

Echinoderm Remains from the Middle Permian (Wordian) from Sosio Valley (Western Sicily)

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With 1 Text-Figure and 2 Plates

Italy
Sicily
Sosio Valley
Paleontology
Echinoderms
Taxonomy

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Zusammenfassung

2 neue Familien, 5 neue Gattungen und 10 neue Arten von mikroskopisch kleinen Echinodermenresten, die zu den Ophiocistoidea, Ophiuroidea, Holothuroidea und Echinodermen inc. sedis gehören, werden aus dem Mittelperm von Rupe del Passo di Burgio (Sosio-Tal, West-Sizilien) beschrieben. Die Gattung *Microantyx*, die bisher zu den Holothuroidea gestellt wurde, wird den Ophiocistoidea SOLLAS zugerechnet.

Abstract

2 new families, 5 new genera and 10 new species of microscopic echinoderm remains belonging to the Ophiocistoidea, Ophiuroidea, Holothuroidea and echinoderm remains incertae sedis were described from the Middle Permian of Rupe del Passo di Burgio (Sosio Valley, Western Sicily). The genus *Microantyx*, so far placed into the Holothuroidea is assigned to the Ophiocistoidea SOLLAS.

1. Introduction

The Middle Permian of the Sosio Valley has been investigated for long time, but mainly macrofaunas (e. g. ammonoids, crinoids, sponges) were described. Except fusulinids, microfossils were only described by BENDER & STOPPEL (1965), who found for the first time conodonts in the Sosio Valley. The stratigraphically most important species from the Rupe del Passo di Burgio section, *Mesogondolella siciliensis* (KOZUR) was still in-

cluded into *Gondolella rosenkrantzi* BENDER & STOPPEL by these authors. This species indicates (? Kubergandian) Wordian age, like also the ammonoid faunas.

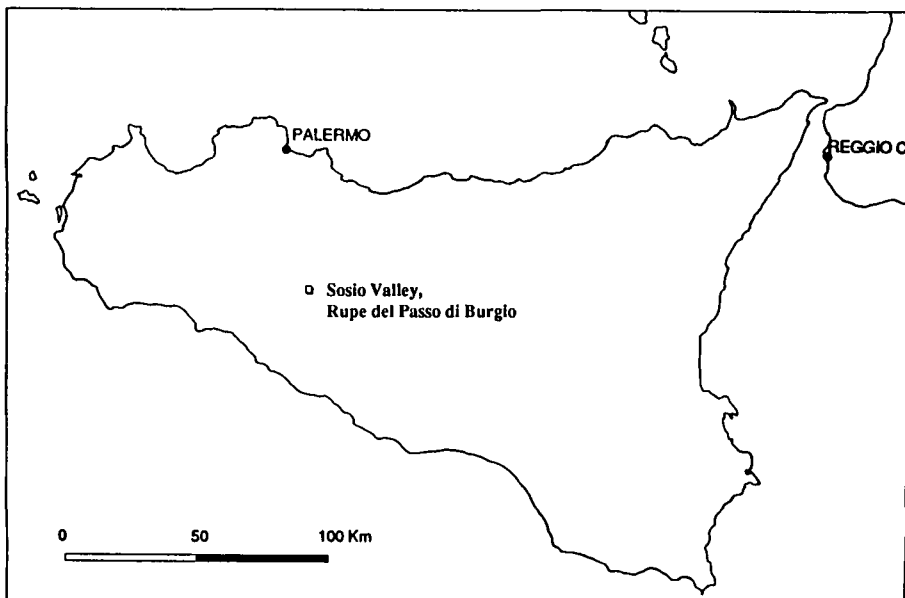
One of the authors (H. MOSTLER) sampled the Rupe del Passo di Burgio, Rocca di San Benedetto and Pietra di Salomone sections in 1984. The other author, H. KOZUR, sampled the same sections together with Dr. P. DI STEFANO, Palermo, in 1987. Ammonoid-bearing sediments of the Rupe del Passo di Burgio section with *Waagenoceras*, the index genus of the Wordian, yielded rich microfaunas with the conodonts *Mesogondolella siciliensis* (KOZUR), *Merrillina galeata* (BENDER & STOPPEL), *Hindeodus* n. sp. A and *Hindeodus* n. sp. B that indicate likewise a Wordian age.

Both authors found also many echinoderm remains (crinoids, echinids, ophiuroids, Ophiocistoidea, holothurian sclerites and echinoderms, inc. sedis) partly described in the present paper. Most of these echinoderm remains derived from the ammonoid-bearing beds of Rupe del Passo di Burgio.

