 1030.3 | *Puzosia (Puzosia)* sp. |
| 1030.5 | *Mortoniceras* sp. |
| 1030.7 | Ammonoidea sp. |
| 1030–1040 | *Lechites gaudini* PICTET & CAMPICHE, 1861 |
| 1030–1040 | *Lechites* sp. |
| 1031.0 | ? Lytoceratina |

Continuation of Table 14

| | |
|---|---|
| 1031.8 | *Puzosia (Puzosia)* sp. |
| 1032.3 | *Puzosia (Puzosia)* sp. |
| 1032.8 | *Puzosia (Puzosia)* sp. |
| 1033.3 | Ancyloceratina sp. |
| 1033.5 | *Cantabrigites cantabrigense* SPATH, 1933 |
| 1034.6 | *Scaphites (Scaphites)* sp. |
| 1034.7 | *Lechites* sp. |
| 1035.2 | Ancyloceratina |
| 1035.7 | Baculitidae sp. |
| 1035.9 | *Helicohamites* cf. *duplicatus* (PICTET & CAMPICHE, 1861) |
| 1038.7 | Acanthoceratacea sp. juv. |
| 1038.7 | Ancyloceratina |
| 1038.7 | *Helicohamites* cf. *duplicatus* (PICTET & CAMPICHE, 1861) |
| 1039.4 | *Puzosia (Puzosia)* sp. |
| 1039.8 | Ammonoidea |
| 1044.4 | *Lechites* sp. |
| 1044.5 | Ammonitina |
| 1044.5 | Ammonoidea |
| 1044.8 | *Lechites* sp. |
| 1046.1 | *Idiohamites spiniger* (J. SOWERBY, 1818) |
| 1050–1100 | Ancyloceratina |
| 1050–1100 | *Puzosia (Puzosia)* sp. |
| 1053.9 | *Puzosia (Puzosia)* sp. |
| 1056.8 | Ammonitina sp. juv. |
| 1056.9 | Ammonitina juv. sp. |
| 1057.0 | Ancyloceratina |
| 1057.2 | Acanthoceratacea sp. juv. |
| 1057.6 | *Idiohamites* juv. sp.<br>Ammonitina juv. sp. |
| 1057.7 | Ammonitina juv. sp. |
| 1060.4 | *Hemiptychoceras gaultinum* (PICTET, 1847) |
| 1060.4 | Phylloceratina juv. sp. |
| 1060.5 | Ammonitina juv. sp. |
| 1060.8 | Ammonitina juv. sp. |
| 1060.9 | *Lechites gaudini* PICTET & CAMPICHE, 1861 |
| 1060.9 | Mortoniceras sp.<br>Ammonitina juv. sp. |
| 1060.9 | *Worthoceras pygmaeum* BUJTOR, 1989 |
| 1067.9 | Ancyloceratina |
| 1071.7 | *Idiohamites spiniger* (J. SOWERBY, 1818) |
| 1071.9 | *Mortoniceras* sp. |
| 1072.0 | *Helicohamites* cf. *ibex* (SPATH, 1941) |
| 1072.4 | *Idiohamites* sp. |
| 1072.5 | Ammonoidea |
| 1072.7 | *Helicohamites duplicatus* (PICTET & CAMPICHE, 1861) |
| 1073.3 | Ammonitina juv. sp. |
| 1073.4 | Brancoceratidae juv. sp. |
| 1073.4 | *Stomohamites virgulatus* (BRONGNIART, 1822) |
| 1080.8 | Baculitidae sp.<br>*Sciponoceras* sp. |
| 1081.3 | ? *Puzosia* sp. |
| 1083.4 | ? Phylloceratina |
| 1083.4 | *Puzosia (Puzosia)* sp. |
| 1083.5 | *Puzosia (Puzosia)* sp. |
| 1084.0 | *Lechites gaudini* PICTET & CAMPICHE, 1861 |
| 1084.0 | Phylloceratidae sp. |
| 1089.7 | Ancyloceratina sp. |
| 1092.8 | *Cantabrigites cantabrigense* SPATH, 1933 |
| 1094.0 | Ancyloceratina |
| 1094.4 | *Puzosia (Puzosia)* sp. |
| 1096.0 | *Eogaudryceras* sp. |
| 1096.3 | *Mortoniceras* sp. |
| 1096.7 | *Puzosia (Puzosia)* sp. |
| 1097.0 | *Puzosia (Puzosia)* sp. |
| 1097.5 | ? Ancyloceratina sp. |
| 1099.6 | *Eogaudryceras* sp. |
| 1099.9 | *Puzosia* sp. |
| 1101.6 | Ammonoidea |
| 1106.9 | Ammonoidea juv. sp. |
| 1107.2 | *Anagaudryceras* cf. *buddha* (FORBES, 1846) |
| 1107.2 | *Puzosia (Puzosia)* sp. |
| 1108.3 | Ancyloceratina |
| 1108.9 | Ammonitina<br>Ancyloceratina |
| 1112.3 | Ancyloceratina |
| 1113.8 | Ancyloceratina<br>Ammonoidea sp. juv. |
| 1113.8 | *Helicohamites duplicatus* (PICTET & CAMPICHE, 1861) |
| 1113.9 | Ammonitina sp. juv. |
| 1114 | *Lechites gaudini* PICTET & CAMPICHE, 1861 |
| 1115.2 | Ammonitina<br>*Stoliczkaia* sp. |
| 1116.3 | Ammonoidea |
| 1116.3 | *Hypophylloceras* sp. |
| 1116.3 | *Lechites* sp. |
| 1117.3 | *Kossmatella* cf. *uhlenbecki* (FALLOT, 1885) |
| 1117.5 | Ammonitina juv. sp. |
| 1124.3 | *Aucellina* sp. |
| 1126.1 | *Neohibolites* sp. |
| 1136.6 | Ammonitina juv. sp. |
| 1137.7 | ? Nautiloidea |
| 1159.6 | *Puzosia (Puzosia)* sp. |
| 1163.9 | *Puzosia (Puzosia)* sp. |
| 1168.9 | *Kossmatella (Kossmatella)* cf. *agassiziana* (PICTET, 1848) |
| 1169.8 | *Neohibolites* sp. |
| 1171.6 | *Lechites* sp. |
| 1171.6 | *Puzosia (Puzosia) mayoriana* (D'ORBIGNY, 1841) |
| 1171.7 | *Kossmatella (Kossmatella)* cf. *agassiziana* (PICTET, 1848) |
| 1171.8 | Ancyloceratina |
| 1171.8 | *Kossmatella* sp. juv. |
| 1171.9 lost | *Kossmatella* cf. *agassiziana* (PICTET, 1848) |
| 1172.3 | Ammonitina sp. |
| 1173.0 | *Neohibolites* sp. |
| 1173.7 | Ammonoidea |
| 1173.7 | *Puzosia* sp. |
| 1175.8 | *? Aucellina* sp. |
| 1180.7 | Ancyloceratina |
| 1181.3 | *Neohibolites* sp. |
| 1188.9 | *Lechites gaudini* PICTET & CAMPICHE, 1861 |
| 1197.0 | Ancyloceratina |
| 1200.9 | *Puzosia (Puzosia)* sp. |
| 1204.9 | Ancyloceratina |

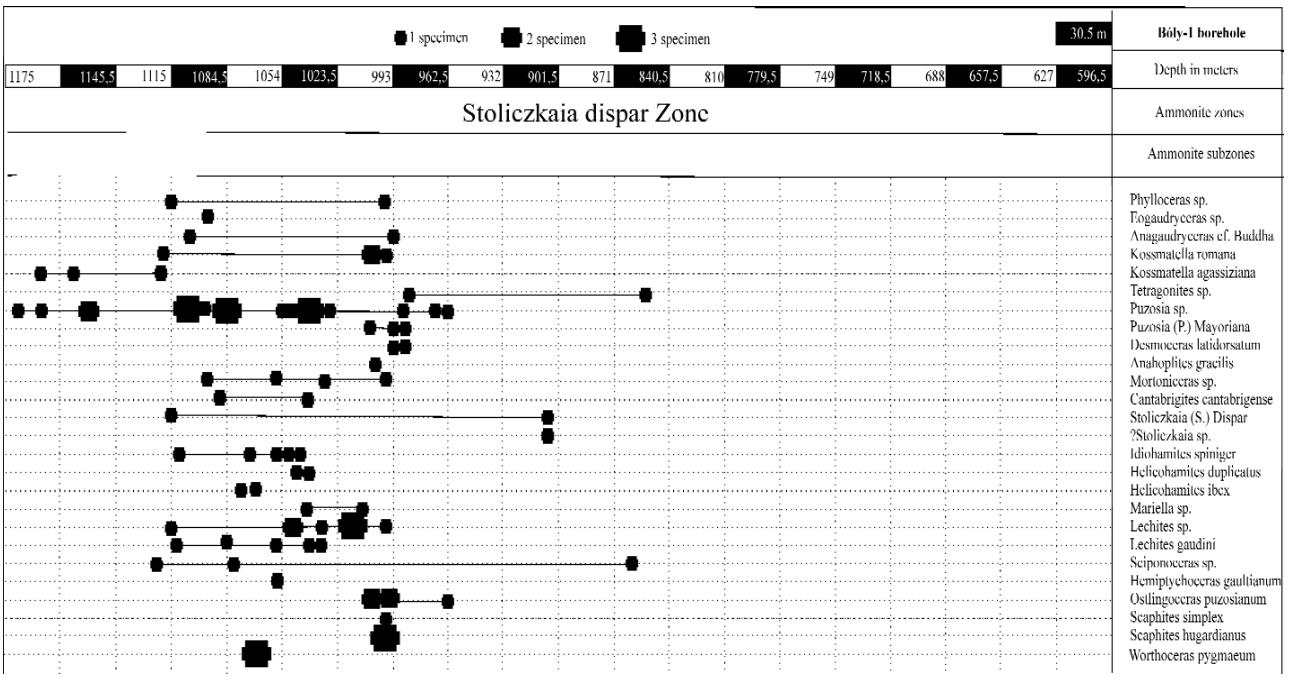
*Dipoloceras cristatum* subzone of the *Mortoniceras (M.) inflatum* Zone to the upper *Mantelliceras mantelli* Zone. Here his data is revised.

Despite that the borehole is more than 600 metres long, there are only a sixteen taxa which can be identified in species level due to the poor state of preservation. Most of the specimens are flattened and heavily phosphatized but shells were preserved in most cases.

The borehole, on the basis of the ammonite assemblage, can be divided into two parts. Below 1000 metres, the assemblage is characterized by the presence of *Mariella, Cantabrigites, Lechites, Hamites, Mortoniceras, Hemiptychoceras* and *Worthoceras*, beside some specimens of *Ostlingoceras* and *Scaphites*. Above 1000 metres the fauna tends to be changing with the appearance of *Ostlingoceras*, *Anahoplites* and *Stoliczkaia* species. This composition suggests that both faunistical "units" belong to the *Stoliczkaia (S.) dispar* Zone, the difference could be explained with stratigraphic and palaeoecological reasons. The sequence of Bóly B–1 borehole should be sedimented in deeper pelagic palaeoenvironment than the borehole sequences of Jásd J–36 and Jásd J–42, as their faunistic picture suggest.

The general composition of the ammonite assemblage (Table 15) suggests Late Albian age. The lack of the typical Uppermost Albian species as *Yezoites, Arrhaphoceras (Praeschloenbachia)* or *Hyphoplites* indicates that the sequence older than the uppermost Albian. None of the typical Early Cenomanian species as *Neostlingoceras, Schloenbachia* or *Mantelliceras* were found. The presence of the *Stoliczkaia (S.) dispar* Zone can be pointed out in the whole length of the sequence, presumably not from the youngest, *Arrhaphoceras (Praeschloenbachia) briacensis* subzone.

***Table 15.*** Ammonite occurences on the sequence of Bóly B–1 borehole




## Faunistic and biostratigraphic evaluation of Hungarian Albian ammonites

As it was demonstrated above, ammonite assemblages of Early Albian *Douvilleiceras mammillatum* Superzone are known only from a single borehole, while ammonites of the Late Albian *Stoliczkaia (S.) dispar* Zone were found from surface outcrops and boreholes as well.

Classic *Douvilleiceras mammillatum* Zone forms as *Douvilleiceras mammillatum* (SCHLOTHEIM 1813), *Cleoniceras* sp., *Brancoceras* sp., and several *Beudanticeras* species are documented from the Transdanubian Range. The restricted occurrence of the genus *Leymeriella* can be due mainly to palaeobiogeographical and palaeoecological reasons. Two species of genus — *Leymeriella (Proleymeriella) revili* (JACOB 1908) and *L. (Proleymeriella) romani* (JACOB 1908) — are mentioned by SCHOLZ from the Tata TVG–55 borehole in manuscripts (mentioned in FÜLÖP 1975, p. 116) and from various other boreholes (Tata TVG–45, Tata TVG–59) but without any figure and the ammonites are apparently seem to be lost. No ammonite data were found from the Early Albian in the area of the southern Mecsek–Villány region.

From the late Early Albian to early Upper Albian, intensive orogenic movements of the future Alps uplifted the area, so sediments were eroded under subaerial circumstances or deposited in shallow water and brackish environments what explains the complete lack or destruction of Middle Albian ammonite assemblages. In the Late Albian, pelagic basin sedi-

ment, the "Turrilitenmergel" was accumulated mainly in the Northern Bakony area. The approximately 500 metres thick marly sequences yield impressive ammonite assemblages besides other macrofossils, which indicate Late Albian age. At the same time, in the Villány region fine grained, dark aleuritic sediment deposited in deeper water circumstances and produced a sequence that penetrated with the Bóly B–1 borehole.

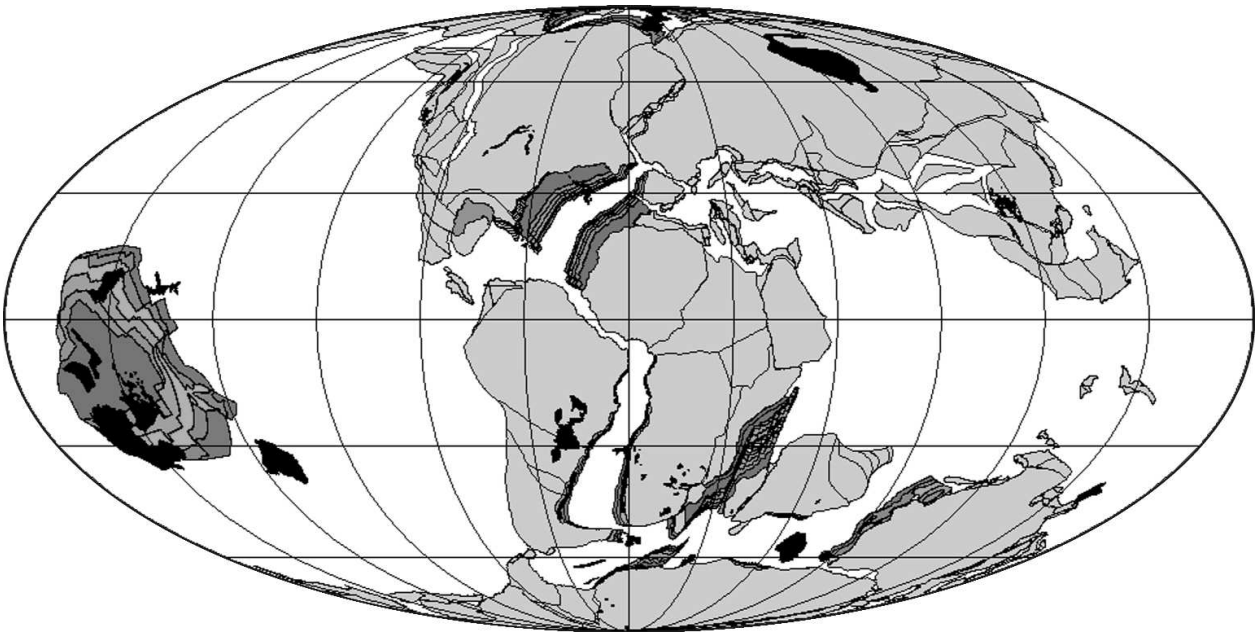
Summarizing the ammonite biostratigraphic results of the most recent ammonite record of the Hungarian Upper Albian sediments, the ammonite data of Tilos Forest, Bakonynána: Zsidó-hegy and Jásd 1 quarry sections indicate the presence of the Late Albian *Mortoniceras (M.) inflatum* and *Stoliczkaia (S.) dispar* Zones. On the basis of the Jásd J–42 and Jásd J–36 boreholes, the age of the ammonite assemblage is younger, can be placed into the Late Albian *Arrhaphoceras (Praeschloenbachia) briacensis* subzone of *Stoliczkaia (S.) dispar* Zone. Bóly B–1 borehole yielded a rich ammonite assemblage of the older subzones of the Late Albian *Stoliczkaia (S.) dispar* Zone.

26 ammonite taxa are described for the first time from Hungary.

## Palaeobiogeographic interpretation of the Hungarian Late Albian ammonite record

In contrary to the well balanced climate and more or less cosmopolitan ammonite taxa of the Aptian, in the Albian certain ammonite provinces can be demonstrated not just in the north-western hemisphere, but in the rest of the marine environments. Palaeobiogeography of the Western Tethys was determined by the opening of the Northern Atlantic and the closure of the Tethys (Text-Figure 55). The Early Albian palaeobiogeographic evaluation is presented at the end of the Aptian chapter because of the faunistic composition of Late Aptian – Early Albian condensed ammonite assemblage.

OWEN (1999) distinguished three Albian faunal provinces in the north-western hemisphere. The first one is the Arctic province, which contains Korjak–Kamchatka, Alaska, Canadian Arctic, Greenland and the Spitzbergen. The second one is the European province with England, France, NW Germany, Austria, Bulgaria and Mangyshlak. The third is the Tethyan province that included the Southern Caucasus, North Africa, Iran and Madagascar. According to faunal and geographical similarities discussed later, the present area of Hungary contains sequences of both European and Tethyan palaeogeographic provinces.



***Text-Figure 55.*** Global palaeogeographical reconstruction of Late Albian (100 My). Map is from the "Plate Tectonics On-Line Reconstruction Tool" website http://www.itis-molinari.mi.it/Intro-Reconstr.html, model after SCHETTINO & SCOTESE 2000. Continental crusts are light grey, opening oceanic trenches are coloured to dark grey, hotspot tracks are black

Despite the great abundance of the collected specimens and their researchers, nobody provided a proper palaeobiogeographic implication for the Albian assemblages of Hungary. Recent workers as SCHOLZ (1975, 1979), NAGY I. Z. (1963, 1971 1973, 1982, 1986) and HORVÁTH (1985, 1989) paid most of their attention to the systematic and stratigraphic problems of the ammonite material. BUJTOR (1990b) was the first researcher, who, after an extensive study of the Upper Albian – Cenomanian ammonites of Hungary, dedicated a paper to the palaeobiogeographic evaluation of Albian–Cenomanian ammonoids of Hungary. He concluded that "ammonite faunas [of Bakony and Villány Mts] indicate different palaeogeographic connections and diverse origin of these tectonic units. Bakony Mts shows southern, while Villány Mts shows north-

ern affinities" (BUJTOR 1990b).

### *Bakony Mts*

According to my opinion, "borehole" and "surface" assemblages of the Bakony Mts are basically different from each other considering their facies and both qualitative and quantitative faunistical parameters.

At present, the Bakony Mts are the part of the Transdanubian Range, situated along a SW–NE mountain chain. Sequences of the Pénzeskút Marl Formation are consist a dolomitic yellow marl with aleurolite and sandstone intercalations. The dominance of genera *Stoliczkaia, Cantabrigites, Salaziceras* and *Mortoniceras* — with the additional presence of *Engonoceras* and *Ficheuria* that restricted to the Mediterranean southern shore of the former Tethys — clearly show the southern affinity of surface ammonite assemblages. MORTONiceratinae (genera *Cantabrigites* and *Mortoniceras*) and Lyelliceratidae–Flickiidae (genera *Stoliczkaia, Neophlycticeras, Ficheuria, Zuluscaphites* and *Salaziceras*) give the 63% of the total ammonite taxa at Jásd 1 quarry 15% at Tilos Forest and 16% at Bakonynána. These heavily ornamented forms preferred warmer, shallower water conditions. The extreme richness of *Ostlingoceras* and other heteromorphs in the upper part of the Tilos Forest sequence is unique. This high monospecific diversity can be explained with the possibly more distal and specific palaeoenvironment (REBOULET et al. 2005). But I have no idea exactly what caused this.

At borehole faunas, the "boreal" domination of ammonoid taxa is obvious as BIRKELUND (BIRKELUND et al. 1984) also pointed out in the case of the Jásd J–42 borehole. Besides the cosmopolitan Albian taxa as *Puzosia* or *Beudanticeras*, the dominance of Hoplitidae (48% at Jásd J–42 borehole and 32% at Jásd J–36 borehole) and the ancillary position of genera *Stoliczkaia, Scaphites, Zuluscaphites* and *Kossmatella* and especially the complete lack of *Engonoceras, Ficheuria* and *Salaziceras* (as the representatives of dominantly Tethyan ammonite assemblages) are the markers of the higher Boreal/European affinity.

But in this case, these "boreal" taxa inhabited the deeper basin environments of cold water and indicate more the basin facies than the different palaeogeographic position. The facies of borehole sequences is a muddy, fine-grained, grey marly siltstone which also support the presence of deeper water conditions.

