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Coniacian ammonites from Štíty in Moravia (Czechoslovakia)

Amoniti coniacu z lokality Štíty na Moravě

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Ammonidea (Cephalopoda)

Coniacian

Bohemian Cretaceous Basin

Králický Graben

Taxonomy

VAŠÍČEK, Z. (1992): Coniacian ammonites from Štíty in Moravia (Czechoslovakia). — Sbor. geol. Věd, Paleont., 32, 163—195. Praha.

Abstract: The paper is a systematic evaluation of the ammonites of Soukup's collection deposited in the Geological Survey in Prague, coming from the siderite concretions and claystones of the Březno Formation at the locality Štíty (Bohemian Cretaceous Basin, Bystřice region, southernmost part of the Kłodzko Graben). I succeeded to determine 10 ammonite species in the material, among which are the new species *Tridenticeras soukupi* and the zone species of the Coniacian — *Peroniceras tridorsatum* (SCHLÜTER) and *Gauthiericeras margae* (SCHLÜTER). The two last-mentioned species prove the middle and lower part of the Upper Coniacian.

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Introduction

Within the scope of my work with the Geological Survey (ÚÚG) in Prague, through the help of Dr. S. Čech, in 1983 I was offered part of the ammonite collection from the inheritance of Dr. Josef Soukup designated as siderite clays of the brickworks Šilperk (Coniacian). Nowadays, instead of the old denomination Šilperk (from the German Schildberg), we use the correct Czech topographic name Štíty, whereby the brickworks (opened in 1929, and denominated as Schmied's brickworks) hold the present-day name Severomoravské cihelny, Hranice, plant Štíty.

The mentioned ammonite collection, which originated during a long time interval (roughly within the time interval 1932—1970 according to isolated, hand-written remarks on newspaper shreds, which were sometimes added to the fossils) unfortun-

ately lacks any preciser data on the sequence of strata, from which the fossils were taken. I received the second part of Soukup's collection as late as 1987. In addition to Soukup's material, I succeeded to find in the collection of the Moravian Museum part of the ammonite material from the collections of Dr. Z. Jaroš, partly published by this author in 1931. Thus, the worked material has attained the number of almost 50 specimens.

Considering the quality and diversity of the unstratified ammonite material, I visited the locality Štíty twice. During my first visit in 1984 at the locality I was accompanied by Dr. Zdeněk Gába from the Okresní vlastivědné muzeum in Šumperk. During my second visit in 1988, I attempted to make a basic geological documentation and stratified collections of fossils.

Localization and outline of geology

The brickworks in Štíty are at the northeastern margin of the community Štíty near the highway Štíty-Bukovice. They are located at the foothills of a low elevation, bounded in the E by the stream Březná and at the SE by a nameless brook, flowing from the NE to the SE (with a headwater region roughly above the railway station Štíty).

The raw material for the production of bricks is being mined by a dipper in about 15–20 m long portions and in a face attaining the total length of over 100 m. The height of the face is some 10 m; after uncovering the Quaternary layers (terrace deposits and waste products) it is at the present time slightly more than 7 m. The general direction of mining has been S–N.

Geomorphologically, the locality belongs to the southern part of the Kłodzko Graben, whose Czech part is designated as the Králíky Graben (MALKOVSKÝ, 1979). It is already on the territory of Moravia.

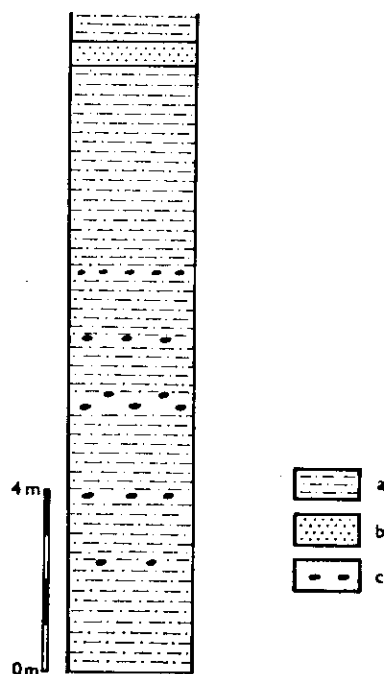
The basic geological structure, stratigraphy and notably the lithology of the region is given in the paper by VALEČKA (1988). The evidenced sequence of strata (mostly based on boreholes), starts with the Korycany Formation (Cenomanian) and ends with the Březno Formation (Coniacian), whereby the thickness of the Upper Cretaceous filling of the graben according to MALKOVSKÝ (1979) is more than 600 m. The preserved sequence of strata is well comparable with the lithostratigraphic units determined in ČECH et al. (1980) in the Bohemian Cretaceous Basin. The age of the Březno Formation in the region of Štíty is witnessed notably by inoceramids and by foraminifers (for details see VALEČKA, 1988). As I was told by S. Čech, characteristic representatives of the inoceramid bivalves are notably *Platyceramus mantelli* and *Volvicceramus koeneni involutus*. SOUKUP (in SVOBODA, 1962), who, in the framework of the edition of geological maps of the ČSSR at 1 : 200,000 scale, also gives a concise geological characterization of the surroundings of the locality, mentions some other macrofaunistic elements, notably non-inoceramid bivalves and gastropods and also ammonites, that were pictured and preliminarily elaborated for the first time

by JAROŠ (1931). SOUKUP compares in the cited work the faunistic content with the Kieslingswaldensis beds on the Polish territory.

State of the locality in 1988

The mined face in the brickworks in Štítý in May 1988 consisted of grey, silty, finely micaceous and imperfectly consolidated claystones with siderite concretions (see pl. I, figs. 1, 2). The concretions are of spheroidal, mostly however of loaf-like shape, their diameter is most often 5–7 cm or 15–20 cm. A subordinate part are concretions of cylindrical form which, having a diameter of some 5–7 cm, attain a height of 20 cm. The concretions are sparsely scattered in the basic clayey sediments; however, they form more or less currently traceable horizons. Only in the uppermost part of the section, but only at the western margin of the mined face, there is a plate of light-grey, fine-grained sandstones in the claystones (tempestite, VALEČKA, 1988). So far it has been the only different lithologic horizon of the mined section (see text-fig. 1.).

In the claystones there are scattered chalky shells of bivalves s.s., among which the inoceram bivalves dominate by size (in addition, there are conspicuously frequent fragments of prismatic layers of these bivalves), and abundant gastropods, also scaphopods, in isolated cases echinoderms, ammonites, and plant remains.



1. Lithological section of the western part of the mined face of the brickworks in Štítý, May 1988. *a* — silty clays, *b* — sandstones, *c* — siderite concretions

In the siderite concretions, the most often preserved were bivalves (after opening as their positives appear internal moulds, whereas the test remains sticking on the negative), less often gastropods, and rarely ammonites.

The sandstone layer from the uppermost part of the profile contains in places fragments of prisms of inoceramids and plant debris.

Z. Jaroš and J. Soukup's finds of fauna could not be repeated during my visits of the locality Štítý. During my last visit I found several fragments of smooth shells of the genus *Baculites* at various levels of the sequence of strata and a fragment of the species *Phlycticioceras trinodosum* in the lower part of the sequence of strata.

Systematic part

When measuring the ammonite shells, the standard parameters (in mm), using the following symbols were used: D = diameter of the shell, H = height of whorl, U = umbilical diameter, B = width of whorl. For illustration of the suture, the following symbols were used: E = outer lobe, L = lateral lobe, U = umbilical lobe, I = internal lobe.

Suborder *Ammonitina* HYATT, 1889

Superfamily *Desmocerataceae* ZITTEL, 1895

Family *Desmoceratidae* ZITTEL, 1895

Subfamily *Puzosiinae* SPATH, 1922

Genus *Mesopuzosia* MATSUMOTO, 1954

Type species: *Mesopuzosia pacifica* MATSUMOTO, 1954. Turonian, Japan.

Mesopuzosia indopacifica (KOSSMAT, 1898)

Pl. II, figs. 1—3, text-fig. 2

1898 *Puzosia indopacifica* n. sp.; KOSSMAT, p. 117, pl. 17, fig. 2a, b, pl. 18, fig. 3.

1932 *Puzosia* (*Parapuzosia*) *indopacifica* KOSSMAT; COLLIGNON, p. 18, pl. 6, fig. 1a, b.

1954 *Mesopuzosia indopacifica* (KOSSMAT); MATSUMOTO, p. 84.

1959 *Mesopuzosia indopacifica* (KOSSMAT); MATSUMOTO, p. 19.

Material: The juvenile part of the shell has been preserved as an internal mould with the remains of the calcareous test, encompassed to less than a half by the following half-whorl, preserved as an internal mould. Also this final half-whorl still belongs to the phragmocone (sp.YA 2032).

Description: Fairly large, semi-involute shell. The umbilical wall is low and perpendicular towards the umbilicus. It is divided by a narrow rounded zone from the fairly high, weakly faulted subparallel flanks of the shell. Towards the outer

side, the flanks converge and pass quite fluently into a relatively narrow, strongly vaulted outer side.

On the surface of juvenile whorls there are conspicuous constrictions and, between them frequent simple ribs, well visible primarily on the outer half of the whorls. In spite of the imperfectly preserved lower part of the whorls we may presume, that long ribs commencing near the umbilicus alternate with shorter ones, which disappear at about one half of the height of the whorl. The constrictions are in the umbilicus shallow and wide, confined at both sides by mound-like inflations, corresponding to short, umbilicus near ribs. On the outer half of the ribs the constrictions are narrow, not excessively deep, at the outer side they distinctly bend towards the peristome. They pass the outer side in forming an angular bent. At the back side, on the circumference of the shell, the constrictions are fringed by a somewhat stronger rib. There are 8–11 ribs between the constrictions. On the internal mould, the ribs are much less visible.

The sculpture of the following half-whorl forms relatively indistinct ribs and more marked constrictions. The constrictions are shallow, and are accompanied in the whole course by a rib of roughly the same strength. The rib, as well as the constriction, run from the umbilicus at first subradially. At $2/3$ of their height, they relatively suddenly bend to the peristome. They pass the outer side by a narrow, almost angularly flexed bend. The siphonal tube is not precisely in the symmetry plane (or in the most intense vaulting of the outer side), but it lies somewhat side-wards.

Three constrictions have been preserved, but there were evidently four on the whole semi-whorl. Between the constrictions, at the inner side, relatively poorly visible single ribs are located, whose continuation towards the umbilicus is less perceptible. The ribs at the outer side have the same course as the constrictions.

Measurements: The maximum estimated diameter of the preserved phragmocone was over 120 mm. At $H = 40.5$ mm is $B \approx 31$ mm ($B/H \approx 0.765$). At $D = 62.5$ mm is $H = 27.0$ (0.43), $U = 19.5$ (0.31), $B = 19.0$ (0.30), $B/H = 0.70$. At the diameter of 62.5 mm 4 constrictions and about 54 ribs are on the circumference.

Suture: The outer lobe of medium depth bears in the axial part a median saddle, which reaches almost as far as half of the height of the lobe. The first lateral saddle has two branches. In its uppermost part, it is somewhat superficially weathered. The lateral lobe is asymmetrically trifold with a more distinctly developed outer part. It is the most robust and the deepest of all lobes. The second lateral saddle is divided by a partial lobe into two parts, each of which has two branches. The following lobe is asymmetrical and has essentially the same form as the lateral lobe. Then follows a relatively low, in its upper part wide saddle, with a superficially weathered uppermost part. A striking element of the suture around the line of coiling is a deep-reaching partial lobe, whose axis runs almost vertically.

Remarks and relationships: The relatively flat subparallel flanks of the whorls, the direct course of the constrictions, the alternating of longer and shorter



2. External suture of *Mesopuzosia indopacifica* (KOSSMAT) at a height of the whorl $H = 19$ mm (specimen YA 2032)

ribs, of which the longer begin near the umbilicus, the number of constrictions per whorl, etc., correspond best to the diagnosis of the species *M. indopacifica*. The related species *M. pacifica* MATSUMOTO, 1954, differs in having a sigmoidal course of constrictions and ribs, more vaulted ribs and a broader umbilicus. The species *M. yubarens* (JIMBO, 1894) and *M. densicostata* MATSUMOTO, 1954, differ mainly in having a finer and denser ribbing.