2. Geological Setting

The stratigraphy of the Permian of western Sicily was quite revised by CATALANO; DI STEFANO & KOZUR (1988 and in press). According to these authors a continuous deep-water sequence is known from the Kungurian (higher Lower Permian) up to the Late Permian. Beside of this deep-water sequence (e. g. Kungurian flysch, Kubergandian olistostrome unit, Wordian to Dzhulfian soft, predominantly reddish clays) also slope sediments are present, known from olistoliths in the olisto-

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Text-Fig. 1.
Location of the sampling locality, Rupe del Passo di Burgio in the Sosio Valley, Western Sicily).

strome unit and from big blocks (tectonic klippen) of Middle Permian light-coloured limestones, which have yielded the famous Wordian faunas from the Sosio Valley described since the end of the last century.

Our investigated rocks were sampled in these blocks of Middle Permian slope sediments. The here described echinoderm remains derived all from light-coloured, ammonoid-bearing limestones of the locality Rupe del Passo di Burgio in the Sosio Valley (location see Fig. 1).

group has to be elevated from the Lower Carboniferous (until now known youngest Ophiocystioidea) up to the top of the Permian.

Until now, *Microantyx* was placed into the holothurian family Protocaudinidae DEFLANDRE-RIGAUD, 1962. But these holothurian sclerites are basically different by the absence of any hub.

3. Paleontological Part

Class Ophiocystioidea SOLLAS, 1899 Family Rotasaccidae HAUDE & LANGENSTRASSEN, 1976

Genus *Microantyx* KORNICKER & IMBRIE, 1958 emend. MOSTLER, 1983

Type species: *Microantyx permiana* KORNICKER & IMBRIE, 1958.

Remarks: The wheels of *Microantyx* are very similar to the wheels of *Rotasaccus dentifer* HAUDE & LANGENSTRASSEN (Ophiocystioidea SOLLAS). Only the symmetry of the arches on the lower surfaces of the wheels is different (4 in *Microantyx* and 3 in *Rotasaccus*). We place here also the genus *Microantyx* into the Ophiocystioidea SOLLAS. This is also supported by the fact that KORNICKER & IMBRIE (1958) published together with *Microantyx permiana*, the type species of *Microantyx*, wrinkle teeth (goniodonts), further very characteristic skeleton elements of the Ophiocystioidea. We have found in our material wheels (*Microantyx* spp.), goniodonts and sieve plates, the most important skeleton elements of Ophiocystioidea. Some elements could be rotulae. By our assignment of *Microantyx* into the Ophiocystioidea the known upper range of this fossil

Microantyx sosioensis n. sp. (Pl. 1, Figs. 1,2)

Derivatio nominis: According to the occurrence in the Sosio Valley.

Holotype: The specimen on pl. 1, fig. 1; rep.-no. KoMo 1988 I/1/IV-55a, Istituto Geologico, Palermo University.

Locus typicus: Rupe del Passo di Burgio, Sosio Valley, Sicily

Stratum typicum: Sample 12D, light coloured, Wordian ammonoid-bearing limestone with *Mesogondolella siciliensis* (KOZUR).

Material: 14 specimens.

Diagnosis: Wheel with moderately undulated rim and large, especially in the central part very high hub. 8 spokes short, tapering towards the rim. Lower side with relatively small, but deep excavation. Arches narrow, with distinct median bar and 4 rays on its ends. The pores between the arches and the margin of hub are smaller than the pores between the spokes and the rim. One pair of opposite central pores is usually somewhat larger than the other one.

Occurrence: Middle Permian of Sosio Valley. Remarks: *Microantyx botoni* GUTSCHICK, 1959, from the Lower Mississippian has cross-shaped, very broad arches and small central pores of equal size. Moreover, the rim is quite round or only indistinctly undulated.

Microantyx tarazi MOSTLER & RAHIMI-YAZD, 1976, from the highest Dorashamian (higher part of Lower Changxingian) has a strongly undulated outer rim. It has obviously evolved from *M. sosioensis* n. sp.

***Microantyx pseudobotoni* n. sp.**

(Pl. 1, Figs. 3,4)

Derivatio nominis: According to the similarity with *M. botoni* GUTSCHICK, 1959.

Holotype: The specimen on pl. 1, fig. 3; rep.-no. KoMo 1988/I/2/III-94 a.

Locus typicus: As for *M. sosioensis*.

Stratum typicum: Sample S 9, light-coloured, ammonoid-bearing limestone with *Mesogondolella siciliensis* (KOZUR), Wordian.

Material: 23 specimens.

