A polychaete jaw apparatus and some scolecodonts from the Polish Middle Triassic

ABSTRACT: A polychaete jaw apparatus, composed of joined carriers, two $MI$ and two $MII$, 13 isolated elements of other jaw apparatus and a form with an unknown taxonomic position have been described from the Middle Triassic (Muschelkalk) of Southern Poland.

INTRODUCTION

The jaw apparatuses of the polychaetes and their isolated single elements, that is, the scolecodonts have recently aroused a more and more lively interest of various paleontologists. So far, the best known are the jaws of the Paleozoic polychaetes, the credit for which should, to a considerable extent, be given to the Polish authors, Kozlowski (1956), Kielan-Jaworowska (1961, 1962, 1966) and Szaniawski (1968, 1971). Of fundamental importance was Kielan-Jaworowska’s work (1966), which contributed to an enormous progress of the knowledge of this group of fossils.

Isolated elements and complete jaw apparatuses have thus far been a rarity in the Mesozoic. Such materials found in deposits younger than the Paleozoic ones have recently become more and more frequent. This is in conformity with Kielan-Jaworowska’s (1968) opinion that an insufficient micropaleontological recognition of the Mesozoic rocks is one of the causes of the rarity of the Mesozoic jaw apparatuses.

So far, nobody succeeded in finding a complete and well preserved Mesozoic jaw apparatus. Even when an imprint of the body of a polychaete was preserved, the jaw apparatus was usually more or less damaged (e.g., *Eunicites triassicus* Gall & Grauvogel 1967).
In Kielan-Jaworowska's (1966, 1968) opinion, the orthotaxonomic system applied to jaw apparatuses should be separated from the parataxonomic one used for isolated elements of such apparatuses. An extensive discussion on this subject is conducted by Kozur (1970, 1971), who decidedly rejects the possibility of using two systems and believes that, according to the provision of the International Code of Zoological Nomenclature (1958), only one taxonomic system should be used for both more or less complete apparatuses and for their isolated elements, with which this author consistently complies conducting a revision of all genera and species known so far in connection with the apparatuses and their parts. The present writer does not intend to take up a discussion on this subject. The presentation of one's attitude towards the problems of taxonomy and a phylogenetic development of the polychaetes would require an elaboration and comparison of many collections of fossil and Recent polychaetes, which would exceed the framework of the present paper. Taking example by many authors who are now concerned with scolecodonts (e.g., Taugourdeau 1970, 1971), most isolated elements of jaw apparatuses is here described according to the parataxonomic system. Since the material includes, however, a jaw apparatus and a few isolated elements which have previously been described by A. Kozur according to the combined uniform taxonomic system, to avoid any mistakes the generic names of parataxons are put in quotation-marks. The terminology used in descriptions have been adopted after Kielan-Jaworowska (1966).

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STRATIGRAPHIC REMARKS AND THE MATERIAL

The material under study includes a jaw apparatus, an MI connected with carriers, an MII and an MIV connected with each other and more than 300 isolated elements. Most of them (182) are MI and MII belonging to the jaw apparatus referred to above. Many samples coming from the whole of the Muschelkalk were dissolved in acetic acid. The presence of scolecodonts was found in only one lithostratigraphic member, that is, the Gogolin Beds (Lower Muschelkalk). Figure 1 shows only those sectors of profiles in which the occurrence of scolecodonts was found. These are the Trzebyczka and Rokitno boreholes in the Polish Jura Chain and profiles from the Strzelce Opolskie and Góraźdże quarries in Lower Silesia. As easily
noticeable, scolecodonts appear in the facies of marly limestones of the upper part of the Gogolin Beds and do not occur higher up in the facies of Diplopora dolomites and onkolitic limestones.

Isolated elements of such an apparatus as found in the Gogolin Beds, were described only from the Lower Muschelkalk of Germany (Kozur 1967, 1970, 1971). In view of this fact they seem to be of a stratigraphic importance as forms characteristic of the Lower Muschelkalk.
PALEONTOLOGICAL DESCRIPTIONS

Higher taxons, including the species previously described by Kozur (1970, 1971), are given after this author.

