

RADVAN J. HORNÝ

THE MIDDLE CAMBRIAN PELAGIELLACEA OF BOHEMIA
(MOLLUSCA)

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Introduction

During the very successful paleontological research carried out by Dr. Ladislav Marek (ČSAV) in the Middle Cambrian near S k r y j e many decalcified concretions in the *Paradoxides* shales were found. Among numerous genera and species of the hyolitids and trilobites they contained 12 fragments of small gastropod-like shells. After a careful study of the latex moulds I recognized that we are concerned with two different species of undescribed genera of the family *Pelagiellidae* KNIGHT, 1956.

I am grateful especially to Dr. Ladislav Marek for lending me the valuable material for the study as well as for presenting it to the collections of the Geological-paleontological department of the National Museum, Prague. Particular thanks to Dr. Ellis L. Yochelson, U. S. National Museum, Washington 25, D. C. for stimulating discussions on the systematic problems concerning the pelagiellid molluscs.

All specimens described are deposited in the collections of the Geological-paleontological department, National Museum, Prague, Czechoslovakia.

Previous study

Several earlier papers reported the occurrence of *Pelagiella* MATTHEW from Bohemia. The only paper in which several species of this genus are described is that of V. Smetana 1918. As the author (R. Horný 1963, p. 59) pointed out, the material described by V. Smetana is poorly preserved in rough sandstone and strongly deformed so that no serious determination is possible. However, the specimens described by V. Smetana 1918 as *Pelagiella* might belong to this genus. They are poorly preserved and strongly deformed; it is quite possible that they represent one species only. In any way, there is no serious reason to determine species on these specimens. They are much larger than the typical representatives of the family; next, they seem to be originally symmetrically coiled.

The first true *Pelagiella* s. l. reported from the Bohemian Lower Paleozoic is that of R. Horný 1963 (p. 59), derived from the collection of Dr. L. Marek (found 1962 in the quarry B u c h a v a near S k r y j e). This specimen which is an internal mould is figured here on pl. I, fig. 7.

Locality and stratigraphical position

All specimens were found in weathered, decalcified concretions which occur in the grey *Paradoxides* shales. The locality is a small quarry near the S l a p y forestry, known as a famous paleontological

locality called Buchava. The shales containing concretions belong to the zone with *Eccaparadoxides pusillus* (BARRANDE), Acadian, Middle Cambrian.

Ecology

The Bohemian pelagiellid molluscs occur in assemblage containing many fragments of other fauna probably transported from the nearby littoral of the Cambrian sea. The hyolithids and trilobites predominate. Hexactinellid spicules of *Porifera* are quite abundant.

Associated fauna: "*Hyolites*" *parens* BARRANDE, "*H.*" *primus* BARRANDE, and other species discovered and recently studied by L. Marek; *Skreiaspis spinosus* (JAHN), *Ctenocephalus coronatus* (BARRANDE), *Peronopsis cuneifera* (BARRANDE), *Eccaparadoxides pusillus* (BARRANDE); *Bohemiella romingeri* (BARRANDE); *Scenella?* sp.

Pelagiellids were never found in shales; this may be due to the conditions of preservation.

Preservation and methods

All specimens studied are internal moulds and their counterprints expressing well preserved external surface of the shells. The shell itself was dissolved during the processes of decalcification of the rock, together with the matrix of the concretions, residuum of which consists of light brown slightly limonitic siltstone. The external surface of the shells was studied on the latex moulds. All the specimens photographed showing the external surface are the latex moulds whitened with ammonium chloride.

Systematics

Nothing is known about the systematical position of these molluscs except that they are molluscs. According to the notes published by Wenz (1938) and Knight (1952) and Knight and allies (Treatise I, 1, 1960), as well as to the written communication by E. L. Yochelson it seems to be rather doubtful whether they belong to the class *Gastropoda*. As we shall comment these problems in a special paper together with E. L. Yochelson, I do not discuss it here.