Distribution: The holotype of *M. indopacifica* should be derived from the Coniacian of India. The finds from the United States and Japan according to MATSUMOTO (1959) come from the upper Turonian. This species has also been known from Madagascar.

Family *Pachydiscidae* SPATH, 1922

Genus *Eupachydiscus* SPATH, 1922

Type species: *Ammonites Isculensis* REDTENBACHER, 1873. Gosau Upper Cretaceous, Austria.

Eupachydiscus isculensis (REDTENBACHER, 1873)

Pl. III, fig. 1

1873 *Ammonites Isculensis* nov. sp.; REDTENBACHER, p. 122, pl. 29, fig. 1a, b.

1979 *Eupachydiscus isculensis* (REDTENBACHER); WIEDMANN in HERM et al., p. 49, pl. 8, fig. A (cum syn.).

1982 *Eupachydiscus isculensis* (REDTENBACHER); MARTINEZ, p. 83, pl. 7, fig. 3a—d.

1982 *Eupachydiscus isculensis* (REDTENBACHER); IMMEL et al., p. 22, pl. 7, figs. 8—11, pl. 8, figs. 1—4.

Material: One very incompletely limonitized internal mould (sp. YA 2009) and others (sp. YA 2031), in places a slightly deformed mould with remains of the test without recognizable inner whorls. The larger part of the last whorl of the second specimen belongs to the phragmocone, the smaller one to the body chamber.

Description: Semi-involute shell of relatively large dimensions with thick whorls. The cross-section of the whorls is roundish. The rounded flanks of the whorl pass fluently into the umbilical wall and into the broad and rounded outer side.

The sculpture is formed by prominent ribs, among which the ribs reaching as far as the umbilical wall prevail. The steep (inner) part of the umbilical wall was evidently smooth. Between the two primary ribs one intercalated rib is placed, and exceptionally splits off; it reaches roughly as far as the transition of the flanks of the whorl into the umbilical part. The ribs are relatively dense. Between the phragmocone and the beginning of the body chamber the ribs — in a relatively short section — are much sparser, but then follows a section with initial density ending in densifying of the ribs. These ribs of the final portion are somewhat thinner than the preceding ribs. The ribs have, starting with the umbilicus, an almost straight course. At the transition of the flanks, towards the outer part of the whorl, the ribs are inclined towards the peristome. They pass the outer side without interruption in forming a wide arch and are convex with respect to the peristome. At the outer side of the core, the ribs in area of the axis of symmetry are interrupted. There is a faint furrow in this place, which evidently corresponds to the course of the siphonal tube.

The suture is visible only partly. It is strongly dissected. It is marked by a deep outer lobe with a characteristic median saddle, which attains $1/3$ of the total height of the lobe. The lateral lobe reached probably only as far as the level of the median saddle.

Measurements: At $D = 110$ mm is $H = 47.5$ mm (0.43), $U = 31$ mm (0.28), $B = 56.5$ mm (0.51). On one half of the whorl at the mentioned diameter are 21 ribs. Except for the last four, all ribs lie on the phragmocone.

Distribution: According to IMMEL et al. (1982), *E. isculensis* is a species with a wide stratigraphic range from the Coniacian to the Lower Campanian. It has been known from the Alps, from northern Germany, southern France, Spain, Madagascar, and South Africa.

Superfamily *Hoplitaceae* H. DOUVILLÉ, 1890

Family *Placenticeratidae* HYATT, 1900

Genus *Placenticeras* MEEK, 1876

Type species: *Ammonites placenta* DE KAY, 1828. Early Senonian, USA.

Placenticerias cf. *semiornatum* (D'ORBIGNY, 1850)

Pl. V, fig. 3, pl. VIII, fig. 4, text-fig. 3

1984 *Placenticerias semiornatum* (D'ORBIGNY); KENNEDY, p. 44, pl. 1, figs. 4—6, pl. 2, figs. 3—5, 7, text-figs. 13 B, 29 D (cum. syn.).

Material: Fragment of about one quarter of the whorl of a slightly deformed internal mould (ex. YA 2033).

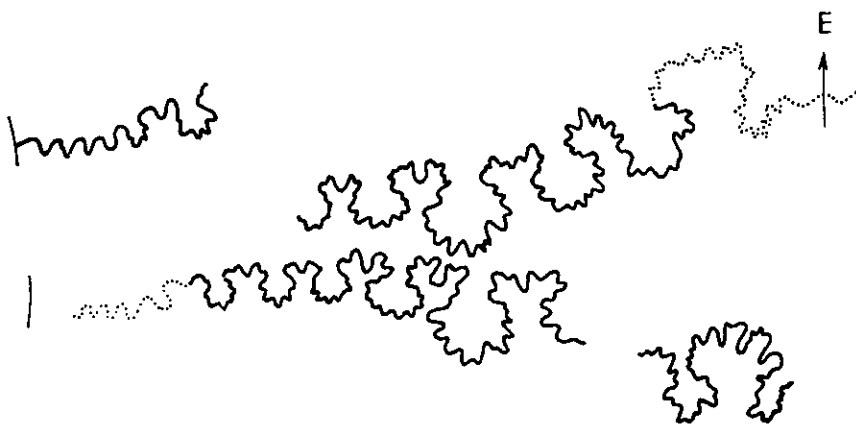
Description: Involute shell with high whorls. Umbilical wall, inclined towards the umbilicus, is not separated from sides. It is terminated as far as the basis of the whorl by an edge. The flanks of the whorl are flatly vaulted, the vaulting rises as far as the umbilicus. The most distinct vaulting of the flanks is in the lower quarter of the whorl. From there, the walls of the whorl diverge towards the outer side. The outer side is narrow, flat, and of an indistinctly furrowlike character, and it is confined with respect to the flanks from each side by a distinct keel.

The shell is smooth; only in the circumferential third of the whorl, in two cases flat ribs are indicated. The umbilical elevations are not developed.

Measurements: The diameter of the shell can be estimated to be 50 mm. At $H = 27.5$ mm is $B \approx 13.5$ mm ($B/H \approx 0.49$).

Suture: The internal mould is in places fairly strongly weathered, so that some of its parts have effaced details. However, the entire external suture, from the outer lobe as far as the umbilical line, is visible. The whole external suture, at a height of the whorls of 28 mm is formed by 13 saddles.

The outer lobe is wide and shallow. The axial part, corresponding to the low median saddle, is only simply undulated. Beyond the edge which separates the outer side from the edges of the whorl, follows a more detailedly undulated oblique branch of the outer lobe. The first lateral saddle is wide, rounded in the overall outline. The following saddles are lower and two-branched. The lobes have an effaced detailed



3. External suture of *Placenticerias* cf. *semiornatum* (D'ORBIGNY) at a height of the whorl $H = 28$ mm (specimen YA 2033)

structure; they were probably indistinctly trifid, always wider than the saddles. The third lobe after the outer one is the most mighty of the lateral lobes. Behind it, the elements of the suture become smaller and their degree of diversification decreases, as long as the last of the twobranch saddles becomes almost smooth. It is followed towards the umbilical seam by five small simple saddles, of which the saddle lying close to the umbilicus is slightly wider than the preceding one.

Remarks and relationships: Considering the incompleteness of the shell, a safe determination is not possible. As the specimen lacks umbilical bullae and, on the contrary, has on the circumference indications of short, flat ribs, it is distinctly closer to the species *P. semiornatum* than to the species *Placenticeras fritschi* (DE GROSSOUVRE). To judge from the section of the whorl and its outer suture we cannot exclude, that the specimen from Štítý is identical with the juvenile specimen of the Březno Formation, whose section has been figured by FRIČ (1893) on text-fig. 53 (p. 75).

Distribution: KENNEDY (1984) reports the species *Placenticeras semiornatum* from the Upper Coniacian of France.

Superfamily *Acanthocerataceae* DE GROSSOUVRE, 1894

Family *Collignoniceratidae* WRIGHT et WRIGHT, 1951

Subfamily *Peroniceratinae* HYATT, 1900

Genus *Peroniceras* DE GROSSOUVRE, 1894

Subgenus *Peroniceras* DE GROSSOUVRE, 1894

Type species: *Peroniceras moureti* DE GROSSOUVRE, 1894. Coniacian, France.

Peroniceras (*Peroniceras*) *tridorsatum* (SCHLÜTER, 1867)

Pl. IV, fig. 1, pl. V, figs. 1, 2, text-figs. 4—6

1867 *Ammonites tridorsatus* n. sp.; SCHLÜTER, p. 26, pl. 5, fig. 1a, b.

1894 *Peroniceras subtricarinatum* var. *tridorsatum* (SCHLÜTER); DE GROSSOUVRE, p. 96, pl. 10, figs. 2, 3, pl. 11, fig. 1.

1894 *Peroniceras moureti* A. DE GROSSOUVRE, n. sp.; DE GROSSOUVRE, p. 100, pl. 11, figs. 3, 4, text-figs. 37, 39.

1894 *Peroniceras rousseauxi* A. DE GROSSOUVRE, n. sp.; DE GROSSOUVRE, p. 102, pl. 11, fig. 5.

1920 *Peroniceras tridorsatum* (SCHLÜTER); DESIO, p. 205, pl. 1, fig. 16.

1931 *Peroniceras* (*Schlönbachia*) *subtricarinatum* D'ORB.; JAROŠ, pl. 1, fig. 2.

1965 *Peroniceras* cf. *tridorsatum* (SCHLÜTER); COLLIGNON, p. 58, 439, figs. 1805, 1806.

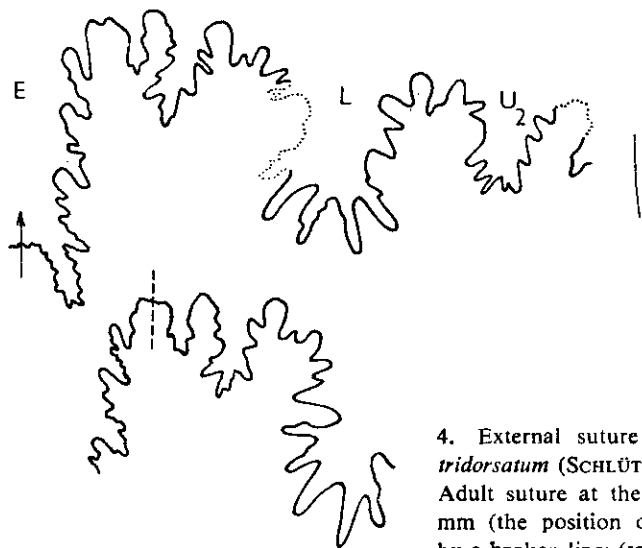
1982 *Peroniceras tridorsatum* (SCHLÜTER); MARTINEZ, p. 113, p. 17, fig. 4a, b.

1984 *Peroniceras* (*Peroniceras*) *tridorsatum* (SCHLÜTER); KLINGER and KENNEDY, p. 139, figs. 3—15, 16 D—E (cum. syn.).

1984 *Peroniceras* (*Peroniceras*) *tridorsatum* (SCHLÜTER); KENNEDY, p. 62, pl. 11, figs. 3—6, pl. 12, figs. 1—5, pl. 13, figs. 5—11, pl. 14, figs. 1, 4, text-figs. 13 G, L, 18 C—E, 19.

Material: Eleven fairly complete shells (YA 2000—2010), in which at least one and a half whorls of various sizes have been preserved; the most juvenile whorls have been preserved nowhere. Part of the shells comes from siderite concretions. These are mostly internal moulds or moulds with sticking relicts of the original test, often with well-visible remains of sutures. The remaining part of the shells, preserved in the claystones, has been strongly deformed and is exposed from one side only.