Order Phyllocoda Dales, 1962
Family Goniadidae Kinberg, 1865
Genus GONIADA Audouin & Milne-Edwards, 1833
Goniada cuneata (Kozur, 1967)
(Pl. 3, Fig. 3)

1971. Goniada cuneata (Kozur); H. Kozur, Pl. 14, Fig. 12; Pl. 15, Fig. 14.

Material. — A jaw.
Dimensions. — Length 0.272 mm.
Description. — Form very characteristic owing to its fairly long, clawlike, strongly upturned denticles. Posterior part of jaw bent and forming an oval-triangular spur behind the last denticle. The opening of pulp cavity gaping as far as the base of the first denticle.
Occurrence. — Lower Silesia (Góraźdże), Lower Muschelkalk; Germany, Lower Muschelkalk, Keuper.

Family — unknown
Genus PARANEREITES Eisenack, 1939
Paranereites balticus Eisenack, 1939
(Pl. 2, Fig. 1)


Material. — Nineteen right and seventeen left jaws.
Dimensions. — Length 0.480 to 0.720 mm; width 0.120 to 0.240 mm. The specimen illustrated: length 0.720, width 0.240 mm.
Description. — An elongated form, resembling a bent and flattened cone, whose anteriorly bent hook extends and gradually passes into the rest of the jaw. Inner and outer margin converge more or less halfway the jaw, so that the posterior part of jaw elongates and, frequently, tapers. Inner margin of the anterior part provided with a thin sharp-edged, fairly wide list situated in the plane of jaw. Ridges stretching posteriorly of the hook and nearer the outer margin of jaw are clearly visible on both the ventral and dorsal side. They make up attachment places of the inner septum to the wall of jaw. This septum divides the wall into two parts, the outer one having, therefore, the form of a long, conical tooth. Part of jaw situated between the outer margin and that mentioned above is ventrally convex and provided with semicircular rollers and grooves.
Remarks. — Almost all features of the specimens described above accurately correspond to characteristics of the holotype. Since only two specimens were available to Eisenack, it seems very likely that the presence of inner septum escaped his attention. In the sight of this supposition, the absence of any mention of this, complication in structure from Kozur’s works (1967, 1971), based on a abundant material, is incomprehensible.
Occurrence. — Lower Silesia (Góraźdże), Polish Jura Chain (Rokitno), Lower Muschelkalk; Baltic-sea region, Jurassic; Germany, Upper Muschelkalk and Upper Cretaceous.
Order Eunicida Dales, 1962
Family Lysaretidae Kinberg, 1865, emend. Kozur, 1970
Genus DELOSITES Kozur, 1967

Delosites raridentatus Kozur, 1967, emend. author
(Pl. 1, Figs 1—3)

1967. Delosites raridentatus n. sp.; H. Kozur, p. 857, PI. 2, Fig. 10.
1971. Delosites raridentatus Kozur; H. Kozur, p. 83, PI. 14, Fig. 14.

New diagnosis. — Length of carriers, about 0.6 of the length of MI, MI shaped like an elongated triangle. Hook long, slender. All other denticles much smaller and widely spaced. Outer-posterior corner provided with a large process. Oval opening of pulp cavity occupying 0.4 of the length of jaw. MII seems to be identical as or somewhat shorter than MI. Teeth widely spaced. Opening of pulp cavity gaping.

Denticle formula: MI 4—5 4—6
MII 6—7 6—9

Material. — An apparatus composed of 6 elements, joined carriers, two MI and two MII, as well as 61 MI and 121 MII.

Description. — Carriers strongly deformed, their shape difficult to discern, except in lateral view which allows one to see that these are two plates strongly fused with MI and MII (?). In Fig. 2, the carriers are shown hypothetically on the basis of the fact that the same type of morphology was observed in all samples in which the carriers occurred, along with MI and MII. Anterior margin sublinear, inner margins slightly concave, outer forming — in the anterior part of carriers — a distinct right subsequently running posteromedially. Length of MI varying from 0.200 to 0.700 mm, of MII 0.200 to 0.600 mm. Dimensions of the apparatus illustrated: length of carriers, 0.120 mm, of MI 0.192 mm, of MII 0.190 mm. MI has a very long, slender hook, running in the posterior part anterolaterally; its anterior terminal part is nearly always arranged laterally and only rarely slightly posterolaterally. Inner margin straight or, in the part occupied by the denticles, somewhat convex. Denticle usually directed laterally; sometimes, the first and second denticle behind the hook display a slight anterolateral deviation. Denticles are long, needle-shaped and gradually diminishing posteriorly. Beginning with the last tooth, which in many cases is very indistinctly, outlined, inner margin changes its direction. Outer margin running posterolaterally and at a distance of 2/3 of its length from the posterior margin of jaw passes in to a large, spatulate process. Further on, this margin runs posteromedially, subsequently turning transversally. The anterior margin of pulp cavity is falcate in outline, the posterior one provided with a collar-shaped convexity.