Several species of *Pelagiella* MATTHEW, 1895 are reported from elsewhere. This genus, according to Treatise I, 1, includes four synonyms: *Parapelagiella* KOBAYASHI, 1839, *Proeccyliopectus* KOBAYASHI, 1939, *Protoscaevogyra* KOBAYASHI, 1939, and *Semicircularia* LOCHMAN in LOCHMAN et DUNCAN, 1944. As it is possible to deduce from the diagnosis given in Treatise I, 1, p. 1323, the representatives of *Pelagiella* MATTHEW are generally smooth.

Only few specimens described in different papers show enough details; they are usually too small (up to 5 mm.) to be photographed by normal methods. They need special photographic methods and preparation. A careful restudy of all up till now described species and specimens is urgently needed; it is the only way how to reach some reasonable results acceptable for any kind of systematics.

The Bohemian species resemble very much the Middle Cambrian *Pelagiella broeggeri* (GRÖNWALL, 1902) of Bornholm (Grönwall 1902, Pl. 4, fig. 28 a, b).

Compared with the type species of *Pelagiella* MATTHEW, 1895, *Pelagiella atlantoides* (MATTHEW, 1894), the Bohemian species agree with in the general shape of the shell and the character of the initial coiling. As far as the outer sculpture of the shell is concerned, it is quite impossible to refer them to this genus. As we know completely nothing about the soft body organisation of these peculiar molluscs, we are strengthened to use an artificial systematics for them. The outer sculpture of the shell might be of generic value in this case.

Including the Bohemian species into the family *Pelagiellidae* KNIGHT, 1956, I establish two new genera for them: *Cambretina* g. n. and *Costipelagiella* g. n.

Pelagiellacea KNIGHT, 1956

Pelagiellidae KNIGHT, 1956

Cambretina g. n.

Type species: *Cambretina mareki* sp. n.

Stratum typicum: Middle Cambrian, Acadian, Skryje Beds, zone with *Eccaparadoxides pusillus*.

Locus typicus: Skryje near Rakovnik, Bohemia.

Diagnosis: Genus of the family *Pelagiellidae* with regularly reticulate outer surface of the shell. Aperture with shallow sinus in the upper part. Base narrow.

Discussion: As far as the general outline of the shell, the protoconch and the development of coiling are concerned, *Cambretina* is related to *Pelagiella* MATTHEW, 1895 and *Costipelagiella* g. n. It distinguishes itself by strong reticulation of the surface and presence of shallow sinus in the upper part of the aperture. No sinistral specimens observed.

Stratigraphical occurrence: Middle Cambrian, Acadian, zone with *Eccaparadoxides pusillus*.

Geographical distribution: Skryje-Area of the Bohemian Cambrian.

Species: *Cambretina mareki* sp. n.

Cambretina mareki sp. n.

(Pl. I, fig. 1—6, pl. II, fig. 4—6, pl. III, fig. 1—6, pl. IV, fig. 1)

Holotype: specimen figured here on plate I, fig. 1—4, and plate IV, fig. 1. National Museum Prague, No. L 6365.

Paratypes: several other specimens figured here on plate I, fig. 5—6, plate II, fig. 4—6, plate III, fig. 1—6. The same collection, No. L 6366, L 6367, L 6370, L 6371, L 6372.

Stratum typicum: Cambrian, Acadian, Skryje Beds, zone with *Eccaparadoxides pusillus*.

Locus typicus: Skryje near Rakovnik, Buchava quarry.

Derivatio nominis: *mareki*, named in honour of my friend, paleontologist Dr. Ladislav Marek, who found the specimens.

Material: besides the types 5 fragments of internal moulds and their counterparts.

Diagnosis: see the diagnosis of genus.