Description: Evolute shells with whorls approximately as high as wide. Umbilical wall relatively high and steep, suddenly turning over a narrow rounded zone into the relatively flat flanks of the whorls. The whorls are widest near the umbilicus, and fairly diverge towards the outer side. At the inner side of the whorls there are three keels, of which the middle one is one of the most distinct. Lateral keels separated from the middle one by relatively wide furrows. Sculpture formed by sparse, relatively strong simple ribs that fade out towards the line of coiling. Elongate bullae on each rib close to the umbilicus are concordant with the course of the ribs, and these bullae form together the umbilical row of nodes. The circumference of the whorls bears another (outer) row of clavate nodes that is oriented transversely to the course of the ribs. Both rows of nodes are visible on the outer whorls, too. The outer nodes are more vigorous than those on the lower row of nodes. They terminate the ribs close to the lateral keel by sharply confined triangular platforms. The furrows or grooves between these platforms are obliquely dipping towards the peristome, so that the ribs are in the terminal part somewhat obliquely inclined (this is evident on the last whorl).



4. External suture of *Peroniceras* (*Peroniceras*) *tridorsatum* (SCHLÜTER)

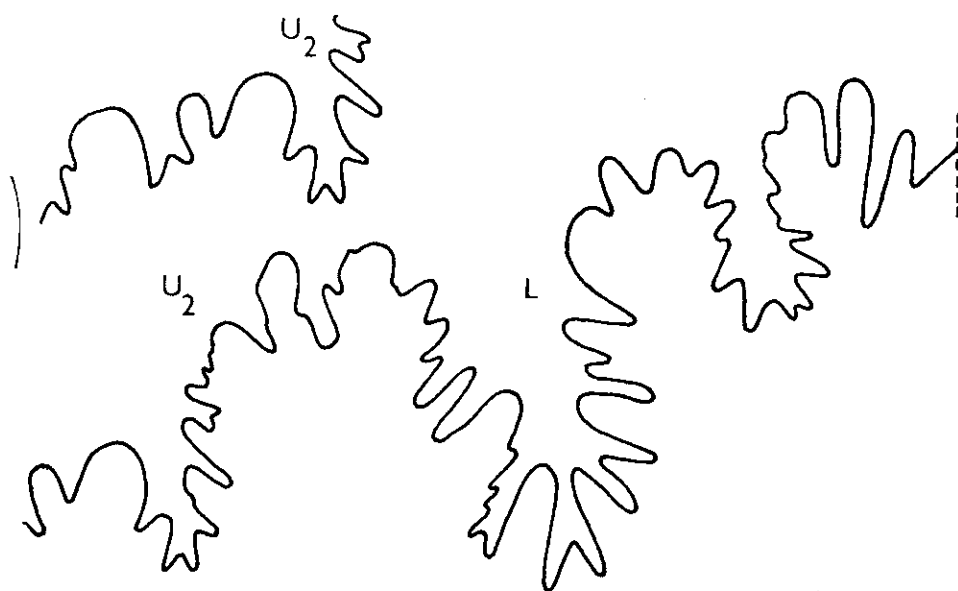
Adult suture at the height of the whorl $H = 21$ mm (the position of the lateral keel is indicated by a broken line; (specimen YA 2001))

Measurements: Dimensions were measured on the most complete shells and the number of ribs belonging to the whole whorl or to the half-whorl was calculated

(arranged according to size):

specimen	D	H	U	B	B/H
YA 2000	41.5	12.5 (0.30)	19.5 (0.47)	13.5 (0.325)	1.08
YA 2001	67.0	20.7 (0.31)	31.0 (0.46)	22.0 (0.33)	1.06
YA 2006	106.0	36.5 (0.34)	46.3 (0.44)	35.0 (0.33)	0.99

specimen	D	number of ribs R
YA 2000	41.5	24
	following whorl (D not measured)	26
YA 2001	75.0	22
YA 2008 (deformed)	80.0	26
YA 2006 (weakly deformed)	85.0	22
	107.0	26
YA 2005 (deformed)	130.0	26



5. External suture of *Peroniceras* (*Peroniceras*) *tridorsatum* (SCHLÜTER)

Adult suture in the part between the lateral keel at the circumference of the shell (broken line) and the line of coiling at a height of the whorl 33 mm (specimen YA 2002)

From the survey of the number of ribs it results, that their density is in all specimens relatively the same, whereby at whorl diameters up to 100 mm 22 to 24 ribs

per whorl occur most frequently; if the whorl diameter is more than 100 mm, 26 ribs occur.

Certain differences of the growth parameters with increasing diameter may have been partly influenced by weak deformations of the shells, or by their local dissolution, even though the measured shells were visually non-deformed.

Suture: On several specimens sutures are visible, of which some of the most complete have been preserved on specimens YA 2001, 2002. On the external suture, three lobes (E, L, U_2) and a slight part of the fourth lobe ($?U_3$) close to the line of coiling are easily discernible. The outer lobe is the deepest, it is considerably dissected, and has a low secondary saddle at the base. The lateral lobe is relatively wide at the base and it is distinctly dissected at the base into five finger-like projections. It occupies roughly the area between the two nodes. The other (umbilical) lobes are distinctly smaller than the first-mentioned. The first saddle is vigorous, divided into two parts by a not excessively deep secondary lobe. The part adjoining the outer lobe is asymmetric and three-branched. The part close to the lateral lobe is very irregularly articulated. The second saddle, which is relatively low, is irregularly articulated, too; the following saddle has not been preserved completely.



6. External suture of *Peroniceras* (*Peroniceras*) *tridorsatum* (SCHLÜTER)

Suture of a juvenile specimen YA 2010. Upper suture at a height of the whorl $H = 2.2$ mm ($D \approx 5$ mm), lower suture at a height of the whorl $H = 3.2$ mm ($D = 5.3$ mm). The position of the lateral keels is indicated by a broken line

Specimen YA 2010 bears limonitized, juvenile whorls, on which the juvenile external sutures are traceable. The earliest has a shell diameter of about 5 mm, when the sculpture is not developed yet; the following, corresponding to a shell diameter of 5.3 mm ($H = 3.2$ mm) lies in places where the sculpture and the keel are starting (see text-fig. 6).

Remarks and relationships: According to the direct course of the ribs between the umbilical bullae and ventral clavi, their density and the circumstance that the ribs do not bifurcate (except for one rib on sp. 2004) all shells from Štíty can be identified with the species *Peroniceras tridorsatum*. SCHLÜTER's type (1867) has —

according to the illustration — at a diameter of 104 mm 28 ribs on the last whorl. *Peroniceras westfalicum* (SCHLÜTER) differs in having sparser ribs (the type specimen of the author's species has at a shell diameter of about 120 mm only 19–20 ribs). *Peroniceras subtricarinatum* (D'ORBIGNY) has a greater number of outer clavi than umbilical bullae, which is often connected with the bifurcating ribs near the umbilicus.

Distribution: *P. tridorsatum* is a Middle Coniacian zone species. KENNEDY (1984) reports it from France, Germany, Spain, Italy, Romania, North Africa, South Africa, Madagascar, and the USA.

Genus *Gauthiericeras* DE GROSSOUVRE, 1894

Type species: *Ammonites margae* SCHLÜTER, 1867. Coniacian, Germany.

Gauthiericeras margae (SCHLÜTER, 1867)

Pl. IV, figs. 2, 3, text-fig. 7

1867 *Ammonites margae* sp. n.; SCHLÜTER, p. 29, pl. 5, fig. 2.

1982 *Gauthiericeras margae* (SCHLÜTER); MARTINEZ, p. 109, pl. 16, figs. 2, 3a, b, 4a, b.

1984 *Gauthiericeras margae* (SCHLÜTER); KENNEDY, p. 88, pl. 18, figs. 1–3, pl. 20, figs. 3, 4, 8–10, pl. 21, figs. 1, 5, pl. 22, figs. 13–17, text-figs. 27, 28, 29 A, B, 30 A, B, 31 (cum syn.).

Material: Single juvenile shell with imperfectly preserved inner whorls. The original test is limonitized. The whole belongs to the phragmocone. It is slightly deformed (sp. YA 2034).

Description: Juvenile whorls of an evolute shell. The umbilical wall is not distinctly differentiated from the flanks. It is low and inclined towards the inner side of the last whorl. The flanks of the whorl are fairly high and flatly vaulted. At about $2/3$ of the height of the whorl they begin to converge rather sharply towards the outer side, where they are terminated by a weakly undulated, distinct keel. The keel is accompanied at both sides by shallow furrows, which are from the flanks bounded by faintly indicated keels. The sculpture is mostly formed by single, bluntly broad ribs, which are indistinctly concavely bent (towards the peristome). The ribs start at the umbilicus. Above the umbilical wall are elongate bullae. At $2/3$ of the height of the whorl there are medium-thick clavate nodes on the ribs. Beyond these, the ribs finish and a smooth zone follows which is linked with shallow furrows that accompany a distinct keel at the axis of the outer side. Periodically, at an interval of about a quarter of a whorl, widely bifurcated ribs appear near the umbilicus, which start from the umbilical bullae. These ribs influence the inclination of the other ribs.

Measurements: $D_{max.} = 56.0$ mm, $H = 18.5$ mm (0.33), $U \approx 22.7$ (0.41). At $D = 51.0$ mm, $H = 17.0$ (0.33), $U = 21.2$ (0.41), $B = 14.0$ (0.27), whereby B has been measured between the ribs, $B/H = 0.80$. At the maximum diameter of

56 mm there are 21 nodes (ribs) on the circumference and 18 umbilical nodes. At $D = 45$ mm there are 21 circumference ribs and 17 umbilical nodes.

Suture: The whole preserved part of the external suture is relatively weakly dissected. At a smaller diameter of the shell, only in one case the part of the suture around the outer lateral lobe is traceable, at a higher diameter, in one case a specimen of the incomplete region of the umbilical lobe with part of the lateral lobe has been established.

The outer lobe is probably the deepest element of the suture. In its axial part, around the undulated keel, about one third of the lobe is occupied by a wide medial saddle. At its sides, towards the base, runs a narrow incision forming the deepest part of the outer lobe. The first lateral saddle has two branches that are relatively wide, with an imperfectly preserved inner part. It is lower than the second lateral saddle.

The lateral lobe is relatively narrow, slightly less deep than the outer one. It has four fingers and is indistinctly bilaterally regular. The second lateral saddle is strongly asymmetrical. The umbilical lobe U_2 is relatively high. It is not excessively deep. It is followed by a low lateral saddle and by part of the lobe U_3 , whose axis is almost horizontal.

Remarks and relationships: The specimen from Štítý is, considering its suture structure, close to the genus *Peroniceras* (whereas certain differences in the structure of the sutures of KENNEDY's specimens of *Gauthiericeras margae* from France, 1984, text-fig. 30 A, B are observable, notably to *Peroniceras* (*Zuluiceras*) *bajuvaricum* (REDTENBACHER), which it also recalls morphologically. It differs, how-



7. Incomplete sutures of *Gauthiericeras margae* (SCHLÜTER). The lower suture at a height of the whorl $H = 12.2$ mm touches the outer and lateral lobes (the keel is undulated, the broken straight line indicates the border of the depression along the keel). The upper suture at the height of the whorl $H = 16.5$ mm (specimen YA 2034)

ever, from the mentioned species in having a much sparser ribbing (17–18 umbilical and 21 circumference ribs compared with the 22–29 umbilical and 34–40 circumference ribs of *P. bajuvaricum*).

Distribution: According to KENNEDY (1984), the species *Gauthiericeras margae* is the zone species of the lower part of the Upper Coniacian in France. It is known to occur in Germany, Austria, Spain, France, Romania, and elsewhere.

Suborder *Ancyloceratina* WIEDMANN, 1960

Superfamily *Turrilitaceae* GILL, 1851

Family *Anisoceratidae* HYATT, 1900

Genus *Phlyctiocieras* SPATH, 1926

Type species: *Ancyloceras ?douvillei* DE GROSSOUVRE, 1894. Coniacian, France.

Phlyctiocieras trinodosum (GEINITZ, 1850)

Pl. VI, figs. 1, 2, text-fig. 8

1850 *Hamites trinodosum* GEINITZ, p. 18, pl. 3, fig. 5.

1872 *Hamites* cf. *angustus*, DIXON; SCHLÜTER, p. 106, pl. 32, figs. 6, 7.