Diagnosis: Wheels with round or only indistinctly undulated rim. Hub higher than rim, large. 8 short spokes, tapering toward the rim. Lower surface deeply excavated. 4 arches thin, with median bar. Central pores generally large, but sometimes smaller than the outer pores. One pair of opposite central pores may be a little smaller than the other one.

Occurrence: Higher Mississippian to Late Permian.

Remarks: The holotype and the paratype of *Microantyx botoni* GUTSCHICK, 1959, have arches in form of a broad cross and the central moderately undulated rim. It is a transitional form between the conservative *M. pseudobotoni* n. sp. and *M. tarazi* MOSTLER & RAHIMI-YAZD, 1976, from the Late Permian.

Genus *Pararotasaccus* n. gen.

Type species: *Pararotasaccus permicus* n. gen. n. sp.

Diagnosis: Wheel circular to subcircular. Hub in the central portion rather strongly elevated. Lower surface in the central part deeply excavated, with 3 at least terminally dibranched arches.

Occurrence: Mississippian to Middle Permian.

Assigned species: *Pararotasaccus permicus* n. gen. n. sp.

Microantyx mudgei GUTSCHICK; CANIS & BRILL, 1967.

Remarks: *Microantyx* KORNICKER & IMBRIE, 1958, has constantly 4 arches, mostly starting from the ends of a short median bar. The wheels of the Devonian *Rotasaccus* HAUDE & LANGENSTRASSEN, 1976, have also an arch with 3 branches, but their ends are not dibranched. In the primitive Mississippian *Pararotasaccus mudgei* (GUTSCHICK; CANIS & BRILL, 1967) the 3 branches of the arch are only terminally branched and mostly one branch is still unbranched. This shows clearly the affinity to *Rotasaccus* HAUDE & LANGENSTRASSEN, 1976. In the highly evolved Middle Permian *Pararotasaccus permicus* n. gen. n. sp. the primary rays branch already shortly after the centrum and near to the end of some of the branched rays begins already a secondary branching. Wrinkle teeth, sieve plates and partly also rotulae were found together with wheels of *Pararotasaccus* n. gen., but in these samples also *Microantyx* occurs, so that in these cases it cannot be decided, whether these elements belong to *Microantyx* (accompanied also with these elements, if it occurs without *Pararotasaccus*) or to *Pararotasaccus* n. gen.

***Pararotasaccus permicus* n. gen. n. sp.**

(Pl. 1, Fig. 5)

Derivatio nominis: According to the occurrence in the Permian.

Holotype: The specimen on pl. 1, fig. 5; rep.-no. KoMo 1988 I-3/IV-55

Locus typicus and stratum typicum: As for *Microantyx sosioensis* n. sp.

Material: 5 specimens.

Diagnosis: Wheels circular to subcircular with constantly 6 spokes tapering toward the wheels. Hub centrally higher than rim. Lower surface of hub in a relatively small inner part deeply excavated. Arches basically triradiate. These 3 primary branches are bibranched shortly after the centre. Near to the margin some of the secondary branches are secondarily branched.

Occurrence: Middle Permian (Wordian) of Sosio Valley.

Remarks: In *Pararotasaccus mudgei* (GUTSCHICK; CANIS & BRILL, 1967) the branching of the 3 primary branches of the arch is near to the margin. Mostly one, sometimes even two primary branches are unbranched. No branching of the secondary branches can be observed. Moreover, in this species an incomplete secondary outer pore ring is developed.

Class Ophiuroidea GRAY, 1840

Family Calclyridae FRIZZELL & EXLINE, 1955

Genus *Calclyra* FRIZZELL & EXLINE, 1955

Type species: *Prosynapta eiseliiana* SPANDEL, 1898.

Remarks: MOSTLER (1971) could demonstrate that *Calclyra* is not a holothurian sclerite, but belongs to the spines of the central parts of ophiuroids (Lochstachel = cavate spine).

***Calclyra gracilis* n. sp.**

(Pl. 1, Fig. 6)

Derivatio nominis: According to the slender form.

Holotype: The specimen on pl. 1, fig. 6; rep.-no. KoMo 1988 I-6/IV-64, Institute of Geology and Paleontology, Innsbruck.

Locus typicus and stratum typicum: As for *Microantyx sosioensis* n. sp.

Material: More than 100 specimens.