### *Villány Mts*

Villány Mts are situated in southern Hungary. The boreal affinity and position of Villány fauna is not questionnable, although the poor state of preservation makes the high level faunistic evaluation difficult. The faunistic composition of Bóly B–1 borehole is presented on Table 14. The genus *Kossmatella* is the only true "Tethyan" element, while *Stoliczkaia, Salaziceras, Ficheuria, Engonoceras, Neophlycticeras* are missing. The genus *Anaholpites* is a boreal form, while the abundancy of genera *Puzosia, Desmoceras, Tetragonites* and *Phylloceras* indicate open, pelagic palaeoenvironment. These are cosmopolitan taxa and in this case indicate palaeobathymetry rather than palaeogeography.

So, in my point of view, the assemblage of Bóly B–1 borehole indicates the deepest, pelagic palaeoenvironment of all Late Albian ammonoid-bearing environments of Hungary, which idea can be supported by the occurence (FREY & SEILACHER 1980) of the trace fossil *Palaeodictyon*.

## Palaeoecology and taphonomy

### *Surface outcrops*

As it was mentioned previously, the Hungarian Late Albian ammonite assemblages are basically different from surface outcrops and boreholes.

The recent bed-by-bed collecting is used for palaeoecological investigation that was done only at Tilos Forest locality. The upper part of the sequence which is light beige coloured marly limestone with marly intercalations. The fauna is dominated by torticone ammonites with the appearence of *Stoliczkaia*. Specimens are generally huge and slightly phosphatized. Sorting by size cannot be observed. The accompanying fauna is dominated by gastropods and echinoids which may imply a shallow neritic palaeoenvironment. REBOULET et al. (2005) interpreted Late Albian torticone ammonites as "inhabited mainly more distalm, neritic palaeoenvironments...". Hungarian material supports this idea.

The condensed basal sediment is different from the overlying fauna at Tilos Forest, the situation might have been similar to the Late Aptian depositional process of the basal pockets of the Tata Limestone Formation. As OWEN (1996b) pointed out, in shallow seas these kinds of erosional surfaces could be swept by tidal flows as it could happened in the case of Tilos Forest. In the local deepenings of the palaeorelief a size-sorted, pyritized fauna accumulated, which was documented by SCHOLZ (1979) and in this present paper. Similar condensed sections are known from the Late Aptian and the Vraconnian sequences of the Swiss Jura Mts (RENZ & JUNG 1978). The ammonite assemblage is dominated by planispirals as *Stoliczkaia, Salaziceras* and *Puzosia* which refer to neritic palaeoenvironment (REBOULET et al. 2005).

Besides them, a great number of torticones is remarkable. Relative abundance of *Scaphites*, which "inhabited more proximal palaeoenvironments… and could have lived near the sea bottom" (REBOULET et al. 2005) correlates well, with the relative abundance of echinoids in the basal bed. It is remarkable as *Stoliczkaia* is interpreted as "neritic environment" preferring form could have lived in more proximal environment in contrast to the others are "oceanic or deep water" taxa of distal environment (REBOULET et al. 2005). REBOULET et al. (2005) has interpreted *Scaphites* as a "vertical migrant" as it was previously proposed by WESTERMANN (1996). They concluded that "*Scaphites* could have lived near the sea bottom… and possible had nektobenthic mode of life". Genera *Stoliczkaia, Desmoceras* and *Puzosia* probably had a "deep-nektonic rather than nektobenthic mode of life" (REBOULET et al. 2005). The change of the faunistic composition upward is remarkable: in the upper non-condensed six beds the dominance of genus *Ostlingoceras* is clear. This high abundance could be controlled by ecological factors. According to MONKS (1998), "turriliticone ammonites have approximately zero rotation angles… and oriented aperture downwards." He concluded that orientation of high spired turriliticones (*Turrilites, Ostlingoceras*) changed less than the low spired forms (*Turrilitoides, Mariella, Proturrilitoides*) when the body moved within the shell. Turriliticones are non-tilters (MONKS 1998) and possibly lived in distal environments and were planktonic animals.

Summarizing the palaeoecological and taphonomical investigations of surface outcrops, the facies of the sediment, the accompanying fauna and the composition of the ammonite assemblage suggest neritic palaeoenvironment. Transgression took place during the sedimentation which can be deduced from the composition of the ammonite fauna.

### *Borehole assemblages*

Late Albian sediments crossed with Jásd J–42 and Jásd J–36 boreholes in the Transdanubian Range and Bóly B–1 borehole in the Villány Mts are fine-grained, dark grey marly aleurolites. This facies is considered to indicate deep water palaeoenvironment (CSÁSZÁR [ed.] 1996). Late Albian assemblage of Jásd J–42 borehole is dominated by Hoplitidae (48%), together with a great number of torticones and orthocones. Planispiral forms as *Stoliczkaia*, *Puzosia, Cantabrigites* and *Salaziceras* are just additional elements of the assemblage. REBOULET et al. (2005) mentiones *Lechites* as "common or abundant in deeper palaeoenvironments of the Vocontian Basin", while "...torticones…inhabited neritic palaeoenvironments". So, these assemblages are considered to be neritic faunas that indicate deeper palaeoenvironment than assemblages of the surface outcrops.

The ammonoid fauna of Bóly B–1 borehole is dominated by the Ancyloceratina subordo. Members of subordo Phylloceratina, Lytoceratina and Desmoceratidae consist of almost 40% of the ammonite specimens which suggest deeper, possibly pelagic palaeoenvironment in contrast of the neritic ammonite assemblage of Jásd J–36 and Jásd J–42 boreholes. Great abundance of orthocones (20%) and torticones (13.18%) suggest deeper epipelagic palaeoenvironment. Other planispiral forms as Hoplitidae and Brancoceratidae are ancillary elements with almost 7% of all. The accompanying fauna is highly dominated by gastropods and the bivalve genera *Aucellina* and *Inoceramus*. A trace fossil *Palaeodictyon* and some specimens of ?*Neohibolites* were also found (BUJTOR 1989). *Palaeodictyon* is a member of "Nereites" ichnofacies (FREY & SEILACHER 1980) which characterizes bathyal environments and is abundant in flysch or flysch-like sediments (FREY & SEILACHER, loc. cit) and mainly in pelagic fine-grained sediments.

In summary, fossil record of boreholes consist on ammonite assemblages that indicate deeper water palaeoenvironment than in the case of surface outcrops. The supposed palaeoenvironment was somewhat deep neritic in the fauna of Jásd J–42 and Jásd J–36 boreholes and pelagic of Bóly B–1 borehole. Numerous specimens of benthic bivalves could have been transported by turbiditic flows.

# Systematic descriptions

For the classification of subordo Ancyloceratina, MONKS's (1998, 1999, 2000, 2002) systematics used here.

Ordo Ammonoidea ZITTEL, 1884
Subordo Phylloceratina ARKELL, 1950
Family Phylloceratidae ZITTEL, 1884

MURPHY & RODDA (2006) discussed the Phylloceratidae and proposed new systematics for the family. Here I follow the systematics of WRIGHT et al. (1996).

Genus *Phylloceras* SUESS, 1865
Type species: *Ammonites heterophyllus*, J. SOWERBY, 1820

### *Phylloceras seresitense* PERVINQUIÉRE, 1907

Pl. XIV, Figure 1, 2

*1907 *Phylloceras seresitense*, PERVINQUIÉRE, p. 52
1963 *Phylloceras (Hypophylloceras) seresitense* PERVINQUIÉRE, 1907 — WIEDMANN, p. 213, Pl. 15, Figures 4a, b; Pl. 21, Figures 1a, b (with synonymy)
2006 *Neophylloceras seresitense* PERVINQUIÉRE, 1907 — MURPHY & RODDA, p. 41, Pl. 5, Figures 5–7, 10–14

*Material.* Three specimens from Tilos Forest.

*Description.* Involute forms with shallow umbilicus and slightly bubbled appearence. The umbilical edge and the lower flank is the widest point of the conch. Flanks are convex, no ornamentation is visible and apart from the prorsiradiate lirae appear on the outer flank.

*Discussion.* The Albian Phylloceratidae contains several specimens, the present one resembles to *Ph. (H) velledae* (MICHELIN 1838) and *Ph. (H) moreti* (MAHMOUD 1956), but the shallower umbilicus and the wide lower flank (in ventral view) characterize the species.

*Occurrence.* The species is known from the condensed basal pockets of the Upper Albian of Tilos Forest, otherwise reported from the Albian deposits of the Mediterranean region.

Genus *Hypophylloceras* SALFELD, 1924
Type species: *Phylloceras onoense* STANTON, 1895

### *Hypophylloceras* sp.

*Material.* Two poorly preserved, flattened, shelled specimens from Bóly B–1 borehole from 999.8 m and 1116.3 m.

*Description.* Small, involute form with very narrow umbilicus. As it is characteristic for the subgenus, on the venter fine, radial ribs can be detected which disappear on the lateral region. Suture cannot be observed.

*Discussion.* The poor preservation and the heavy flattening destroyed the features necessary for the identification at species level.

*Occurrence.* The subgenus was cosmopolitan from the Valanginian to Maastrichtian.

Subordo Lytoceratina HYATT, 1889
Superfamily Tetragonitaceae HYATT, 1900
Family Gaudryceratidae SPATH, 1927b
Subfamily Gaudryceratinae SPATH, 1927b
Genus *Eogaudryceras* SPATH, 1927b
Type species: *Ammonites numidus* COQUAND, 1880

### *Eogaudryceras* sp. indet.

Pl. XXVIII, Figure 1, 2

*Material.* Bóly B–1 borehole two flattened, shelled specimens from 1096.0 m and 1099.6 m.

*Description.* Moderately evolute, small forms with wide umbilicus. Ornamentation is from S–shaped fine ribs. Aperture not ornamented, follows the S-shape of the ribbing. Suture cannot be observed.

*Discussion.* The whorl section and the umbilical region are necessary for the species level identification (KENNEDY & KLINGER 1979) but these characters cannot be visible because of the heavy flattening.

*Occurrence.* The genus is reported from the *Stoliczkaia (S.) dispar* Zone sequence of Bóly B–1 borehole; otherwise it is known from the Upper Aptian to Upper Albian, from the Western Tethyan region, but from North America, South-Africa and California as well.

Genus *Anagaudryceras* SHIMIZU, 1934
Type species: *Ammonites sacya* FORBES, 1846

### *Anagaudryceras* cf. *buddha* (FORBES, 1846)

1979 *Anagaudryceras buddha* (FORBES) — KENNEDY & KLINGER, p.146, Pl. 8, Figures 1–3; Pl. 10, Figures 1–6; Pl. 11, Figures 1, 2.

*Material.* A poorly preserved shelled specimen from 997.6 m and an impression from 1107.2 m from Bóly B–1 borehole.

*Description.* Slightly depressed evolute forms. Umbilicus is wide and deep but hardly visible. Shell is ornamented with fine, radial ribs. In every 2–5 millimetres, collared ribs follow the fine, uncollared ones which only visible over 8 mm in diameter. Suture cannot be visible.

*Discussion.* Intraspecific variation is very common and high (KENNEDY & KLINGER 1979) at this species, therefore taxonomic problems also occur. Herein the author accepts the opinion of KENNEDY & KLINGER (1979) that *Ammonites sacya* FORBES (1846) represents the young ontogenetic stage of *Ammonites buddha* FORBES (1846).

*Occurrence.* The species is known from the Late Albian sequence of Bóly B–1 borehole; otherwise reported from the Middle Albian to Coniacian strata of the Western Tethys, Madagascar, Alaska, Japan and the Antarktica.

Genus *Zelandites* MARSHALL, 1926
Type species: *Zelandites kaiparaensis* MARSHALL, 1926

### *Zelandites dozei* (E. FALLOT, 1885)

Pl. XIV, Figure 3

*1885 *Ammonites dozei* FALLOT, p. 235, Pl. 4, Figure 3
1979 *Gaudryceras (Zelandites) dozei dozei* (FALLOT) — SCHOLZ, p. 51, Pl. 10, Figures 3, 4, Text-Figure 14
1996 *Zelandites dozei dozei* (FALLOT) — KENNEDY in GALE et al., p. 549, Figures 13a–c, g, i, j, l, m, 26c, 29p

*Material.* A single specimen from Tilos Forest.

*Description.* The specimen is 30 mm in diameter, highly compressed, with an oval whorl section. The cast is smooth with hardly visible constrictions which are slightly sinuous on the flanks and prorsiradiate on the venter.

*Discussion.* The specimen resembles to the one figured by KENNEDY (KENNEDY in GALE et al. 1996).

*Occurrence.* The species is known from the condensed basal pockets of the Upper Albian sequence of Tilos Forest; otherwise reported from the *Stoliczkaia (S.) dispar* and *Mantelliceras mantelli* Zones of France, Switzerland and Algeria.

Subfamily Kossmatellinae BREISTROFFER, 1953
Genus *Kossmatella* JACOB, 1908
Type species: *Ammonites agassizianus* PICTET, 1847

### *Kossmatella* sp. indet.

Pl. XXVI, Figure 14, Pl. XXVIII, Figure 5

*Material.* Three poorly preserved, shelled specimens from 919.5 m and 1001.65 m, and a juvenile one from 1171.8 m Bóly B–1 borehole.

*Description.* Small, involute forms. The only visible part is the last whorl. There are bubbles starting on the umbilical edge and gradually disappearing on the lateral region interspaced with lateral sulci. From the umbilical edge fine radiate ribs cross the lateral part and become prorsiradiate on the venter. Suture cannot be observed.

*Discussion.* The poor preservation only allows the generic level identification.

*Occurrence.* The genus is known from the Late Albian sequence of Bóly B–1 borehole; otherwise reported from the Lower Albian to Middle Cenomanian wordwide, considered as a typical Mediterranean taxon.

### *Kossmatella agassiziana* (PICTET, 1847)

1910 *Kossmatella agassiziana* PICTET — FALLOT, P., p.67, Pl. 3, Figure 2
1930 *Kossmatella agassiziana* PICTET — PASSENDORFER, p. 462 (112)
1967 *Kossmatella agassiziana* PICTET — DIMITROVA, p. 30, Pl. 10, Figure 4
1979 *Kossmatella agassiziana* PICTET — SCHOLZ, p. 54, Pl. 10, Figures 7, 9

*Material.* Two shelled specimens from Bóly B–1 borehole (1171.7 m and 1171.9 m) and an impression from 1168.9 m.

*Description.* The involution of the shells and the umbilical region cannot be observed because of the fragmented preservation. A fragment is characterized by the constrictions that start from the umbilical edge and cross the lateral part sinuously, finally prorsiradiate on the ventral edge. The constriction is shallow and moderately wide. In between them,

fine lirae can be observed, strat from the midflank and well visible on the outer flank. The interspace between the constrictions is flat.

*Discussion.* The species differs from *K. (K) muhlenbecki* (E. FALLOT, 1885) from the shallower constrictions, also differs from *K. (K) romana* (WIEDMANN, 1962c) from the absence of umbilical bullae.

*Occurrence.* The species is known from the condensed basal pockets of the Upper Albian of Tilos Forest and the Late Albian sequence of Bóly B–1 borehole; otherwise reported from the Upper Albian to Lower Cenomanian deposits of the Mediterranean region and North America.

### ***Kossmatella* cf. *muhlenbecki* (E. FALLOT, 1885)**

Pl. XIV, Figure 4

1908 *Kossmatella muhlenbecki* (FALLOT) — JACOB, p. 23, Pl. 2, Figure 7
1930 *Kossmatella muhlenbecki* (FALLOT) — PASSENDORFER, p. 461 (111), Pl. 2, Figure 40
1968 *Kossmatella muhlenbecki* (FALLOT) — WIEDMANN & DIENI, p. 39, Pl. 2, Figure 9, Pl. 3, Figures 9, 11, 12
1979 *Kossmatella muhlenbecki* (FALLOT) — SCHOLZ, p. 53, Pl. 10, Figures 5, 6, 8

*Material.* A fragmented, shelled specimen from Bóly B–1 borehole at 1117.3 m and one specimen is from Bakonynána from bed no. 15.

*Description.* A piece of a small specimen where the umbilical region and the inner phragmocone cannot be visible. The trapezoidal whorl section is characteristic for the species. There are three, deep constrictions on the fragment which start on the umbilical edge, run radially on the lateral region, become prorsiradiate on the ventrolateral part and finally disappear on the venter. Fine, slight lirae are also observed which follow the shape of the constrictions and also disappear on the venter. Suture cannot be studied.

*Discussion.* Even the best preserved fragment is in poor state, which justifies the use of the open nomenclature.

*Occurrence.* The species is known from the condensed basal pockets of the Upper Albian of Tilos Forest and the Upper Albian sequence of Bóly B–1 borehole and Bakonynána; otherwise reported from the Albian deposits of the Mediterranean region.

### ***Kossmatella romana* WIEDMANN, 1962c**

Pl. XIV, Figure 5, Pl. XXVIII, Figures 3, 9, 14

*1962c *Kossmatella (Kossmatella) romana* n. sp. WIEDMANN, p. 164, Pl. 8, Figures 6, 7, Pl. 13, Figure 12, Abb. 21–24
1968 *Kossmatella (Kossmatella) romana* WIEDMANN — WIEDMANN & DIENI, p. 38, Pl. 1, Figures 10, 11, Pl. 3, Figure 10
1979 *Kossmatella (Kossmatella) romana* WIEDMANN — SCHOLZ, p. 53
1990 *Kossmatella (Kossmatella) romana* WIEDMANN — MARCINOWSKI & WIEDMANN, p. 28, Pl. 2, Figure 7

*Material.* Two shelled specimens from Bóly B–1 borehole at 988.0 m and 1001. 8 m.

*Description.* Small, slightly ellipsoidal forms. Bullae appear on the umbilical edge and flatten on the mid-lateral region and finally disappear on the venter. Fine lirae can be observed on the lateral region and disappear on the outer flank. In between the bullae, very shallow constrictions appear which getting wider on the outer flank. Suture cannot be detected.

*Discussion.* On the morphology of this species — in contrast to the previously described *Kossmatella* species —, the bullae characterize the appearence and not the constrictions.

*Occurrence.* The species is known from the condensed Upper Albian basal pockets of Tilos Forest and the Upper Albian sequence of Bóly B–1 borehole, otherwise reported from the Lower to Upper Albian deposits of the Western Tethyan region and Zululand.

Family Tetragonitidae HYATT, 1900
Genus *Tetragonites* KOSSMAT, 1895

### ***Tetragonites* sp.**

Pl. XXVIII, Figure 7

*Material.* Fragments of shelled specimens from Bóly B–1 borehole (850.0 m and 983.1 m) and two internal moulds from Tilos Forest.

*Description.* Small, evolute forms, whorl section and umbilical region cannot be observed. Ornamentation consists of 3–5 constrictions on each fragment, no ribs are present. Suture cannot be seen.

*Discussion.* Characters necessary for the species level identification as whorl section and the shape of the constrictions (WIEDMANN 1973) cannot be observed therefore identification of the fragments remained at generic level.

*Occurrence.* The species is known from the condensed Upper Albian basal pockets of Tilos Forest and the Upper Albian sequence of Bóly B–1 borehole; otherwise the genus was cosmopolitan and reported from the Upper Aptian to Maastrichtian.

Subgenus *Tetragonites* KOSSMAT, 1895
Type species: *Ammonites timotheanus* PICTET, 1847

### *Tetragonites (Tetragonites) timotheanus* (PICTET, 1847)

Pl. XIV, Figure 16; Pl. XIX, Figure 2

1923 *Tetragonites timotheanus* (PICTET) — SPATH, p. 25, Pl. I, Figures 5, 6; Text-Figure 6
1967b *T. timotheanus* (PICTET) — MURPHY, p. 19, Text-Figures 8, 9a–d, f–k; Pl. 1, Figures 10–19
1973 *Tetragonites timotheanus* (PICTET) — WIEDMANN, p. 605, Pl. 7, Figures 5–7
1979 *Tetragonites timotheanus* (PICTET, 1847) — SCHOLZ, p. 56, Taf. 10, Figures 10–12; Taf. 11, Figures 1–8; Abb. 16, 17

*Material.* Two specimens from Tilos Forest.

*Description.* Medium sized specimens with medium involution, umbilicus is broad compared to other species of the genus. Whorl section is subquadrate. Umbilical edge is rounded, the lateral side is flattened. The only visible ornamentation are the constrictions, which almost straight with a strong prorsiradiation on the outer flank. Venter smooth apart, from the constrictions and flattened.

*Discussion.* The species is already reported from the Tilos Forest (SCHOLZ 1979). The broad umbilicus and the deep, straigt constrictions are specific characters.

*Occurrence.* The species is known from the condensed Upper Albian basal pockets of Tilos Forest; otherwise the species was distributed worldwide in the Late Albian.

Subordo Ammonitina HYATT, 1889
Superfamily Desmoceratacеae ZITTEL, 1895
Family Desmoceratidae ZITTEL, 1895

### Desmoceratidae gen. et. sp. indet

*Material.* Several crushed specimens from Bóly B–1 borehole (858.7 m; 872.2 m; 878.5 m; 984.6 m and 989.2 m).

*Description.* Small, smooth specimens with narrow umbilicus and depressed whorl section. No sutures are visible.

*Discussion.* Probably juveniles or nuclei remained; no generic characters are visible on the crushed specimens.

*Occurrence.* The family is known from the Upper Valanginian to the Upper Maastrichtian (WRIGHT et al. 1996).

Subfamily Puzosiinae SPATH, 1922b
Genus *Puzosia* BAYLE, 1878

### *Puzosia* sp. indet.

*Material.* 26 fragments of shelled specimens and internal moulds from various localities and boreholes.

*Description.* Small and medium sized specimens. Umbilical region and the whorl section are poorly preserved. Deep and wide constrictions ornamenting the shells, crossing the venter with a convex sinuos. In between them 10–17 fine ribs can be recognized. Suture cannot be observed.

*Discussion.* Distinctive features that characterize each species are cannot be seen therefore the identification at species level is not possible.

