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Some Jurassic holothurian sclerites from the High-Tatric Series of the Tatra Mts., Poland

In the present paper the first find of the holothurian sclerites in the Jurassic of the Tatra Mts. is described. Some mistakes in the determinations of species resulted from different states of preservation of sclerites caused by a kind of maceration, a preparation from rocks with different compactness, a different contents of calcium carbonate, and recristalization is considered.

INTRODUCTION

The small holothurian sclerites assemblage has been found in the dark-red limestone of uncertain age (Callovian, ?Lower Oxfordian) on the Kalackie Siodło — the pass on the ridge Kalacka Turnia — Wrótka. The red limestone level enters into a composition of the Giewont series (High-Tatric Series). The find contains 31 specimens, belonging to: 7 species, 6 genera and 4 families: *Calclamnidae, Priscopedatidae, Theelidae, Protocaudinidae* and the one specimen described as *incertae sedis*. This is the first find of this microfauna in the Jurassic and the High-Tatric Series of the Tatra Mts.

Hitherto from Poland the holothurian sclerites have been described from: Ordovician (J. Sztejn, 1989), Devonian (B. A. Matyja et al., 1973), Carboniferous (Z. Alexandrowicz, 1971), Permian (H. Szaniawski, 1968), Triassic (H. Kozur, H. Mostler, 1970; K. Zawidzka, 1971; H. Senkowiczowa, 1972), Jurassic (J. Garbowska, A. Wierzbowski, 1967; H. Górka, L. Łuszczewska, 1969; B. A. Matyja, 1972), Cretaceous (W. Kubiatowicz, B. A. Matyja, 1977; J. Sztejn, 1984, in press) and Tertiary (H. Górka, L. Łuszczewska, 1969).

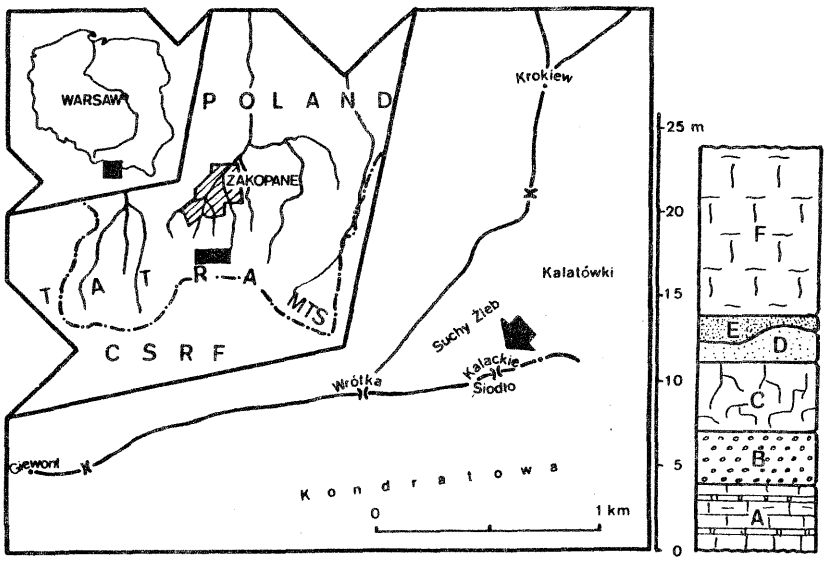

Fig. 1. Locality map of the High-Tatric Jurassic profile sampled for holothurian sclerites in the Tatra Mts. and schematic profile of the deposits at the Kalackie Siodło

A — limestone, marly limestone, dolomite (Anisian); B — white and red crinoid limestone (Bajocian); C — light-grey limestone with veins (Callovian, ?Lower Oxfordian); D — light-rose-brown limestone (Callovian, ?Lower Oxfordian); E — dark-red condensed limestone (Callovian, ?Lower Oxfordian); F — grey limestone (Oxfordian – Hauterivian)

Lokalizacja odsłonięć oraz schematyczny profil geologiczny osadów odsłaniających się w rejonie Kalackiego Siodła

A — wapienie, wapienie margliste, dolomity (anizyk); B — białe i czerwone wapienie krynoidowe (bajos); C — jasnoszare wapienie z żyłkami (kelowej, ?dolny oksford); D — jasnoróżowo-brązowe wapienie (kelowej, ?dolny oksford); E — ciemnoczerwone skondensowane wapienie (kelowej, ?dolny oksford); F — szare wapienie (oksford – hoteryw)