Diagnosis: Shaft circular, of different length. Basal socket distinct, with excentric opening. Distal part of shaft widened, but flattened. Head with 3 rays that run over most of the distance subparallel. All 3 rays strongly upward-bended from the plane of the shaft in the lower third of the head and then with almost 90° downward-bended so that the whole spine is angular in lateral view. The middle ray reaches about to the middle part of the head, where it is connected as a keel with the thin, but broad, distally widened median part of the head. In continuation of the keel a narrow furrow can be often observed. Distally two

very narrow parallel pores are present in the median part of the head. The upper end of the head is broadly rounded or blunt. The two cavae are long and broadest in their lower part.

A second type of cavate spines of the same species has only a very short shaft and a short, broad head of oval to nearly subcircular outline, broadest in the lower third or middle part and in its upper part broadly rounded to blunt.

Occurrence: Middle Permian of Sosio Valley. Remarks: *Calclyra eiseliiana* (SPANDEL) from the Dzhulfian (Late Permian) is only known from the morphotypes with short shaft and head. The upper part of the head is slightly concave. *Calclyra carbonica* n. sp. has a pointed upper end of the head, no perforation in the median upper part of the head and the head has no parallel to subparallel, but clearly convex outer rays.

***Calclyra carbonica* n. sp.**

Derivatio nominis: According to the occurrence in the Carboniferous.

Holotype: The specimen, figured by MOSTLER (1971), Fig. 4.

Locus typicus: Dasht-i Nawar Valley section (eastern central Afghanistan).

Stratum typicum: Biogenic limestone of Mississippian (Lower Carboniferous, Viséan).

Material: More than 100 specimens.

Diagnosis: Long slender morphotype with shaft of different length with well developed basal socket that has an excentric opening. Head suboval, broadest a little below its midlength and pointed in its upper part. Median ray tapers towards the midlength and becomes then considerably broader towards the upper end of the head. In lateral view the cavate spine is angular, highest in the broadest part of the head, but the elevation is not very steep. Cavae broadest in the middle part. The short morphotype has a broad, very short shaft with broad basal socket, likewise with excentric opening. The head is short, broad, nearly round to broadly subtriangular. Upper margin of head pointed and also slightly angular against the side branches.

Occurrence: Lower Carboniferous (Mississippian).

Remarks: This species was placed into *Calclyra eiseliiana* (SPANDEL) by MOSTLER (1971). But the outline of the head in this species is quite different (concave upper margin).

Calclyra gracilis n. sp. has a broadly rounded or blunt upper margin of the head and the slender morphotype has subparallel outer rays of the head.

Class Holothuroidea ZITTEL, 1883 **Family Calclamnidae** **FRIZZELL & EXLINE, 1955**

Genus *Eocaudina* MARTIN, 1952

Type species: *Eocaudina septaforaminalis* MARTIN, 1952.

***Eocaudina septaforaminalis* MARTIN, 1952** **emend. GUTSCHICK & CANIS, 1971**

(Pl. 1, Fig. 7)

Range: Devonian to Triassic.

Family Priscopeditidae **FRIZZELL & EXLINE, 1955** **Genus *Staurocumites*** **DEFLANDRE-RIGAUD, 1952**

Type species: *Staurocumites bartensteini* DEFLANDRE-RIGAUD, 1952.

***Staurocumites tetraporatus* n. sp.**

(Pl. 1, Fig. 8)

Derivatio nominis: According to the 4 large pores.

Holotype: The specimen on pl. 1, fig. 8; rep.-no. KoMo 1988 I-4/IV-57.

Locus typicus and stratum typicum: As for *Microantyx sosioensis* n. sp.

Material: 3 specimens.

Diagnosis: Basal plate with 4 big oval pores of about equal size arranged in form of a cross. Central spine very robust, long, a little arched, terminally branched.

Occurrence: Middle Permian (Wordian) of Sosio Valley.

Remarks: *Staurocumites bartensteini* DEFLANDRE-RIGAUD, 1952 from the Jurassic has often a quite similar basal plate, but the central spine is terminally not branched and its base is composed of 2-4 small spines.

Similar forms occur in the Triassic (*Priscopeditus* sp. 1 SPECKMANN, 1968), but they have a more delicate central spine.

Family Theeliidae FRIZZELL & EXLINE, 1955 **Genus *Theelia* SCHLUMBERGER, 1890**

Type species: *Chirodota undulata* SCHLUMBERGER, 1890.

***Theelia mesopermiana* n. sp.**

(Pl. 1, Fig. 9)

Derivatio nominis: According to the occurrence in the Middle Permian.

Holotype: The specimen on pl. 1, fig. 9; rep.-no. KoMo 1988 I-5/IV-71.

Locus typicus and stratum typicum: As for *Microantyx pseudobotoni* n. sp.

Material: 3 specimens.