1891 *Hamites trinodosus* GEINITZ; LANGENHAN et GRUNDEY, p. 9, pl. 2, figs. 2, 3.

1894 *Ancyloceras ?douvillei* A. DE GROSSOUVRE, n. sp.; DE GROSSOUVRE, p. 254, pl. 35, fig. 8, text-figs. 88, 89.

?1931 *Hamites striatus* FRIČ et SCHÖNBACH; JAROŠ, pl. 1, fig. 5.

1984 *Phlyctiocieras trinodosus* (GEINITZ); KENNEDY, p. 136, pl. 32, figs. 4, 11, text-fig. 42 E (cum syn.).

Material: Approximately 1/3 of a loosely coiled undeformed whorl. Its upper preserved part belongs to the body chamber, the smaller one to the phragmocone. The state of preservation corresponds to the internal mould with remains of a sideritized test (sp. YA 2014).

Description: Arcuately bent whorl has flat, sufficiently high lateral walls, which slightly diverge towards the outer side. The utmost width of the whorl is in the uppermost fifth of the whorl. After this, the flanks distinctly converge towards the outer side of the whorl. The outer side is almost pointed. The inner side of the whorl is flatly vaulted, not excessively wide.

The sculpture is formed by simple ribs of a uniform type. The ribs set on suddenly and distinctly at the transition of the inner side into the flanks. However, they are also indicated at the inner side of the whorl. At the flanks, the ribs are direct to slightly bent, moderately inclined towards the embryonal end. In almost four fifth of the height of the whorl, following the direction of the ribs, elongate, relatively short and not too high tubercles appear on the ribs. Behind these, the ribs are relatively sharply bent and are obliquely inclined towards the embryonal beginning of the shell. The ribs pass the outer part without interruption. On its edge (on the plane of

symmetry of the whorl), distinct tubercles are developed on all ribs. The ribs are of medium thickness, the interspaces between them are wider than the ribs. On the phragmocone, after every six ribs, follows a narrow relatively deep constriction (whereof three are preserved), whose course is identical with the interspaces between the ribs; on the body chamber follows a constriction no sooner than after 10 ribs.

Measurements: Only the height and the width of the shell and the width of the whorl are measurable. The height increases relatively quickly (at the same diameter of the coil), as it results from the measuring at the beginning and the end of the whorl (values measured between ribs):

H (body chamber) = 20.8 mm B = 13.3 mm (B/H = 0.64)

H (on the phragmocone) = 30.2 mm B = 19.4 mm (B/H = 0.64)

On the preserved about 1/3 of the whorl, 32 ribs and 4 constrictions are visible.

Suture: The complete adult suture is formed by four lobes that are of approximately equal depth. The outer lobe is organized in a complicated manner and it is the widest one. The siphonal region is complicated by a median saddle, which reaches as far as one half of the total height of the lobe and another partial saddle at its sides, both of them being somewhat higher than the median saddle. The lobe that follows after the partial saddle is asymmetrically three-fingered in its lower part. The lateral lobe, which is somewhat higher than the outer lobe, is indistinctly asymmetrical, divided by a secondary saddle, which reaches as far as 2/5 of the height to form two branches, which are trilobate at the base. The following lobe (U) is the



8. Complete suture of *Phlycticrioceras trinodosum* (GEINITZ) at a height of the whorl H = 21 mm (specimen YA 2014)

deepest. It is faintly asymmetrical, composed of two branches as well, whereby its two partial branches, divided by a relatively low secondary saddle, are indistinctly trilobate at the base. The inner lobe is the simplest. It is complicated only by a weakly dissected secondary saddle, which reaches as far as one third of the height of the inner lobe. The saddles between the lobes are generally divided by a median secondary lobe into two branches of unequal size. The first and the second saddles are approximately equal in size, whereby the saddle adjacent to the outer lobe is distinctly wider than the median lobe. The last saddle, adjacent to the inner lobe, is low compared

with the other ones and the least distinctly dissected. However, it has the same width as the saddle adjacent to the outer lobe.

Remarks and relationships: The species has been lately revised by KENNEDY (1984), whose conclusions I share. The Moravian species has a perfectly preserved whole suture. Interesting would be its more detailed comparison with the suture of the American specimen, whose photograph has been presented by CLARK (1963, pl. 52, fig. 4 = *P. oregonense* REESIDE, 1927).

Distribution: According to KENNEDY (1984), the mentioned species occurs in the Upper Coniacian of France (Paratexanites serratomarginatus Zone), further in the not precisely differentiated Coniacian of Germany, Mexico, and the USA. According to recent data, Poland and Czechoslovakia can be added. The finds from the USA from the Campanian stage (CLARK, 1963 and YOUNG, 1963) lack constrictions and do not belong to the mentioned species.

Family *Nostoceratidae* HYATT, 1894

Genus *Tridenticeras* WIEDMANN, 1962

Type species: *Turrilites tridens* SCHLÜTER, 1876. The lowermost Coniacian, FRG.

The genus *Tridenticeras* includes heteromorphous shells coiled in a three-dimensional turriliticon-type spiral. The representatives of the genus bear 3 or 4 rows of tubercles on the main ribs. Between the ribs there are 1–5 subsidiary ribs, which are without tubercles.

WIEDMANN (1962) refers the genus *Tridenticeras* to the family *Turrilitidae* MEEK, 1876. KENNEDY (1984), with respect to the time interspace between the Cenomanian (when the *Turrilites* occurred for the last time) and the Coniacian (when *Tridenticeras* appears for the first time) considers the mentioned genus as a representative of the family *Nostoceratidae*. Considering the form of the suture of the species *Tridenticeras soukupi* n. sp. (see following part of this text), the genus *Tridenticeras* belongs to the family *Nostoceratidae*. A more detailed discussion on the development trends offers KENNEDY (1984, p. 138).

Tridenticeras soukupi n. sp.

Pl. V, figs. 4, 5, pl. VII, figs. 1–4, text-fig. 9

1931 *Turrilites varians* SCHLÜT.; JAROŠ, pl. 1, fig. 4.

Holotype: Sp. YA 2035, figured in pl. VII, figs. 1, 2. It is deposited in the collections of the Geological Survey, Prague.

Paratype: Sp. YA 2017 in pl. VII, figs. 3, 4, deposited in the same place as the holotype.

Locus typicus: brickworks E of the community Štítý.

Stratum typicum: Middle Coniacian, equivalent of the Březno Formation.

Derivatio nominis: The species has been determined in honour of Dr. Josef Soukup, geologist

and stratigrapher of the Bohemian Upper Cretaceous Basin, from whose collections the prevalent part of the elaborated specimens is derived.

Material: Three incomplete specimens (YA 2015, 2017, 2035), of which the most complete (holotype) has somewhat more than two whorls preserved, always with siderite remains of the original test, further the similarly preserved specimen No. 36260 from the collections of the National Museum in Prague, and a fragment of the whorl on the internal mould with well-visible sutures (sp. YA 2019).

Diagnosis: Spatially coiled shell with stout whorls that remain in contact even in adult stage. Distinct thin ribs, which periodically alternate with the main ribs bearing four rows of tubercles. Main ribs accompanied by constrictions at the back side.

Description: Relatively large shells coiled in trochospiral. The whorls are mutually touching in the course of the entire growth. They are strongly vaulted and higher than wide. During the growth, they distinctly increase in bulkiness. The lower half of the whorl is rounded, the upper one is flatter. The utmost vaulting of the whorl is about at $2/3$ of the height. The sculpture changes during growth. On the final whorls of the adult specimens, the secondary and strong ribs are distinctly differentiated, in the lower part this applies only to the collar-like main ribs. The main ribs are fringed at the back side by relatively wide and deep constrictions. They bear four rows of tubercles. The strongest row is in the utmost vaulting of the whorls, i.e. approximately at $2/3$ of the height. It is matched (when preserved) by about 1 cm long spines. The lower rows of spines, gradually become less distinct. The last row, lying at the base of the whorl, roughly at the transition of the flanks of the whorl into the umbilical wall, is the weakest one and shortly spined. The lower rows of spines become gradually less distinct with decreasing distance towards the basal line. The last row, lying at the base of the whorl, roughly at the transition of the flanks of the whorl into the umbilical wall, is the weakest one and shortly spined. In the direction from the peristome, the main ribs lose their collar-like character and dissect into triads or couples of ribs that correspond in strength to the simple secondary ribs. Between them protrude tubercles, the ribs often form a needle ear-like shape between the highest and the following second-from-the-top, and particularly between the second and third row of tubercles. In the interval between the main ribs, there are 3–5 plain secondary ribs. One of them (immediately following the constriction), tends to be shorter, because it reaches the level of the second to third rows of tubercles. All ribs are slightly S-formed and run obliquely over the whorls.

Towards the embryonal end of the whorls, the constrictions and also the tubercles become less prominent. The basal row of the tubercles on the juvenile whorls is not visible, because it lies on the inner side, and consequently only 3 series are visible. On the juvenile whorls that were not preserved, the ribs might have been uniform and no nodes have probably been developed.

Measurements: The holotype attained the height of the whole shell over 90 mm (estimated height). On the paratype, near the peristome of the whorl (which does not

correspond with the real mouth) the diameter of the last whorl is 63 mm. The umbilicus is narrower than 30 mm (it is filled with sediment). The height of the whorl on the measured ray is about 31 mm. On the half-whorl (at the above-measured diameter), there are 6–7 ribs with tubercles and about 45 ribs (total number) on the upper side of the whorl. On the fragment of the internal mould, the maximum height of the whorl is 28.5 mm and the width 23.5 mm ($B/H = 0.82$).

The specimen from the National museum at the diameter of the whorl 57 mm reaches a height of the whorl of about 28 mm. There are 6 main ribs and about 37 of all ribs on the upper side of the whorl.

Suture: Compared to the coiling of the shell, the suture is strongly asymmetrical. The siphonal tube and hence also the outer lobe lie somewhat above the center of the whorl.

The outer lobe is formed in the axial part by a relatively high rectangular secondary saddle. The primary (lateral) saddles at its sides differ in height and size. The lateral saddle, which belongs to the external branch of the suture, is very wide and strongly dissected, divided at the base by a wide partial lobe into two, repeatedly subdivided partial saddles. The partial saddle adjacent to the outer lobe is much higher than that adjacent to the lateral lobe. The lateral lobe is very wide and deep, in the axial part it has a high and large, strongly dissected secondary saddle, which divides the lobe into two parts. The following saddle is two-branched, having both branches at the same height. It is usually high and divided by a deep secondary lobe.



9. Complete suture of *Tridenticeras soukupi* n. sp. at a height of the whorl 26 mm. Thin line indicates the less-preserved saddle between the umbilical and the inner lobes (specimen YA 2019)

The umbilical lobe is also wide, asymmetrical, and dissected. The saddle between the umbilical and inner lobes is fairly high, formed only by two partial saddles (near the preceding saddles, always by two pairs of saddles). The inner lobe is fairly deep and narrow.

Remarks and relationships: The trochospiral shells of Soukup's material are characteristic in having mutually touching and relatively stout whorls, which bear dense, thin ribs. On the main ribs there are 4 rows of nodes that become gradually stronger, together with the main ribs, towards the peristome. On the incomplete shells the region of the aperture has not been preserved, however, it does not seem, that an unwound hook-like part of the last whorl would form.

With respect of the character of coiling and in having thin ribs, the Moravian specimens remind of some of the representatives of the genus *Didymoceras* HYATT, 1894, or of some of the narrowly coiled species of the genus *Eubostriyoceras* MATSUMOTO, 1967. These genera, however, do not have any tubercles on the ribs, or have maximally developed two rows of weak tubercles. The genus *Eubostriyoceras* has a very similarly developed suture, judging from the suture of the species *Eubostriyoceras japonicum* (YABE), figured by MICHAJLOVA (1983, text. fig. 60). The similarity in the suture, coiling and sculpture reminds also of the Japanese genus *Yezoceras* MATSUMOTO, 1977. Apart from the smaller differences, the most important difference to be mentioned is that the siphonal tube and hence also the outer lobe of the suture in the genus *Yezoceras* is at the basis of the whorl, whereas the specimens from the locality Štítý have the outer lobe above the centre of the whorl. With a view to the character of the sculpture, mainly because of having 4 rows of tubercles on the main ribs, also *Hyphantoceras* HYATT, 1900, is a related genus. Its shells, however, are less vigorous and coiled in an insufficiently tight trochospiral.