GEOLOGICAL SETTING AND LITHOLOGY

There are three small outcrops of red limestone in the Kalackie Siodło area, the first on the north-east side of the pass and the two others slightly nearer to the north-west, towards the Suchy Żleb. Described specimens come from the dark-red condensed limestone with hematite concretions (Fig. 1E), which has a thickness of 80 cm, and is found within the outcrop about 50 m to the north-east, below the Kalackie Siodło. The limestone lies on the light-rose-brown limestone of similar age (Callovian, ?Lower Oxfordian — Fig. 1D), which overlies 4 m of a thick complex of light-grey limestone with red, ferruginous veins (Callovian, ?Lower Oxfordian — Fig. 1C) and 3 m of a thick complex of crinoid limestone (upper — red and rose and lower — white) of the Bajocian age (Fig. 1B). Above the red limestone passes into the Oxfordian – Hauterivian grey limestone complex (Fig. 1F), according to the custom called Malm – Neocomian. The red limestone from the Kalackie Siodło may be correlated with the Czorsztyn Limestone Member within the Raptawicka Turnia Limestone Formation

(J. Lefeld, ed., 1985). Under the microscope, the red limestone is wackstone with 30% particle contents and represents the globigerinoid microfacia. In the micritic matrix with scattered ferruginous substance inhere bioforms of numerous planctonic foraminifers, spicules of sponges, benthonic foraminifers from genera *Ophtalmidium, Nodosaria*, aptychies and bioclasts of numerous crumbled echinoderm fragments. After dissolution of the limestone samples in the 15% acetic acid in the residue (beside ferruginous substance and singles detrical quartz granules) numerous discoidal foraminifers, crumbled echinoderm fragments, spicules of sponges and singles fish remains are visible.

SYSTEMATIC DESCRIPTION

The holothurian sclerites assemblage comprises the following taxa: *Eocaudina micropora* (Deflandre-Rigaud, 1962), *E. mortenseni* Frizzell et Exline, 1955, *Paracucumarites porosus* Deflandre-Rigaud, 1962, *Staurocumites bartensteini* Deflandre-Rigaud, 1952, *Theelia convexa* (Whidborne, 1883) emend. Lord et Senior, 1973, *Stueria malmensis* (Frizzell et Exline, 1955) emend. 1966, *Protocaudina mortenseni* Deflandre-Rigaud, 1946 and *incertae sedis*.

Family **Calclamnidae** Frizzell et Exline, 1955
Genus *Eocaudina* Martin, 1952
Eocaudina micropora (Deflandre-Rigaud, 1962)
(Pl. I, Figs. 4, 5)

1962 *Cucumarites microporus* n. sp.; M. Deflandre-Rigaud: p. 57, Fig. 33, Pl. 5, Fig. 6.
1966 *Eocaudina micropora* (Deflandre-Rigaud); D. I. Frizzell, H. Exline: p. U660.
1972*b* *Eocaudina micropor*a (Deflandre-Rigaud); H. Mostler: p. 5.

Material: 2 specimens.

Dimension in mm:

Plates — 0.11–0.13 x 0.25
Perforations — 0.01–0.03

Description. Sclerite in form of a thin, perforate plate, flat or slightly convex; outline irregular, subpentagonal; perforations numerous scattered rather irregular, rather small and variousing diameter and shape — from subcircular to subelliptical.

Remarks. Both of the specimens differ from each other in diameter of sclerite and perforations. The smaller one is rather complete and the bigger one, with an irregular outline becouse of its imperfect preservation, nicely relates (though diameter differences are noted) to the first specimen of this species, described by M. Deflandre-Rigaud (1962).

Occurrence. Callovian, ?Lower Oxfordian of the Tatra Mts.; Oxfordian of France (M. Deflandre-Rigaud, 1962).

Eocaudina mortenseni Frizzell et Exline, 1955
(Pl. I, Figs. 1, 2)

1937 Spicule of *Dendrochirote* Holothurian; T. Mortensen: p. 24, Pl. 4, Fig. 5.
1955 *Eocaudina mortenseni* n. sp.; D. I. Frizzell, H. Exline: pp. 38, 88, Pl. 3, Fig. 5.
1961 *Cucumarites mortenseni* (Frizzell et Exline); M. Rioult: pp. 135, 148.
1962 *Cucumarites mortenseni* (Frizzell et Exline) Deflandre-Rigaud; M. Deflandre-Rigaud: pp. 51, 57, Fig. 37–42, Pl.1, Fig. 8.
1966 *Eocaudina mortenseni* Frizzell et Exline; D. I. Frizzell, H. Exline: p. U660.
1969 *Cucumarites mortenseni* Frizzell et Exline (Deflandre-Rigaud,1959; H. Górka, L. Łuszczewska: p. 364, 365, 376, 377, Pl. 77, Figs. 10–13.
1972 *Cucumarites mortenseni* (Frizzell et Exline); B. A. Matyja: p. 235, 236, Text-fig. 1.
1972*b* *Eocaudina mortenseni* Frizzell et Exline; H. Mostler: p. 5.

Material: 3 specimens.