Diagnosis: Wheel subcircular to slightly undulated, inner margin not denticulated. Hub small, high. 8 spokes of equal width on their whole length. Lower surface deeply excavated.

Occurrence: Middle Permian of Sosio.

Remarks: *Theelia consonus* (CARINI, 1962) has a plane lower surface and a cylindrical hub.

Echinodermata, incertae sedis **Family Pediculacaudinidae n. fam.**

Diagnosis: Sieve plate with terminal shaft of different length that is somewhat oblique to the plane of the sieve plate.

Occurrence: Lower Mississippian to Middle Permian.

Assigned genera: *Pediculacaudina* n. gen.
Spicatocaudina n. gen.

Remarks: Representatives of this family were until now placed into the Holothuroidea, but this assignment is unsure. Therefore we prefer to place these forms into Echinodermata, inc. sedis.

Genus *Pediculacaudina* n. gen.

Type species: *Pediculacaudina siciliensis* n. gen. n. sp.

Diagnosis: Oval, marginally slightly upturned sieve plates with slightly thickened margin. Shaft very long, solid, only slightly upturned from the plane of the sieve plate, always marginally situated.

Occurrence: Middle Permian of Sosio Valley, Sicily.

Remarks: *Spicatocaudina* n. gen. has a considerably shorter, spine-like shaft, situated marginally or submarginally. The sieve plate is subcircular with regular, in their size only a little varying pores.

***Pediculacaudina siciliensis* n. gen. n. sp.**

(Pl. 1, Fig. 10)

Derivatio nominis: According to the occurrence in Sicily.

Holotype: The specimen figured on pl. 1, fig. 10; rep.-no. KoMo 1988 I-9/IV-72, Istituto Geologico, Palermo University.

Locus typicus and stratum typicum: As for *Microantyx sosioensis* n. sp.

Material: 3 specimens.

Diagnosis: Sieve plate oval, with distinct elevated narrow marginal rim. Pore size irregular. Near the rim, there is an imperfect ring of small pores. The other pores are larger, subcircular, oval or rounded polygonal, varying in their sizes from large to moderately large. Lattice frame irregularly polygonal. Shaft very long, solid, a little arched, somewhat oblique to the plane of the sieve plate. Occurrence: Middle Permian of Sosio Valley.

Remarks: No similar species are known.

***Spicatocaudina* n. gen.**

Derivatio nominis: According to the marginal/submarginal spine.

Type species: *Turoholia spicata* GUTSCHICK, 1959.

Diagnosis: Sieve plate round, with smooth or slightly undulated outer margin. Pores in size and form regular. Marginally or submarginally a short to moderately long spine is present, obliquely arranged to the plane of the sieve plate.

Occurrence: Lower Carboniferous (Mississippian).

Assigned species: *Turoholia spicata* GUTSCHICK, 1959.
Spicatocaudina n. sp. = *Eocaudina spicata* (GUTSCHICK) sensu GUTSCHICK, CANIS & BRILL, 1967.

Remarks: *Eocaudina* MARTIN, 1952, and *Turoholia* GUTSCHICK, 1954, are distinguished by the absence of the spine.

In *Pediculacaudina* n. gen. a long shaft is present instead of a spine and the sieve plate is oval with irregular pores and thickened margin.

Family Semperitidae MOSTLER, 1970

Remarks: Taxa, assigned to this family, were until now regarded as holothurians. We cannot exclude such a possibility, but no similar holothurian sclerites are known among recent forms. Therefore, we cannot exclude that these sclerites belong to other echinoderms. For this reason we regard the Semperitidae MOSTLER as echinoderm remains, inc. sedis.

Genus *Bicornuticaudina* n. gen.

Derivatio nominis: According to the two horns.

Type species: *Bicornuticaudina burgioensis* n. gen. n. sp.

Diagnosis: Strongly arched elongated sieve plate. In the middle part, just at the beginning of the upward-bending, there are 2 solid horns.

Occurrence: Middle Permian of Sosio Valley.

Remarks: In *Biacumina* MOSTLER, 1970, from the Triassic, the sieve plate ends in 2 big, often imperforate arms. In the central part a more or less large prolongation of the sieve plate is present that bears only irregular appendices.

***Bicornuticaudina burgioensis* n. gen. n. sp.**

(Pl. 2, Fig. 3)

Derivatio nominis: According to the occurrence in Rupe del Passo di Burgio, western Sicily.

Holotype: The specimen on pl. 2, fig. 3; rep.-no. KoMo 1988 I-8/IV-54.

Locus typicus and stratum typicum: As for *Microantyx sosioensis* n. sp.

Material: 12 specimens.