Within the genus *Tridenticeras*, the most closely related to the newly determined species seems to be the species *Tridenticeras varians* (SCHLÜTER, 1876), which differs only in having three series of tubercles on the main ribs and in the absence of constrictions.

Distribution: The newly described species has been known so far only from Czechoslovakia, from the locality Štítý. According to the accompanying ammonites, it occurs in the Middle or upper part of the Upper Coniacian, and/or in both time intervals.

Family *Baculitidae* GILL, 1871

Genus *Baculites* LAMARCK, 1799

Type species: *Baculites vertebralis* LAMARCK, 1799. Upper Senonian, France.

Baculites incurvatus DUJARDIN, 1837

Pl. III, fig. 4, text-figs. 10, 11

1982 *Baculites incurvatus* DUJARDIN, 1837; IMMEL - KLINGER - WIEDMANN, p. 27, pl. 11, figs. 5—7 (cum syn.).

1984 *Baculites incurvatus* DUJARDIN; KENNEDY, p. 143, pl. 32, figs. 12, 15—19, pl. 33, figs. 1—22, text-figs. 41, 42 F—M (cum syn.).

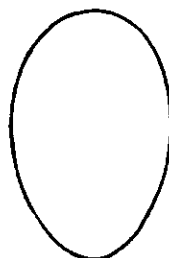
Material: Internal mould with the remains of the test preserved in the sandy siderite concretion (sp. YA 2036).

Description: Shell straight, elliptical in diameter. The ventral side is somewhat narrower than the dorsal one. The flanks are symmetrically vaulted, from their half they distinctly converge towards the outer side. The most pronounced vaulting is in one third of the height of the shoulder, in the dorsal region.

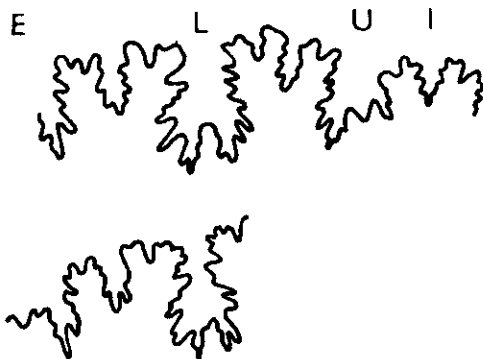
The mould is smooth, only in the vicinity of the dorsal side, in several places weak dorsolateral bullae are indicated. The bullae are distant from each other in the part which roughly corresponds to the height of the shell.

Measurements: The preserved length of the shell is 55 mm. At $H = 15.1$ mm, $B = 10.1$ mm ($B/H = 0.67$).

10. Section of the shoulder of *Baculites incurvatus* DUJARDIN at height $H = 15$ mm and at width $B = 10$ mm. The dorsal side is broadly rounded, the ventral side is narrower (specimen YA 2036)



11. Complete sutures of *Baculites incurvatus* DUJARDIN. Upper suture at the height $H = 15.3$ mm, lower at the height $H = 14.7$ mm (specimen YA 2036)



Suture: The outer lobe has not been preserved entirely. It is most probably broad, complicated also by a wide median saddle, which reaches higher than one half of the height of the lobe. The first lateral saddle is very wide, irregularly two-branched, whereby also both partial branches of the inner branch (which is more mighty), are indistinctly divided into two parts. The second lateral saddle, which is somewhat higher than the preceding one, is similarly formed, but more mighty is its outer branch. The third saddle is narrow, only indistinctly two-branched. The lateral lobe, which is relatively wide, is bifid and weakly asymmetrical. The umbilical

lobe is wide and strongly asymmetrical. The inner lobe is simple and not excessively deep.

Remarks and relationships: The Moravian specimen differs partly from the type material of the species *Baculites incurvatus* in having a less prominent sculpture (similarly as the sp. on pl. 33, figs. 10, 11 in W. J. Kennedy, 1984), since — except for the bullae — no ribs are visible (this might be partly influenced by the preservation as an internal mould. The section across the shell and the structure of the suture, however, completely correspond to the mentioned species.

Distribution: According to KENNEDY (1984), the species *Baculites incurvatus* occurs in the Middle and Upper Coniacian (and also in the Santonian) of France, Germany, Austria, Czechoslovakia, and also Poland.

Baculites cf. *undulatus* D'ORBIGNY, 1850

Pl. III, figs. 2, 3

1979 *Baculites undulatus* D'ORBIGNY; WRIGHT, p. 287, pl. 1, figs. 6—8, pl. 7, fig. 11 (cum syn.).

Material: Unique fragment of siderite (internal mould) belonging to part of the body chamber, terminated by the last septum of the phragmocone. The author's collection (sp. YA 2037).

Description: The considerably incomplete direct body chamber is elliptical in diameter. The central side is, compared with the broadly rounded dorsal side, distinctly narrower. The flanks are widely rounded and most prominently vaulted at about $3/4$ of the height of the shell close to the dorsal side. At the ventral side, there are dense, distinctly wave-like bent thin ribs, which continue on the sides in the direction down to the phragmocone. They are approximately of the same type. Close to the back side the ribs gradually disappear, when they still bend towards the opposite side. The dorsal side is smooth.

Measurements: The fragment reaches only the length of 32 mm. Maximum height $H = 23.0$ mm, maximum width $B = 18.5$ mm ($B/H = 0.80$).

Remarks and relationships: The described specimen with an unbent shell lacks periodical stronger to strong ribs between dense, thin ribs, as well as bulbose inflations or bullae in the region of the dorsal side. Compared with the pictured in literature specimens of *Baculites undulatus*, the specimen from Štítý attains a relatively considerable size. With regard to its type of ribbing it seems to be closest to the specimens, which — under the name of *B. undulatus* — were shown by WRIGHT (1979) on pl. 1, figs. 6—8. The section across the shell reminds a section across the species *Baculites incurvatus* pictured by KENNEDY (1984) on text-fig. 42 I, M. Considering the incompleteness of my material, and also for stratigraphic reasons (see below), a safe determination is not possible.

Distribution: According to literary data, the species *B. undulatus* has probably been known from the Upper Turonian only.

Superfamily *Scaphitaceae* GILL, 1871

Family *Scaphitidae* GILL, 1871

Subfamily *Scaphitinae* GILL, 1871


Genus *Scaphites* PARKINSON, 1811

Type species: *Scaphites equalis* J. SOWERBY, 1813. Cenomanian, England.

Scaphites kieslingswaldensis kieslingswaldensis LANGENHAN et GRUNDEY, 1891

Pl. VIII, figs. 1—3, text-figs. 12, 13

- 1872 *Scaphites Geinitzi*, D'ORB.; SCHLÜTER, p. 75, pl. 23, figs. 12—16, non figs. 17—22 (= *Sc. geinitzi*), pl. 27, fig. 9.
- 1872 *Scaphites* sp.?, SCHLÜTER, pl. 23, figs. 23—25.
- 1872 *Scaphites Geinitzii* D'ORB., var. *binodosus* RÖM.; FRITSCH, p. 42, pl. 14, fig. 13.
- 1891 *Scaphites Kieslingswaldensis* n. sp.; LANGENHAN and GRUNDEY, p. 9, pl. 1, fig. 1.
- 1894 *Scaphites meslei* DE GROSSOUVRE, p. 239, pl. 32, figs. 4, 7.
- 1894 *Scaphites lamberti* DE GROSSOUVRE, p. 241, pl. 32, figs. 1, 5.
- ?1896 Übergangsform zwischen *Scaphites* cf. *Geinitzi* var. *Lamberti* GROSSOUVRE und *Scaphites* GEINITZI D'ORB.; JAHN, p. 134, pl. 8, fig. 6a, b.
- 1897 *Scaphites binodosus*, RÖM.; FRİČ, p. 37, fig. 20.
- 1901 *Scaphites kieslingswaldensis* LANGENH. u. GRUNDEY; STURM, p. 61, pl. 3, fig. 8.
- 1907 *Scaphites Lamberti* DE GROSS.; BOULE, LEMOINE and THEVÉNIN, p. 31, pl. 13, figs. 7, 8.
- 1931 *Scaphites Kieslingswaldensis* LANGENHAN et GRUNDEY; JAROŠ, pl. 1, fig. 3.
- 1934 *Scaphites Kieslingswaldensis* LANGENHAN & GRUNDEY; ANDERT, p. 402, pl. 19, fig. 5.
- 1958 *Scaphites* aff. *lamberti* DE GROSSOUVRE; REYMENT, p. 33, pl. 6, fig. 1.
- 1962 *S. (Scaphites) compressus* D'ORBIGNY; WIEDMANN, p. 214, pl. 12, fig. 4.
- 1979 *Scaphites meslei* DE GROSSOUVRE; COLLIGNON et al., p. 388, pl. 1, fig. 2.
- 1979 *Scaphites potieri* DE GROSSOUVRE; COLLIGNON et al., p. 389, pl. 1, fig. 3.
- non 1979 *Scaphites kieslingswaldensis* LANGENHAN & GRUNDEY; WRIGHT, p. 303, pl. 3, figs. 10—12 (= *S. geinitzi*).
- 1984 *Scaphites (Scaphites) meslei* DE GROSSOUVRE; KENNEDY, p. 149, pl. 31, figs. 1—13, 15—17, non fig. 14 (= ?*Yezoites compressus*), ? 18, 19 (= ?*S. kieslingswaldensis doylei*), text-fig. 42 C, D.
- 1987 *Scaphites (Scaphites) meslei* DE GROSSOUVRE; IMMEL, p. 137, pl. 14, fig. 13, ?14.
- 1987 *Scaphites kieslingswaldensis kieslingswaldensis* LANGENHAN & GRUNDEY; KAPLAN - KENNEDY - WRIGHT, p. 14, pl. 4, figs. 1—5.

Material: Four almost complete specimens (sp. YA 2039), one from the collections of the Moravian museum in Brno (sp. B 3175), one from the locality Robeč, and one fragment of the direct shoulder from Soukup's collection (sp. YA 2023). The fragment and a specimen from the locality Robeč correspond to microconchs, the rest to macroconchs. The best-preserved specimens (internal moulds bear the remains of the original test) in one case (B 3175) sideritized. 

Description: The shells are medium to large in diameter. The visible part of the spiral-like coiled phragmocone (usually only its last whorl is visible), is already scaphitoid in shape. The umbilical wall of the phragmocone passes fluently into

the flanks of the whorl. These are relatively high, considerably vaulted. The flanks pass almost fluently into the flanks of the whorl. These are relatively high, considerably vaulted. The flanks pass almost fluently into a wide, flatly rounded outer side. The hook-like body chamber is characterized by high flanks and by a well-rounded outer side. The body chamber is terminated by a constriction corresponding to a simple aperture.

On the inner quarter of a coil of the phragmocone of the macroconchs, relatively sparse plain ribs are visible, which at the transition of the flanks into the outer side of the shell bear small conical tubercles. In these, bifurcation of the ribs occurs. Between the parts of the ribs there is sometimes a simple intercalated rib, attaining the level of the tubercles. All ribs pass the outer side subradially, or are slightly bent concavely with respect to the peristome, without interruption and having the same thickness. In the following part of the phragmocone, the ribs are slightly denser, and they end by being convexly bent towards the peristome. The tubercles move somewhat lower, towards the sides of the whorls. The ribs are regularly bifurcated. Exceptionally, between the pairs of ribs running from the tubercles, a rib is inserted. At the end of the phragmocone, towards the ventrolateral tubercles, come the first umbilical bullae.