*Occurrence.* The genus is known from the condensed Upper Albian basal pockets of all surface outcrops and the Upper Albian sequence of Bóly B–1 borehole; otherwise the genus was cosmopolitan from the Early Albian to the Late Turonian.

Subgenus *Puzosia* BAYLE, 1878
Type species: *Ammonites planulatus* J. de C. SOWERBY, 1827

### *Puzosia (Puzosia) mayoriana* (D'ORBIGNY, 1841)

Pl. XIII, Figure 9, Pl. XIV, Figure 7; Pl. XIX, Figure 8, Pl. XXVIII, Figures 8, 10, 13

*1841 *Ammonites Mayorianus* D'ORBIGNY, p. 267, Pl. 79, Figures 10, 11
1862 *Ammonites Mayorianus* D'ORBIGNY — HAUER, p. 654
1899 *Desmoceras (Puzosia) Mayorianum* D'ORBIGNY — ANTHULA, p. 106
1923 *Puzosia mayoriana* (D'ORBIGNY) — SPATH, p. 42, Pl. I, Figures 9a, b; 10a, b; Text-Figure 10
1979 *Puzosia mayoriana* (D'ORBIGNY) — SCHOLZ, p. 66
1984 *Puzosia (Puzosia) mayoriana* (D'ORBIGNY, 1841) — WRIGHT & KENNEDY, p. 55, Pl. 3, Figures 1, 2, 4, 6, 9–12; Pl. 4, Figures 1, 2, 5–7; Text-Figures 1A, B; 2C, H, M; 3N–R; 4A–E (with synonymy of Upper Albian and Cenomanian references)
1996 *Puzosia (Puzosia) mayoriana* (D'ORBIGNY, 1841) — KENNEDY in GALE et al., p. 552, Figures 10f; 11k, l; 14h–n

*Material.* Three specimens from Bóly B–1 borehole (988.4 m; 993.1 m; 1171.6 m), one from Jásd J–42 (281.7m), one is from Jásd 1 quarry from bed no. 13, and 15 specimens from Tilos Forest.

*Description.* Generally the species is characterized by huge specimens; however the specimens known from Bóly B–1 borehole are quite small. Whorl section is compressed, the umbilicus is shallow and the umbilical edge is rounded. The lateral side is flattened. Fragments are well identified on the basis of the constrictions and the light, dense (10–15) ribs between them, start at the outer lateral region. Constrictions cross the venter with sinuous and the ribs follow them. Suture cannot be observed.

*Discussion.* The species is fully discussed by SPATH (1923), WRIGHT & KENNEDY (1984) and COOPER & KENNEDY (1987).

*Occurrence.* The species is known from the condensed Upper Albian basal pockets of various Hungarian localities and boreholes; otherwise reported from the Middle Albian to Upper Cenomanian and considered as a "Tethyan" species described from Europe, Africa, Madagascar, Japan and India.

Subfamily Beudanticeratinae BREISTROFFER, 1953
Genus *Beudanticeras* HITZEL, 1902
Type species: *Ammonites beudanti* BRONGNIART in CUVIER & BRONGNIART, 1822

### *Beudanticeras* sp.

Pl. II, Figure 1

*Material.* 7 fragments from Tilos Forest, 5 is from Bakonynána.

*Description.* Huge discoidal specimens, but too poorly preserved for specific identification.

Subgenus *Beudanticeras* HITZEL, 1902
Type species: *Ammonites beudanti* BRONGNIART in CUVIER & BRONGNIART, 1822

### *Beudanticeras (Beudanticeras) beudanti* (BRONGNIART, 1822)

Pl. III, Figures 9–13, Pl. XIV, Figure 8, Pl. XIX, Figure 1, Pl. XXI, Figure 1, Pl. XXV, Figures 2, 6

For synonymy see the Aptian chapter.

*Material.* Two specimens are documented from the Tatabánya Ta–1383 borehole between 230.0–256.0 metres; twoneo other specimen is reported from the Oroszlány O–1881 borehole at 295.5 m. 9 huge specimens were collected from Tilos Forest.

*Description.* See the Aptian chapter.

*Discussion.* The Early Albian specimens are smaller, and have stronger ornamentation, while Late Albian ones are bigger and smooth. This change of the ornamentation also appeared during the ontogeny and not only considered as an evolutionary tendency.

*Occurrence.* The species is known from the condensed Upper Albian basal pockets of Tilos Forest. Also reported from the Early Albian sequences of *Douvilleiceras mammillatum* Zone of Tatabánya Ta–1383 and Oroszlány O–1881 boreholes; otherwise the species documented from Upper Aptian to Upper Albian deposits and considered as a "Tethyan" species described from Europe and Angola.

### *Beudanticeras (Beudanticeras) dupinianum* (D'ORBIGNY, 1841)

Pl. XXV, Figure 5

*1841 *Ammonites Dupinianus* D'ORBIGNY, p. 276, Pl. 81, Figures 6, 7, 8
1923 *Beudanticeras dupinianum* (D'ORBIGNY, 1841) — SPATH, p. 60–62, Pl. 4, Figures 1a–d; Text–Figure 14
1961b *Beudanticeras dupinianum* (D'ORBIGNY, 1841) — CASEY, p. 152, Pl. XXVI, Figure 11; Pl. XXVII, Figures 6–8; Pl. XXVIII, Figures 5a, b; Text-Figures 48a–g

*Material.* A single fragment is reported from the Oroszlány O–1881 borehole at 295.5 m.

*Description.* The fragment consists of a quarter whorl with narrow umbilicus. Three prominent ridges present on the quarter whorl, plication appear between them on the outer flank. Ridges and the ribs are most pronounced towards the venter.

*Discussion.* The stronger ornamentation and the shape of the plicae make difference from *B. (B.) beudanti* (BRONGNIART, 1822).

*Occurrence.* The species is reported from the Early Albian sequences of *Douvilleiceras mammillatum* Zone of Oroszlány O–1881 borehole; otherwise the species documented from the *mammillatum* Zone worldwide.

Genus *Desmoceras* ZITTEL, 1884
Type species: *Ammonites latidorsatus* MICHELIN, 1838
Subgenus *Desmoceras* ZITTEL, 1884
Type species: *Ammonites latidorsatus* MICHELIN, 1838

### *Desmoceras (Desmoceras) latidorsatum* (MICHELIN, 1838)

Pl. III, Figure 25, Pl. XIV, Figure 10, Pl. XIX, Figures 3, 4, Pl. XXVI, Figures 1, 2, Pl. XXVIII, Figure 6

*1838 *Ammonites latidorsatus* MICHELIN, p. 101, Pl. 12, Figure 9
1841 *Ammonites latidorsatus* MICHELIN — D'ORBIGNY, p. 270, Pl. 80, Figures 1–5
1862 *Ammonites latidorsatus* MICHELIN — HAUER, p. 557
1968 *Desmoceras (Desmoceras) latidorsatum* (MICHELIN) — RENZ, p. 20, Pl. 1, Figure 12
1979 *Desmoceras (Desmoceras) latidorsatum* (MICHELIN) — SCHOLZ, p. 61, Text-Figure 18
1990 *D. (Desmoceras) latidorsatum* (MICHELIN) — MARCINOWSKI & WIEDMANN , p. 62, Pl. 7, Figures 2, 3
1984 *Desmoceras (Desmoceras) latidorsatum* (MICHELIN) — WRIGHT & KENNEDY, p. 61, Pl. 3, Figures 3, 5, 7, 8, 13
1996 *Desmoceras (Desmoceras) latidorsatum* (MICHELIN) — KENNEDY in GALE et al., p. 551, Figures 11h–j; 13d, o; 171 (pars)

*Material.* Two specimens from the basal pockets of Pénzeskút Marl Formation at Tilos Forest. Two specimens from the Bóly B–1 borehole at 984.4 m and 996.5 m; three specimens from Jásd J–42 borehole at 321.4; 304.6 and 175.5 m. 22 specimens from Bakonynána from beds no. 11, 13 and 15.

*Description.* Specimens are bubbled with depressed whorl section and deep, narrow umbilicus. Flanks are smooth (Pl. XIX, Figure 4), or stronger (Pl. XIX, Figure 3) constrictions are visible. If present, constrictions are slightly convex on mid-flank and slightly projected forwards on the venter. No suture visible.

*Discussion.* The variability of the species is fully discussed by WIEDMANN & DIENI (1968). Here we do not accept the opinion of WRIGHT & KENNEDY (1984) that a subgeneric and subspecies separation is not necessary.

*Occurrence.* The species is known from the condensed Late Albian basal pockets of Tilos Forest and Bakonynána; also reported from the Late Albian sequences of Bóly B–1 and Jásd J–42 boreholes. Otherwise the species was cosmopolitan from the Late Albian to Late Cenomanian.

Family Cleoniceratidae WHITEHOUSE, 1926
Genus *Cleoniceras* PARONA & BONARELLI, 1897
Type species: *Ammonites Cleon* D'ORBIGNY, 1950

### *Cleoniceras* cf. *cleon* D'ORBIGNY, 1850

Pl. XXV, Figure 1, 7

*1850 *Ammonites Cleon* D'ORBIGNY, p. 124
1908 *Sonneratia cleon* D'ORBIGNY — JACOB, p. 60, Pl. IX, Figures 6a, 6b, 6c
1909 *Desmoceras cleon* D'ORBIGNY — SINZOW, Pl. II, Figures 1, 2, 3, 4, 5, 6
1925a *Cleoniceras* aff. *cleon* (D'ORBIGNY) — SPATH, p. 91, Pl. 5, Figure 8

*Material.* A single, crushed fragment is from the Oroszlány O–1881 borehole at 321.4 m.

*Description.* A fragment of the flank with falcoid, slight ribs. No ridges, no constrictions are present.

*Discussion.* The fragment resembles to *Beudanticeras*, but ribs are present on the whole flank which makes the generic identification clear.

*Occurrence.* The species is known from the Early Albian sequence of Oroszlány O–1881 borehole; otherwise known from the *Douvilleiceras mammillatum* Superzone worldwide.

Superfamily Hoplitaceae H. DOUVILLÉ, 1890
Family Hoplitidae H. DOUVILLÉ, 1890
Subfamily Anahoplitinae BREISTROFFER, 1947
Genus *Anahoplites* HYATT, 1900 (= *Lepthoplites* SPATH, 1925a)
Type species: *Ammonites splendens* J. SOWERBY, 1814

### *Anahoplites gracilis* (SPATH, 1928)

Pl. XXVIII, Figure 15

1840 *Ammonites Renauxianus* D'ORBIGNY, p. 113, Pl. XXVII, Figures 1, 2
1860 *Ammonites Renauxianus* (D'ORBIGNY) — PICTET & CAMPICHE, p. 233, Pl. XXXI, Figures 5a–c
*1928 *Pleurohoplites renauxianus* var. *gracilis* SPATH, p. 243
1968 *Anahoplites gracilis* (SPATH) — RENZ, p. 36, Pl. 4, Figures 12–14
1985 *Anahoplites gracilis* (SPATH) — IMMEL & SEYED-EMAMI, p. 94, Pl. 1, Figure 10
1994 *Leptohoplites* sp. — LATIL, Pl. 5, Figure 3
2000 *Pleurohoplites (Pleurohoplites) renauxianus* (D'ORBIGNY, 1840) — AMÉDRO & ROBASZYNSKI, Pl. 1, Figure 7

*Material.* A shelled specimen from Bóly B–1 from 1000.3 m.

*Description.* Small, platycone, compressed specimen. Whorl section and the venter cannot be observed because of the heavy flattening. Umbilical shoulder is getting more elevated towards the last whorl, umbilical edge is 90 degrees. On

the last whorl an umbilical row of tubercles arises and become more prominent and form bullae towards the venter. From these bullae 2–3 falcoid, prorsiradiate ribs start which end at the venter (hardly seen) at fine tubercles. Suture cannot be observed.

*Discussion.* The specimen shows good similarity to *Anahoplites cantabrigensis* SPATH, 1925a. But at the *A. gracilis* "[…the interspace between the ribs — and therefore the ventral tubercles — is getting twice bigger at the end of the pharagmocone.]" (RENZ 1968). Other characteristic of the species is that on the last whorl the *A. gracilis* have more or less 10 ribs while A. *cantabrigensis* has 20.

*Occurrence.* The species was first recorded from Hungary by BUJTOR (1989) from the Late Albian sequence of Bóly B–1 borehole; otherwise reported from the *Stoliczkaia (S.) dispar* Zone of the Boreal and Western Tethyan regions.

### *?Anahoplites picteti* SPATH, 1925a

Pl. XXVI, Figure 3

1847–1853 *Ammonites splendens* PICTET — PICTET & ROUX, Pl. VI, Figure 6
*1925 *Anahoplites picteti* SPATH, p. 81
1926 *Anahoplites picteti* SPATH, p. 149, Pl. XIII, Figure 13; Text-Figure 43

*Material.* One fragmented specimen from Jásd J–42 borehole (176.7 m).

*Description.* A fragment of the lateral part of a flattened specimen. Ten ribs are present on the quarter whorl. Ribs cross the lateral part straight and become heavily prorsiradiate on the outer. No bifurcation or intermediate ribs. Involuteion, the venter and suture cannot be visible.

*Discussion.* Although the fragment is only a quarter whorl, it resembles very much to PICTET's original, refigured by SPATH (1925a). Due to the lack of ventral characters, here the questionned generic nomenclature is prefered.

*Occurrence.* The species is known from the Upper Albian sequence of Jásd J–42 borehole. Otherwise the species is reported from the English Lower Gault, from the *Mortoniceras (M.) inflatum* Zone.

Genus *Arrhaphoceras* WHITEHOUSE, 1927
Type species: *Ammonites woodwardi* SEELEY, 1865
Subgenus *Praeschloenbachia* SCHOLZ, 1973
Type species: *Schloenbachia (Praeschloenbachia) briacensis* SCHOLZ, 1973

### *Arrhaphoceras (Praeschloenbachia)* sp.

Pl. XXVII, Figure 3

1985 *Acanthoceras* sp. — HORVÁTH, Taf. 4, Figure 34

*Material.* Two fragments at 216.9 and 449.3 metres depth from Jásd J–42.

*Description.* A fragment of the outer lateral part of an internal mould. Four, well developed spine-like tubercles appear on the ventrolateral region. Feeble, very slight sinuous ribs also can be visible. Neither the umbilical nor the ventral region can be visible.

*Discussion.* Due to the fragmented preservation the specific identification is not possible.

*Occurrence.* The species occurs in the Late Albian sequence of Jásd J–42 borehole; otherwise it is know from the Late Albian *Stoliczkaia (S.) dispar* Zone of Europe.

Subfamily Hoplitinae H. DOUVILLÉ, 1890
Genus *Discohoplites* SPATH, 1925a
Type species: *Ammonites coelonotus* SEELEY, 1865

### ?*Discohoplites* sp.

Pl. XXVI, Figure 4, 7, 12, 13, 16, 17

*Material.* Several fragments from Jásd J–42 borehole and from Tilos Forest (6 fragments) and Jásd 1 quarry (3 fragments).

*Description.* Small fragments of flanks, with the characteristic sigmoidal ribs.

*Discussion.* The fragments are too small or fragmentary for the more exact identification. Many cases just the impression of the venter can be seen.

*Occurrence.* The genus was a characteristic boreal genus in the Late Albian, in Hungary it is known from the Jásd J–42 borehole.

### *Discohoplites coelonotus* (SEELEY, 1865)

Pl. XIV, Figure 6, Pl. XIX, Figures 5, 6; Pl. XXI, Figure 6; Pl. XXVI, Figures 5, 6, 10, 11, Pl. XXIV, Figure 14

| | |
|---|---|
| *1865 | Ammonites coelonotus SEELEY, p. 237, Pl. 10, Figure 2 |
| 1968 | Discohoplites coelonotus (SEELEY) — RENZ, p. 22, Pl.2, Figures 4a, b; 5 |
| 1979 | Hyphoplites (Discohoplites) coelonotus (SEELEY) s.l. — SCHOLZ, p. 72–74, Pl. 13, Figures 5, 8–11, 13 |
| 1989 | Hyphoplites (Discohoplites) coelonatus coelonatus (SEELEY) — HORVÁTH, Pl. 3, Figure 1 |
| 1989 | Hyphoplites (Discohoplites) coelonatus densecostatus (RENZ) — HORVÁTH, Pl. 3, Figures 2, 4 |
| 1989 | Hyphoplites (Discohoplites) coelonatus transitorius SPATH — HORVÁTH, Pl. 3, Figures 2, 4 |
| 1996 | Discohoplites coelonotus (SEELEY) — KENNEDY in GALE et al., p. 553, Figure 15q. |
| 2000 | Hyphoplites (Discohoplites) coelonotus (SEELEY) — AMEDRO & ROBASZYNSKI, Pl. 1, Figures 3, 4, 5, 8 |

*Material.* 14 specimens between 159.2–448.4 metres of Jásd J–42 borehole.

*Description.* Discoidal, involute forms with narrow umbilicus, characterized by dense, narrow falcoid ribs, flat, sulcate venter, slight umbilical bullae present but no ventrolateral ones.

*Discussion.* This *Discohoplites* species is discussed by RENZ (1968) and KENNEDY (in GALE et al. 1996).

*Occurrence.* The species is known from the *Stoliczkaia (S.) dispar* Zone of the condensed Upper Albian basal pockets of Tilos Forest and the *Stoliczkaia (S.) dispar* Zone of the Upper Albian sequence of Jásd J–42 borehole; otherwise reported from the *Stoliczkaia (S.) dispar* Zone of Southern England, Switzerland and Southern France.

Genus *Hyphoplites* SPATH, 1922a

Type species: *Ammonites falcatus* MANTELL, 1822

### *Hyphoplites* sp.

Pl. XXVI, Figures 8, 9, 22, 31

*Material.* One specimen is from Jásd 1 quarry, two from Tilos Forest. Also reported from Jásd J–42 borehole between 333.5–114.7 m; at Jásd J–36 borehole between 209.9–9.6 m.

*Description.* Imprints of the ventral region, the venter is sulcate, ribs end at the edge of the sulca. If the lateral sid is visible, ribs can be observed.

*Discussion.* Specific characters as the umbilical region, the shape of the ribs on the flanks and the ventrolateral region cannot be observed together or partly.

*Occurrence.* The genus is documented from Europe and the Trans-Caspian region from Upper Albian – Lower Cenomanian sediments.

### *Hyphoplites falcatus aurora* WRIGHT & WRIGHT, 1949

Pl. XXVI, Figures 19, 20, 21, 24, 32

| | |
|---|---|
| * 1949 | *Hyphoplites falcatus* (MANTELL) *aurora* WRIGHT & WRIGHT, p. 485, Pl. 29, Figures 3, 9; Pl. 30, Figure 5 |
| 1984 | *Hyphoplites falcatus aurora* WRIGHT & WRIGHT — WRIGHT & KENNEDY, p. 66, Pl. 6, Figures 11–13; Pl. 7, Figure 2; Text-Figures 7E–G, 9C (with full synonymy) |
| non1989 | *Hyphoplites (Hyphoplites) falcatus* (MANTELL) — HORVÁTH, Pl. 5, Figure 2 |

*Material.* Several fragments between 114.7–28.0 m from Jásd J–42 borehole.

*Description.* Imprints of discoidal, involute forms ornamented with strong, falcoid ribs that flatten on the outer lateral region. Ribs are single and start from umbilical bullae. Venter — if it is visible — flat and sulcate, the alternating, elongated, sharp, ear-like tubercles are prominent on the sides of the sulca. Body chamber cannot be visible.

*Discussion.* The flattened venter and the elongated ear-like tubercles are characteristic. Resembles to *Hyphoplites curvatus* (MANTELL, 1822) but tubercles of are sharper and more elongated.

*Occurrence.* The species occurs in the Late Albian sequence of Jásd J–42 borehole; otherwise it is known from the *Mantelliceras mantelli* Zone of the northern shore of the former Tethys.

### *Hyphoplites campichei* SPATH, 1925a

Pl. XXV, Figure 8

| | |
|---|---|
| 1860 | *Ammonites falcatus* MANTELL — PICTET & CAMPICHE, p. 210, Pl. 27, Figure 1 |
| *1925a | *Hyphoplites campichei* SPATH, p. 83 |
| 1968 | *Hyphoplites campichei* SPATH, 1925 — RENZ, p.25, Pl. 2, Figures 8, 10; Text-Figures 9b, 10b |
| 1984 | *Hyphoplites campichei* SPATH, 1925 — WRIGHT & KENNEDY, p. 69, Pl. 6, Figures 2–6, 8, 9, Text-Figures 7J, 8A, B, F, 9A, E |
| 1984 | *Hyphoplites campichei* SPATH, 1925 — KENNEDY & JUIGNET, p. 115. Figures 11 (i), (j); Figures 30 (e)–(h) |
| 1989 | *Hyphoplites (Hyphoplites) campichei* SPATH, 1925 — HORVÁTH, Pl. 5, Figure 1 |
| 1996 | *Hyphoplites campichei* SPATH, 1925 — KENNEDY in GALE et al., p. 553, Figure 15k |
| 1997 | *Hyphoplites* cf. *campichei* (SPATH) — SCHOLZ in FÜLÖP, p. 81 |
| 1997 | *Hoplites campichei* SPATH — SCHOLZ in FÜLÖP, Pl. 1, Figure 6 |

*Material.* Six specimens between 115.0–9.6 metres from the Jásd J–36 borehole; thirteen fragments from Jásd J–42 borehole between 119.2– 333.5 m.

*Description.* Discoidal forms with narrow umbilicus. Fine, strongly prorsiradiate or falcoid ribs start from the umbilical bullae and later disappear still on the lateral side. Ventrolateral tubercles are prominent; the venter is flat and sulcate.