Diagnosis: Strongly arched elongated sieve plate with round to oval pores of irregular size. The unit is both strongly arched with concave lower, upper side and also strongly curved in the perpendicular plane with strongly upturned outer parts. At the upper side, just at the beginning of the bending, 2 solid roundish horns are present.

Occurrence and remarks: As for the genus.

Family Tubocaudinidae n. fam.

Diagnosis, occurrence and remarks: As for the genus *Tubocaudina* n. gen. (see below).

Genus Tubocaudina n. gen.

Type species: *Tubocaudina longitubus* n. gen. n. sp.

Derivatio nominis: According to the similarity with *Eocaudina* MARTIN and the presence of a tubus.

Diagnosis: Sieve plate with irregular slightly lobate outline and pores of irregular size and shape. On one end a round tubus of different height is present.

Occurrence: Middle Permian of western Sicily.

Assigned species: *Tubocaudina longitubus* n. gen. n. sp.
Tubocaudina n. sp.

Remarks: *Tubocaudina* n. gen. resembles *Eocaudina* MARTIN, 1952, but the outline is more irregularly lobate and no tubus is present above one marginal pore.

Tubocaudina longitubus n. gen. n. sp.

(Pl. 2, Fig. 1)

Derivatio nominis: According to the long tubus.

Holotype: The specimen on Pl. 2, Fig. 1, rep.-no. KoMo 1988 I-7/IV-73, Istituto Geologico, Palermo University.

Locus typicus and stratum typicum: As for *Microantyx pseudobotoni* n. sp.

Material: 3 specimens.

Diagnosis: Sieve plate of irregular, slightly lobate outline. Pores irregular in size and shape. Above a large marginal pore a high tubus is developed.

Occurrence: Middle Permian (Wordian) of western Sicily.

Remarks: *Tubocaudina* n. sp. has only a low tubus.

4. Stratigraphic Evaluation of the Fauna

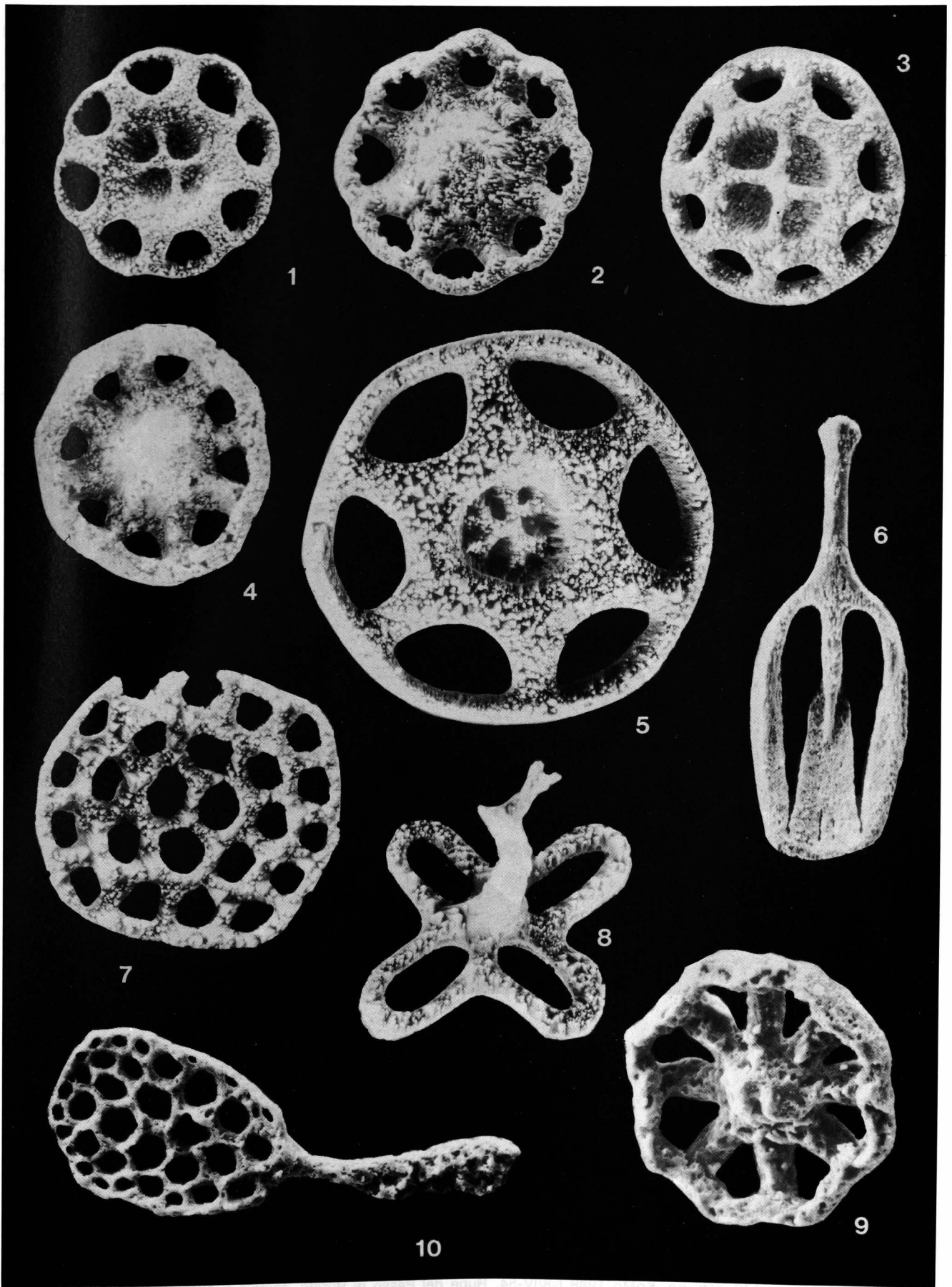
The Ophiocistoidea, the holothurian sclerites and the other echinoderm elements have in the Late Paleozoic some importance for stratigraphic subdivisions. The Late Permian association, described by MOSTLER & RAHIMI-YAZD, 1976, is quite different from our Middle Permian associations by the dominance of rather highly evolved *Theelia* of Triassic type. Our Middle Permian fauna, in turn, contains quite different and not so diversified *Theelia*. On the other hand, Ophiocistoidea are more frequent in the Middle Permian and partly represented by forerunners of Late Permian species (*Microantyx sosioensis* – *M. tarazi*). Quite surprisingly, our Middle Permian fauna has more similarity to Carboniferous, even Lower Carboniferous faunas, than to higher Late Permian faunas that are more related to Middle Triassic faunas (Lower Triassic holothurian sclerites are not yet known).