The right and left jaws are mirror-like reflections of each other. MII is elongated. Except for the anterior part with the first denticle, the entire jaw is lanceolate in outline. Outer margin of a wide, foliaceous tooth passes posteriorly into a short, posteriorly directed shank. Anterior parts of the outer margin of the left slope of the right jaw and of the right slope of the left jaw form a fairly wide, oval, posterolaterally facing convexity. Inner, narrow parts of this slope are subvertical, outer wider and situated at a certain angle to the inner. Margins of these slopes are usually provided with a remainder of the attachment lamella. Denticles widely spaced, foliaceous or triangular, sometimes nodular. Opening of pulp cavity occupying the entire length of jaw. On the side of the right margin of the right jaw and left margin of the left jaw, the margin of pulp cavity is swollen. MIIr is a mirror-like reflection of MII.
Diagram of the jaw apparatus Delosites raridentatus Kozur, emend. Zawidzka

Variability. — A general variability is shown in Fig. 3. In the case of MI, it is mostly expressed in the outline of the inner margin and the shape and situation of teeth, while in MII a differentiation is observed in the shape and size of teeth. Dimensions of jaws vary within wide limits.

Remarks. — In 1967, two genera and two species for MI and MII of the apparatus described have been erected by Kozur who treated them as separate parataxons. Then, in 1970, he placed them in the classification, he corrected, on the following positions: MI = "Delosites" raridentatus Kozur within the family Lysaretidae, Kinberg, 1885, emend. Kozur, 1970 and MII = "Palurites" separatus within the family Dorvilleidae Chamberlin, 1919, emend. Kozur, 1970. At the same time, this author is not quite certain of the systematic position of the last-named genus (Palurites).


The fact described above may constitute a contribution to further considerations of the advisability of using one taxonomic system for both isolated elements and complete jaw apparatus of fossil polychaetes.

Detosites raridentatus Kozur, emend. Zawidzka; several jaws illustrating the specific variability

It should be added that the fact that, in the process of studies on this material, "D." raridentatus and "P." separatus occurred in samples in equal amounts, predominating over other scolecodonts, enabled the conclusion that they belonged to one and the same apparatus. This conclusion was subsequently confirmed by finding such an apparatus.

Occurrence. — The apparatus was found in the Gogolin Beds at Górażdze, Lower Silesia. Isolated elements of this apparatus occurred in predominant amounts in all profiles (Fig. 1). In Germany, such elements also occur in the Lower Muschelkalk.

Eunicites thuringensis? (Kozur, 1967)
(Pl. 3, Figs 6—7)

Material. — Two right and one left jaw.

Dimensions. — Length of the order of 0.380 mm, width 0.096 mm; dimensions of the specimens illustrated: in Pl. 3, Fig. 7 — length 0.373; in Pl. 3, Fig. 6 — length 0.364 mm.

Description. — Elongate, narrow jaws with a large number of triangular, posteriorly deflected denticles on outer margin. Not very long, transverse branchings occur in the anterior part. In dorsal view, some of the specimens are bent and S-shaped. Opening of pulp cavity gaping.
Remarks. — The undulations of the jaw, differing in intensity in various planes, do not seem to be a permanent character within one species.

Occurrence. — Lower Silesia (Góraźdże), Lower Muschelkalk; Germany, Upper Muschelkalk.

?Eunicites sp. A
(Pl. 3, Fig. 4)

Material. — Probably MIIIr and MIVr connected with each other.

Dimensions. — Each of the jaws is about 0.240 mm long.

Remarks. — The jaws illustrated are very similar to MIII and MIV of the jaw apparatus of Kielanoprion pomeranensis Szaniawski, described from the Permian of Poland, and to anterior jaw of Paulinites paraanaensis Lange, 1969. Similar, isolated jaws were described by various authors as Paleoconites, Eunicites, etc. (cf. Szaniawski 1968, pp. 271—273).