Description: shell helicoidally coiled, consisting of at least two rapidly expanding whorls. Protoconch bulbous, smooth, as well as the initial half of the first whorl. Upper surface of the whorls nearly flat; periphery roundly arched, base narrow, perhaps narrowly phaneromphalous (?), raphistomatid in outline. Sutures considerably deep. The basal part of the last whorl bears two or three obscurely visible revolving angulations (see plate I, fig. 3—4, and plate III, fig. 3). Upper part of the apertural margin with shallow U-shaped sinus culminating approximately in the middle part of the apertural margin in a slightly depressed zone. This depressed zone is well expressed in the internal moulds (see pl. I, fig. 7, and pl. III, fig. 1). The shallow sinus was studied on the internal mould figured here on plate III, fig. 4, and on the isolated internal mould with the apertural margin broken off but still expressing its original shape — plate 3, fig. 1. This sinus seems to be much deeper when expressed by the outer shell structures.

Outer surface of the shell with sharp reticulation consisting of regular hexagones deformed in the region of the sinus. The reticulation is so regular that several directions of rows of the hexagones may be observed so that the original growth structures are not visible. Only in the inner (adapical) part of the sinus there can be seen certain structures speaking for limited or retarded growth of the apertural margin expressed by means of the elongated and crowded hexagones (half of a "pseudoselenizone"). Aperture broadly elliptical, except of the short sinus seemingly in a plane, the spira slightly overhanging the "parietal" margin. Anterior margin of the aperture thin-shelled; the "posterior" margin in adult stages thick-shelled, forming "parietal" or "umbilical" structures probably not expressed on the outer surface of the shell. No true parietal inductura overlapping the preceding whorl observed, as the shell probably has a slight tendency toward free coiling namely in the adult stages.

Measurements:

holotype,	maximum diameter:	1.5 mm.
paratype L 6366,	"	1.3 mm.
paratype L 6367,	"	2.3 mm.
paratype L 6370,	"	1.8 mm.
paratype L 6371,	"	2.7 mm., height 1.4 mm.
paratype L 6372,	"	2.0 mm.

The holotype is a nearly adult specimen preserved as a negative counterprint.

Costipelagiella g. n.

Type species: *Costipelagiella zázvorkai* sp. n.

Stratum typicum: Middle Cambrian, Acadian, Skryje Beds, zone with *Eccaparadoxides pusillus*.

Locus typicus: Skryje near Rakovník, Bohemia.

Diagnosis: Genus of the family *Pelagiellidae* with strongly transversally costate surface of the shell. Apertural margin with an in-

complete insinuation in the upper part. The upper peripheral angulation sharply rounded, the periphery itself flattened to slightly concave, base probably not narrow.

Discussion: *Costipelagiella* g. n. distinguishes itself from *Pelagiella* MATTHEW and *Cambretina* g. n. by strongly regularly costate outer surface of the shell and the presence of irregular insinuation in the upper part of the apertural margin. It possesses probably much wider and shorter base than *Cambretina* g. n. as well as more rapidly expanding shell.

Stratigraphical occurrence: Middle Cambrian, Acadian, zone with *Eccaparadoxides pusillus*.

Geographical distribution: Skryje Area of the Bohemian Cambrian.

Species: *Costipelagiella zázvorkai* sp. n.

Costipelagiella zázvorkai sp. n.

(Pl. II, fig. 1—3, pl. IV, fig. 2)

Holotype: specimen figured here on plate II, fig. 1—3, and plate IV, fig. 2. National Museum Prague, No. L 6369.

Paratypes: none.

Stratum typicum: Cambrian, Acadian, Skryje Beds, zone with *Eccaparadoxides pusillus*.

Locus typicus: Skryje near Rakovník, Buchava quarry.

Derivatio nominis: *zázvorkai*, named in commemoration of 60th birthday of Dr. Vlastislav Zázvorka, who has contributed to our knowledge of the fossil faunas of Czechoslovakia.

Material: besides the type none.