At the beginning of the hook-like body chamber, the sculpture changes distinctly. Immediately near the umbilicus, sparse simple ribs set on. At about one third of the shaft, they inflate into long bullae. At about one half of the height of the shaft, the



12. Almost complete combined external sutures of *Scaphites kieslingwaldensis kieslingwaldensis* LANGENHAN et GRUNDEY at a height of the whorl $H = 17$ mm (lower suture) and 21 mm (upper suture); specimen from the Moravian museum

ribs are almost disappearing. At about one third of the height of the shaft appear distinct ventrolateral tubercles, that correspond to the tubercles on the spira of the phragmocone. They are followed by 2–3 ribs. Into the interval between the mentioned ribs, 2–3 intercalated ribs are placed. All ribs having the same thickness, subradially pass the outer side. In the terminal part of the shell, the intervals between the main ribs decrease, the tubercles become less distinct, and the intercalated ribs disappear.

On the microconchs, the sculpture is similar. The ventrolateral tubercles on the phragmocone are stronger than on the macroconchs, and usually 3 ribs run out of them. Behind the umbilical bullae (closely above one half of the height of the shaft) the ribs bear clavate ventrolateral tubercles, from which three ribs run out. Between the pairs of the mentioned ribs, usually one or two ribs are intercalated, starting at the level of the ventrolateral tubercles. Towards the aperture, the two rows of nodes become less distinct. The bifurcating of the ribs in the ventrolateral tubercles is being substituted by the inserting of ribs.

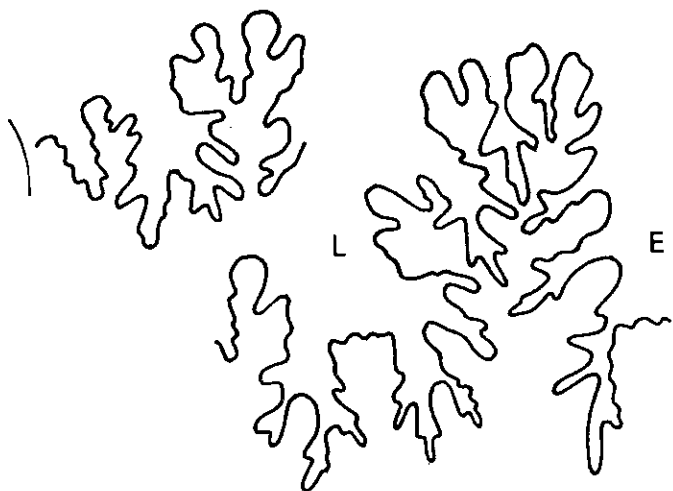
Measurements:

	Spec. B 3175	Spec. 2038	Spec. Robeč
D max.	80.3 mm	50.0 mm	85.0 mm
H in bent	28.5 mm	16.0 mm	—
D max. of the phragmocone	41.0 mm	28.0 mm	44.0 mm
H at the end of the phragmocone	26.0 mm		
	(H/D = 0.63)		
B at the end of the phragmocone	25.5 mm		
	(B/D = 0.62)		
	B/H = 0.98		
H in the bent of the phragmocone		12.5 mm	
B at the bent of the phragmocone		25.0 mm	
		B/H = 1.2	

At the terminal half-whorl of the phragmocone of the larger macroconch, there are about 15 main and 34 all-circumferential ribs. On the terminal half-whorl of the phragmocone of the smaller macroconch there are 13 (?14) main ribs and about 29 circumferential ribs. On the terminal half whorl of the specimen from the locality Robeč (microconch) there are 11 or 12 main and 34 circumferential ribs.

Suture: The best-preserved suture is on specimen B 3175. The external suture is traceable from the siphonal region as far as deep into the umbilicus.

The outer lobe is deep. In its axial part there is a relatively wide median saddle, which reaches as far as $1/3$ of the total height of the lobe. The first lateral saddle is the largest element and has a broad base. It is strongly asymmetrical, divided into a more robust outer part, which is relatively symmetrically two-branched in detail, and into a substantially smaller, completely asymmetrical inner part. The lateral lobe is not excessively deep. It is of median thickness, relatively symmetrical, with



13. Incomplete external sutures of *Scaphites kieslingswaldensis kieslingswaldensis* at the height of the whorl 13 mm (lower suture) and at the height of 15 mm (upper suture). The curved line in the umbilical region corresponds in this case to the umbilical edge and not to the line of coiling. Specimen from the locality Robeč

a thick secondary saddle. Behind the lateral lobe follow two-branched lateral saddles, separated by a not excessively deep lobe, which — considering its essential features — has the same structure as the lateral lobe. The remaining visible part of the external suture, which already lies on the umbilical wall, starts with a narrow, trifold, obliquely oriented lobe, which is followed by a low, weakly dissected saddle, and finally a shallow, asymmetrical bifid lobe.

Remarks and relationships: The scaphites from the Coniacian stage have been lately studied mainly by KENNEDY (1984) and by KAPLAN, KENNEDY and WRIGHT (1987), but in a different conception. In this paper, I adhere to the opinions of the last quotation, according to which the specimens from Štítý correspond to *S. kieslingswaldensis kieslingswaldensis* in which the microconchs have more pronounced nodes, and the ventrolateral tubercles on the shaft are clavate. The mentioned subspecies is variable both with respect to the sculpture and to the size of the specimens. Part of the Czechoslovak specimens is larger than known so far.

A discussion of the related species has been published by KAPLAN et al. (1987). The holotype of *S. kieslingswaldensis kieslingswaldensis* comes from the Polish and not from the Czechoslovak territory, as presumed by KAPLAN et al. (1987, p. 16). The subspecies *S. kieslingswaldensis doylei* WRIGHT, 1979 differs in the absence of ventrolateral tubercles on the phragmocone and in primary ribs from the umbilical bullae on the uncoiled shaft.

Distribution: According to KAPLAN et al. (1987), *S. kieslingswaldensis kieslings-*

waldensis appears for the first time in the central part of the Lower Coniacian (Zone *C. erectus*). The subspecies has been known from Germany, Spain, Poland, France, Austria, and Czechoslovakia.

Occurrence: Four specimens come from the brickworks near the town of Štítý, one specimen from the locality Robeč near Česká Lípa (Coniacian).

Conclusion

In the studied ammonite collection I succeeded to determine the following species: *Mesopuzosia indopacifica* (KOSSMAT), *Eupachydiscus isculensis* (REDTENBACHER), *Placenticerias* cf. *semior natum* (D'ORBIGNY), *Peroniceras* (*Peroniceras*) *tridorsatum* (SCHLÜTER), *Gauthiericeras margae* (SCHLÜTER), *Phlycticrioceras trinodosum* (GEINITZ), *Tridenticeras soukupi* n. sp., *Baculites incurvatus* DUJARDIN, *Baculites* cf. *undulatus* D'ORBIGNY, and *Scaphites kieslingswaldensis kieslingswaldensis* LANGENHAN and GRUNDEY. The mentioned species are usually documented by one specimen. An exception are only *Peroniceras tridorsatum*, *Tridenticeras soukupi*, or *Scaphites kieslingswaldensis kieslingswaldensis*. As already mentioned in the introduction, the individual finds lack preciser data that would indicate their position in the sequence of strata, so that their stratigraphic succession is unknown.

The stratigraphic range is the sequence of strata of the Březno Formations in the brickworks of the locality Štítý can be judged only indirectly according to data on the stratigraphic position of the species published so far (French Coniacian, sensu KENNEDY, 1984):

Upper Coniacian	<i>Paratexanites serratmarginatus</i> <i>Gauthiericeras margae</i>
Middle Coniacian	<i>Peroniceras</i> (<i>Peroniceras</i>) <i>tridorsatum</i>
Lower Coniacian	<i>Forresteria</i> (<i>Harleites</i>) <i>petrocoriensis</i>

Of the mentioned Coniacian zone species, two were determined at Štítý: *Peroniceras tridorsatum*, the most frequently occurring ammonite in the studied collection, and *Gauthiericeras margae*, which has been safely determinable in a solitary specimen only. Basing on the occurrence of the mentioned zone species it may be inferred, that the fossiliferous deposits of the locality Štítý are referable to the Middle and lower part of the Upper Coniacian.

As for the Lower Coniacian, both a zonal species and some other characteristic Lower Coniacian species are missing.

The Middle Coniacian, on the contrary, has been documented by numerous specimens of the zone species, among which, as reported by KENNEDY (1984), also *Scaphites kieslingswaldensis kieslingswaldensis* (= *S. meslei* in the older conception) occurs. Among the representatives of the mentioned zone (judging from the character

of preservation) are also *Tridenticeras soukupi*, possibly even *Mesopuzosia indopacifica*.

From the lower part of the Upper Coniacian stems the zone species *Gauthiericeras margae* and, according to recent collections, also *Phlycticroceras trinodosum*, *Baculites incurvatus*, and *Eupachydiscus isculensis*. The presence of *Phlycticroceras trinodosum* does not exclude even the late Upper Coniacian, because in France, as published by KENNEDY (1984), this species occurs in the Zone Paratexanites serratomarginatus together with *Baculites incurvatus* and *Placenticeras semiorнатum*, but the mentioned species has not been found there (in Štity).

When I sampled in Štity in 1984 and 1988, Dr. Z. Jaroš and Dr. Soukup's ammonite finds (besides small exceptions) could not be repeated. The reason therefore might be that more than 50 years had elapsed since the major samplings of these geologists, and that other parts of the sequence of strata had been mined in the brickworks since that time. This is also supported by one item from JAROŠ's (1931) measuring; he reports an inclination of strata of 21° to the NW. The measured value indicates — when following the face from the S to the N — that increasingly younger deposits are being mined above the fossiliferous layers, which are referable to the higher part of the Upper Coniacian.

K tisku doporučil M. Rakús
Přeložila H. Šilarová

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Explanation of plates

Pl. I

1. View of the W part of the mined face of the brickworks in Štítý in May 1988. In the uppermost part, a sandstone table faintly protrudes from the face.
2. View of the E part of the mined face of the brickworks in Štítý in May 1988.

Photographs by Z. Vašíček

Pl. II

Mesopuzosia indopacifica (KOSSMAT)

1. Lateral view of the last whorl.
2. Lateral view of the prepared-out inner whorl from the last whorl.
3. View of the outer side of the inner whorl. Sp. YA 2032.

Pl. III

Eupachydiscus isculensis (REDTENBACHER)

1. Lateral view of the adult specimen YA 2031. The last half of the whorl forms the body chamber.

Baculites cf. *undulatus* D'ORBIGNY

2. Lateral view.
3. View of the outer side of the same specimen (YA 2037).

Baculites incurvatus DUJARDIN

4. Lateral view, imperfectly visible nodes at the right-hand side. Sp. YA 2036.

Pl. IV

Peroniceras (*Peroniceras*) *tridorsatum* (SCHLÜTER)

1. Lateral view of an adult specimen of the shell, sp. YA 2000.

Gauthiericeras margae (SCHLÜTER)