*Discussion.* It is common that lateral flanks are almost smooth as seen on Plate XXV, Figure 8.

*Occurrence.* The species occurs in the Late Albian sequence of Jásd J–36 borehole; otherwise it is know from the Western Tethyan region from the Early Cenomanian.

### *Hyphoplites costosus* WRIGHT & WRIGHT, 1949

Pl. XXVI, Figures 15, 18, 23, 25, 26, 27, 28, 29, 30

*1949 *Hyphoplites costosus* WRIGHT & WRIGHT, p. 484, Pl. 29, Figure 7
1984 *Hyphoplites costosus* WRIGHT & WRIGHT, 1949 — WRIGHT & KENNEDY, p. 70, Pl. 7, Figure 12
1989 *Hyphoplites (Hyphoplites) costosus* WRIGHT & WRIGHT — HORVÁTH, Pl. 5, Figures 5, 8

*Material.* 28 specimens between 159.2–299.5 metres from Jásd J–42 borehole.

*Description.* Discoidal, involute forms with characteristic falcoid ribs which has neither umbilical nor ventral tubercles. Venter — if can be seen — sulcate.

*Discussion.* The lack of ventral tubercles distinguishes the species from *Hyphoplites curvatus pseudofalcatus* (SEMENOV 1899).

*Occurrence.* The species known from the condensed Upper Albian basal pockets of Tilos Forest and the Upper Albian sequence of Jásd J–42 borehole, otherwise reported from the Late Albian of Europe and Transcaspia.

?Family Engonoceratidae HYATT, 1900
Genus *Engonoceras* NEUMAYR & UHLIG, 1881
Type species: *Ammonites pierdenalis* BUCH, 1850

### *Engonoceras duboisi* LATIL, 1989

Pl. XV, Figures 1, 4

*1989 *Engonoceras duboisi* LATIL, p. 56, Pl. 2, Figures 1–3
1990a *Engonoceras duboisi* LATIL — BUJTOR, p. 9–14, Pl. 1, Figures 1–4

*Material.* There are three, slightly deformed specimens from Tilos Forest.

*Description.* Oxycone, strongly involute phragmocones with distinct umbilical bullae. Ribs are very wide and flat, flexous, nearly disappear on midflank but end in clavi on the ventral edge. Venter flat with no ornamentation but zigzagging tubercles.

*Discussion.* The species, just as the genus itself, is very rare in the Hungarian Late Albian material. The specimen on Plate XV, Figure 2 is the same as that BUJTOR (1990a, 4A) figured. A detailed desrciption of ten *Engonoceras* species and a short discussion on the possible evolutionary origin is given by KENNEDY et al. (1998). The suture of one specimen was published by BUJTOR (1990a).

*Occurrence.* The species occurs in the condensed Upper Albian basal pockets of Tilos Forest; otherwise it is known only from the Late Albian of Southern France.

Superfamily Acanthoceratacea DE GROSSUVRE, 1894
Family Brancoceratidae SPATH, 1934
Subfamily Brancoceratinae SPATH, 1934
Genus *Hysteroceras* HYATT, 1900
Type species: *Ammonites varicosus* J. de C. SOWERBY, 1824

### *Hysteroceras binum* (J. SOWERBY, 1815)

Pl. XIV, Figure 12; Pl. XXI, Figure 5; Pl. XXIV, Figure 13

*1815 *Ammonites binus* J. SOWERBY, p. 208, Pl. XCII, Figure 3
1934 *Hysteroceras binum* (J. SOWERBY, 1815) — SPATH, p. 478, Pl. 52, Figures 8, 9; Text-Figures 161j, 165

*Material.* Three specimens from Tilos Forest.

*Description.* Small, evolute, well preserved specimens with compressed whorl section. Ribs arise from prominent umbilical bullae, then cross the lateral part straight and tend to be weakening on the flank, finally getting stronger and wider

on the outer flank with forming tubercles on the ventral edge. Ribs do not bifurcae, no intermedier ribs are present. Venter is carinated, ribs end in pairs on the two sides of the keel.

*Discussion.* The sides are flattened, the umbilical,the ventral tubercles are strong and the ribs are straight and weakening on the lateral region. Ribs of *H. varicosum* do not weaken on the midflank. The holotype has no intention of carinated venter, but SPATH's specimen (SPATH, 1934, Text-Figure 9) shows a good example for the keeled venter. The species shows good resemblance to *Mortoniceras (Mortoniceras) nanum* SPATH, 1933, but *nanum* is more robust and less compressed. The resemblance between *binum* and *Hysteroceras antipodeum* (R. ETHERIDGE Jr., 1902) is also remarkable, although *antipodeum* is reported only from the south-eastern hemisphere (ETHERIDGE Jr. 1902; HENDERSON 1990). Besides their slightly different stratigraphic range, the specification of *Hysteroceras, Cantabrigites* and some *Mortoniceras* species based on their morphological features seems obscure and need further investigations.

*Occurrence.* The species is known from the condensed Upper Albian basal pockets of Tilos Forest; otherwise the species is recorded from the varicosum subzone of the Late Albian *Mortoniceras (M.) inflatum* Zone, reported from England, France and probably from Nigeria.

Subfamily Mojsisovicziinae HYATT, 1903
Genus *Dipoloceras* HYATT, 1900
Type species: *Ammonites cristatus*, BRONGNIART in CUVIER & BRONGNIART, 1822

### *Dipoloceras (Dipoloceras)* sp.

*Material.* A single fragment from the bed no. 10 from Bakonynána, Zsidó Hill.

*Description.* A fragment of a depressed whorl section with three primary ribs. Two ribs have two, small lateral tubercles and a prominent, ventrolateral spine-like tubercle as well. The third rib is high, ear-like and without tubercles. The venter is strongly keeled. Whorl section is characteristic with the huge, ear-like ribs that overstrech the other ones.

*Discussion.* The very strong, spine-like ventrolateral tubercle and the ear-like rib characterize the genus.

*Occurrence.* The genus is known from the lower part of the Late Albian Pénzeskút Marl Formation from Bakonynána. Otherwise *Dipoloceras* is known from the Middle and Upper Albian deposits worldwide.

Subfamily Mortoniceratinae R. DOUVILLÉ, 1912
Genus *Mortoniceras* MEEK, 1876 (= *Pervinquieria* BÖHM, 1910)
Type species: *Ammonites vespertinus* MORTON, 1834

### *Mortoniceras* sp.
Pl. XXVIII, Figure 11, 12

*Material.* Five poorly preserved, fragmented specimens from Bóly B–1 borehole (1030.5, 1060.9, 1071.9, 1071.9 and 1096.3 metres) and several fragments from Jásd J–42 and Jásd J–36 boreholes, and surface outcrops of Tilos Forest (3 specimens) and Bakonynána (29 specimens).

*Description.* Small, evolute forms. The whorl section is hardly seen at any fragment but seems like trapezoidal. At the umbilical edge heavy tubercles can be visible. Straight or bit S-shaped ribs start from the umbilical tubercles and carrying a lateral and a ventral tubercle as well. Venter — if can be seen — carinated. Suture cannot be observed.

*Discussion.* Specimens show similarities to subgenus *Durnovarites* SPATH, 1932 but the identification would be uncertain.

*Occurrence.* The genus occurs in the condensed Late Albian – Early Cenomanian basal pockets of surface outcrops and the Late Albian sequence of Bóly B–1, Jásd J–42 and Jásd J–36 boreholes; otherwise was cosmopolitan in the Late Albian.

Subgenus *Mortoniceras* MEEK, 1876
Type species: *Ammonites vespertinus* MORTON, 1834

### *Mortoniceras (Mortoniceras)* cf. *inflatum* (J. SOWERBY, 1817)
Pl. XXIV, Figure 15

| | |
|---|---|
| *1817 | *Ammonites inflatus* J. SOWERBY, p. 170, Pl. 178 |
| 1933 | *Mortoniceras (Pervinquieria) inflatum* (J. SOWERBY, 1817) — SPATH, Pl. 35, Figure 9; Pl. 37, Figure 1; Pl. 39, Figure 2; Pl. 42, Figure 6; Pl. 43, Figure 1; Pl. 46, Figures 1, 2; Text-Figures 125–129, 130a, b; 137d |
| 1994 | *Mortoniceras inflatum* (J. SOWERBY, 1817) — LATIL, Pl. 1, Figure 2 (refigured holotype) |

*Material.* A single fragment from Bakonynána, Zsidó Hill section from bed no. 16.

*Description.* A fragment of a conch with depressed, quadrate-polygonal whorl section. Ribs are strong, slight impression of trituberculation is visible, but the tubercles are less prominent. Quadritubercualtion is also can be detected. The ribs are branching but intermedier ribs also present. The venter is strongly keeled. Suture is not preserved.

*Discussion.* Tuberculation is not so strong than in *M. (M) rostratum* (J. SOWERBY, 1817), the third tubercle forms shoulder on the ventral edge. The specimen shows very good resemblance to SOWERBY's holotype.

*Occurrence.* The species is known from Hungary from Bakonynána, Zsidó Hill, bed no. 16. of the lower part of the Upper Albian Pénzeskút Marl Formation. Otherwise the species is an index fossil of the Late Albian *Mortoniceras (M.) inflatum* Zone and known worldwide.

### *Mortoniceras (Mortoniceras) rostratum* (J. SOWERBY, 1817)

| | |
|---|---|
| *1817 | *Ammonites rostratus* J. SOWERBY, p. 163, Pl. 173 |
| 1932 | *M. (Pervinquieria) rostrata* (SOWERBY) — SPATH, p. 402, Text-Figure 136 (refigured holotype) |
| 1979 | *Pervinqueria (Subschloenbachia) rostrata* (SOWERBY, 1817) — SCHOLZ, p. 111, Pl. 26, Figure 1; Pl. 27, Figures 1, 2 |
| 1994a | *Mortoniceras rostratum* (J. SOWERBY, 1818) — LATIL, Pl. 1. Figure 1 (refigured holotype) |

*Material.* A huge, adult specimen with the beginning of the rostrum from Bakonynána, bed. no. 12.

*Description.* An adult specimen of 195 mm in diameter shows the beginning of the rostrum at the end of the body chamber. Whorl section is poligonal. The conch is very evolute but rather dingy so the delicate ornamentation is not visible. Ribs are single, strong, quadrituberculate, equal in size, later on the body chamber the ribs are trituberculated. The venter is keeled. Suture cannot be visible.

*Discussion.* Although the specimen is in a poor preservation state, the type of ornamentation is closer to the slightly deformed original of J. SOWERBY. Since the inner whorls are poorly preserved, the specific identification is questionnable. The rostrum is not a specific feature because it was probably correlated with the sexual dimorphism or a certain ontogenetic stage (or both).

*Occurrence.* The species known from Bakonynána, Zsidó Hill, from bed no. 12. Otherwise it is a cosmopolitan fossil of the Late Albian *Stoliczkaia (S.) dispar* Zone sediments.

Genus *Cantabrigites* SPATH, 1932
Type species: *Mortoniceras (Cantabrigites) cantabrigense* SPATH, 1932

### *Cantbrigites cantabrigense* SPATH, 1932
Pl. XIV, Figures 11, 13; Pl. XXI, Figure 4, Pl. XXVIII, Figure 17

| | |
|---|---|
| *1932 | *Mortoniceras (Cantabrigites) cantabrigense* SPATH, p. 438, Pl. 41, Figures 3, 4; Pl. 45, Figure 4; Pl. 46, Figure 8 |
| 1968 | *Cantabrigites cantabrigense* SPATH, 1933 — RENZ, p. 58, Pl. 10, Figures 10a, b |
| 1979 | *Hysteroceras (Cantabrigites) cantabrigense* (SPATH) — SCHOLZ, p. 115, Pl. 29, Figures 11, 12 |
| 1981 | *Cantabrigites cantabrigense* SPATH, 1933 — KENNEDY & WRIGHT, Figures 30–32, 36–38 |
| 1989 | *Hysteroceras (Cantabrigites) cantabrigense* helveticum (RENZ) — HORVÁTH, Pl. 2, Figures 3, 5 |
| 1989 | *Hysteroceras (Cantabrigites) cantabrigense* (SPATH) — HORVÁTH, Pl. 2, Figures 7, 8 |
| 1989 | *Hysteroceras (Cantabrigites) cantabrigense minor* (SPATH) — HORVÁTH, Pl. 3, Figures 5, 6 |
| 1996 | *Cantabrigites cantabrigense* SPATH, 1933 — KENNEDY in GALE et al., p. 555, Figures 16i–k, 17f, h, j |
| 1997 | *Mortoniceras (Cantabrigites) cantabrigense* (SPATH) — SCHOLZ in FÜLÖP, p. 81 |

*Material.* Flattened, shelled specimens from Bóly B–1 (1092.8 m, 1033.5 m and 1071.9 m) and four specimens from Jásd J–42 borehole (471.8 m, 446.5 m, 446.2 m, 439.7 metres). Several specimens found at surface outcrops of Tilos Forest (6 specimens), Villó Hill (15 specimens) and Bakonynána (31 specimens).

*Description.* Small, medium evolute form with a slight excentricity at the last whorl. Ribs rectiradiate apart from the last whorl where prorsiradiate ribs are present. Tubercles are strong. Other features as for the genus.

*Discussion.* The specimen shows good similarity to *Cantabrigites subsimplex* SPATH, 1933 but subsimplex has fewer ribs per whorl and coarser ornamentation. Probably the two species are intraspecific variations of each other. The phylogenetic relations of *Cantabrigites* with the Cenomanian *Euhystrichoceras* SPATH, 1923 and *Algericeras* SPATH, 1925b are discussed by KENNEDY & WRIGHT (1981).

*Occurrence.* The species occurs in the condensed Upper Albian basal pockets of surface outcrops and the Late Albian sequence of Bóly B–1, Jásd J–42 and Jásd J–36 boreholes; otherwise reported from the Late Albian *Stoliczkaia (S.) dispar* Zone of Europe.

Family Lyelliceratidae SPATH, 1921a
Subfamily Stoliczkaiinae BREISTROFFER, 1953
Genus *Neophlycticeras* SPATH, 1922a (= *Faraudiella* BREISTROFFER, 1947; *Eotropitoides* CASEY, 1965)
Type species: *Ammonites brottianus* D'ORBIGNY, 1841
Subgenus *Neophlycticeras* SPATH, 1922a
Type species: *Ammonites brottianus* D'ORBIGNY, 1841

### *Neophlycticeras (Neophlycticeras) blancheti* (PICTET & CAMPICHE, 1859)

Pl. XV, Figures 5, 6; Pl. XX, Figures 3, 10

| | |
|---|---|
| *1859 | *Ammonites Blancheti* PICTET & CAMPICHE, p. 188, Pl. 23, Figures 2–6 |
| 1931 | *Neophlycticeras blancheti* (PICTET & CAMPICHE) — SPATH, p. 323, Pl. 34, Figures 11a–c; 12a, b; 13a, b; Text-Figure 105 |
| 1979 | *Stoliczkaia dispar* (D'ORBIGNY, 1841) — SCHOLZ, p. 83, Pl. 14, Figures 1, 2, 4, 5, 7; Pl. 15, Figure 1, ?4 |
| non 1989 | *Stoliczkaia dispar blancheti* (PICTET & CAMPICHE) — HORVÁTH, Pl. 1, Figure 7. (= Stoliczkaia sp.) |
| 1994b | *Neophlycticeras (Neophlycticeras) blancheti* (PICTET & CAMPICHE, 1859) — KENNEDY & DELAMETTE, p. 1269, Figures 6.1–6.8, 6.19–6.22, 7.1–7.12, 7.15–7.17, 8.3, 9.1–9.2 |
| 1994 | *Neophlycticeras (Neophlycticeras) blancheti* (PICTET & CAMPICHE, 1859) — WRIGHT & KENNEDY, p. 563, Figures 2a–m, 6d–f, 7a–h (with synonymy) |

*Material.* Several specimens from Tilos Forest (13 specimens), Villó Hill (2 specimens) and Bakonynána, Zsidó Hill (31 specimens).

*Description.* Involute specimens with high, compressed whorl section. Flanks are convex; the maximum width is at lower third of the flanks. There are six–eight primary ribs appear on the last half whorl. There are 17–20 intercalated ribs appear on the last half whorl at the ventral shoulder. Ribs are low, straight or slightly prorsiradiate from the umbilical shoulder. Ribs bear clavi on the ventral edge and then follow until they form sipholal clavi.

*Discussion.* WRIGHT & KENNEDY (1994) fully discussed the genus and its relationship between Stoliczkaiinae. They also regarded *Stoliczkaia rhamnonotus* (SEELEY, 1865) to the genus *Neophlycticeras*. I agree with WRIGHT & KENNEDY (loc. cit) that *N. blancheti* (PICTET & CAMPICHE, 1859) and *N. sexangulatum* (SEELEY, 1865) are closely similar. Differences between them are listed by WRIGHT & KENNEDY (1994) as the following: "*N. (N) blancheti* differs from *N. (N) sexangulatum* (SEELEY, 1865) in its greater involution and whorl height, denser ribbing and finer tuberculation.". We can add nothing to their opinion, but we accept the necesity of a subgeneric division. KENNEDY & DELAMETTE (1994a) discussed the type specimen of the genus.

*Occurrence.* The species occurs in the condensed Upper Albian basal pockets of Pénzeskút Marl Formation in surface outcrops; otherwise is known from the lower part of Late Albian *Stoliczkaia (S.) dispar* Zone of the Western Tethys and Early Cenomanian of Texas (YOUNG 1979).

Genus *Stoliczkaia* NEUMAYR, 1875b (=*Villoutreysia* CASEY, 1965)
Type species: *Ammonites Dispar* D'ORBIGNY, 1841

### *Stoliczkaia* sp.

Pl. XXV, Figure 10, 11, Pl. XXVI, Figure 34, Pl. XXVII, Figure 8, Pl. XXVIII, Figure 16

*Material.* 28 fragments from Tilos Forest, 3 fragments from Jásd 1 quarry .

*Description.* The fragments are too small or poorly preserved for more exact classification.

Subgenus *Stoliczkaia* NEUMAYR, 1875b
Type species: *Ammonites Dispar* D'ORBIGNY, 1841

### *Stoliczkaia (Stoliczkaia) dispar* (D'ORBIGNY, 1841)

Pl. XVII., 1, Pl. XX, Figure 5, Pl. XXI, Figures 2, 3, Pl. XXV, Figure 9

| | |
|---|---|
| *1841 | *Ammonites Dispar* D'ORBIGNY, p. 142, Pl.45, Figures 1, 2 |
| 1931 | *Stoliczkaia dispar* (D'ORBIGNY) — SPATH, p. 329, Pl. 33, Figures 3a, b; Text-Figure 108 (with full synonymy). |
| 1979 | *Stoliczkaia dispar* (D'ORBIGNY) — SCHOLZ, p. 83, Pl. 14, Figures 1–10, Pl. 15, Figures 1–5, Pl. 16, Figures 1–5, Pl. 17, Figures 1–5, Pl. 18, Figures 1–4, Pl. 19, Figures 1–6, Pl. 20, Figures 1–4, Text-Figures 22, 23 |
| 1985 | *Stoliczkaia dispar* D'ORBIGNY– HORVÁTH, Pl. 2, Figure 14 |
| 1989 | *Stoliczkaia dispar dispar* D'ORBIGNY– HORVÁTH, Pl. 1, Figure 9 |
| 1996 | *Stoliczkaia dispar* (D'ORBIGNY) — KENNEDY in GALE et al., p. 559, Figure 17k |
| 1997 | *Stoliczkaia dispar* (D'ORBIGNY) — SCHOLZ in FÜLÖP, p. 81, Pl. 1, Figure 10 |

*Material.* Internal moulds from Tilos Forest (10 specimens), Jásd 1 quarry (10 specimens), Bakonynána (19 specimens); some specimens from Jásd J–42 borehole (429.3 m; 388.6 m), Jásd J–36 borehole (224.7–227.8 m) and Pusztavám Pv–980 borehole (350.6–351.0 m).

*Description.* Involute, compressed, slightly discoidal forms with narrow umbilicus. Prorsiradiate primary ribs start from the umbilical edge, and sometimes wear bullae on the inner flank. Intercalated ribs rise on midflank, both primaries and intercalated ones cross the venter with a pair of feeble tubercles on the ventral edge. Rib index is above 40. On the specimen at Pl. XXI, Figure 2 shows the loss of ornament at maturity; only the inner flank and ventrolateral–ventral ornamentation remain.

*Discussion.* The species and even the genus are almost absent the rich ammonite assemblage of the Hungarian borehole faunas that enclosed in a grey aleuritic marl. This can be explained by palaeotopographic and palaeogeographic reasons besides ecological factors, this was discussed in the previous chapter.

*Distribution.* The species occurs in the condensed Upper Albian basal pockets of Pénzeskút Marl Formation in surface outcrops and boreholes; otherwise the species is the index fossil of the Late Albian *Stoliczkaia (S.) dispar* Zone, distributed worldwide.

### *Stoliczkaia (Stoliczkaia) tenuis* RENZ, 1968

Pl. XV, Figure 3; Pl. XX, Figure 2

| | |
|---|---|
| *1968 | Stoliczkaia (Stoliczkaia) tenuis RENZ, p. 48, Taf. 6, Figures 6a, b; 12a,b; Text-Figures 16b, f |
| 1994 | Stoliczkaia (Stoliczkaia) dispar (D'ORBIGNY, 1841) — WRIGHT & KENNEDY, Figures 11h, i, j, k, l, m, n, o, p, q, r, s, t, u, v; Figures 12, c, d |
| 1994 | Stoliczkaia (Stoliczkaia) clavigera (NEUMAYR, 1875) — WRIGHT & KENNEDY, Figures 12g, h |

*Material.* Three internal moulds from Tilos Forest.