Description: shell helicoidally coiled, consisting of about one and half to two rapidly expanding whorls. Protoconch corrugated; probably smaller than in *Cambretina* g. n., smooth. The initial half of the first whorl smooth. Upper surface of the whorls flat; periphery flat, seemingly concave, the upper angulation much sharper than the lower, which is roundly arched. Base not known, seemingly not so narrow as in *Cambretina* g. n. Sutures deep. Upper part of the apertural margin with a shallow incomplete insinuation causing a sigmoidal flexure of costae, located approximately in the middle part of the upper whorl profile. Outer surface of the shell bears regular sharp costae; they run from the suture to the flexure with strong forward convexity, straightly passing the upper whorl angulation; they are slightly posteriorly convex at the concave periphery and probably anteriorly roundly convex at the lower whorl angulation. Base unknown.

Measurements: holotype, maximum diameter: 1.6 mm.

The holotype is a nearly adult specimen preserved as an incomplete negative counterprint.

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EXPLANATION OF PLATES

Pl. 1.

Cambretina mareki sp. n.

- 1.—4. Holotype, NM — L 6365. 1 — apical, 2 — lateroapical, 3 — lateral, 4 — laterobasal view. Note the hyolithid appendage in fig. 1. x 24.
5. Paratype NM — L 6366. Juvenile specimen. x 24.
6. Paratype NM — L 6367. Adult specimen. Note the irregular development of the hexagones in the sinus area. x 24.

Cambretina cf. *mareki* sp. n.

7. Internal mould showing the spiral depression of the sinus area. NM — L 6368. x 20.

Pl. 2.

Costipelagiella zázvorkai sp. n.

- 1.—3. Holotype, NM — L 6369. 1 — apical, 2 — lateroapical, 3 — lateral view. x 24.

Cambretina mareki sp. n.

- 4.—5. Paratype NM — L 6370. 1 — apical, 2 — lateroapical, 3 — lateral view. x 24.

Pl. 3.

Cambretina mareki sp. n.

- 1.—3. Paratype NM — L 6371. Internal mould. 1 — apical, 2 — basal, 3 — lateral view. Note the spiral depression of the sinus area in fig. 1. x 20.
4. Paratype NM — L 6372. Internal mould, not whitened to show the shape of sinus (the mould is covered with limonite and therefore darker). x 20.
- 5.—6. The same paratype, whitened. Anterior laterobasal (5) and posterior (6) view showing the "parietal" or "umbilical" structures in the umbilical region. x 20.

Pl. 4.

Cambretina mareki sp. n.

1. Slightly restored figure, after holotype. Orig. x 70.

Costipelagiella zázvorkai sp. n.