Dimension in mm:

Plates — 0.11–0.26
Perforations — 0.02–0.04

Description. Sclerite in form of a perforate plate, flate and thin; numerous coarse perforations arranged in parallel rows, perforations subcircular to circular; the specimens incomplete and the rounded lateral margin only partly visible.

Remarks. The specimens from the Tatra Mts. differ from the T. Mortensen's (1937) specimen cited by D. I. Frizzell and H. Exline (1955), and from the specimens from the Polish Jurassic (H. Górka, L. Łuszczewska, 1969; B. A. Matyja, 1972) by their absence of rows of perforations, which become small towards the margin of a sclerite. However, the specimens are similar to those discovered from the Oxfordian of France and determinated as *Cucumarites mortenseni* by M. Deflandre-Rigaud (1962).

Occurrence. Callovian, ?Lower Oxfordian of the Tatra Mts.; Lower Jurassic of Germany (T. Mortensen, 1937); Sinemurian (M. Rioult, 1961) and Oxfordian of France (M. Deflandre-Rigaud, 1962); Upper Bajocian, Middle and Upper Bathonian of the Polish Lowlands (H. Górka, L. Łuszczewska, 1969); Oxfordian of the Holy Cross Mts. (B. A. Matyja, 1972).

Genus *Paracucumarites* Deflandre-Rigaud, 1962
Paracucumarites porosus Deflandre-Rigaud, 1962
(Pl. I, Fig. 3)

1962 *Paracucumarites porosus* n. sp.; M. Deflandre-Rigaud: p. 64, Fig. 61, Pl. 2, Fig. 10.
1966 *Paracucumarites porosa* Deflandre-Rigaud; D. I. Frizzell, H. Exline: p. U660.
1972*b* *Paracucumarites porosa* Deflandre-Rigaud; H. Mostler: p. 6.

Material: 3 specimens.

Dimension in mm:

First layer — 0.33
Perforations within the first layer — 0.01–0.02
Perforations within the second layer — 0.02–0.03

Description. Sclerite in form of a perforate plate of two layers; first layer flat and thin with numerous, irregular scattered small perforations, subcircular to subellipsoidal in the shape; sclerite margin irregular, slightly rounded; central and partly peripherical part of the first layer is occupied by the second layer-low, coarsely perforated, spongy structure.

Remarks. The specimens from the Tatra Mts. are considerably larger than described from France (M. Deflandre-Rigaud, 1962).

Occurrence. Callovian, ?Lower Oxfordian of the Tatra Mts.; Oxfordian of France (M. Deflandre-Rigaud, 1962).

Family **Priscopedatidae** Frizzell et Exline 1955
Genus *Staurocumites* Deflandre-Rigaud, 1952
Staurocumites bartensteini Deflandre-Rigaud, 1952
(Pl. I, Figs. 7, 8a,b)

1936 Gitter-Plattchen von Kreuz-Form; H. Bartenstein: p. 8, Text- Figs. 4, 5, 12.
1937 Spicules of Holothurian; T. Mortensen: p. 26, 27, Pl. 4, Fig. 10.
1953 *Staurocumites bartensteini* Deflandre-Rigaud; M. Deflandre-Rigaud: p. 953, Fig. 12.
1955 *Priscopedatus bartensteini* (Deflandre-Rigaud); D. I. Frizzell, H. Exline: p. 38, 58, 103, 104, Pl. 5, Figs. 4, 6–9.
1961 *Staurocumites bartensteini* Deflandre-Rigaud; M. Rioult: p. 140, 141, 148.
1962 *Staurocumites bartensteini* Deflandre-Rigaud; M. Deflandre-Rigaud: p. 75.
1964 *Crux bartensteini* nov. gen., nov. spec.; K. Frentzen: p. 33, 34, Pl. 3. Figs. 20–24.
1965 *Priscopedatus bartensteini* (Deflandre-Rigaud); E. Kristan-Tollmann: p. 18.
1966 *Staurocumites bartensteini* Deflandre-Rigaud; D. I. Frizzell, H. Exline: p. U660, U666, U667, Fig. 532, 5.
1970 *Staurocumites bartensteini* Deflandre-Rigaud, 1952; H. Kozur, H. Mostler: p. 389.
1971 *Staurocumites bartensteini* Deflandre-Rigaud, 1952; H. Kozur, H. Mostler: p. 27.
1971 *Staurocumites bartensteini* Deflandre-Rigaud, 1952; K. Zawidzka: p. 430, 436, Pl. 2, Figs. 2–5
1972*a* *Staurocumites bartensteini*; H. Mostler: p. 737, 742.
1972*b* *Staurocumites bartensteini* Deflandre-Rigaud; H. Mostler: p. 8.
1974 *Staurocumites bartensteini* Deflandre-Rigaud; T. Bechstadt, H. Mostler: p. 9, 42.
1974 *Priscopedatus bartensteini* (Deflandre-Rigaud); H. Kozur, R. Mock: p. 130, Pl. 5, Figs. 12, 13.
1977 *Priscopedatus bartensteini* (Deflandre-Rigaud); M. Mišík et al.: p. 39, Pl. 6, Figs. 13, 14, non 15.
1978 *Staurocumites bartensteini* Deflandre-Rigaud; E. Mirauta, D. M. Gheorghian: p. 117, 131.
1980 *Staurocumites bartensteini* Frizzell, et Exline; D. A.Donofrio et al.: p. 68.
1981 *Priscopedatus bartensteini* (Deflandre-Rigaud); J. Pevný: p.606.