Occurrence. — Lower Silesia (Góraźdże), Lower Muschelkalk.

„Arabellites” mamilatus sp. n.
(Pl. 3, Fig. 12)

Holotype: MII 0175 (21—22), Pl. 3, Fig. 12.
Type horizon: upper part of the Gogolin Beds, Lower Muschelkalk.
Type locality: Góraźdże, Lower Silesia.
Derivation of name: after mamillary denticles.

Material. — Six right and nine left jaws.

Dimensions. — All jaws, both right and left, are similar in dimensions, length 0.450, width 0.120 mm; holotype 0.432 mm long and 0.160 mm wide.

Description. — Jaw triangular, elongate, with denticulated inner margin. Hook slender, short, deflected posteriorly. The denticles mamillary in shape, rarely tapering distally; they may be longer or shorter in particular jaws. Their number reaching 16, they are almost uniform in size, closely and uniformly spaced, directed laterally and slightly bent dorsally. Inner margin straight, with an only small concavity below the center of jaw. Denticles occupy 3/5 of the length of inner margin. Outer margin, anteriorly straight, further running posterolaterally and forming in this corner a distinct, pointed process. Outer part of posterior margin first running posteromedially and then transversally. Anterior margin of pulp cavity semicircular, posterior limited by a convex belt extending towards the inner margin of jaw. Both right and left jaws are symmetrical.

Remarks. — A. mamilatus sp. n. is similar to A. plesiocomis Tasch & Stude, 1966, from which it differs, however, in the number and shape of teeth.

Occurrence. — Lower Silesia (Góraźdże), Polish Jura Chain (Rokitno, Trzebyczka), Lower Muschelkalk.

„Arabellites” magnidentatus Seidel, 1959
(Pl. 2, Figs 5 and 7)

1959. Arabellites? magnidentatus n. sp.; S. Seidel, pp. 22—23, Pl. 1, Figs 16—18; Pl. 2, Fig. 19.

Material. — Three right and four left jaws along with a carriers connected with MIII.
Dimensions. — Length varying from 0.5 to 1.0 mm. Length of the specimens illustrated: Pl. 2, Fig. 5 — 0.528 mm, Fig. 7 — 0.848 mm.

Description. — Jaw triangular in outline, with inner margin having 9 to 11 teeth, the first of them most conspicuous and directed laterally, the remaining ones decreasing and gradually more and more sloping posteriorly. Outer margin forming, near the posterolateral corner, a distinct bight and a triangular or rounded process. Posterior margin straight in its inner part and directed posteromedially. Its inner sector, marking up 1/5 of the entire margin, changes its direction more transversally. A furrow, separating the distal part of jaw from the rest of it, runs of the dorsal side parallel to the outer sector of posterior margin. This furrow does not reach the posterior margin. The anterior margin of pulp cavity semicircular, posterior labiately convex.

Carriers reaching in length about a half of that of jaw (Pl. 2, Fig. 5) and seem to be shifted so that their anterior margin is situated underneath. Both lateral margins of carriers are concave, the anterior substraight, posterior rounded.

Occurrence. — Lower Silesia (Góraźdze), Lower Muschelkalk; Thuringia, Zechstein.

„Arabellites” oblongus Seidel, 1959
(Pl. 2, Fig. 6)

1959. Arabellites? oblongus n. sp.; S. Seidel, p. 24, Pl. 2, Fig. 33.

Material. — One Mflr.

Dimensions. — Length 0.838, width 0.387 mm.

Description. — Jaw elongate with five robust, triangular teeth, fairly widely spaced on inner margin. Hook substraight, not very long, anterolateral. The size of the remaining denticles slightly decreasing posteriorly, their direction changing into more lateral, Anteriorly, outer margin substraight, further on arcuate, forming near the posterolateral corner a shallow bight and a small process. Outer sector of posterior margin substraight, inner forming a bight and changing its direction transversally. An opening of pulp cavity, occupying one-third of the length of jaw, is visible on the ventral side. Its anterior margin is semicircular, posterior labiate.

Remarks. — A. oblongus differs from other isolated elements primarily in length, number and situation of denticles on inner margin.