2. Slightly restored figure, after holotype. Orig. x 70.

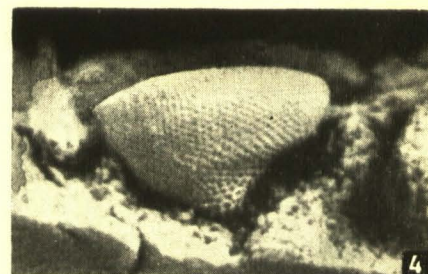
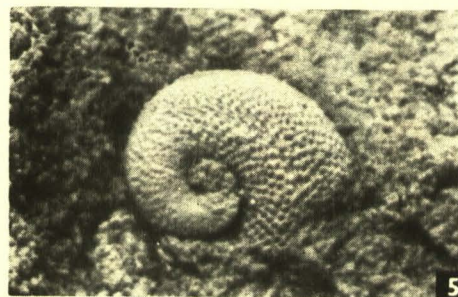
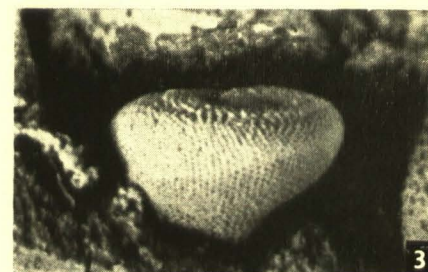
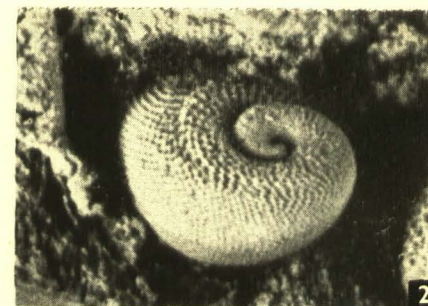
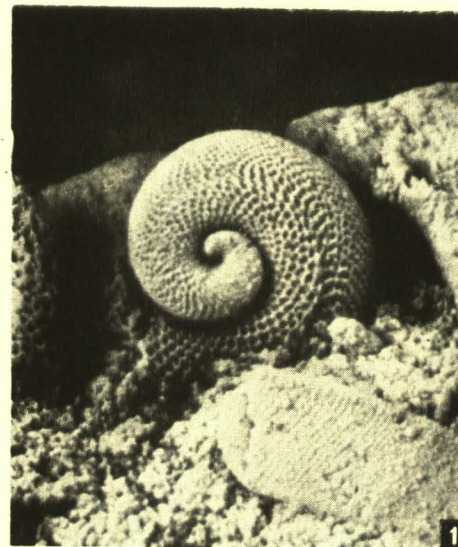
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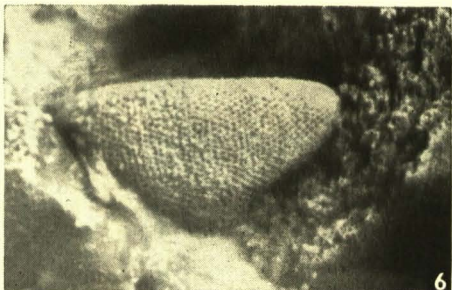
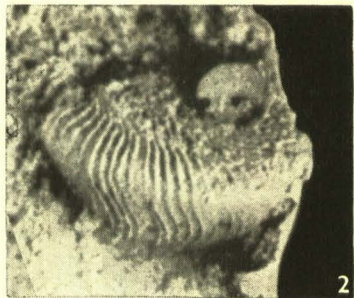
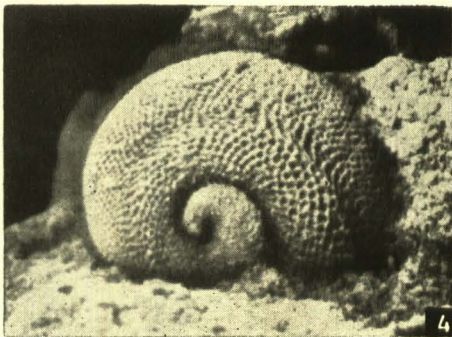
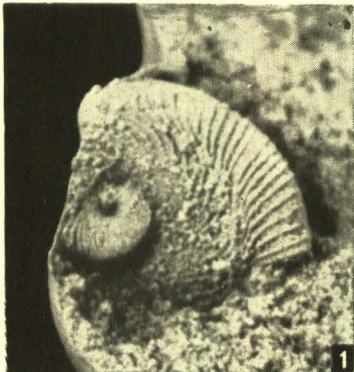
Jiří Kouřimský: Příspěvek k morfologické krystalografii korundu — К морфологической кристаллографии корунда — Beitrag zur morphologischen Kristallographie des Korunds