Acknowledgements

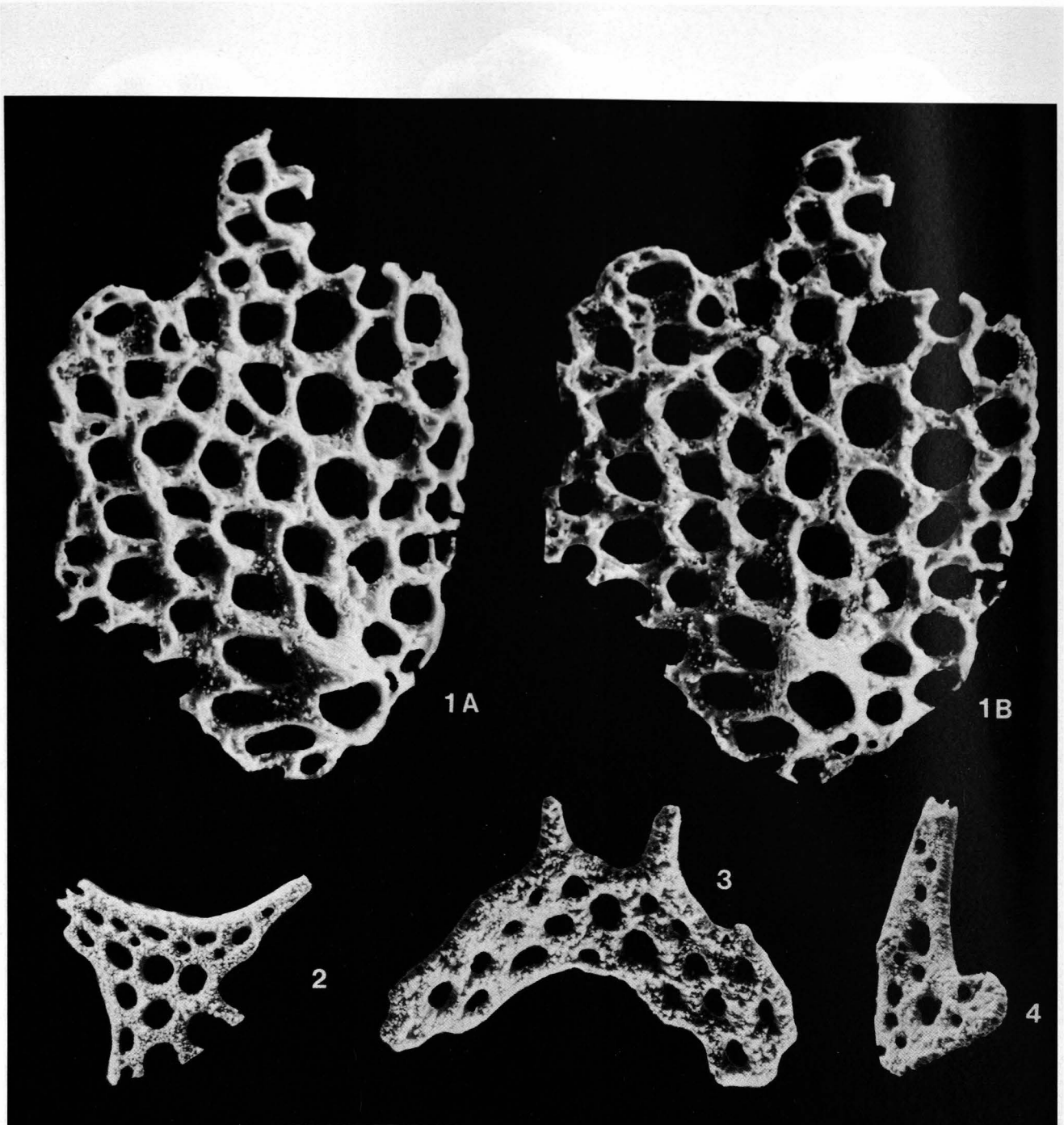
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Plate 1