2. Lateral view.
3. View of the outer side of the same specimen YA 2034.

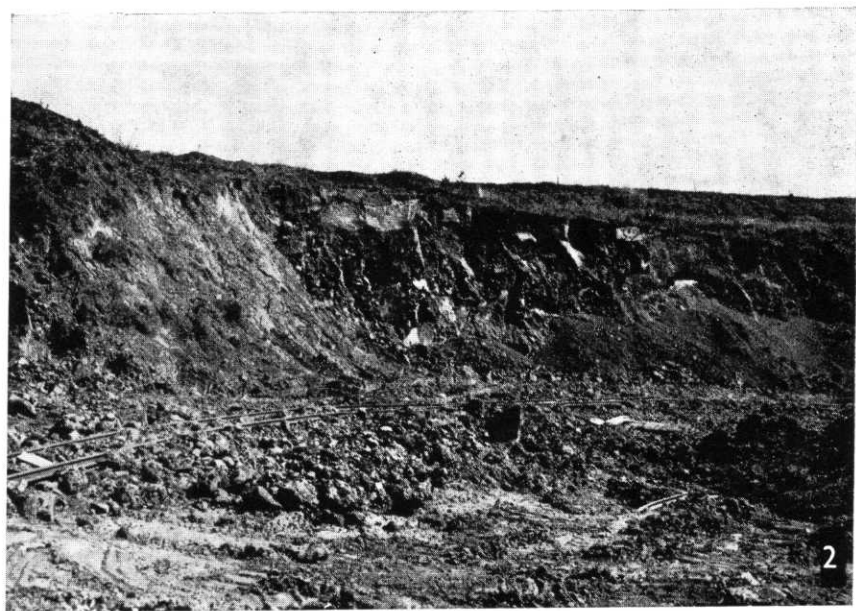
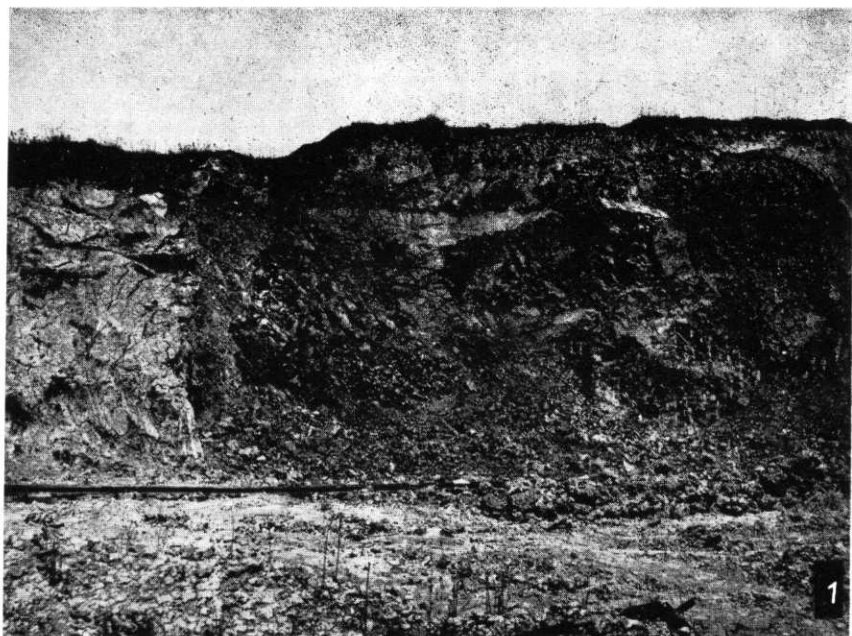
Pl. V

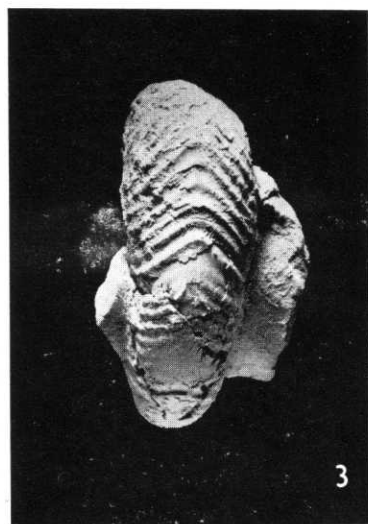
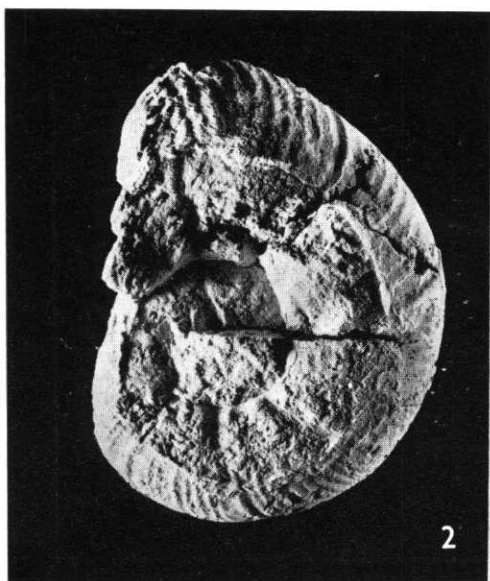
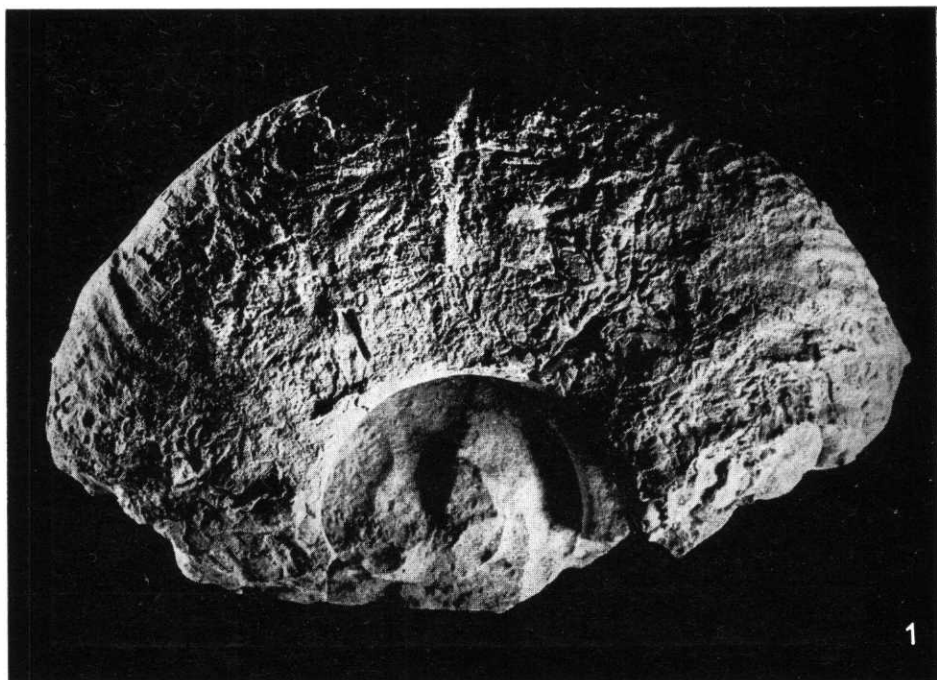
Peroniceras (*Peroniceras*) *tridorsatum* (SCHLÜTER)

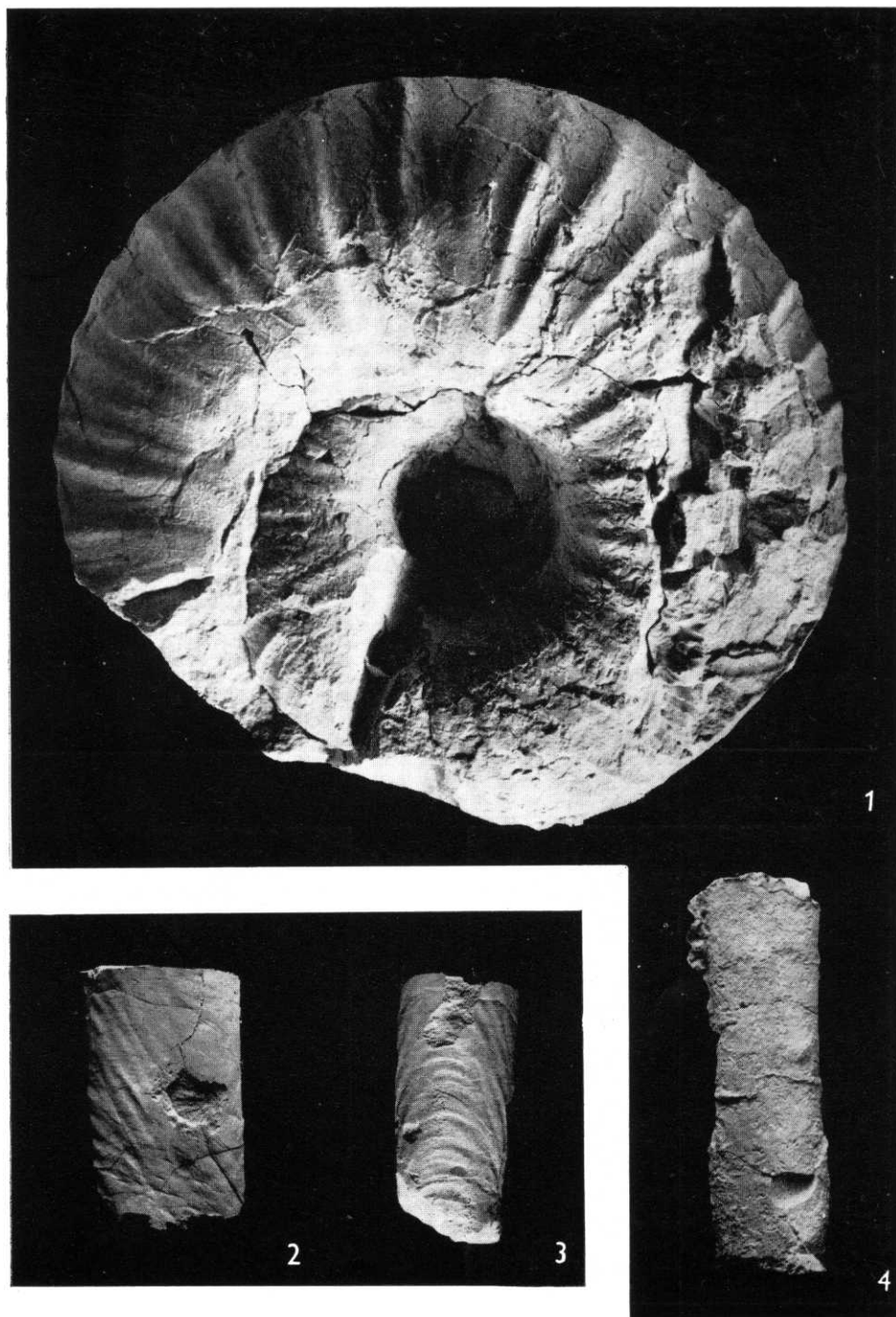
1. Lateral view.
2. View of the outer side of the same specimen YA 2001.

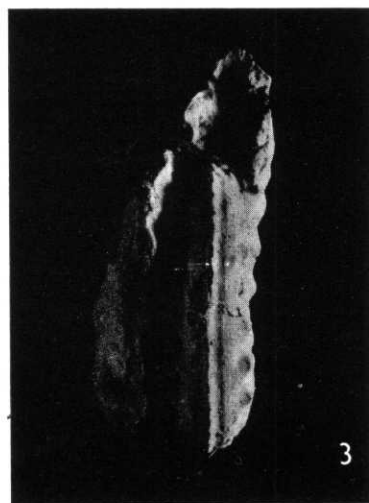
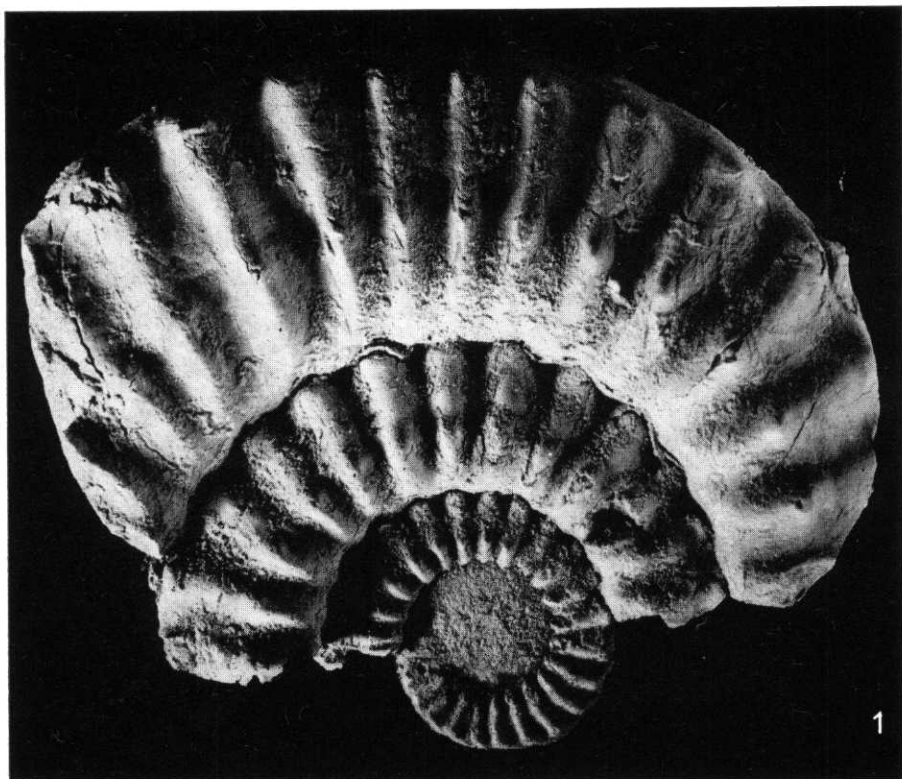
Placenticeras cf. *semiornatum* (D'ORBIGNY)

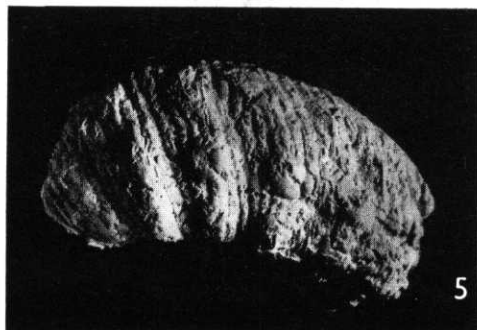
3. Lateral view; close to the outer side, short and flat ribs are indicated. Sp. YA 2033.