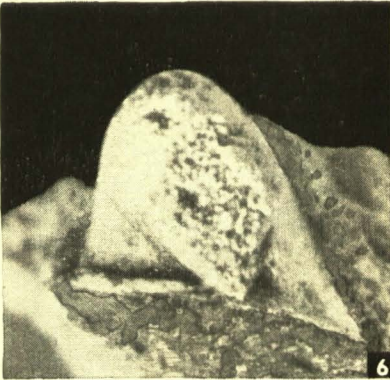
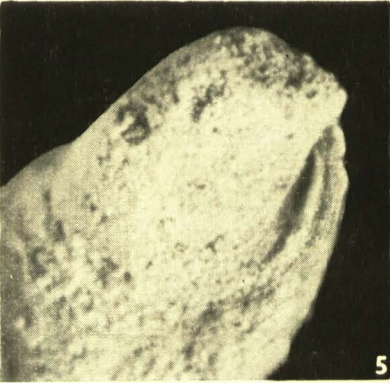
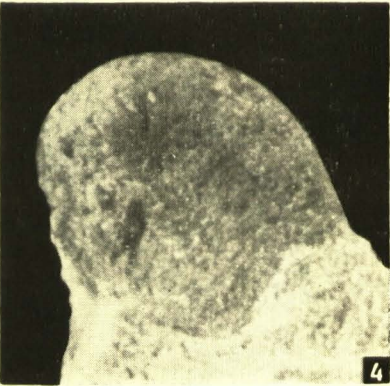
Vladimír Hudec: O výskytu plže *Aegopinella epipedostoma* (FAG.) a dalších druhů rodu *Aegopinella* LINDH. v ČSSR — Zur Vorkommen der Schnecke *Aegopinella epipedostoma* [FAG.] und der anderen Arten der Gattung *Aegopinella* LINDH. in der Tschechoslowakei

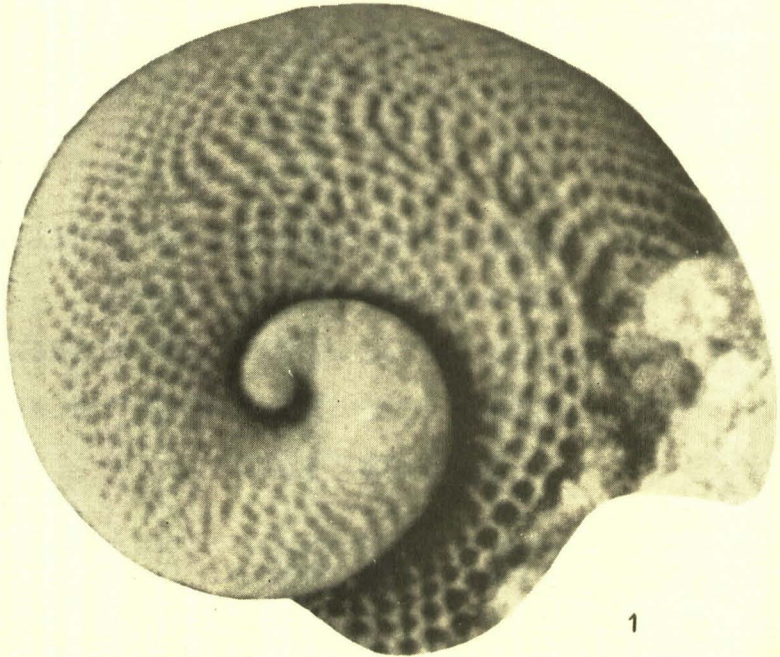
Radvan J. Horný: The Middle Cambrian Pelagiellacea of Bohemia (Mollusca)