*Description.* Small, moderately depressed, rather involute specimen. Primary ribs arise from umbilical bullae, cross straight the flank and weaken on midflank. Intercalated ribs appear, the total rib index on the last half whorl is 20. On the outer lateral part ribs getting prorsiradiate and wider and form tubercles on the ventral edge. The ventral part is flattened, almost smooth with a slight impression of siphonal tubercles.

*Discussion.* The identification of the specimens is equivocal due to the characteristic strong ventrolateral pair of tubercles and the flattened venter. However, some broken mature and huge specimens which determined as *S. (S.) notha* (SEELEY, 1865) or *S. (S) clavigera* (NEUMAYR, 1875b), has similar featured venter in the inner whorls.

*Occurrence.* The species occurs in the condensed Upper Albian basal pockets of Pénzeskút Marl Formation at Tilos Forest; otherwise the species is reported from the Late Albian *Stoliczkaia (S.) dispar* Zone of the type area of the "Vraconnian" in Switzerland.

### *Stoliczkaia (Stoliczkaia) notha* (SEELEY, 1865)

Pl. XIX, Figure 7, Pl. XX, Figure 4

| | |
|---|---|
| 1968 | *Stoliczkaia (Stoliczkaia) notha* (SEELEY, 1865) — WIEDMANN & DIENI, p. 147, Pl. 15, Figure 7, Text-Figures 96, 97 |
| 1979 | *Stoliczkaia dispar* (SEELEY, 1865) — SCHOLZ, p. 83, Pl. 15, Figure 3; Pl. 16, Figures 4, 5; Pl. 17, Figures 4, 5, Pl. 18, Figure 4 (= *S. notha*, according to WRIGHT & KENNEDY, 1994) |
| 1994b | *Stoliczkaia (Stoliczkaia) notha* (SEELEY, 1865) — KENNEDY & DELAMETTE, p. 1270, Figures 4.20– 4.22, 4.26–4.37, 5.1, 9.11–9.14, 9.18, 9.19, 10.18–10.21 |
| 1994 | *Stoliczkaia (Stoliczkaia) notha* (SEELEY, 1865) — WRIGHT & KENNEDY, p. 569, Figures 5a, d, e; 8a–r; 9a–k; 10a–j |

*Material.* Ten internal moulds from Tilos Forest.

*Description.* Huge, mature, moderately involute, compressed specimens with paralel flanks. Ribs are feeble, rursiradiate, plicate and very steep. Primaries start from the umbilical edge, alternating with one or two intercalated ones that start on the midflank. Ribs cross the venter which is rounded. Early growth stage cannot be visible.

*Discussion.* The specimen is less involute and less compressed than *S. (S) dispar* (D'ORBIGNY, 1841), ribs are wider and steeper, also weakening on the midflank. Full discussion is given by WRIGHT & KENNEDY (1994).

*Occurrence.* The species occurs in the condensed Upper Albian basal pockets of Pénzeskút Marl Formation at Tilos Forest; otherwise the species is a characteristic fossil of the Late Albian *Stoliczkaia (S.) dispar* Zone of the Western Tethys and Angola.

### *Stoliczkaia (Stoliczkaia) clavigera* (NEUMAYR, 1875b)

Pl. XX, Figure 1

| | |
|---|---|
| *1875b | *Stoliczkaia clavigera* NEUMAYR, p. 933 |
| 1968 | *Stoliczkaia (Stoliczkaia)* cf. *clavigera* NEUMAYR — RENZ, p. 50, Pl. 6, Figure 7; Pl. 8, Figures 1–3 |
| 1989 | *Stoliczkaia dispar* D'ORBIGNY f. clavigera — HORVÁTH, Pl. 4, Figure 5 |
| 1994 | *Stoliczkaia (Stoliczkaia) clavigera* (NEUMAYR, 1875) — WRIGHT & KENNEDY, Figures 5b; 11k–m; 12e–h, k–n; 13a–c; 14a–c (with synonymy) |

*Material.* Sixteen specimens from Tilos Forest.

*Description.* Involute specimens with almost rounded whorl section, narrow umbilicus and coarse ornamentation. Ribs prorsiradiate, primaries and intercalated ones alternating. Primary rib index on the last half whorl is 13. Ribs cross the venter straight, no tuberculation or bifurcation are visible. The venter is wide, rounded.

*Discussion.* Very similar to *S. (S.) dispar* (D'ORBIGNY, 1841) but whorl section is less compressed with wider and more rounded venter and coarser ornamentation. Discussion is given by WRIGHT & KENNEDY (1994).

*Occurrence.* The species occurs in the condensed Upper Albian basal pockets of Pénzeskút Marl Formation at Tilos Forest; otherwise the species is reported from the *Mortoniceras (M.) perinflatum* Subzone of the Late Albian *Stoliczkaia (S.) dispar* Zone.

Subgenus *Lamnayella* WRIGHT & KENNEDY, 1978
Type species: *Stoliczkaia (Lamnayella) juigneti* WRIGHT & KENNEDY, 1978

### *Stoliczkaia (Lamnayella) worthense* (ADKINS, 1920)
Pl. XIX, Figure 9

*1920 *Acanthoceras worthense* ADKINS, p. 93, Pl. 1, Figures 11–13, 15–17, 20–25
2004a *Stoliczkaia (Lamnayella) worthense* (ADKINS, 1920) — KENNEDY, p. 884, Figures 15B, E, H–J, M–O; 17A–X; 18A–P; 19B–K; 20A–C

*Material.* A single specimen from Tilos Forest.

*Description.* Highly compressed, involute specimen with narrow and shallow umbilicus. The inner and the middle lateral part is smooth, the ornamentation appears at the outer third of the flank, where prorsiradiate, coarse ribs start which end at the ventrolateral shoulder. Rib index is 18 in a half whorl. The venter is narrow, flattened and the ventrolateral shoulder is ornamented by the ribs.

*Discussion.* The flattened venter and the ventrolateral rib ends of the specimens resembles to *Stoliczkaia (Stoliczkaia) tenuis* RENZ, 1968, but *S. (L. ) worthense* is more compressed and the ornamentation lacks on the inner and mid lateral part.

*Occurrence.* The species occurs in the condensed Upper Albian basal pockets of Pénzeskút Marl Formation at Tilos Forest; otherwise the species is reported from the Late Albian of Texas.

Family Flickiidae ADKINS, 1928
Subfamily Salaziceratinae KENNEDY & WRIGHT, 1984
Genus *Zuluscaphites* VAN HOEPEN, 1955 (= *Huescarites* LATIL, 1990)
Type species: *Zuluscaphites orycteropusi* VAN HOEPEN, 1955

### *Zuluscaphites orycteropusi* VAN HOEPEN, 1955
Pl. XVI, Figures 4, 5, 6, 13, 14, 15,

*1955 *Zuluscaphites orycteropusi* VAN HOEPEN, p. 359, Text-Figure 6
1979 *Salaziceras (Salaziceras) breistrofferi breistrofferi* SCHOLZ, p. 96, Pl. 21, Figures 21, 22, 25, 27, 28; Text Figures 25, 27A, Z
1979 *Salaziceras (Salaziceras) breistrofferi pseudonodosa* SCHOLZ, p. 96, Pl. 21, Figures 23, 24, 26; Text Figures 27R
1990 *Huescarites companyi* LATIL, p. 31, Pl. 1, Figures 1–3, 5–7; Text-Figures 1–6
1993 *Zuluscaphites orycteropusi* VAN HOEPEN, 1955 — KENNEDY & KLINGER, p. 64, Figures 1G, J; Figure 2
1994b *Zuluscaphites orycteropusi* VAN HOEPEN, 1955 — KENNEDY & DELAMETTE, p. 1278, Figures 6.9–6.11, 8.1, 9.3–9.7, 12.1–12.3, 12.6–12.9

*Material.* Seven specimens from Tilos Forest.

*Description.* The specimens are involute and bubbled, with circular-depressed whorl section and well rounded venter. The ornamentation varies from the smooth venter (Pl. XVI, Figure 4) to well — developed lateral bullae (Pl. XVI, Figure 6). The ornamentation consists lateral bullae which turn into primary ribs that cross the lateral and the ventral part straight. In between the primaries narrow intercalated ribs may appear (Pl. XVI, Figure 5). The ornamentation changes during the ontogeny — as it can be noticed on Figure 5, after reaching a certain size (in this case 15 mm) of the conch, ribs disappear from the venter and all the ornamentation is getting weaker and blunter. The conch is getting narrower towards the body chamber (Pl. XVI, Figures 6, 14). The venter is well rounded, ribs cross the venter without any trace of tuberculation.

*Discussion.* Despite of its name, WIEDMANN (1965, p. 443) proposed first that "*Zuluscaphites* merely represents a lyelliceratid inner whorl.". KENNEDY & KLINGER (1993) discussed the relationship between *Zuluscaphites* VAN HOEPEN (1955) and *Huescarites* LATIL, 1990 and concluded the latter as a junior synonym of *Zuluscaphites*. Here I follow their opinion. KENNEDY & KLINGER (1993) put the genus into the family Lyelliceratidae SPATH, 1921a, into the subfamily Stoliczkaiinae BREISTROFFER, 1953. In contrast, LATIL (1990) placed the genus *Huescarites* to the family Flickiidae ADKINS, 1928, into the subfamily Salaziceratinae KENNEDY & WRIGHT, 1984. According to morphological features and the transitional forms that occur in the Hungarian material, here I follow the classification proposed by LATIL (1990). It is difficult to separate *Z. helveticus, Z. orycteropusi* and *Salaziceras (Salaziceras) breistrofferi* SCHOLZ, 1979 from each other in the Hungarian material. It seems that there are transitional forms between the two genera. Examining Scholz's material, on the basis of the ornamentation and the outer morphology, the described specimens of *Salaziceras (Salaziceras) breistrofferi* SCHOLZ, 1979 belong to *Zuluscaphites orycteropusi* VAN HOEPEN, 1955. Siphonal clavi can be visible on SCHOLZ's specimen (1979: Pl. 21, Figure 21), on the specimen figured by KENNEDY & DELAMETTE (1994b: Figure 13–5) and the material described here (Pl. 16, Figure 13). Specimens figured by SCHOLZ (1979: Pl. 21, Figures 23, 24, 26) and referred to *Salaziceras (Salaziceras) breistrofferi pseudonodosa* SCHOLZ, 1979 develop ventral tubercles which can be recognized other specimens figured here.

*Occurrence.* The species occurs in the condensed Upper Albian basal pockets of Tilos Forest which age can be determined in the *Stoliczkaia (S.) dispar* Zone; otherwise its distribution is very restricted, known just from the lower part of the Late Albian *Stoliczkaia (S.) dispar* Zone of Spain, the Western Alps and Zululand.

### *Zuluscaphites helveticus* KENNEDY & DELAMETTE, 1994b

Pl. XIV, Figure 14, Pl. XVI, Figures 1, 2, Pl. XX, Figure 7

*1994b *Zuluscaphites helveticus* KENNEDY & DELAMETTE, p. 1281, Figures 12–1, 2, 3, 6, 7, 8, 9

*Material.* Two specimens from Tilos Forest locality.

*Description.* Slightly bubbled, involute specimens with circular whorl section. The venter is smooth. The umbilical edge rounded and low. The lateral part is very delicately ornamented by blunt ribs. Blunt, wide primary ribs appear on the inner flank, intercalated ribs also may appear. After reaching the ventral edge, both ribs disappear.

*Discussion.* The separation of *helveticus* and *orycteropusi* is based on "compressed whorl section, coarse, feebly flexed ribs and distant irregular body chamber ornament distinguish [*Z. helveticus*] from *Zuluscaphites orycteropusi*". In my opinion, the smooth venter is also a specific character of helveticus. There is also a resemblance with *Metascaphites thomasi* (PERVINQUIÉRE 1907). Both forms have similar sculpture, but ribs appear on the inner lateral region on *Z. helveticus*, in contrast to the ventrolateral tubercled bullae of *M. thomasi*.

*Occurrence.* The species occurs in the condensed Upper Albian basal pockets of Tilos Forest which age can be determined in the *Stoliczkaia (S.) dispar* Zone; otherwise its distribution is very restricted, known just from the lower part of the Late Albian *Stoliczkaia (S.) dispar* Zone of the Western Alps.

Genus *Salaziceras* BREISTROFFER, 1936
Type species: *Ammonites salazacensis* HÉBERT & MUNIER-CHALMAS, 1875
Subgenus *Salaziceras* BREISTROFFER, 1936
Type species: *Ammonites salazacensis* HÉBERT & MUNIER-CHALMAS, 1875

### *Salaziceras (Salaziceras) salazacense salazacense* (HÉBERT & MUNIER-CHALMAS, 1875)

Pl. XIV, Figure 15; Pl. XVI, Figures 7, 8, 9, 10, 11, 12, Pl. XX, Figure 6, 8, 9

1979 *S. (Salaziceras) salazacense salazacense* (HÉBERT & MUNIER-CHALMAS, 1875) — SCHOLZ, p. 92, Pl. 21, Figures 6–10, 13–15, 17; Text-Figures 25, 26A, 27B, H, I, J, L, M, U, V
1985 *Salaziceras (Salaziceras) salazacense gracilicostatus* SCHOLZ — HORVÁTH, p. 155, Pl. 2, Figure 2
1994 *Salaziceras (Salaziceras) Salazacense* (HÉBERT & MUNIER-CHALMAS, 1875) — KLINGER & KENNEDY, p. 146, Figures 1 A–H
1994a *Salaziceras (Salaziceras) Salazacense* (HÉBERT & MUNIER-CHALMAS, 1875) — LATIL, Pl. 6, Figure 3

*Material.* 11 specimens from Tilos Forest. A single specimen is from Jásd J–42 borehole at 377.3 m.

*Description.* Forms belong to this subspecies are involute, bubbled, slightly depressed ones. Thick, high primary ribs start from the umbilical edge, intercalated ribs appear on the midflank, both primaries and intercalated ones cross the venter straight. The venter is rounded.

*Discussion.* There is an interesting ontogenetical change can be seen on Pl. XX, Figure 9. The ribbed inner whorls tend to be smooth towards the aperture. The body chamber is completely smooth with an aperture that narrower than the previous whorls.

The Hungarian Salaziceras assemblage is unique because of its richness and high morphotypical variability. SCHOLZ (1979, pp. 91–97) separated five morphyotypes of the subspecies *Salaziceras*.

*S. (S.) salazacense salazacense* (HÉBERT & MUNIER-CHALMAS, 1875) — the same morphotype in the recently studied material is also referred to *S. (S) salazacense salazacense.*

*S. (S.) salazacense gracilicostatus* SCHOLZ, 1979 — this subspecies does not occur in the recently studied material. According to SCHOLZ's description, I agree with the establishment of this new subspecies.

*S. (S.) salazacense peyrolasense* SCHOLZ, 1979 — this subspecies, on the basis of his photographes, can be divided into two morphotypes: A: Pl. 21, Figures 16, 17, 20; B: Figures 18, 19. In the recently studied material the morphotype A is referred to *Zuluscaphites helveticus* KENNEDY & DELAMETTE, 1994. Morphotype B is referred to *Ficheuria kiliani* PERVINQUIÉRE, 1910. KENNEDY & DELAMETTE (1994b, p. 1282) referred all figured specimens of S. (S) salaziceras peyrolasense to *Ficheuria kiliani* PERVINQUIÉRE, 1910.

*S. (S.) breistrofferi* SCHOLZ, 1979 — studying SCHOLZ's material and compared the specimens with the recently collected ones, according to my opinion this subspecies does not exist, because all the figured specimens belong to *Zuluscaphites orycteropusi* an Hoepen, 1955. On SCHOLZ (1979) Pl. 21, on Figures 21a, b and a siphonal clavi can be recognized just as on a specimen documented here on Pl. XVI, Figure 13. The pseudonodosa subspecies of SCHOLZ is proposed as a new subspecies of *orycteropusi*.

In Hungary, *Salaziceras* occurs only in the surface outcrops, in yellowish white marl and are completely missing from borehole assemblages characterized by Desmoceratids and Hoplitids that indicate deeper water environments with the fine grained aleuritic, grey marly sediments. Presumably *Salaziceras* preferred warmer, shallower environments rather than open neritic waters.

*Occurrence.* The species occurs in the condensed Upper Albian basal pockets of surface outcrops; otherwise its distribution is very restricted, it is known only from the lower part of the Late Albian *Stoliczkaia (S.) dispar* Zone of France, England and Zululand. The genus is reported from Nigeria (FÖRSTER, SCHOLZ 1979) as well.

Subgenus *Noskytes* SCHOLZ, 1979
Type species: *Salaziceras (Noskytes) bakonyense* SCHOLZ, 1979

According to the Hungarian material, I follow SCHOLZ's classification, who established *Noskytes* as a subgenus of *Salaziceras*. Subgenus *Noskytes* can be characterize with distinctive morphological features as the rigid ribbing and the broad, flat, sulcate venter, therefore I do not accept it as a synonym of *Salaziceras*.

### *Salaziceras (Noskytes) bakonyense* SCHOLZ, 1979
Pl. XVI, Figure 19

*1979 *Salaziceras (Noskytes) bakonyense* SCHOLZ, p. 97. Pl. 22, Figures 1–5

*Material.* Six specimens from Tilos Forest.

*Description.* Bubbled, involute forms with deep umbilicus and depressed whorl section. Strong, coarse ribs start from the umbilical edge and cross the ventral region. Rib index is 7 on a half whorl. No intercalated or bifurcated ribs present. The venter is widely sulcate.

*Discussion.* Differs from the typical representatives of the subgenus *Salaziceras* are in its deeper, crater-like umbilicus and heavily sulcate venter. For detailed description see SCHOLZ (1979, p. 97). According to the well defined morphological differences we support to keep *Noskytes* as a valid subgenus of *Salaziceras*. Probably it would be even to worth to raise *Noskytes* to a generic position but the present material is not enough for further studies.

*Occurrence.* The subgenus and the species are reported only from the condensed Late Albian basal pockets of Tilos Forest.

Subfamily Flickiinae ADKINS, 1928
Genus *Ficheuria* PERVINQUIÉRE, 1910
Type species: *Ficheuria kiliani* PERVINQUIÉRE, 1910

### *Ficheuria kiliani* PERVINQUIÉRE, 1910
Pl. XVI, Figure 3; Pl. XVII, Figure 2

*1910 *Ficheuria kiliani* PERVINQUIÉRE, p. 35
1979 *Salaziceras (S) salazacense peyrolasense* n. sp. — SCHOLZ, p. 93, Pl. 21, Figures 16, 18, 19, 20 (only)
1994a *Ficheuria kiliani* PERVINQUIÉRE — LATIL, Pl. 6, Figure 4

*Material.* A single specimen from Tilos Forest, another one is from Bakonynána.

*Description.* Small, globular, very involute specimen with narrow, deep umbilicus. The whorl section is highly compressed. The umbilical edge is rounded; the flanks are convex and have the highest part on the middle. The venter is rounded. No ornamentation and suture visible.

*Discussion.* The genus is very rare, in the Hungarian material it is represented by only a single specimen. It could be confused with the almost smooth variation of *Salaziceras* which is also figured (Plate XVI, Figure 13), but *Salaziceras* has slightly ornamented cast and rather more evolutee umbilicus.

*Occurrence.* This rare genus is known from the condensed Upper Albian basal pockets of Tilos Forest, the Late Albian sequence of Bakonynána, otherwise the genus was described from North Africa, also reported from Japan.

Family Acanthoceratidae DE GROSSUVRE, 1894
Subfamily Mantelliceratinae HYATT, 1903
Genus *Mantelliceras* HYATT, 1903
Type species: *Ammonites mantelli* J. SOWERBY, 1814

### *Mantelliceras* (?) sp.
Pl. XXV, Figure 14; Pl. XXVI, Figure 35; Pl. XXVII, Figure 1, 7

*Material.* Two fragments from Jásd J–36 borehole between 152.7–157.2 m and 15.2–16.9 m; four specimens from Jásd J–42 borehole at 30.2 m; 125.8 m; 260.6 m 280.0 m and 297.8 m. *Description.* Rather involute, flattened specimens. Primary ribs are strong, start at the umbilical edge and cross the lateral side radially. Secondary ribs are randomly intercalated

between primaries and start at the dorsolateral part. Sometimes tubercles are present on the umbilical edge and/or on the ribs. Venter and the suture cannot be observed.

*Discussion.* Characters necessary for the exact species level identification as the shape of venter, tuberculation and rib index are poorly or not preserved at all. The crushed, compressed fragments are referred to genus *Mantelliceras* on the base of the rigid ribbing and the presence of lateral, ventrolateral and ventral tubercles. These coarsely ribbed, tubercualted forms seem to be transitions between the genera *Stoliczkaia* and *Mantelliceras*, unfortunatelly the material is insufficient to base a new genera or species on. LÓPEZ-HORGUE et al. (1999) have published a similar form (Figures 16, y, z) from the top of the *Stoliczkaia (S.) dispar* Zone of Spain, captured as "*Stoliczkaia* sp. with tuberculate, *Mantelliceras couloni*-like outer whorl ornament…".

*Occurrence.* The genus *Mantelliceras* occurs in the Late Albian, *Stoliczkaia (S.) dispar* Zone sequences of Jásd J–36 and Jásd J–42 boreholes. The genus is known from the Lower Cenomanian *Mantelliceras mantelli* Zone worlwide. However, GALE et al. (1996) reported *Mantelliceras* specimens below the Albian/Cenomanian (A/C) boundary at Mont Risou, France and concluded that the first appearence of the genus *Mantelliceras* is not eligible to mark the position of the A/C boundary. This data corresponds to the Hungarian borehole sequences, where *Mantelliceras* spp. occur somewhere below the A/C boundary. The exact position of the A/C boundary is not penetrated at Jásd J–42 on the basis of the ammonite record.