Material: 4 specimens but only one well preserved.

Dimension in mm:

Basal plate — 0.18
Perforations — 0.03 x 0.04
Length of the spire — 0.16

Description. Sclerite in form of a cross-shaped table with spire; in four arms set at 90°, there are very large elongate perforations; opposite arms similar; spire in the central part of a specimen; in the best preserved one spire very long (length = width of the basal plate), in the other specimens spire is short (length = 1/3 width of the basal plate), typical for described previously; spire jointed to disk by a very low four-footed stirrup.

Occurrence. Callovian, ?Lower Oxfordian of the Tatra Mts.; Middle and Upper Triassic of the Alps, Carpathians, Balathon Upland; Lower Jurassic of Germany (H. Bartenstein, 1936) and France (M. Rioult, 1961).

Family **Theelidae** Frizzell et Exline, 1955
Genus *Theelia* Schlumberger, 1891
Theelia convexa (Whidborne, 1883) emend. Lord et Senior, 1973
(Pl. II, Figs. 1, 2)

1936 *Chirodota heptalampra* n. sp.; H. Bartenstein: p. 6, 7, Text-figs 10, 11.
1950 *Chirodotites heptalampra* (Bartenstein); M. Deflandre-Rigaud: p. 27, 28, Text-figs. 49, 50.
1955 *Theelia convexa* (Whidborne); D. I. Frizzell, H. Exline: p. 36, 116, 117.
1955 *Theelia heptalampra* (Bartenstein); D. I. Frizzell, H. Exline: p. 39, 117, 120, 121, 123, Pl. 7, Fig. 1.
1956 *Theelia convexa* (Whidborne); F. Hodson et al.: p. 338, 339, Text-Fig. 4.
1961 *Chiridotites heptalampra* (Bartenstein); M. Rioult: p. 143, 143, 148.
1964 *Chirodota heptalampra* Bartenstein; K. Frentzen: p. 43, Pl. 4, Figs. 18–21.
1965 *Theelia heptalampra* (Bartenstein); E. Kristan-Tollmann: p. 18.
1966 *Theelia convexa* (Whidborne); D. I. Frizzell, H. Exline: p. U660.
1966 *Theelia heptalampra* (Bartenstein); D. I. Frizzell, H. Exline: p. U660.
1967 *Theelia heptalampra* (Bartenstein, 1936); J. Garbowska, A. Wierzbowski: p. 533, 534, Text-Fig. 6, Pl.1, Fig. 1.
1967 *Theelia wartensis* sp. n.; J. Garbowska, A. Wierzbowski: p. 534,, 535, 536, Text-Fig. 7, Pl. 1, Figs. 2–4.
1969 *Theelia heptalampra* (Bartenstein, 1936) Frizzell et Exline; H. Górka, L. Łuszczewska: p. 364, 365, 379, Pl. 78, Figs. 1–3.
1972 *Theelia heptalampra* (Bartenstein, 1936); B. A. Matyja: p. 240, Text-Fig. 8.
1972*b* *Theelia convexa* (Whidborne); H. Mostler: p. 9.
1972*b* *Theelia heptalampra* (Bartenstein); H. Mostler: p. 9.
1973 *Theelia convexa* (Whidborne, 1883); A. Lord, J. R. Senior: p. 36, 37, Pl. 1, Figs. 1, 3, 4.
1977 *Theelia vonvalensis* sp. n.; W. Kubiatowicz, B. A. Matyja: p. 405, 406, Text-Figs. 5a–5c, Pl. 1, Figs. 10, 11.
1990 *Theelia convexa* (Whidborne, 1883); H. Kozur, W. Saddedin: p. 362, Pl. 2, Figs. 1, 2, 5.

Material: 11 specimens.

Dimension in mm:

External diameter — 0.09–0.18
Internal diameter — 0.08–0.13

Description. Sclerite in form of a wheel circular and subcircular to subheptagonal or subhexagonal (depends on number of spokes); seven or six medium long, rather wide spokes with equal width or slightly narrowing towards the hub, more or less convex; in rather large hub, on the lower side of sclerite, spokes markedly narrow and connect with others in the centre — it creates an impression of the characteristical seven- or six-raised star; on the upper side the convex hub creates button-like structure; very small numerous denticles on the inner part of the rim only partly visible becouse of the not the best preservation.