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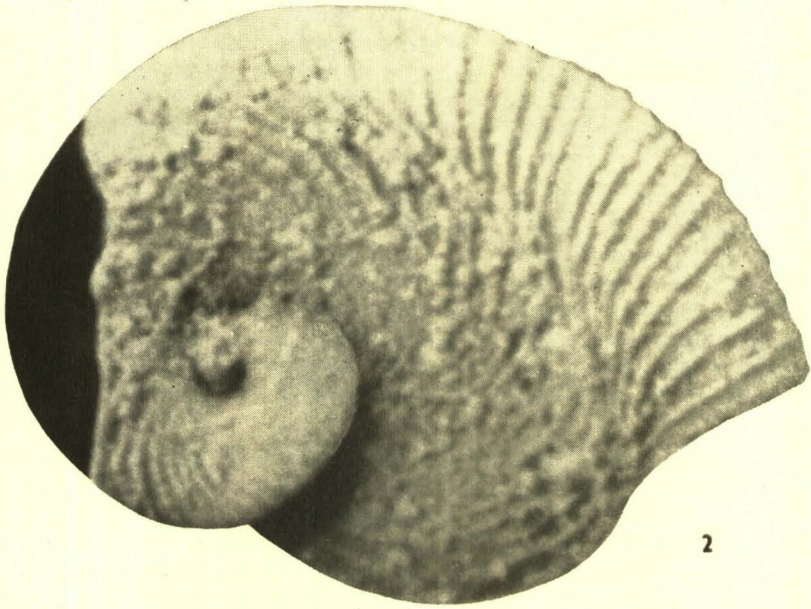








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SBORNÍK NÁRODNÍHO MUZEA V PRAZE
ACTA MUSEI NATIONALIS PRAGAE

Volumen XX B (1964) No. 3
REDAKTOR JIŘÍ KOUŘIMSKÝ

VLASTISLAV ZÁZVORKA

JEŽOVKY EPIASTER SUBLACUNOSUS (GEINITZ, 1872) Z KŘÍDY
STŘEDNÍ EVROPY (STŘEDNÍ TURON)

THE ECHINOID EPIASTER SUBLACUNOSUS (GEINITZ, 1872)
FROM THE CRETACEOUS OF CENTRAL EUROPE
(MIDDLE TURONIAN)

Určení a stratigrafické vymezení nálezů druhu *Epiaster distinctus* (AGASSIZ) vynutilo si také revizi nálezů, které se od druhu *E. distinctus* (AG.) liší.

Otomar Novák r. 1882 a 1887 uvedl v seznamech ježovek z české křídly jím stanovený nový druh *Epiaster cotteauanus* NOV. Protože však nepodal ani diagnózu, ani vyobrazení, je toto označení *nomen nudum*. Při zpracování druhu *Epiaster distinctus* (AG.) uvedl jsem za synonymy toto označení s pochybou. V geologicko-paleontologickém oddělení Národního muzea je nedokončený rukopis práce O. Nováka. V něm je také rozpracován druh *E. cotteauanus* NOV. i s vyobrazením a je k němu dokonce i nátisk tabule. Z tohoto nátisku je u vystaveného exempláře, který by byl holotypem, vyobrazení připojeno.

Teprve další studium ukázalo, že nálezy ze středního turonu se liší od spodnoturonského druhu *E. distinctus* (AG.) a že tedy záznamy O. Nováka nelze klást do synonym druhu *E. distinctus*. Ukázalo se, že H. B. Geinitzem uvedený *Hemiaster sublacunosus* a Novákův *E. cotteauanus* jsou totožny. Došel jsem dále k závěru, že Geinitzem uvedené nálezy ze saské křídly náležejí do rodu *Epiaster* a že Geinitzem uvedený nález z Rathen je tedy *Epiaster sublacunosus* (GEIN.). O. Novákem zaznamenaný druh *E. cotteauanus* je tedy synonymem druhu *E. sublacunosus* (GEIN.).

Jako lektotyp druhu *Epiaster sublacunosus* (GEIN.) může být stanoven pouze exemplář vyobrazený Geinitzem (1872, *Elbthalgeb.* II) na tabuli 4, obr. 6. — Exemplář vyobrazený na tab. 4, obr. 5, nepřichází v úvahu. Je z kvádrovců Annenbergu u Haltern ve Vestfálsku. Tato lokalita stratigraficky náleží spodnímu kampánu. Jde tedy o odlišný chorotyp i chronotyp a spadá do rámce hodnocení kampánské fauny