Genus *Graysonites* YOUNG, 1958
Type species: *Graysonites lozoi* YOUNG, 1958

### *Graysonites horvathi* sp. nov.

Pl. XXIV, Figure 12

*Material.* A single specimen is from Jásd 1 quarry, Hungary, from bed no. 212 of the Pénzeskút Marl Formation, Late Albian. The unnamed specimen is marked with a question mark on the original label of the collector, A. HORVÁTH.

*Derivation of name.* To the honour of Anna HORVÁTH, a former Hungarian palaeontologist, who collected and studied Late Albian ammonites.

*Location.* Repository number is 2007.68.1, the specimen is housed at the Palaeontological Department of the Hungarian Natural History Museum (HNHM).

*Dimensions.*

| | D | H | W | W/H | U |
|---|---|---|---|---|---|
| 2007.68.1 | – | 26 | 43 | 0.6 | – |

*Description.* The specimen is a fragmented internal mould. Coiling is very evolute; the umbilical wall is low, rounded. The whorl section is polygonal, highly compressed, the whorl breadth to height ratio is 0.6 and the greatest is at midflank. Ventrolateral shoulders are narrow, rounded. Ribs on the inner whorls are untubercualted. There are 7 ribs on a quarter whorl, so the rib index can be calculated around 27–29. Ribs are coarse, straight and prorsiradiate on the flanks. Ribs start in umbilical bullae, these bullae elongated until the midflank. On the ventrolateral edge ribs bear a prominent, spine-like tubercle. On the top of the venter, just beside the ventrolateral tubercle, there is a larger spine stranding upwards, almost paralell with the sides. There is no trace of a keel on the narrow venter.

*Discussion.* The specimen shows good resemblance to the holotype of *Graysonites adkinsi* YOUNG, 1958, but the new species has denser ribbing, more prominent ventral spines and, as the main point, older stratigraphic position. This is the oldest record of the genus *Graysonites* YOUNG, 1958, which was stratigraphically positioned into the Lower Cenomanian.

*Occurrence.* The specimen was found in the bed no. 212 of Jásd 1 quarry , the exact position of the bed cannot be given due to the lack of the original documentation of the collecting. According to the accompanying fauna, the age of the Hungarian species can be placed into the *Stoliczkaia (S.) dispar* Zone, however, the genus itself is reported only from younger, Lower Cenomanian deposits of Spain, Japan, California, Texas and Brazil.

Subordo Ancyloceratina WIEDMANN, 1966
Superfamily Turrilitaceae GILL, 1871
Family Anisoceratidae HYATT, 1900
Genus *Anisoceras* PICTET, 1854
Type species: *Hamites saussureanus* PICTET in PICTET & ROUX, 1847

### *Anisoceras armatum* (J. SOWERBY, 1817)

Pl. XXII, Figures 1, 2; Pl. XXVI, Figure 33; Pl. XXVII, Figure 2

1939 *Anisoceras armatum* (J. SOWERBY) — SPATH, p. 543, Pl. LIX, Figure 6; Pl. LX, Figure 1; Pl. LXI, Figures 9–11; Pl. LXII, Figure 5; Text-Figure 191 (with full synonymy)

1968 *Anisoceras armatum* (J. SOWERBY) — RENZ, p. 75, Pl. 15, Figures 1, 3, Text-Figures 27d, 28a
1968 *Anisoceras perarmatum perarmatum* PICTET & CAMPICHE — RENZ, p. 74, Pl. 13, Figure 5, Pl. 14, Figures 1, 2, 3, 5; Text-Figures 27a, 28g
1989 *Anisoceras (Anisoceras) armatum* (SOWERBY) — HORVÁTH, Pl. 1, Figure 4, Pl. 2, Figure 2
non 1989 *Anisoceras (Anisoceras) armatum* (SOWERBY) f. *perarmatum* — HORVÁTH, Pl. 3, Figure 7 (= 1989 *Anisoceras perarmatum* PICTET & CAMPICHE)
1996 *Anisoceras armatum* (J. SOWERBY) — KENNEDY in GALE et al., p. 573, Figures 24d–f, h
1996 *Anisoceras perarmatum* PICTET & CAMPICHE — KENNEDY in GALE et al., p. 571, Figures 23a, e; 24a–c, g
1997 *Anisoceras (Anisoceras) perarmatum* (PICTET & CAMPICHE) — SCHOLZ in FÜLÖP, p. 81, Pl. 1, Figure 3

*Material.* 26 specimens from Tilos Forest, 55 from Bakonynána, 6 from Jásd 1 quarry and 5 from Villó Hill; three specimen is from Jásd J–42 borehole (456.5; 442.35 and 411.5 m) and a single specimen from Pusztavám Pv–980 borehole (454.0–455.0 m).

*Description.* A hook and a fragment of a shaft are figured on Pl. XXII. The whorl section is circular at the hook, slightly compressed at the shaft. The ornament consists wide, rursi- or rectiradiate ribs which are separated with wide interspaces. On the mid-ventral region ribs bear tubercles, then primary ribs can bifurcate or intercalated ribs appear. Pair of a ventrolateral tubercle appear on the ventral edge. Ribs cross the venter, become blunter and wider closer to the aperture. The dorsal part is smooth.

*Discussion.* According to the Hungarian material studied here, we agree that *Anisoceras armatum* (SOWERBY, 1817) and *Anisoceras perarmatum* PICTET & CAMPICHE, 1861 are "no more than variants of a single species" (KENNEDY in GALE et al. 1996, p. 573) as it was proposed by SCHOLZ (1979). At younger ontogenetic stage the ornamentation is finer as it can be observed on the studied material.

*Occurrence.* The species occurs in the condensed Upper Albian basal pockets of surface outcrops and in the Late Albian sequence of Jásd J–42 borehole; otherwise distributed worldwide in the Late Albian *Stoliczkaia (S.) dispar* Zone and probably reported from the Lower Cenomanian *Mantelliceras mantelli* Zone as well.

### *Anisoceras pseudo-elegans* PICTET & CAMPICHE, 1861

Pl. XVII, Figures 3, 4, 5, 6, 8

*1861 *Anisoceras pseudo-elegans* PICTET & CAMPICHE, p. 69, Pl. 1, Figures 5a, b
1939 *Anisoceras pseudo-elegans* PICTET & CAMPICHE — SPATH, p. 556, Pl. LIX, Figure 5; Pl. LX, Figures 2, 3; Pl. LXIII, Figure 12; Text-Figures 196a–d only
1968 *Anisoceras pseudoelegans* PICTET & CAMPICHE — RENZ, p.79, Pl.14, Figs 10–12; Pl. 16, Figure 7; Text-Figures 17i, 28k
1989 *Anisoceras (Anisoceras) pseudoelegans* (J. SOWERBY) — HORVÁTH, Pl. 1, Figure 8
1996 *Anisoceras pseudoelegans* PICTET & CAMPICHE — KENNEDY in GALE et al., p. 573, Figs 23c, d, f

*Material.* 5 fragmented shafts from Tilos Forest, 10 from Bakonynána.

*Description.* The whorl section is compressed. Fine, dense ribs start from the dorsal region; ribs are rursi- or rectiradiate. Thre are tubercles on the ventral edge which sit on two-three ribs. The ribs are cross the venter straight. The dorsal pari consist ribs as well.

*Discussion.* This species differs from *Anisoceras armatum* (J. SOWERBY, 1817) in its finer and denser ribbing.

*Occurrence.* The species occurs in the condensed Upper Albian basal pockets of Tilos Forest, the Late Albian sequence of Bakonynána; otherwise it was distributed in the Western Tethys and Zululand in the Late Albian *Stoliczkaia (S.) dispar* Zone.

Genus *Idiohamites* SPATH, 1925b
Type species: *Hamites tuberculatus* J. SOWERBY, 1818

### *Idiohamites* sp. ind.

*Material.* A shelled specimen from Bóly B–1 from 1072.7 m; three specimens from Jásd J–42 borehole (151.7 m, 192.0 m and 281.0–281.3 m).

*Description.* Shell characterized by the idiohamitid coiling which getting straight at the body chamber. The beginning of the shell and the aperture is cannot be observed. The specimen is laterally compressed so the whorl section and the dorsal and ventral side cannot be seen. Shell is ornamented with straight, radial ribs which become more prominent and wider towards the venter.

*Discussion.* The specimen shows similarities to *I. dorsetensis* SPATH, 1925b and *I. favrinus* (PICTET 1847) but the poor preservation and the flattening did not let us to see the specific characters.

*Occurrence.* The genus known from the Late Albian – Early Cenomanian sequence of Bóly B–1 and Jásd J–42 boreholes; otherwise reported from Upper Albian to Cenomanian deposits of Europe, North America and Madagascar.

### *Idiohamites spiniger* (J. SOWERBY, 1818)

Pl. XXVIII, Figures 18, 19

1939 *Idiohamites spiniger* (J. SOWERBY) — SPATH, p. 584, Pl. 64, Figures 10, 11; Pl. 65, Figure 12
1987 *Idiohamites spiniger* (J. SOWERBY) — IMMEL, p. 130, Pl. 14, Figure 7

*Material.* Two shelled fargmens from Bóly B–1 borehole at 1046.1 m; 1072.4 metres depth.

*Description.* The coiling is idiohamitid, the specimens are heavily flattened. Primary and secondary ribs are straight. The primaries end in spines at the venter. The spines are one third length of the primary ribs they hold. The spines are present from the juvenile stage until the whole phragmocone.

*Discussion. I. tuberculatus* (J. SOWERBY, 1818) has similar characters that has *I. spiniger* (J. SOWERBY) so it is not unexpected that some authors merged the two species (SPATH, 1939, p. 583). The original description of J. SOWERBY (1818) spines was not mentioned (probably because of the lack of the shell). This is the first record of *I. spiniger* from Hungary.

*Occurrence.* The species occurs in the Late Albian sequence of Bóly B–1 borehole; otherwise the species is reported from the Upper Albian *Mortoniceras (M.) inflatum* Zone of Europe.

### *Idiohamites dorsetensis* SPATH, 1939

Pl. XXVII, Figure 10

*1939 *Idiohamites dorsetensis* SPATH, p. 596, Pl. 62, Figures, 2, 3; Pl. 63, Figures 1, 9, 15; Pl. 65, Figure 2; Text-Figure 215
1968 *Idiohamites dorsetensis* SPATH — RENZ, p. 70, Pl. 11, Figures 39a–c, 40a–c; Pl.12, Figures 3a–c, 4a–c; Text-Figures 25a–d, f; 26a–b

*Material.* A single specimen from Jásd J–42 borehole at 258.4 m.

*Description.* A deformed, fragmented specimen consist the hook and a shaft. The coiling is idiohamitid. The ribs are sharp, dense, start from the umbilical edge, cross the lateral part, bear tubercles on the ventral egde. Rib index is 5.

*Discussion.* A pair of the ventral tubercles, the shape of coiling and the sharp, dense ribs well characterizes the specimen.

*Occurrence.* The species occurs in the Late Albian sequence of Jásd J–42 borehole; otherwise reported from the Upper Albian *Stoliczkaia (S.) dispar* Zone deposits of Europe.

Family Hamitidae GILL, 1871

According to MONKS' (1999) cladistic analysis done for the Albian heteromorph ammonites, a new cladistic term was proposed (MONKS 2002). In the present work MONKS's systematic revision for the family Hamitidae is followed.

Genus *Hamites* PARKINSON, 1811
Type species: *Hamites attenuatus* J. SOWERBY, 1814

### *Hamites* sp. ind.

*Material.* Two poorly preserved specimens from Bóly B–1 at 1072.0 m and 1073.4 m.

*Description.* Small fragments of slightly curved specimens. Whorl height is constant, rib index RI = 3. The only ornamentation is straight, radial ribs which have the same width at any length. Suture cannot be observed.

*Discussion.* The specimens are too fragmented for more exact classification.

*Occurrence.* The genus occurs in the Late Albian sequence of Bóly B–1 borehole; otherwise reported from the Lower Albian to the Cenomanian worldwide.

### *Hamites* cf. *intermedius* J. SOWERBY, 1814

Pl. XXVII, Figure 13

1941 *Hamites intermedius* J. SOWERBY — SPATH, p. 632, Pl. 70, Figure 19; Pl. 71, Figures 3, 5; Text-Figures 229a–d, m.
1989 *Hamites intermedius* J. SOWERBY — HORVÁTH, Pl. 6, Figure 6
1998 *Hamitella intermedius* (J. SOWERBY) — MONKS, p. 102, Figure 3.41

*Material.* A single specimen from Jásd J–42 borehole at 418.8 m.

*Description.* The specimen is a fragment of the hook, so the coiling cannot be observed. Blunt, wide ribs start at midflank, presumably cross the venter. The dorsal part is smooth.

*Discussion.* On the basis of the wide, blunt ribs, the specimen is referred to *H. intermedius* with question mark.

*Occurrence.* The species occurs in the Late Albian sequence of Jásd J–42 borehole; otherwise reported from the upper part of the *Mortoniceras (M.) inflatum* Zone of Europe.

Genus *Stomohamites* BREISTROFFER 1940
Type species: *Hamites virgulatus* BRONGNIART, 1822

### *Stomohamites virgulatus* (BRONGNIART, 1822)
Pl. XXVIII, Figure 24

1939 *Hamites (Stomohamites) virgulatus* (BRONGNIART?) PICTET & CAMPICHE — SPATH, p. 635, Pl. LXXI, Figures 7–10; Pl. LXXII, Figure 11; Text-Figure 230
1979 *Hamites (Hamites) virgulatus* BRONGNIART, 1822 — SCHOLZ, p. 18
1985 *Hamites (Hamites) virgulatus* BRONGNIART — HORVÁTH, p. 151
1990 *Hamites (Hamites) virgulatus* BRONGNIART — MARCINOWSKI & WIEDMANN, p. 36, Pl. 2, Figure 12
1997 *Hamites (H) virgulatus* BRONGNIART — SCHOLZ in FÜLÖP, p. 81, Pl. 1, Figures 5, 8

*Material.* A single fragment from Jásd J–36 borehole between 22.1–25.2 metres and two specimens from Pusztavám Pv–980 borehole at 375.0–376.0 m and 434.0 m. Two specimens are from Bóly B–1 borehole at 1072.0 m and 1073.4 m. A single species from Jásd 1 quarry, 8 from Tilos Forest, 9 from Bakonynána.

*Description.* A fragment of a shaft with straight, wide, rursiradiate ribs. Rib index is 3.

*Discussion.* The species shows high intraspecific variation as it is discussed by SPATH (1941), WIEDMANN & DIENI (1968), SCHOLZ (1979) and COOPER & KENNEDY (1979).

*Occurrence.* The species is documented from the Late Albian sequences of Jásd J–42 and Pusztavám Pv–980 boreholes and Jásd 1 quarry and Tilos Forest; otherwise it was reported wordwide from the Middle Albian to the Middle Cenomanian.

### *Stomohamites subvirgulatus* (SPATH, 1941)
Pl. XXV, Figure 15; Pl. XXVII, Figures 4, 5, 6, 9

*1941 *Hamites (Stomohamites) subvirgulatus* SPATH, p. 645, Text-Figures 234a–h
1968 *Hamites (Stomohamites) subvirgulatus* SPATH — RENZ, p. 66, Pl. 11, Figures 13, 14; Text-Figures 23e, 24a
1996 *Hamites subvirgulatus* SPATH, 1941 — KENNEDY in GALE et al., p. 567, Figures 20d, e, j; 25g, h, j; 26j, k

*Material.* Three specimens reported from Jásd J–42 borehole at 389.0, 414.25 and 430.95 metres depth; and a specimen from Bóly B–1 borehole at 976.3 m; a specimen from Jásd J–36 at 21.0–25.2 m. Fragments also known from Tilos Forest (6 specimens), Jásd 1 quarry (2 specimens), Villó Hill (3 specimes) and Bakonynána (9 specimens).

*Description.* Fragments are part of a coiled shaft with slightly compressed whorl section. The ornamentation of the fragments consist narrow, rursiradiate ribs, rib index is 5–8.

*Discussion.* According to KENNEDY (in GALE et al. 1996, p. 568): "*H. subvirgulatus* was introduced for compressed curved fragments with a rib density between those of *H. virgulatus* (BRONGNIART 1822) and *H. duplicatus* PICTET & CAMPICHE, 1861…".

*Occurrence.* The species occurs in the Late Albian sequences of Bóly B–1, Jásd J–42 and Pusztavám Pv–980 boreholes and the condensed Late Albian basal pockets of Tilos Forest, Jásd 1 quarry and Bakonynána; otherwise reported worldwide from the Upper Albian *Mortoniceras (M.) inflatum* and *Stoliczkaia (S.) dispar* Zone deposits.

Genus *Helicohamites* MONKS, 2002
Type species: *Baculita parkinsoni*, FLEMING, 1828

### *Helicohamites duplicatus* (PICTET & CAMPICHE, 1861)
Pl. XXVIII, Figure 20

*1861 *Hamites (Stomohamites) duplicatus* PICTET & CAMPICHE, 1861, p. 98
1941 *Hamites (Stomohamites) duplicatus* PICTET & CAMPICHE — SPATH, p. 640, Pl. 72, Figures 12–16
1968 *Hamites (Stomohamites) duplicatus* PICTET & CAMPICHE — RENZ, p. 68, Pl. 11, Figures 19–22
non 1971 *Hamites (Stomohamites)* aff. *duplicatus* PICTET & CAMPICHE — NAGY I. Z., p. 15
1979 *Hamites (Stomohamites) duplicatus* PICTET & CAMPICHE — COOPER & KENNEDY, p. 227, Figures 16d, 32a

*Material.* Five shelled fragment from Bóly B–1 at 999.8 m; 1035.9 m, 1038.7 m; 1072.0 m and 1113.8 m and 2 fragments from Tilos Forest.

*Description.* Early whorls are coiled, then, during the ontogeny a shaft formed with a beginning of a hook at the end. Ribs are dense, RI = 10–12. Ribs before the aperture are getting widen. Suture cannot be observed.

*Discussion.* Dense ribs are well characterizing the subspecies. A *H. (S.) duplicatus* is described by NAGY I. Z. (1971) from the Barremian of Hungary, but this is a misidentification of an older, homeomorph form.

*Occurrence.* The species occurs in the Late Albian sequence of Bóly B–1 borehole and Tilos Forest; otherwise it is reported from the Upper Albian *Stoliczkaia (S.) dispar* Zone.

### *Helicohamites ibex* (SPATH, 1941)
Pl. XXVII, Figure 16

*1941 *Hamites (Stomohamites) ibex* SPATH, 1937–43, p. 646, Pl. LXXI, Figure 14; Text-Figure 235

*Material.* A single fragment from Jásd J–42 borehole at 258.4 m and a fragment from Bóly B–1 borehole at 1072.0 m.

*Description.* Whorl section is cannot be observed. The fragment from Jásd J–42 borehole is quite big, a part of a helicoid shaft. Ribs are coarse, wide, intercalated ribs appear. The dorsal and the ventral part is cannot be observed.

*Discussion.* The species is very close to *S. virgulatus* (BRONGNIART, 1822), but whorl section is circular and rib irregularities are often, as it is discussed by SPATH (1941, p. 646).

*Occurrence.* The species occurs in the Late Albian sequence of Bóly B–1 borehole and the; also documented from the Late Albian sequence of Jásd J–42 borehole; otherwise reported from England, from Upper Albian deposits.

Genus *Ptychoceras* D'ORBIGNY, 1842
Type species: *Ptychoceras Puzosianum* (D'ORBIGNY, 1842)

### *Ptychoceras adpressum* (J. SOWERBY, 1814)
Pl. XXVII, Figure 14

1842 *Hamites adpressus* J. SOWERBY — D'ORBIGNY, p. 555
1941 *Mastigoceras adpressum* (J. SOWERBY) — SPATH, p. 657, Text-Figure 241

*Material.* A single specimen from Jásd J–42 borehole (219.4 m)

*Description.* Small, ptychocon specimens with subcircular whorl section (if not flattened). The specimen is completely smooth.

*Discussion.* This specimen is twice at size that the tiny holotype figured by J. SOWERBY (1814). SOWERBY's original figure is republished by SPATH (1941) but the holotype is seems to be lost. The species is similar to *Ptychoceras puzosianum* (D'ORBIGNY, 1841) but much smaller. The shell ultrastructure of the genus is discussed by DOGUZHAEVA & MUTVEI (1989).

*Occurrence.* The species occurs in the Late Albian sequence of Jásd J–42 borehole; otherwise the species is reported worldwide from the Upper Albian *Mortoniceras (M.) inflatum* Zone deposits.

Genus *Hemiptychoceras* SPATH, 1925b
Type species: *Ptychoceras gaultinum* PICTET, 1847

### *Hemiptychoceras* sp. aff. *gaultinum* (PICTET, 1847)

1968 *Hemiptychoceras gaultinum* (PICTET) — WIEDMANN & DIENI, p. 61, Pl. 5, Figures 6, 8; Pl. 6, Figure 12
1978 *Hemiptychoceras gaultianum gaultinum* (PICTET) — SCHOLZ, p. 44, Pl. 3, Figure 12
1979a *Hemiptychoceras gaultianum gaultinum* (PICTET) — SCHOLZ, p. 20, Pl. 1, Figure 17
1997 *Hemiptychoceras* sp. aff. *gaultinum* PICTET — SCHOLZ in FÜLÖP, p. 81, Pl. 1, Figure 1

*Material.* A shelled specimen from Bóly B–1 borehole from 1060.4 m.