Distribution. 9 specimens with seven spokes (and seven-raised star in the middle) and to with six spokes (and six-raised star).

Remarks and discussion. Different states of preservation of specimens causes two things: different pictures of the star in the central part of a sclerite, and a

possibility of omission of very small numerous denticulation of the inner margin of the rim. Different numbers of spokes as well as the above consequence produce a disorder in the determinations of this species. The Whidborn's badly preserved specimen from the Inferior Oolite (*vide* F. Hodson et al., 1956; A. Lord, J. R. Senior, 1973), after supplementation of description and photographs may be unmistakably accepted as *Theelia convexa*. The seven-raised star — that characteristic feature of *Theelia heptalampra* is made by jointed, markedly narrowed within the hub, spokes. The star may be more visible when the spokes are more convex and the hub more concave (on the lower side of sclerite).

The problem of different numbers of spokes in specimens with identical other features have been discussed by A. Lord, J. R. Senior (1973). The authors demonstrated that the specimens of this same species may have different numbers of spokes — 6, 8, 9 or 11. This feature shows, among other things, *Theelia vonvalensis* (W. Kubiatowicz, B. A. Matyja, 1977) — 5 or 6, and the specimens from the Tatra Mts. — 6 or 7.

The variability of dimensions of the sclerites from the Tatra Mts. is: 0.09–0.18 and the possibility of distinguishing *Theelia convexa* from *Theelia heptalampra* (F. Hodson et al., 1956) under this feature is precluded. *Theelia heptalampra* from Triassic may not be included into *Theelia convexa* because of a strong variability of genus *Theelia* during this period.

O c c u r r e n c e . Callovian, ?Lower Oxfordian of the Tatra Mts.; Lower Jurassic of Germany (H. Bartenstein, 1936) and France (M. Rioult, 1961); Middle Jurassic of Jordan (H. Kozur, W. Saddedin, 1990); Bathonian (H. Górka, L. Łuszczewska, 1969); Upper Oxfordian, Lower Kimmeridgian (J. Garbowska, A. Wierzbowski, 1967); Upper Valanginian of Poland (W. Kubiatowicz, B. A. Matyja, 1977); Upper Bajocian and Lower Bathonian of Great Britain (A. Lord, J. R. Senior, 1973).

Genus *Stueria* Schlumberger, 1880
Stueria malmensis (Frizzell et Exline, 1955) emend. 1966
(Pl. II, Figs. 5–7)

1937 Wheels of Myriotrochus; T. Mortensen: p. 20, Pl. 3, Figs. 1, 2
1950 *Myriotrochus costiferus* (Terquem et Berthelin); in part M. Deflandre-Rigaud: Fig. 93.
1950 *Myriotrochites sieboldi* (Schwager); in part M. Deflandre-Rigaud: Fig. 84.
1955 *Hemisphaeranthos malmensis* sp. n.; D.I. Frizzell, H. Exline: p.39, 133, 134, Pl. 8, Figs. 7, 8.
1964 *Myriotrochus chrysanthemum* nov. sp.; K. Frentzen: p. 46, Pl. 4, Figs. 33–36.
1965 *Hemisphaeranthos malmensis* Frizzell et Exline; E. Kristan-Tollmann: p.18.
1966 *Stueria malmensis* (Frizzell et Exline); D. I. Frizzell, H. Exline: p. U660, U668, Fig. 533, 3b.
1969 *Hemisphaeranthos malmensis* Frizzell et Exline, 1955; H. Górka, L. Łuszczewska: p. 364, 365, 380, 381, Pl. 77, Fig. 10.
1972*b* *Stueria malmensis* (Frizzell et Exline); H. Mostler: p. 9.

M a t e r i a l: 4 well preserved halfs of sclerites and 3 fragments of coarsely denticulated rim.

D i m e n s i o n in mm:

External diameter — 0.23–0.37

Description. Sclerites in form of a wheel with 12–17 spokes; rim inclined in plane of wheel, curving upward and inward; inner margin visible on the upper side, coarsely denticulate; number of denticles in some relation to number of spokes ±2 denticles per spoke; spokes thin, slightly narrowed towards the hub, finished on the margin, not continued within the hub; interspoke spaces high triangular; hub rather small without any structures; on the upper side of a sclerite slightly convex, creating button-like structure.

Remarks and discussion. The variability of the numbers of spokes in the same species, demonstrated by A. Lord and J. R. Senior (1973) on the ground of the similar to that described above species *Stueria gracillima* have been confirmed to be similar to the specimens from the Tatra Mts. The described specimens differ from T. Mortensen's (1937) specimens, cited by many authors (M. Deflandre-Rigaud, 1950; D. I. Frizzell, H. Exline, 1955, 1966) and from specimens from Poland (H. Górka, L. Łuszczewska, 1969) by the relation of numbers of spokes to numbers of denticles on the inner margin of a rim. This relation is very similar to the species *Stueria horrida* (B. A. Matyja, 1972), differing by the button-like structure on the lower side of sclerite.