Occurrence. — Lower Silesia (Góraźdze), Lower Muschelkalk; Thuringia, Zechstein.

„Arabellites” sp.
(Pl. 3, Fig. 11)

Material. — One Mflr.

Dimensions. — Length 0.768, width 0.208 mm.

Description. — Jaw elongate, with a long, slender, pointed hook, directed laterally. Seven denticles occur on the outer, twisted margin. Inner margin of hook is not situated in the plane of this twisted margin but extends further posteriorly into a distinct ridge and, consequently, a deep, longitudinal depression is formed on the dorsal side outside the denticulated margin. The second denticle having an identical habitus as that of hook, is smaller. The remaining denticles triangular, pointed, sloping posteriorly, their size decreasing and slope increasing also posteriorly. Outer margin, running posterolaterally, forms a small bight. Outer
sector of posterior margin running obliquely from the posterolateral corner, inner transversally. Opening of pulp cavity small.

Remarks. — The jaw under study is relatively well preserved and does not display any flattening, which seems to preclude diagenetic changes in its structure and be an evidence of primary complications in structure.

Occurrence. — Lower Silesia (Góraźdze), Lower Muschelkalk.

,,Nereidavus'' nudus Taugourdeau, 1971
(Pl. 2, Figs 2—3)

Material. — Thirteen right and thirteen left jaws.

Dimensions. — All jaws approximately the same in size. Length of the specimen illustrated in Pl. 2, Fig. 2 — 0.576, width 0.236 mm and of that illustrated in Pl. 2, Fig. 3 — resp. 0.426 and 0.208 mm.

Description. — An elongate, slender form with a prominent hook directed posteriorly. Inner margin smooth and medially convex, outer bending from the base of hook posterolaterally and passing in a small but well outlined process. Outer part of posterior margin running posteromedially, inner changing its direction in a more transversal one. Opening of pulp cavity small, its anterior margin semicircular. Inner wing well developed, separated from the posterior part of inner margin by a narrow depression. A small groove occurs between this margin and a more dorsally situated small ridge. Such a system of depressions and elevations may be observed on both right and left jaw which are symmetrical.

Occurrence. — Lower Silesia (Góraźdze), Polish Jura Chain (Rokitno, Trzebyczka), Lower Muschelkalk; Sahara Desert, Middle Devonian.

,,Paleoenonites'' sp.
(Pl. 3, Fig. 4)

Material. — One right and three left jaws.

Dimensions. — Length of the order of 0.400, width 0.270 mm; length of the specimen illustrated 0.400 mm.

Description. — Jaw shaped like an elongate triangle. Inner margin straight, denticulated. Number of denticles constant, amounting to 7. The first tooth always more conspicuous than other ones, the second the smallest. Denticles triangular, frequently with truncate tips, only slightly sloping posteriorly and occupying about two-thirds of the inner margin. Anterior part, together with anterior teeth deflected transversally. Opening of pulp cavity gaping. Ventral part of the outer margin always with a superstructure formed by a variously-sized attachment lamella.


Occurrence. — Lower Silesia (Góraźdze), Polish Jura Chain (Rokitno), Lower Muschelkalk.

,,Idraites'' anatinus (Stauffer, 1939)
(Pl. 5, Fig. 5)


1967. *Arabellites anatinius* Stauffer; H. Kozur, p. 88, Pl. 1, Fig. 2.


1971. *Arabellites anatinius* Stauffer; H. Kozur (partim), p. 86, Pl. 14, Fig. 1 (non cet.).

Material. — Four right jaws.

Dimensions. — Length of the specimen illustrated 0.364, width 0.160 mm.

Description. — A form with a prominent hook. Outer and inner margins slightly convex, subparallel to each other, inner having seven conical, almost equally sized, posteriorly sloping denticles. The last tooth is always the smallest. Posterior margin forming a deep bight, oval or subrectangular in outline.


Occurrence. — Lower Silesia (Strzelce Opolskie), Polish Jura Chain (Rokitno), Lower Muschelkalk; U.S.A., Middle Devonian; Germany, Upper Muschelkalk; France, Upper Devonian.

,,*Ildraites*” cf. *serratus* Kozur, 1967
(Pl. 4, Fig. 6)

1962. *Ildraites cf. serratus* n. sp.; H. Kozur, pp. 860–861, Pl. 3, Fig. 9.