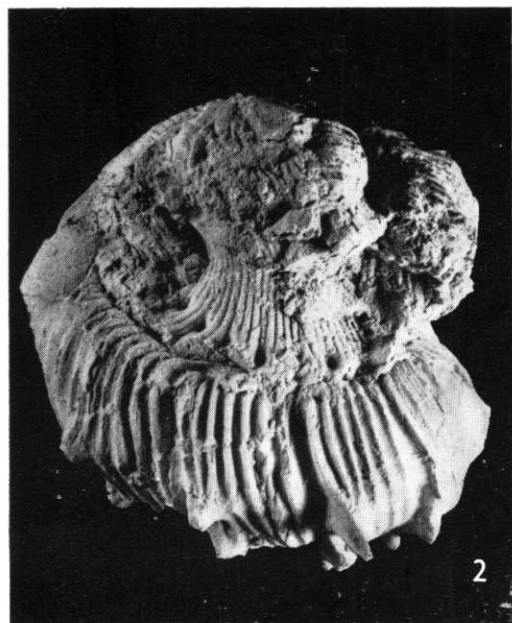
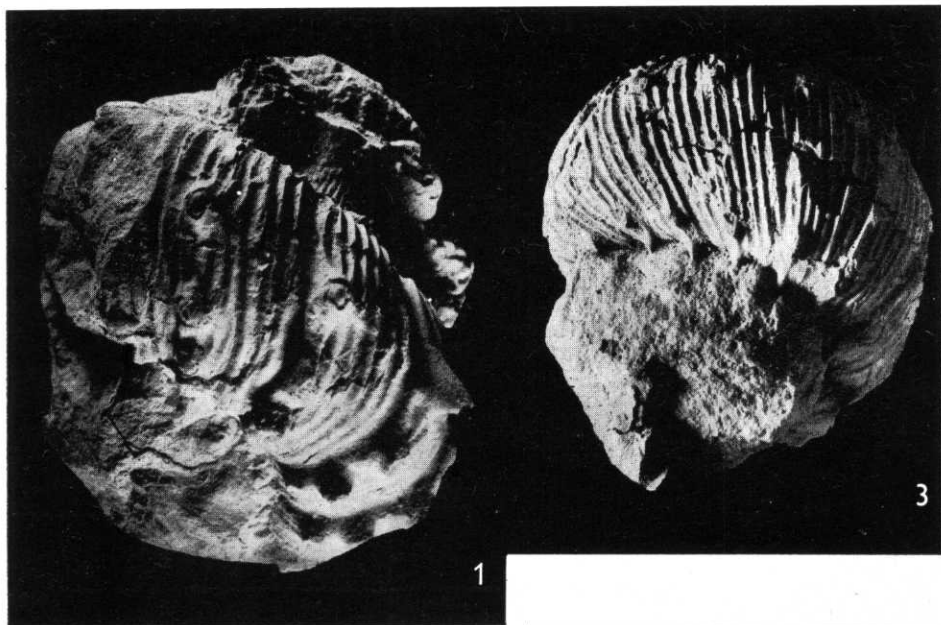


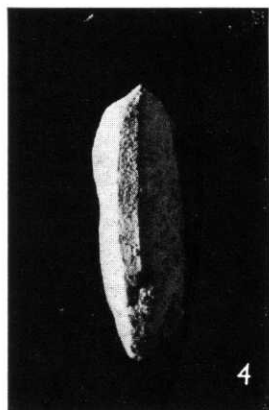
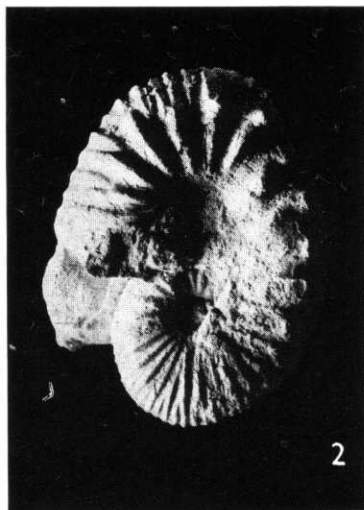
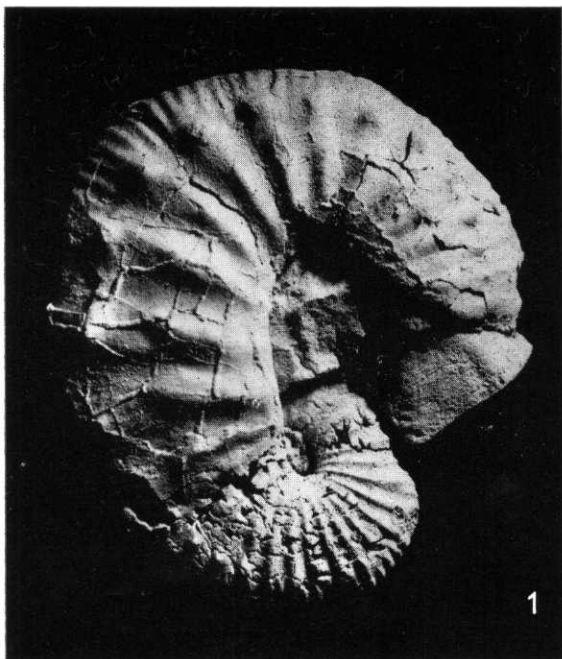












Tridenticeras soukupi n. sp.

4. Lateral view of the deformed specimen YA 2015.
5. Internal mould with well-preserved sutures. Sp. YA 2019.

Pl. VI

Phlycticrioceras trinodosum (GEINITZ)

1. Lateral view.
2. View of the circumferential elevations (fragment of the body chamber of the specimen from fig. 1) — sp. YA 2014.

Pl. VII

Tridenticeras soukupi n. sp.

1. Lateral view of the last whorl of the holotype with four rows of tubercles on the main ribs.
2. View of the penultimate whorl of the holotype, partly preserved as an impression only. On the depressions left by the lower (fourth) rows of tubercles are well discernible. Sp. YA 2035.
3. Lateral view of a more recent whorl with well visible forms resembling a needle's ear between the medium rows of tubercles. Paratype.
4. View of the base of the paratype in a more advanced growth stage. Sp. YA 2017.

Pl. VIII

Scaphites kieslingswaldensis kieslingswaldensis LANGENHAN et GRUNDEY

1. Lateral view of the macroconch with well-visible boundary between phragmocone and the body chamber. Specimen from the Moravian Museum in Brno, from Jaroš's collection (sp. B 3175).
2. Lateral view of the macroconch. sp. YA 2038.
3. Lateral view of macroconch with clavate ventrolateral tubercles. Robeč near Česká Lipa.
4. View of the outer side of the specimen YA 2033.

All specimens or figures 1 : 1. If not stated otherwise, all come from the locality Štítý (Coniacian).

The material is part of the collections of the Geological Survey, Prague, under the reported inventory numbers (except for one specimen coming from the collections of the Moravian Museum in Brno).

All shells have been whitened with ammonium chloride before photographing. Photographs by K. Mezihoráková, Faculty of Pedagogy in Ostrava.

Amoniti coniaku z lokality Štítý na Moravě

(Résumé anglického textu)

ZDENĚK VAŠÍČEK

Předloženo 7. května 1990

V rámci spolupráce s Ústředním ústavem geologickým v Praze mi byla poskytnuta ke zpracování část amonitové kolekce z pozůstalosti dr. J. Soukupa, pocházející z lokality Štítý (Šilperk).

Uvedená amonitová sbírka vznikla v dlouhém časovém období, zhruba od 30. do 70. let tohoto století. Obvykle však postrádá bližší údaje, ze které části vrstevního sledu jednotlivé faunistické nálezy pocházejí. Fosiliferní uloženiny pelitické povahy se sideritovými konkréciemi a ojedinělými deskami pískovců náležejí k ekvivalentům březenského souvrství podle litostratigrafického členění uloženin české křídové pánve ČECHA et al. (1980).

Převážná většina amonitů pochází ze sideritových konkrécií a je dobře zachovaná. Na kamenných jádrech bývají dobře dochované sutury, pro některé níže uvedené druhy známé z literatury jen neúplně, případně vůbec.

V amonitové kolekci o necelých 50 exemplářích se podařilo systematicky zpracovat 10 druhů, z nichž jeden je nový: *Mesopuzosia indopacifica* (KOSSMAT), *Eupachydiscus isculensis* (REDTENBACHER), *Placenticeras* cf. *semiornatum* (D'ORBIGNY), *Peroniceras* (*Peroniceras*) *tridorsatum* (SCHLÜTER), *Gauthiericeras margae* (SCHLÜTER), *Tridenticeras soukupi* n. sp., *Phlycticrioceras trinodosum* (GEINITZ), *Baculites incurvatus* DUJARDIN, *Baculites* cf. *undulatus* D'ORBIGNY a *Scaphites kieslingswaldensis kieslingswaldensis* LANGENHAN et GRUNDEY. Faunistické spektrum je blízké amonitovému společenství známému z lokality Kieslingswalde na polském území v kladském výběžku (kladský prolom), moravský materiál je však bohatší. První údaje o výskytu amonitů na lokalitě Štítý uvádí JAROŠ (1931).

Stratigraficky nejvýznamnější zástupce ve zpracovaném materiálu představují amonitové druhy *Peroniceras tridorsatum* a *Gauthiericeras margae*, které KENNEDY (1984) považuje za zónové druhy středního coniaku (prvý) a nižší části coniaku svrchního (druhý).

V dnešní době se až na nepatrné výjimky (*Phlycticrioceras trinodosum*, *Baculites* sp.) už nepodařilo amonitové nálezy zopakovat. Při úklonu vrstev zhruba k S a při postupu těžební stěny cihelny ve Štítech z J na S jsou v průběhu šedesátileté existence lokality těženy stále mladší a mladší uloženiny v nadloží starších fosiliferních poloh. V současnosti jsou těženy na amonity chudé uloženiny amonitové zóny s *Gauthierice-*

ras margae nebo dokonce *Paratexanites serratomarginatus* (svrchní coniak). Posledně uvedený zónový druh nejvyššího coniaku se však nepodařilo nalézt ani ve sbírkovém materiálu ani v posledních letech při vlastních faunistických sběrech v cihelně.

**Верхнемеловая фауна аммонитов на местонахождении Штиты в Моравии
(Чехословакия)**

В представленной работе подвергнуты систематической обработке аммониты из коллекции И. Соукупы в Центральном геологическом институте в Праге, происходящие из сидеритовых конкреций и аргиллитов бржезенской свиты на местонахождении Штиты (Чешский меловой бассейн, самая южная часть Кладского пролома, Чехословакия). В материале удалось определить 10 видов аммонитов, м. пр. новый вид *Tridenticeras soukupi* и виды биозон коньякского яруса: *Peroniceras tridorsatum* (SCHLÜTER) и *Gauthiericeras margae* (SCHLÜTER). Последними доказаны средняя и более нижняя части верхнего коньяка.

Přeložil A. Kříž



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