Family **Protocaudinidae** Deflandre-Rigaud, 1962
Genus *Protocaudina* Croneis, 1932
Protocaudina mortenseni Deflandre-Rigaud, 1946
(Pl.II, Figs. 3, 4)

1953 *Protocaudina mortenseni* Deflandre-Rigaud; M. Deflandre-Rigaud: p. 953, 954, Text-Fig. 14.
1955 *Protocaudina mortenseni* Deflandre-Rigaud; D. I. Frizzell, H. Exline: p. 39, 58, 138, Pl.8, Figs. 13, 14.
1962 *Protocaudina mortenseni* Deflandre-Rigaud; M. Deflandre-Rigaud: p. 98, Figs. 148, 149, Pl. 3, Figs. 1, 2.
1966 *"Protocaudina" mortenseni* Deflandre-Rigaud; D. I. Frizzell, H. Exline: p. U661, U668.
1972*a* *Protocaudina rigaudae* Mostler; H. Mostler: p. 738, 739.
1972*b* *"Protocaudina" mortenseni* Deflandre-Rigaud; H. Mostler: p. 9.
1974 *Protocaudina rigaudae* Mostler; H. Kozur, R. Mock: Pl. 2, Figs. 2, 3.
1977 *Protocaudina rigaudae* Mostler; M. Mišík et al.: p. 47.

Material: 3 well preserved specimens.

Dimension in mm:

External diameter — 0.13–0.34
Perforations on the central plate — 0.01–0.3

Description. Sclerite in form of a wheel; rim inclined in plane of wheel, with outer part slightly irregular; central plate large with four perforations separated by characteristicly shaped bars; bars slightly convex; central part connected to the rim by eight very short, narrow, slightly narrowed towards the rim, spokes; interspoke spaces low and wide; inner margin of the interspoke spaces arched, outer nearly straight; denticulation only partly visible on the inner margin of the interspoke spaces of the largest specimen.

Remarks. Joint occurrence of the specimens of the same species with differences in dimensions demonstrate that the dimensions of sclerite are bad diagnostic feature.

Because of differing preservation of specimens there are some differences in the picture of denticles in the interspoke spaces. In the specimens from France (M. Deflandre-Rigaud, 1953, 1962; D. I. Frizzell, H. Exline, 1955) they are visible on the outer margin of these spaces (near to the rim), in the specimens from the Tatra Mts. partly on the inner margin (near to the central plate) but in the specimens from Slovakia (H. Kozur, R. Mock, 1974) the whole margin of the interspoke spaces is coarsely denticulate.

Some differences in the picture of the bars in the central part are noted. In the specimens from France they are markedly convex, in the specimens from Austria and Czecho-Slovakia flat, but in the Polish ones slightly convex.

Protocaudina mortenseni from the Tatra Mts. differs from *Protocaudina acmaea* (B. A. Matyja, 1972) from Oxfordian of the Holy Cross Mts. by the shape of the spokes and the interspoke spaces.

Occurrence. Callovian, ?Lower Oxfordian of the Tatra Mts.; Carnian of Austria (H. Mostler, 1972*b*) and Slovakia (H. Kozur, R. Mock, 1974); Upper Norian of Slovakia (M. Mišík et al., 1977); Oxfordian of France (M. Deflandre-Rigaud, 1953).

Incertae sedis
(Pl. I, Fig. 6a, b)

Material: One partly preserved specimen.

Dimension in mm:

Length of the sclerite — 0.42
Length of the branch — 0.25
Width of the branch — 0.10

Description. Incomplete sclerite of a triradiate form with branches circular in the cross section; the best preserved branch rounded at the and with numerous medium pores, elliptical in shape, elongated in direction of branch and arranged in parallel rows; on the other side, where the sclerite is broken shape and dimensions of pores inside the sclerite are showed; there pores are coarse, irregular and subcircular to elliptical.

Remarks. The specimen is similar to the one and only known specimen, described from Lower Jurassic of Germany as *Cucumaria feifeli* (T. Mortensen, 1937) and later cited as *Cucumarites feifeli* (D. I. Frizzell, H. Exline, 1955, 1966; E. Kristan-Tollmann, 1965; H. Mostler, 1972*b*), *"Mortensenites" feifeli* (M.Rioult, 1961) and

Procucumaria feifeli (K. Frentzen, 1964). Because of imperfect preservation and unclear systematic position of *Cucumarites feifeli*, the specimen from Poland is described as *incertae sedis*.

Occurrence. Callovian, ?Lower Oxfordian of the Tatra Mts.