Material. — A left jaw.

Dimensions. — Length 0.336, width 0.240 mm.

Description. — A fairly short, flattened form with eight teeth gradually diminishing posteriorly. Hook not distinguished. Anterior margin straight; margin of the right slope medially extends to form a pointed process. Opening of pulp cavity occupying the outer part of jaw.

Occurrence. — Lower Silesia (Góraźdże), Lower Muschelkalk; Germany Upper Muschelkalk.

,,*Ildraites*” sp.
(Pl. 3, Fig. 5)

Material. — A left jaw.

Dimensions. — Length 0.320, width 0.176 mm.

Remarks. — The scolecodont described is similar to many forms of the genus ,,*Ildraites*”, e.g.: *I. decorus* Eller, 1961, *I. bifurcatus*, *I. elderus*, *I. spiculatus* Tasch & Stude, 1966.

Most of the characters of its morphology are in common with those of *MII* of *Kalloprion* sp. a Kielan–Jaworowska, 1966 and *MIII* of *Hallia tortilis* (Kozur), 1967 (cf. remarks on *Lumbriconereites* sp. *A*).

Occurrence. — Polish Jura Chain (Rokitno), Lower Muschelkalk.

,,*Lumbriconereites*” sp. A
(Pl. 3, Fig. 10)

Material. — A right jaw.

Dimensions. — Length 0.560 mm.

Description. — An elongate form with a substraight inner margin provided with 12–13 long, triangular, pointed, posteriorly sloping denticles. The first
tooth is slightly longer than the remaining ones. Anterior margin rounded, posteriorly passing in a fairly long shank with a more or less deep bight. Opening of pulp cavity occupying almost an entire length of jaw, except for the hook.

Remarks. — The genus *Lumbriconereites* Ehlers, 1868 has been considered by Kozur (1970) as a synonym of *Eunicites* Ehlers, 1868 since the erection of these two genera by Ehlers was based, according to Kozur, on an insufficiently well preserved and erroneously interpreted material. The scolecodonts described as *Lumbriconereites* are the jaws of apparatus belonging to the Polychaetaspidae, Ramphopriionidae, Polychaeturidae, and Kalloprionidae. The discussed form seems to correspond in Kozur’s classification to *Mii* of the species *Notocirrus? pulcher* Kozur, 1971 (entitling the second part of diagnosis as *Mii* in Kozur, 1971, p. 79 should perhaps be considered as a printing mistake?). On the other hand, this form is very similar to *Mii* of *Halla tortilis* (Kozur, 1967).

Occurrence. — Lower Silesia (Góraždze), Lower Muschelkalk.

*„Lumbriconereites”* sp. B

(Pl. 3, Fig. 9)

Material. — Two right jaws.

Dimensions. — Length 0.364 mm.

Description. — An elongate form with 15 teeth and a distinct, posterolaterally directed shank. Inner wing conspicuous, triangular, its anterior margin concave. The first, posteriorly deflected, tooth is the largest. Opening of pulp cavity gaping as far as the base of the first 2 to 3 teeth.


Occurrence. — Lower Silesia (Góraždze), Polish Jura Chain (Trzebyczka), Lower Muschelkalk.

*„Leodictites” falciformis* (Stauffer, 1939)

(Pl. 4, Fig. 1)

Material. — Five right and six left jaws.

Dimensions. — Length varying from 0.270 to 0.440, width from 0.130 to 0.230 mm. Length of the specimen illustrated 0.432, width 0.236 mm.

Description. — An elongate jaw with a straight, denticulated inner margin and fairly long, transversal branch, arranged at a varying, but always acute angle to the longitudinal branch of jaw. Transversal branch sharply terminating and only slightly upturned, similarly as a row of denticles whose number fluctuates between 11 and 13. The first tooth is always the largest. All denticles sloping posteriorly. Opening of pulp cavity occupying the outer part of jaw.
Remarks. — It should be stated, in conformity with Lange's opinion, that some MII (dental plate) of the jaw apparatus of *Paulinites paranaensis* Lange (cf. Lange 1949) are similar to *L. falciformis*. A considerable similarity to the species under study is also displayed by the type species of the genus *Leodicites*, that is, *L. variedentatus* Eller, 1940 and by *L. irregularidentatus* Taugourdeau, 1968. Their similarity to *L. falciformis* has already been emphasized by the authors of the species referred to above. In addition, certain characters in common with *L. falciformis* are displayed by *L. heteropsis* Eller, 1964.