- Figs. 1,2: ***Microantyx sosioensis* n. sp.**
x 170, Rupe del Passo di Burgio (Sosio Valley, Western Sicily), sample S 12D, light-coloured, ammonoid-bearing limestone with *Mesogondolella siciliensis* (KOZUR).
Fig. 1: Holotype, lower view, rep.-no. KoMo 1988 I-1/IV-55a.
Fig. 2: Upper view, rep.-no. KoMo 1988/IV-58.
- Figs. 3,4: ***Microantyx pseudobotoni* n. sp.**
x 170, Rupe del Passo di Burgio (Sosio Valley), sample S 9, Wordian, light-coloured, ammonoid-bearing limestone with *Mesogondolella siciliensis* (KOZUR).
Fig. 3: Holotype, lower view, rep.-no. KoMo 1988 I-2/III-94a.
Fig. 4: upper view, rep.-no. KoMo 1988/IV-42.
- Fig. 5: ***Pararotasaccus permicus* n. gen. n. sp.**
Holotype, lower view, x 320, rep.-no. KoMo 1988 I-3/IV-55, locality and sample data as for Figs. 1,2.
- Fig. 6: ***Calclyra gracilis* n. sp.**
Holotype, ophiuroid spine, x 170, rep.-no. KoMo 1988 I-6/IV-64, locality and sample data as for Figs. 1,2.
- Fig. 7: ***Eocaudina septaforaminalis* MARTIN, 1952 emend. GUTSCHICK & CANIS, 1971.**
x 320, rep.-no. KoMo 1988/IV-60, locality and sample data as for Figs. 1,2.
- Fig. 8: ***Staurocumites tetraporatus* n. sp.**
Holotype, somewhat oblique upper view, x 320, rep.-no. KoMo 1988 I-4/IV-57, locality and sample data as for Figs. 1,2.
- Fig. 9: ***Theelia mesopermiana* n. sp.**
Holotype, upper view, x 320, rep.-no. KoMo 1988 I-5/IV-71, locality and sample data as for Figs. 3,4.
- Fig. 10: ***Pediculicaudina siciliensis* n. gen. n. sp.**
Holotype, x 320, rep.-no. KoMo 1988 I-9/IV-72, locality and sample data as for Figs. 1,2.



Small text at the bottom of the image, possibly a scale bar or reference information, which is mostly illegible.



- Fig. 1: *Tubocaudina longituba* n. gen. n. sp.
 Holotype, x 320, rep.-no. KoMo 1988 I-7/IV-73, Rupe del Passo di Burgio, sample S 9, Wordian light-coloured ammonoid-bearing limestone with *Mesogondolella siciliensis* (KOZUR).
 a) Slightly tilted upper view, tubus well visible in the lower part of the picture.
 b) Untilted upper view.
- Figs. 2,4: Indet echinoderm remains (holothurian sclerites?), x 170, locality and sample data as for Fig. 3.
- Fig. 3: *Bicornutocaudina burgioensis* n. gen. n. sp.
 Holotype, x 170, rep.-no. KoMo 1988 I-8/IV-54, Rupe del Passo di Burgio, sample S 12D, Wordian, light-coloured ammonoid-bearing limestone.

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