Translated by the Author

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Michał LIPIEC

KILKA SKLERYTÓW HOLOTURII Z JURY SERII WIERCHOWYCH TATR

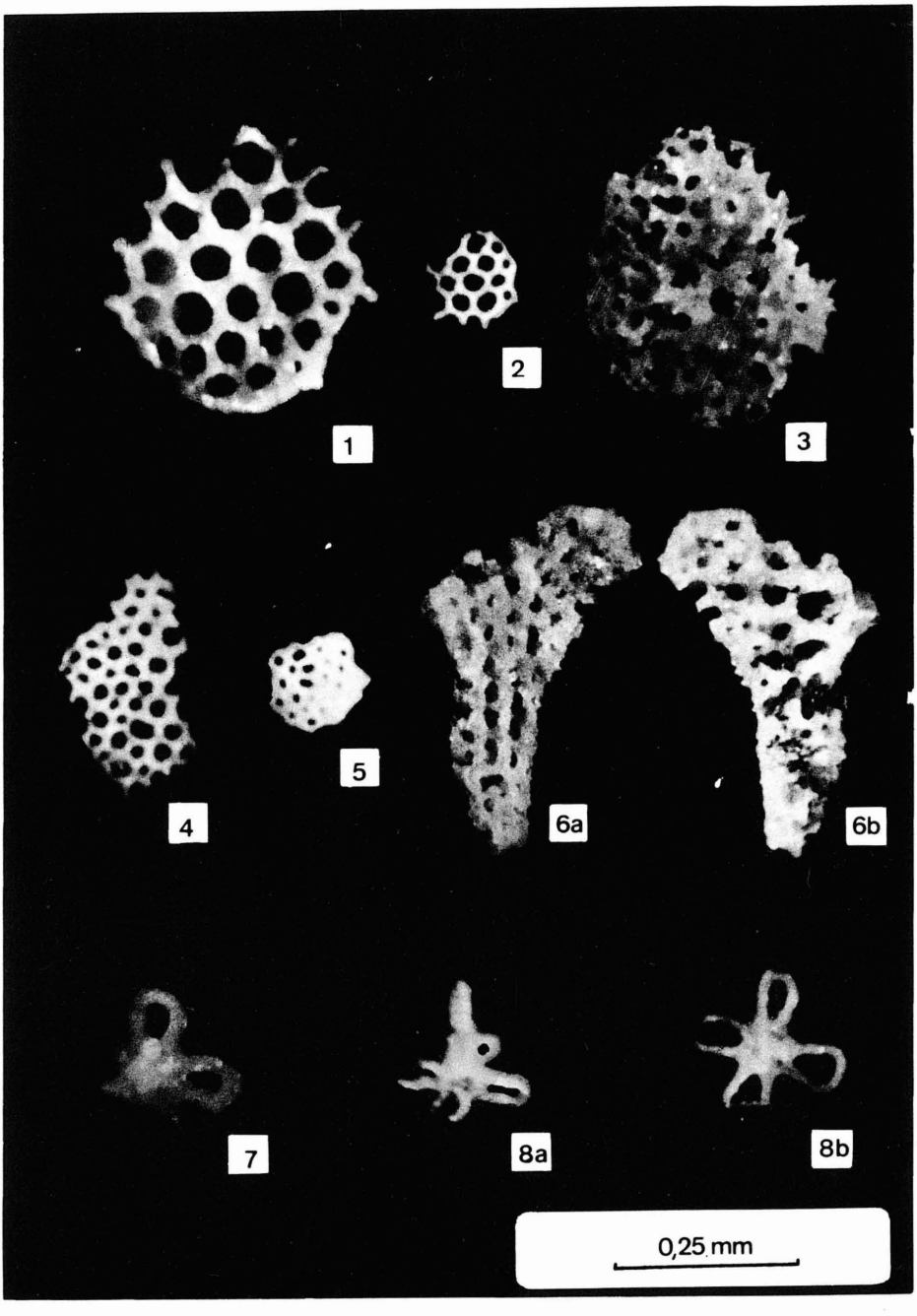
Streszczenie

Opisany został niewielki zespół sklerytów holoturii znaleziony w ciemnoczerwonych skondensowanych wapieniach o niejasnym wieku (kelowej, ?dolny oksford). Zasugerowana została możliwość popełniania błędów w oznaczeniach sklerytów strzykw spowodowana różnym stanem ich zachowania, na który mają wpływ: rodzaj maceracji, preparacja ze skał o różnym stopniu zwięzłości, różna zawartość węglanu wapnia w macierzystych skałach oraz rekrystalizacja.