*Description.* A small, heavily flattened ptychocone fragment, the whorl section is cannot be observed. Flanks are touching; the older flank is smooth but poorly preserved. The first fine, rectiradiate ribs start at the knee and very rapidly become wider and stronger on the younger flank. The ribs are crossing the venter straight.

*Discussion.* Fragments are not complete or the ontogeny had not yet finished because the pre-apertural constriction cannot be detected.

*Occurrence.* The species occurs in the Late Albian sequence of Bóly B–1 borehole; otherwise known from the Upper Albian deposits of Zululand and Europe.

Family Turrilitidae GILL, 1871

The phylogenic classification of Turrilitidae is revised and discussed by COOPER (1999). We follow his classification on the systematics of Turrilitidae.

Subfamily Turrilitinae GILL, 1871

**Turrilitinae gen. et sp. indet.**

*Material.* Eleven poorly preserved fragments from Bóly B–1 between 982–1005 m.
*Description.* Flattened fragments of the lateral side with traces of tubercles.
*Discussion.* The fragments are too smalll and poorly preserved for more precise identification.

Genus *Turrilitoides* SPATH, 1923
Type species: *Turrilites Hugardianus* D'ORBIGNY, 1842

***Turrilitoides hugardianus* (D'ORBIGNY, 1842)**
Pl. XXIII, Figure 7, Pl. XXIV, Figures 8, 10

| | |
|---|---|
| *1842 | *Turrilites Hugardianus* D'ORBIGNY, p. 588, Pl. 147, Figures 9–11 |
| 1861 | *Turrilites intermedius* PICTET & CAMPICHE, p. 127, Pl. 57, Figure 14 |
| 1930 | *Turrilites densicostatus* PASSENDORFER, p. 673, Pl. 4, Figure 70 |
| 1968 | *Turrilitoides (Turrilitoides) intermedius* (PICTET et CAMPICHE) — RENZ, p. 84, Pl. 17, Figures 24a, b; 25, 26a–b; Text-Figure 30f |
| 1968 | *Turrilitoides (Turrilitoides) hurgardianus hugardianus* (D'ORBIGNY) — RENZ, p. 84, Pl. 17, Figures 18a, b; 19–21; Text-Figures30a–d |
| 1979 | *Turrilites (Turrilitoides) hugardianus densicostatus* PASSENDORFER — SCHOLZ, p. 35 |
| 1979 | *Turrilites (Turrilitoides) hugardianus hugardianus* (D'ORBIGNY) — SCHOLZ, p. 34, Pl. 7, Figures 1–14, Text-Figures 11A, B, C, D |
| 1990 | *Turrilitoides (Turrilitoides) intermedius* (PICTET & CAMPICHE) — MARCINOWSKI & WIEDMANN, p. 50, Pl. 4, Figures 9, 10 |
| 1990 | *Turrilitoides (Turrilitoides) hurgardianus* (D'ORBIGNY) — MARCINOWSKI & WIEDMANN, p. 50, Pl. 4, Figures 9, 10 |
| 1994a | *Turrilitoides intermedius* (PICTET & CAMPICHE, 1861) — LATIL, Pl. 5, Figure 10 |
| 1994a | *Turrilitoides hugardianus* (D'ORBIGNY, 1842) — LATIL, Pl. 5, Figure 14 |
| 1998 | *Turrilitoides hugardianus* (D'ORBIGNY, 1842) — COOPER, p. 146, Figures 1–32, 2, 6, 7A, 8B |

*Material.* 20 specimens from Tilos Forest, 3 from Jásd 1 quarry, 17 from Villó Hill and 21 are from Bakonynána.

*Description.* Torticone forms with circular whorl section. The ornamentation consist of ribs which are untuberculated at any visible stage of growth. Rib index is 23–30.

*Discussion.* SCHOLZ (1979) united *Turrilites (Turrilitoides) densicostatus* PASSENDORFER, 1930 into a subspecies level of *T. hugardianus*. MARCINOWSKI & WIEDMANN (1990, p. 51) did not share SCHOLZ's opinion, they proposed to keep the two taxa as separate species, which can be distinguished on the basis of rib density. MARCINOWSKI & WIEDMANN (1990) discussed the differences between *T. intermedius* and *T. hugardianus* as "… *T. intermedius* can be separated from *T. hugardianus* and *T. densicostatus* on the basis of a larger apical angle of the helix, a more circular whorl section, and a number of about 30 ribs per whorl….ribs run straight across the whorls instead of curving.". COOPER (1998) has fully discussed the Turrilitidae, and use *T. intermedius* (PICTET & CAMPICHE, 1861) as a synonym of *T. hugardianus*. According to the Hungarian material, I share COOPER's and SCHOLZ's opinion beacuse neither a significant morphologic, nor stratigraphic difference can be demonstrated between the three species. There are no permanent pair of specific characters that can be the base of the separation between the three species (*Turrilitoides hugardianus* (D'ORBIGNY, 1842), *Turrilitoides intermedius* (PICTET & CAMPICHE, 1861) and *Turrilites (Turrilitoides) densicostatus* PASSENDORFER, 1930) and the said-to-be specific morphological characters are varies and none of them can be pointed out as an obligate specific one. For instance there are forms with higher apical angle but dense ribbing, while other high-angled form consist few ribs. The circular whorl section can be combined with dense or loose ribs, as well as with high or low apical ange.

Summarizing my opinion, according to the Hungarian material, a high intraspecific variation can be documented on *T. hugardianus* (D'ORBIGNY), and I was not able to point out at least two significant specific characters that can be permanent. Therefore I agree with SCHOLZ (1979, p. 34) and COOPER (1998, p. 147) on the contraction of the three species, but without a further investigation on the holotypes the merging of the three *Turrilitoides* species, even in subspecies level is not adviced.

*Occurrence.* The species occurs in the condensed Late Albian basal pockets of Tilos Forest, Jásd 1 quarry, Villó Hill and Bakonynána; otherwise reported from the Upper Albian *Mortoniceras (M.) inflatum* and *Stoliczkaia (S.) dispar* Zone deposits of Europe.

Genus *Mariella* NOWAK, 1916 (= *Bergericeras* WIEDMANN 1962c)
Type species: *Turrilites Bergeri* BRONGNIART, 1822

***Mariella* sp. indet.**
Pl. XXVII, Figure 12

*Material.* A shelled fragment from Bóly B–1 (1005.7 m) and a small juvenile from Jásd J–42 borehole at 417.6 m; three fragments from Bakonynána.

*Description.* The fragment is supposedly the piece of the lateral part. On the whorl three rows of tubercles can be seen. Each tubercle is independent, not touching at all. Suture cannot be observed.

*Discussion.* Due to the poor preservation specific characters as the number of row of tubercles per whorl, apical angle, whorl section etc. cannot be observed; therefore more exact identification cannot be given.

*Occurrence.* The genus known from the Late Albian to Early Cenomanian worldwide.

Subgenus *Mariella* NOWAK, 1916
Type species: *Turrilites Bergeri* BRONGNIART, 1822

### *Mariella (Mariella) bergeri* (BRONGNIART, 1822)

Pl. XVIII, Figure 1, Pl. XXIII, Figure 6, 8, Pl. XXIV, Figures 7, 9, Pl. XXVII, Figures 19, 20

1937 *Mariella bergeri* (BRONGNIART) — SPATH, p. 510, Pl. 57, Figure 28, Text-Figure 178
1968 *Mariella (Mariella) bergeri* (BRONGNIART) — RENZ, p. 85, Pl. 17, Figures 37a, b; 41a, b; Taf. 18, Figures 3, 4, 8; Text-Figures 31f, k
1979 *Turrilites (Bergericeras) bergeri bergeri* BRONGNIART — SCHOLZ, p. 40, Pl. 8, Figures 12, 14, 15, 17; Pl. 9, Figure 1; Text-Figure 11/j
1997 *P. (Bergericeras) bergeri* (BRONGNIART) — SCHOLZ in FÜLÖP, p. 81, Pl. 1, Figures 11, 12
1998 *Mariella bergeri* (BRONGNIART, 1822) — COOPER, p.160, Figures 5.1–5.4.

*Material.* 13 specimens from Tilos Forest, 5 specimens from Jásd 1 quarry, 2 specimens from Villó Hill and 34 specimens are from Bakonynána; seven specimens between 276.2 – 449.3 m from the sequence of Jásd J–42 borehole.

*Description.* Coiling is turriliticone; the apical angle is between 25–35°. The ornament comprises 26–38 ribs per whorl, ornamented by 4 rows of tubercles. Tubercles are equal in size and more or less equidistant.

*Discussion.* WIEDMANN & DIENI (1968) have discussed the species, COOPER (1998) also supported their opinion that the contemporaneous populations of *Mariella* can be covered with the transition series of *M. miliaris* (PICTET & CAMPICHE, 1861) – *M. bergeri* (BRONGNIART, 1822) – *M. crassituberculata* (SPATH, 1937).

*Occurrence.* The species occurs in the Late Albian sequence of Jásd J–42 borehole and the Upper Albian strata of Tilos Forest, Jásd 1 quarry, Villó Hill and Bakonynána; otherwise reported from the Late Albian *Stoliczkaia (S.) dispar* Zone deposits of the former Tethys.

Genus *Paraturrilites*, BREISTROFFER, 1947
Type species: *Turrilites gresslyi* (PICTET & CAMPICHE, 1861)

Here we follow COOPER's (1998) opinion who keep the genera *Paraturrilites* BREISTROFFER, 1947 and *Mariella* NOWAK, 1916 are separate taxa on the basis of three rows of tubercles at *Paraturrilites* versus the four rows of tubercles of *Mariella*.

### *Paraturrilites* sp.

Pl. XXV, Figure 12; Pl. XXVII, Figures 23, 24; Pl. XXVIII, Figure 21

*Material.* One flattened fragment from Bóly B–1 borehole at 1005.7 m, two fragments from Jásd J–36 borehole and 198.2 m; and a fragment of a juvenile from the Jásd J–42 borehole at 120.2 m. 7 fragments are from Tilos Forest.

*Description.* The fragments are ornamented with three rows of tubercles.

*Discussion.* On the basis of the three rows of tubercles, the classification of COOPER (1998) is followed. The fragments are too small for the specification.

*Occurrence.* The genus is known from the Late Albian sequences of Bóly B–1, Jásd J–36 and Jásd J–42 boreholes; otherwise reported from the Late Albian worldwide.

Subfamily Ostlingoceratinae COOPER, 1999
Genus *Ostlingoceras* HYATT, 1900
Type species: *Turrilites Puzosianus* D'ORBIGNY, 1842

### *Ostlingoceras puzosianum* (D'ORBIGNY, 1842)

Pl. XXIII, Figures 1, 2, 3, 4, 5, 9, Pl. XXIV, Figures 1, 2, 3, 4, 5, 6, 11, Pl. XXVII, Figure 18, Pl. XXVIII, Figure 23

*1842 *Turrilites Puzosianus* D'ORBIGNY, p. 587, Pl. 143, Figures 1, 2
1862 *Turrilites Puzosianus* D'ORBIGNY — HAUER, p. 637, Pl. 1, Figures 1, 2
1937 *Ostlingoceras puzosianum* (D'ORBIGNY) — SPATH, p. 523, Pl. 58, Figures 38, 39, 40
1979a *Ostlingoceras puzosianus* (D'ORBIGNY) — SCHOLZ, p. 42, Pl. 9, Figures 4, 9, 12, 13
1985 *Ostlingoceras puzosianus* (D'ORBIGNY) — HORVÁTH, Pl. 2, Figure 13
1997 *Ostlingoceras (Ostlingoceras) puzosianum* (D'ORBIGNY) — SCHOLZ in FÜLÖP, p. 81, Pl. 1, Figure 7
1998 *Ostlingoceras puzosianum* (D'ORBIGNY) — COOPER, p. 165, Figure 1.29, 5.8–5.9, 5.12

*Material.* Five fragments are reported from Bóly B–1 borehole at 962 m; 997, 5 m (two specimens), 1001.2 m and 1008.4 m.

Four specimens were found between 345.4–417.6 m of Jásd J–42 borehole as well. 260 specimens were collected from Tilos Forest.

*Description.* The apical angle and the whorl section cannot be observed due to the poor preservation. Strong, radiate ribs start at the ventral area and end before the first row of tubercles appears. Rib index cannot be counted because there is no whole whorl fragment. Ribs and tubercles are independent; each 8 rib has 9–10 tubercles. The stronger is the row of tubercles which is closest to the apical area; rows towards the aperture become less prominent. Tubercles can be detected even at the youngest part whereas here the ribs are very weak or not present at all. Aperture and suture cannot be observed.

*Discussion.* The extreme richness of *Ostlingoceras* in the Hungarian Upper Albian deposits is unique. Specimens found in the upper 6 strata of Tilos Forest are dividen into two groups: generally huge specimens with coarse ornamentation and small ones with fine ribbing. These two types can be interpreted as macro- and microconches as it was proposed by COOPER (1998). In the borehole assemblage *Ostlingoceras* specimens are small but probably this is caused the limited extension of the borehole sampling. Already SPATH (1937, p. 524) recognized that ribs and tubercles are not present at the same number, generally tubercles are more numerous than ribs.

*Occurrence.* The species occurs in the Late Albian sequence of Bóly B–1 borehole and the Late Albian strata of surface outcrops; also reported from the Late Albian sequence of Jásd J–42 borehole; otherwise it was reported from the Upper Albian *Stoliczkaia (S.) dispar* Zone of Europe, North Africa, Iran, Caucasus and Madagascar.

Family Baculitidae GILL, 1871

**Baculitidae gen. et sp. indet.**

*Material.* Four shelled specimens from Bóly B–1 borehole at 596.5 m; 977.9 m; 1035.7 m; 1080.8 metres.

*Description.* Straight fragments of shelled, heavily compressed specimens. Fragments ornamented with prorsiradiate ribs. Suture cannot be observed.

*Discussion.* The poor preservation does not allow more precise identification.

Genus *Lechites* NOWAK, 1908
Type species: *Baculites Gaudini* PICTET & CAMPICHE, 1861

***Lechites* sp. indet.**

*Material.* Fourteen poorly preserved fragments were collected from Bóly B–1 borehole, one specimen from Jásd J–36 borehole, 5 from Villó Hill.

*Description.* Straight, compressed fragments with slight ventral ribs. Suture cannot be observed.

*Discussion.* The poor preservation does not allow more precise identification.

*Occurrence.* The genus is known from the Upper Albian to Lower Cenomanian deposits of Europe and the Americas.

Subgenus *Lechites* NOWAK, 1908
Type species: *Baculites Gaudini* PICTET & CAMPICHE, 1861

***Lechites (Lechites) gaudini* (PICTET & CAMPICHE, 1861)**

Pl. XVII, Figure 7, Pl. XXII, Figure 5, 6, Pl. XXV, Figure 16, XXVII, Figures 22, Pl. XXVIII, Figure 25, 26, 27

| | |
|---|---|
| *1861 | *Baculites Gaudini* PICTET & CAMPICHE, p. 112, Pl. 55, Figures 5–11 |
| 1862 | *Baculites Gaudini* PICTET & CAMPICHE — HAUER, p. 648, Pl. 2, Figures 6–9 |
| 1941 | *Lechites gaudini* (PICTET & CAMPICHE) — SPATH, p. 662, Pl. 72, Figures 4–7, 9, 10 (with synonymy) |
| 1968 | *Lechites gaudini* (PICTET & CAMPICHE) — RENZ, p. 80, Pl. 17, Figures 1–3 |
| 1971 | *Lechites gaudini* (PICTET & CAMPICHE) — NAGY I. Z., p. 17, Pl. 1, Figure 5 |
| 1977 | *Lechites gaudini* (PICTET & CAMPICHE) — COOPER & KENNEDY, p. 644, Figure 1, 1–38, Figure 2, 1–30; Figure 3; Figure 4, 1–18; Figure 5, 1–15; Figures 6–7; Figure 8, 16–26 |
| 1979 | *Lechites gaudini* (PICTET & CAMPICHE) — SCHOLZ, p. 12, Pl. 1, Figures 1, 2, 11, 12 |
| 1985 | *Lechites gaudini* (PICTET & CAMPICHE) — HORVÁTH, Pl. 1, Figure 2 |
| 1997 | *Lechites gaudini* (PICTET & CAMPICHE) — SCHOLZ in FÜLÖP, p. 81, Pl. 1, Figure 4 |

*Material.* Several shelled, heavily flattened specimens from Bóly B–1 borehole between 1030.0 and 1188.9 m; one internal mould from Jásd J–42 borehole at 474.5 m. 4 specimens were collected from Jásd 1 quarry, 32 internal moulds from Tilos Forest, 4 from Jásd 1 quarry, and 18 internal moulds from Bakonynána.

*Description.* Whorl section and aperture cannot be observed due to the heavy flattening. Ribs are prorsiradiate, narrow and sharp, RI = 3–5. The angle between ribs and the sides is between 30–70 degrees. Suture, dorsal and ventral part cannot be seen.

*Discussion.* According to the opinion of KENNEDY (GALE et al. 1996), "…specimens are referred to *Lechites* where constrictions are absent, and *Sciponoceras* HYATT, 1894 when present.". SPATH (1937), COOPER & KENNEDY (1977) and KENNEDY in GALE et al. (1996) have discussed the species.

*Occurrence. Lechites (L.) gaudini* was reported from Hungary from the Upper Albian (*Stoliczkaia (S.) dispar* Zone) surface outcrops of Tilos Forest, Bakonynána and Jásd 1 quarry; was also reported from the Late Albian (*Stoliczkaia (S.) dispar* Zone) sequence of Jásd J–42 borehole and the Late Albian (*Stoliczkaia (S.) dispar* Zone) sequence of Bóly B–1 borehole. The species characterises the *Stoliczkaia (S.) dispar* Zone but also known worldwide from the Late Albian upper, *Hysteroceras variscosum* Subzone of the *Mortoniceras (M.) inflatum* Zone.

### *Lechites (Lechites) moreti* (BREISTROFFER, 1936)

Pl. XXII, Figures 7, 8; Pl. XXVII, Figures 11, 17, 21

*1936 *Baculites moreti* BREISTROFFER, p. 66
1941 *Lechites moreti* BREISTROFFER — SPATH, p. 665, Text-Figures 243a–d
1979 *Lechites gaudini moreti* (BREISTROFFER) — SCHOLZ, p. 14, Pl. 1, Figure 10; Text-Figure 5c
1989 *Lechites moreti* BREISTROFFER — HORVÁTH, Pl. 3, Figure 3; Pl. 4, Figure 1
1997 *Lechites moreti* BREISTROFFER — SCHOLZ in FÜLÖP, p. 81
1998 *Lechites moreti* BREISTROFFER — MONKS, p. 143

*Material.* Three fragments are from Jásd J–42 borehole at 474.5 m; 420.8 m and 394.0 m. Two internal moulds were collected from Tilos Forest.

*Description.* Straight fragments of a shaft ornamented by blunt, wide bulges, which are separated by narrow interspaces.

*Discussion.* SPATH (1941) and COOPER & KENNEDY (1977) have fully discussed the variation of the species.

*Occurrence.* The species is reported from Hungary from the Upper Albian (*Stoliczkaia (S.) dispar* Zone) surface outcrops of Tilos Forest; also reported from the Late Albian (*Stoliczkaia (S.) dispar* Zone) sequence of Jásd J–42 borehole. The species characterises the *Stoliczkaia (S.) dispar* Zone but also known from the Late Albian upper, *Hysteroceras variscosum* Subzone of the *Mortoniceras (M.) inflatum* Zone deposits of the former Tethys. SPATH (1941, p. 666) mentiones from England a Lower Cenomanian occurrence as well.

### *Lechites (Lechites) communis* SPATH, 1941

Pl. XXII, Figures 3, 4, 9

*1941 *Lechites communis* SPATH, p. 666, Text-Figure 244
1977 *L. (Lechites) communis* SPATH — COOPER & KENNEDY, p. 644, Figures 5. 1–3 (refigured holotype)
1985 *Lechites communis* (SPATH) — HORVÁTH, Pl. 1, Figure 5

*Material.* One specimen is from Tilos Forest, one is from Bakonynána, bed no. 18–25

*Description.* Straight fragments of a shaft ornamented by narrow, dense, prorsiradiate ribs.

*Discussion.* Differs from *Lechites (Lechites) gaudini* (PICTET & CAMPICHE, 1861) in its fine, denser ribbing. According to COOPER & KENNEDY (1977), *L. (L.) gaudini* and *L. (L.) communis* are intraspecific variations of each other, having priority of the former name. On the basis of the Hungarian material, there are two, clearly different types of *Lechites* specimens and therefore I keep the two taxa separated.

*Occurrence.* The species occurs in the Late Albian *Stoliczkaia (S.) dispar* Zone deposits of Tilos Forest and Bakonynána, otherwise reported from the *Stoliczkaia (S.) dispar* Zone of England.

Genus *Sciponoceras* HYATT, 1894
Type species: *Hamites Baculoides* MANTELL, 1822

### *Sciponoceras* sp.

*Material.* Shelled specimens from 861.8 m; 999.8 m and 1116.3 m and an internal mould from 618.2 m, both from Bóly B–1 borehole.

*Description.* Medium sized forms, whorl section cannot be observed because of the flattening, aperture neither. Ornamentation is widely interspaced srong, prorsiradiate ribs which cross the venter straight. Ribs are strongest on the venter, cross the lateral side and finally disappear on the dorsal part.

*Discussion.* According to the opinion of KENNEDY (GALE et al. 1996), "…specimens are referred to *Lechites* where constrictions are absent, and *Sciponoceras* HYATT, 1894 when present.".