PLATE I

Figs. 1, 2. *Eocaudina mortenseni* Frizzell et Exline
Fig. 3. *Paracucumarites porosus* Deflandre-Rigaud
Figs. 4, 5. *Eocaudina micropora* (Deflandre-Rigaud)
Figs. 6a,b. *Incertae sedis*
Figs.7, 8a, b. *Staurocumites bartensteini* Deflandre-Rigaud

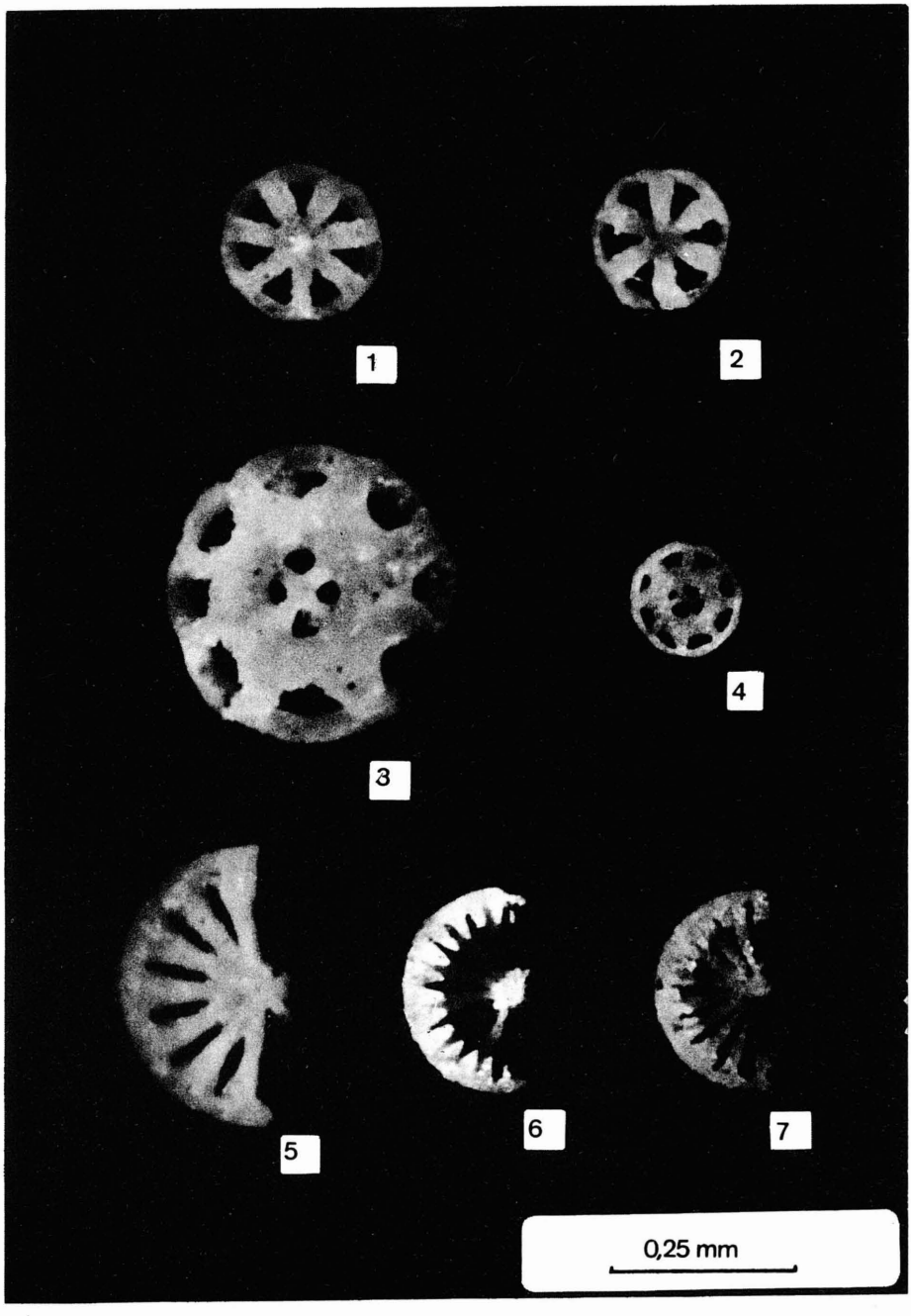
Holothurian sclerites from the Jurassic of the High-Tatric Series at the Kalackie Siodło, Tatra Mts.
Skleryty holoturii z jury serii wierchowych na Kalackim Siodle



Michał LIPIEC — Some Jurassic holothurian sclerites from the High-Tatric Series of the Tatra Mts., Poland

PLATE II

Figs. 1, 2. *Theelia convexa* (Whidborne)
Figs. 3, 4. *Protocaudina mortenseni* Deflandre-Rigaud
Figs. 5–7. *Stueria malmensis* (Frizzell et Exline)



Michał LIPIEC — Some Jurassic holothurian sclerites from the High-Tatric Series of the Tatra Mts., Poland