*Occurrence.* The genus is reported from the Late Albian sequence of Bóly B–1 borehole, otherwise it is known from the Late Albian to Late Cenomanian, worldwide.

Superfamily Scaphitaceae GILL, 1871
Family Scaphitidae GILL, 1871
Subfamily Otoscaphitinae WRIGHT, 1953
Genus *Worthoceras* ADKINS, 1928
Type species: *Macroscaphites platydorsus* Scott, 1924

### *Worthoceras pygmaeum* BUJTOR, 1991

Pl. XXVIII, Figures 22, 29, 30

1989 *Worthoceras pygmaeum* BUJTOR, p. 104, Pl. 11, Figures 5–8
*1991 *Worthoceras pygmaeum* BUJTOR, p. 537–542, Figure 2
1996 *Worthoceras pygmaeum* BUJTOR — KENNEDY in GALE et al, p. 586, Figures 30d, g, i, n
2005 *Worthoceras pygmaeum* BUJTOR — REBOULET et al., Figure 3E

*Material.* The three type specimens were described from Bóly B–1 borehole at 976.9 m; 975.8 m and 975.3 metres.

*Description.* Small, scaphitid specimens with long shaft and a small spire. Specimens are lack of ornament.

*Discussion.* The type species rediscribed here are fully described by BUJTOR (1991). *W. pygmaeum* differs from *W. worthense* (ADKINS, 1920) than the latter one has low prorsiradiate ribs on the shaft.

*Occurrence.* The species occurs in the Late Albian sequence of Bóly B–1 borehole; otherwise reported from the upper part of the Late Albian *Stoliczkaia (S.) dispar* Zone of France.

Genus *Yezoites* YABE, 1910
Type species: *Scaphites perrini* ANDERSON, 1902

### *Yezoites subevolutus* (BÖSE, 1928)

Pl. XXV, Figure 17; Pl. XXVII, Figure 15

*1928 *Scaphites subevolutus* BÖSE, p. 225, Pl. 7, Figures 7–30; Pl. 18, Figure 8
1984 *Yezoites subevolutus* (BÖSE, 1928) — WRIGHT & KENNEDY, Text-Figure 149I–N
1996 *Yezoites subevolutus* (BÖSE, 1928) — KENNEDY in GALE et al., p. 589, Figures 30b, c, h, j, k
2005 *Yezoites subevolutus* (BÖSE, 1928) — KENNEDY et al., p. 419, Figure 53A–O

*Material.* One specimen is from Jásd J–36 borehole at 207.7 m; another specimen is from Jásd J–42 borehole at 152.3 m.

*Description.* The two heavily compressed described specimens represent the two different part of the phragmocone. The specimen of Jásd J–42 borehole (Pl. XXVII, Figure 15) is the spire, consists of an ornament of narrow, strong primary ribs ends in a small tubercle, and narrow, very dense, fine intercalated ones that appear on the midflank. Primary ribs disappear after ending in a tuberce on the midflank. At Jásd–32 specimen (Pl. XXV, Figure 17), the shaft is preserved well while the spire is heavily pyritized and preserved in a bad state. The shaft is ornamented with narrow, dense, strong primary ribs, rib index is 5. On the mid lateral part, very dense, fine intercalated ribs appear, while primary ribs disappear.

*Discussion.* The characteristic ornamentation and the stratigraphic position make the specification clear. KENNEDY (in GALE et al. 1996) mentiones that "Poorly preserved *Phylloceras*… are superficially similar, but much more involute and without primary ribs."

*Occurrence.* The species was found in the Late Albian sequence of Jásd J–42 and Jásd J–36 boreholes. In the sequence of Jásd J–42 borehole, *Y. subevolutus* occurs in the *Arrhaphoceras (Praeschloenbachia) briacensis* subzone of the Late Albian *Stoliczkaia (S.) dispar* Zone. Otherwise the species was described from the Early Cenomanian of Del Rio Clay, Texas. Also reported from the Latest Albian of Mont Risou (GALE et al. 1996), with few metres below the Albian/Cenomanian boundary.

Subfamily Scaphitinae GILL, 1871
Genus *Eoscaphites* BREISTROFFER, 1947
Type species: *Ammonites? circularis* J. de C. SOWERBY, 1836

### *?Eoscaphites* sp. indet.

*Material.* Two shelled specimen from Bóly B–1 at 1044.8 and 1060.9 m.

*Description.* Small, laterally compressed specimens, so whorl section cannot be studied. Both specimens are fragments, the hook and the body chamber missing. Spirals are touching and the perforation on the beginning of the spiral as a generic character is well observed with microscope. Shaft is straight. Whorls are smooth or slightly ornamented with radiate ribs (1044.8 m). Suture cannot be observed.

*Discussion.* Due to the poor preservation even the generic level can be identify with question mark.

*Occurrence.* The genus known from the Upper Albian to Lower Cenomanian of Europe, Algeria and Madagascar.

Genus *Metascaphites* WIEDMANN, 1962c
Type species: *Scaphites (?) thomasi* PERVINQUIÉRE, 1907

Discussions on the systematic position of *Scaphites (?) Thomasi* PERVINQUIÉRE led to a complex brainstorming on the systematic position of genera *Zuluscaphites* Hoepen 1955, *Huescarites* LATIL, 1990 and *Metascaphites* WIEDMANN, 1962c. SCHOLZ (1979, p. 10) placed *S. (?) thomasi* PERVINQUIÉRE to *Noskytes*, a subgenus of *Salaziceras*. LATIL (1990, p. 33), KENNEDY & KLINGER (1993), WRIGHT & KENNEDY (1994) and KLINGER & KENNEDY (1994, p. 146) also discussed the relationship between *Zuluscaphites* HOEPEN 1955 and *Huescarites* LATIL, 1990, *Salaziceras* BREISTROFFER, 1936; *Scaphites* PARKINSON 1811 and *Metascaphites* WIEDMANN 1962c.

According to the features of the Hungarian materal, there are morhological similarities and supposedly transition forms between genera *Stoliczkaia* NEUMAYR, 1875b; *Zuluscaphites* VAN HOEPEN, 1955; genus *Salaziceras* BREISTROFFER, 1936; subgenus *Noskytes* SCHOLZ, 1979 and genus *Metascaphites* WIEDMANN, 1962c. Here the classification of WRIGHT et al. (1996) is followed. Due to the lack of the suturelines, we are not able to change the systematic position of genus *Metascaphites*. However, on the basis of the morphology WRIGHT & KENNEDY (1994) concluded: "if it does indeed belong to Stoliczkaiinae, it is probably a dwarf taxon allied to, and probably derived from *Shumarinaia*.". in my point of view, on the basis of the ornamentation and the fragmented suture of the Hungarian material, it is more likely that this genus belongs to Lyelliceratidae or Flickiidae. The genus was discussed by WIEDMANN (1962c, 1965).

### *Metascaphites thomasi* (PERVINQUIÉRE, 1907)

Pl. XVI, Figure 16

*1907 *Scaphites (?) Thomasi* PERVINQUIÉRE, p. 121, Pl. 4, Figures 30, 31
1979 *Salaziceras (Noskytes) thomasi* (PERVINQUIÉRE, 1907) — SCHOLZ, p. 101, Pl. 22, Figure 6
1994 *Metascaphites thomasi* (PERVINQUIÉRE, 1907) — WRIGHT & KENNEDY, Figures 3a–c (refigured holotype)

*Material.* A single specimen from Tilos Forest.

*Description.* Very involute, small specimen with ribs that become tuberculate on the midflank then weaken on the outer-flank and cross the rounded venter straight. The specimen is slightly compressed. Ribs tend to be weakening both on the lateral and the ventral sides. Venter getting wider, and slightly flattened with strong ventrolateral tubercles. The venter is very broad and flat. Suture cannot be observed at none of the specimens.

*Discussion.* The systematic position of *M. thomasi* is uncertain. See above the discussion of the genus.

*Occurrence.* The species occurs in the condensed Late Albian basal pockets of Pénzeskút Marl Formation at Tilos Forest which age can be placed into the *Stoliczkaia (S.) dispar* Zone. Otherwise this rare species is reported from the Upper Albian – ?Lower Cenomanian deposits of Algeria (PERVINQUIÉRE 1907) and Hungary (SCHOLZ 1979). WIEDMANN (1962c) described *M. subthomasi* from Spain, but this form is somehow older.

### *?Metascaphites kashaii* sp. nov.

Pl. XV, Figure 2

*Material.* A single specimen is from the condensed Late Albian basal pocket of the Pénzeskút Marl at Tilos Forest.

*Derivation of name.* After our peregrine tiercel, Kashai.

*Location.* The holotype is housed in the Palaeontological Department of the Hungarian Natural History Museum, repository number is 2007.70.1.

*Dimensions.*

| | D | W | H | W/H | U |
|---|---|---|---|---|---|
| 2007.70.1. | 27(100) | 9(33) | 9(33) | 1 | 3(11) |

*Description.* The specimen is very involute and compressed, with rounded whorl section. The umbilicus is narrow and shallow. Flanks are paralell. The umbilical shoulder is smooth, as well as the lower flank. The inner whorls are smooth; ornamentation appears just on the last whorl. Blunt, low, ribs appear on the outer third of the lateral part and form tubercles quickly on the ventrolateral edge. Ribs disappear after the tubercles; do not cross the well rounded, smooth venter. Reaching 24 mm in diameter, probably at the beginning of the body chamber, ribs appear but do not form tubercles on the ventrolateral edge but become stronger and prorsiradiately cross the venter. In this ribbed ontogenetic stage, the conch becomes more evolute. Before the aperture, a collar persists.

*Discussion.* This single specimen is referred to genus *Metascaphites* on the basis of the ornamentation and the smooth venter, but the systematic position is very uncertain — both for the specimen as well as for the genus *Metascaphites*.

The tubercles of kashaii are more on the ventral edge then on the holotype of *M. thomasi* (PERVINQUIÉRE, 1907). The Hungarian specimen shows close resemblance to an unregistered paralectotype of *Stoliczkaia (Shumarinaia) africana* (PERVINQUIÉRE, 1907) figured by WRIGHT & KENNEDY (1994, Figures 3r–t). The smooth, wide and rounded venter of the

Hungarian specimen is in contrast to the flattened venter of PERVINQUIÉRE's. The ornamentation of ?*M. kashaii* resembles very much to *Stoliczkaia (Shumarinaia) asiatica* MATSUMOTO, INOMA, 1975 figured by KENNEDY (2004a, Figures 21, V, W) as *S. (S.)* aff. *asiatica* MATSUMOTOV & INOMA, 1975. The resemblance with *Metascaphites thomasi* (PERVINQUIÉRE, 1907) is also remarkable, especially on the early ontogenetic stages. Tubercles appear just on the last whorl for both species, until then the mould is smooth.

*Occurrence.* The species occurs in the condensed Late Albian, *Stoliczkaia (S.) dispar* Zone basal pockets of Pénzeskút Marl Formation at Tilos Forest.

### *?Metascaphites scholzi* sp. nov.

Pl. XVI, Figure 17, 18

*Material.* Two specimens are from the condensed Late Albian basal pocket of the Pénzeskút Marl Formation at Tilos Forest.

*Derivation of name.* After Gábor Scholz, a Hungarian palaeontologist, who worked extensively on the Late Albian ammonite assemblage of Tilos Forest.

*Location.* The holotype is housed at the Palaeontological Department of the Hungarian Natural History Museum, repository no. 2007.69.1. The other specimen is at the private collection of Z. Evanics.

*Dimensions.*

| | D | W | H | W/H | U |
|---|---|---|---|---|---|
| 2007.69.1. | 24(100) | 14(58) | 10(42) | 0.714 | 3(12.5) |
| | 25(100) | 17(68) | 10(40) | 0.588 | 3(12) |

*Description.* Rather involute specimen with slightly depressed whorl section.The umbilicus is narrow; the umbilical shoulder is low and rounded. Strong, wide primary ribs arise from the umbilical edge, which wear small tubercles on the outer third of the lateral part. At the outer lateral region intercalated ribs arise, both primaries and the intercalated ones cross the venter with slight prorsiradiation. The ornamentation changes at the diameter of 15 mm. The most peculiar is that the venter become smooth, flat and wide, the small tubercles getting coarser and become huge, so on the ventrolateral edge is ornamented by heavy, spine-like tubercles. On the last quarter whorl, the phragmocone is getting narrower and a collar is visible just befor the aperture.

*Discussion.* The specimen is referred to the genus *Metascaphites* on the basis of the smooth venter and the prominent ventrolateral tubercles. It differs from *M. thomasi* (PERVINQUIÉRE, 1907) in its coarser ornamentation and sculpture, and in the presence of ribs at the earlier whorls. It is differs from *M. kashaii* sp. nov. in its wider, flattened venter and the type of ribbing.

*Occurrence.* The species occurs in the condensed Upper Albian basal pockets of the Pénzeskút Marl Formation at Tilos Forest.

Genus *Scaphites* PARKINSON, 1811
Type species: *Scaphites equalis* J. SOWERBY, 1813

### *Scaphites* sp. indet.

*Material.* Bóly B–1 borehole 999.8 m; 1116.3 m.

*Description.* Small scaphitid forms in a very poor state of preservation, mostly heavily pyritized.

*Discussion.* Lacks of specific characters do not allow to determining more precise identification.

Subgenus *Scaphites* PARKINSON, 1811
Type species: *Scaphites equalis* J. SOWERBY, 1813

### *Scaphites (Scaphites) hugardianus* D'ORBIGNY, 1842

Pl. XVIII, Figures 2, 5, 6, 7, 8, 9, Pl. XXIII, Figures 11, 12

*1842 *Scaphites hugardianus* D'ORBIGNY, p. 521, 525
1965 *Scaphites hugardianus* D'ORBIGNY, 1842 — WIEDMANN, p. 423, Pl. 54, Figure 5; Pl. 57, Figures 1, 2, 6, 6, 7; Text-Figures 5d, e
1979 *Scaphites hugardianus* D'ORBIGNY — SCHOLZ, p. 43, Pl. 1, Figures 20–25
1989 *Scaphites (Scaphites) hugardianus* (D'ORBIGNY) — HORVÁTH, Pl. 1, Figure 3
1989 *Scaphites (Scaphites) merani* (PICTET & CAMPICHE) — HORVÁTH, Pl. 1, Figure 4
1994 *Scaphites hugardianus* D'ORBIGNY, 1842 — COOPER, pp. 165–193, Figure 1E–G
1996 *Scaphites (Scaphites) hugardianus* D'ORBIGNY 1842 — KENNEDY in GALE et al., p. 589–590, Text-Figure 17a–c, g
1997 *Scaphites merani* (PICTET & CAMPICHE) — SCHOLZ in FÜLÖP, p. 81, Pl. 1, Figure 2
1998 *Scaphites hugardianus* D'ORBIGNY — MONKS, p. 169, Figure 3. 88

*Material.* A single specimen is reported from Jásd J–36 borehole at 207.0–209.0 m; 31 specimens from Tilos Forest, 3 specimes from Jásd J–42 borehole at 411.25 m; 345.4, and 228.7 m. One specimen is found in Bóly B–1 borehole at 998.2 m, 6 specimens from Jásd 1 quarry and 45 specimens are collected from Bakonynána.

*Description.* Small and medium sized, scaphitid specimens, that ornamented by dense, prorsiradiate ribs with small tubercles on the body chamber. Ribs pass through the rounded venter.

*Discussion.* COOPER (1994) revised the genus *Scaphites* and concluded *Scaphites (Scaphites) meriani* PICTET & CAMPICHE, 1861 and *Scaphites (Scaphites) simplex* JUKES-BROWNE, 1875 as the intraspecific variants, so junior synonyms of *S. (S) hugardianus*. KENNEDY (in GALE et al. 1996, p. 589) kept separated the three species on the base of morphology and different stratigraphic distribution. Here the view of KENNEDY (loc. cit) is followed. MONKS (2000) also discussed the systematic position of the Scaphitidae, as well as WIEDMANN (1965) and COOPER (1994).

*Occurrence.* The species is reported from the condensed deposits of Late Albian *Stoliczkaia (S.) dispar* Zone of Tilos Forest and other surface outcrops; otherwise known from the Late Albian *Stoliczkaia (S.) dispar* Zone deposits of the former Western Tethys.

### *Scaphites (Scaphites) simplex* (JUKES-BROWNE, 1875)

Pl. XXVIII, Figure 28

| | |
|---|---|
| *1875 | *Scaphites Meriani* var. *simplex* JUKES-BROWNE, p. 287, Pl. 14, Figure 3 |
| 1937 | *Scaphites simplex* JUKES-BROWNE — SPATH, p. 504, Text-Figures 176c–f; 177a, b, d, e; Pl. 57, Figures 13–22 |
| 1965 | *Scaphites (Scaphites) simplex* (JUKES-BROWNE) — WIEDMANN, p. 412, Pl. 54, Figures 1, 7; Pl. 55, Figures 4, 5; Text-Figure 3e |
| 1997 | *Scaphites (Scaphites) simplex* (JUKES-BROWNE) — SCHOLZ in FÜLÖP, p. 81 |

*Material.* A single specimen from the Pusztavám Pv–980 borehole at 460 m and a small specimen from Bóly B–1 borehole at 1034.5 m.

*Description.* Small, flattened, scaphitid specimens that ornamented by dense, prorsiradiate ribs that completely lack tubercles. The venter cannot be observed.

*Discussion.* Lack of tubercles on the final shaft and hook and the fine, dense ribbing with scaphitid coiling characterize the species. According to WIEDMANN (1965), *S. (S.) simplex* belongs to the *meriani* main stock and defined with the presence of untuberculated primary ribs, the rounded whorl section and the absence of lateral bulges. WIEDMANN (loc. cit) was fully discussed the species.

*Occurrence.* The species is reported from the Late Albian *Stoliczkaia (S.) dispar* Zone sequence of Bóly B–1 borehole; otherwise it is known from England, Switzerland, Spain and Algeria and restricted to the Late Albian *Mortoniceras (M.) inflatum* and *Stoliczkaia (S.) dispar* Zones.

### *Scaphites (Scaphites) evanicsi* sp. nov.

Pl. XVIII, Figure 3, 4, 10, 11; Pl. XXIII, Figure 10

*Material.* Seven internal moulds, all from the condensed basal pockets of the Pénzeskút Marl Formation at Tilos Forest.

*Derivation of name.* After Zoltán Evanics, an amateur fossil hunter who collected the most beautiful specimens of this new species.

*Location.* The holotype is housed at the Palaeontological Department of the Hungarian Natural History Museum, Budapest. Repository number is 2007.71.1. Six additional specimens are in the private collection of Z. Evanics.

*Dimensions.* Here the measurement method of WIEDMANN (1965) is followed.

— D = greatest diameter of spiral portion and final hook,
— B = maximum thickness of spiral portion and final hook,
— d = diameter of the spiral portion,
— h = max. whorl height of the spiral portion,
— b = max. whorl thickness of the spiral portion,
— u = umbilical diameter of the spiral portion.

| | D | B | d | h | b | u |
|---|---|---|---|---|---|---|
| Holotype | 24 | 15 | 13 | 8.5 | 8.5 | 1 |

*Description.* Medium sized, compressed scaphitid form. The spire is involute, ornamented with fine lirae. The shaft and the hook have flat, almost paralell sides, the whorl section is quadrangled. The final hook is less inflated, the shaft is long and the venter is flattened. There are coarse tubercles appearing on the outer flank of the shaft but the sculpture changes towards the aperture. The tubercles form elongated bullae when the hook begins and become more prominent towards the aperture.

*Discussion.* This new *Scaphites* species described here has a completely smooth venter and coarse bullae on the lateral flank. *Scaphites (Scaphites) equalis* J. SOWERBY, 1814, which is reported adequately only from the Cenomanian, shows resemblance with the new species on the ornamentation of the lateral region, but the venter of *S. (S.) equalis* is always ribbed. *Scaphites wellmani* HENDERSON, 1973 described from New Zealand has similar sculpture, apart from the ribbed venter. WIEDMANN (1965) mentions that "In the more inflated forms the sculpture is coarser while the compressed specimens are more weakly ribbed.", in the case of the Hungarian specimens it is true.

*Occurrence.* The species is reported from the condensed, Late Albian *Stoliczkaia (S.) dispar* Zone basal pockets of Tilos Forest.

Superfamily Douvilleiceratacеae PARONA & BONARELLI, 1897
Family Douvilleiceratidae PARONA & BONARELLI, 1897
Subfamily Douvilleiceratinae PARONA & BONARELLI, 1897
Genus *Douvilleiceras* GROSSUVRE, 1894
Type species: *Ammonites mammillatus* SCHLOTHEIM, 1813

### *Douvilleiceras mammillatum* (SCHLOTHEIM, 1813)

Pl. XXV, Figure 3

1896 *Douvilleiceras mammillatum* (SCHLOTHEIM) — PARONA & BONARELLI, p. 95
1923 *Douvilleiceras mammillatum* (SCHLOTHEIM) — SPATH, p. 68, Pl. IV, Figures 3a, b; Pl. V, Figures 1–4
1990 *Douvilleiceras mammillatum* (SCHLOTHEIM) — MARCINOWSKI & WIEDMANN, p. 51, Pl. 7, Figures 5, 6

*Material.* A single specimen from Tatabánya Ta–1462 borehole at 338.4 m.

*Description.* Fragment of the last whorl, ornamented with coarse, mammillate tubercles.

*Discussion.* The mammillate tubercles characterize the species.

*Occurrence.* The species reported from Hungary only from the Early Albian sequence of Tatabánya Ta–1462 borehole; otherwise known worldwide from the Early Albian *Douvilleiceras mammillatum* Superzone. The genus is reported from the Late Albian basal pockets of the Tata Limestone Formation from the Kálvária Hill locality, Tata, Hungary.