According to Kozur's suggestions, the paragenus *Leodicites* makes up an MII of the jaw apparatus of *Kettnerites* Zebra, 1935. The jaws described as *Leodicites* also occur in the jaw apparatus of *Eunicites* sp. under Tasch & Stude, 1964.


Occurrence. — Lower Silesia (Strzelce Opolskie, Góraźdże), Polish Jura Chain (Rokitno), Lower Muschelkalk; U.S.A., Middle Devonian; Sahara Desert, Devonian; France, Devonian.

"*Leodicites*" angiformis Eller, 1955
(Pl. 1, Fig. 7; Pl. 3, Figs 1—2)

1966. *Arabettes falciformis* Stauffer; Tasch & Stude, pp. 12—13, PI. 1, Figs 1—5, 8.

Material. — Three right jaws.

Dimensions. — Lengths and widths of the specimens illustrated: in PI. 1, Fig. 7 — resp. 0.794 and 0.208 mm, in PI. 3, Fig. 1 — 0.512 and 0.224 mm, in PI. 3, Fig. 2 — 0.640 and 0.192 mm.

Remarks. — Within the genus "*Leodicites*" there are many species very similar to each other. *L. angiformis* in principle differs from *L. crassimarginatus* only in the lack of a process in the anterior part of the margin of the right slope of the right jaw and of the left slope of the left jaw and, consequently, in a different shape of the opening of pulp cavity. All other characteristics are mostly similar in both species. Characteristics of many of these species are contained within the variability of the features of the second pair of jaws of the apparatus in *Kielanoprion pomeranensis* Szañiawski, 1968 (cf. remarks on *L. falciformis*).

Occurrence. — Lower Silesia (Góraźdże), Lower Muschelkalk.

"*Leodicites*" crassimarginatus Eller, 1961
(Pl. 1, Fig. 6)


Material. — Two right and five left jaws.

Dimensions. — Length and width of the specimen illustrated resp. 0.884 and 0.320 mm.

Remarks. — *L. crassimarginatus* is very similar to *L. angiformis* (cf. remarks on *L. angiformis*).

Occurrence. — Lower Silesia (Góraźdże), Lower Muschelkalk.
"Leodicites" magnificus (Stauffer, 1939)
(Pl. 4, Fig. 2)

1939. Arabellites magnificus n. sp.; C. R. Stauffer, p. 303, Pl. 57, Fig. 7; Pl. 58, Figs 1, 14.
1971. Arabellites anatitus Stauffer; H. Kozur (partim), p. 86, Pl. 14, Fig. 11 (non cet.).

Material. — Two jaws, the right with seven and left with five teeth.
Dimensions. — Length and width of the specimen illustrated, resp. 0.284 and 0.308 mm.
Remarks. — The jaws described are almost identical with MIIt of the jaw apparatus of Atraktoprion eudoxus Szaniawski, 1968, which has already been emphasized earlier by the author of the latter species (Szaniawski 1968). Kozur (1971) considers L. magnificus as the second pair of jaws of the apparatus he described as Arabellites anatitus.

Occurrence. — Lower Silesia (Góraźdże), Polish Jura Chain (Trzebyczka), Lower Muschelkalk.

Gen. et spec. indet. A
(Pl. 3, Fig. 8)

Material. — One basal plate?
Dimensions. — Length 0.208, width 0.128 mm.

Occurrence. — Lower Silesia (Góraźdże), Lower Muschelkalk.

Gen. et spec. indet. B
(Pl. 4, Fig. 5)

Material. — One specimen.
Dimensions. — Length 0.352, width 0.116 mm.
Description. — A small, triangular form with six conical, pointed and straight denticles on inner margin, their size gradually decreasing posteriorly. Anterior part of the right slope provided with a very long attachment lamella. Opening of pulp cavity gaping over the entire length.
Remarks. — Similarly as in the previous form (gen. et spec. indet. A), most characters are similar or sometimes even identical with those of the scolecodonts so far described as Paleoelenonites and Anisocerasites. A particular similarity is displayed by Paleoelenonites pektken Taugourdeau, 1968.

Occurrence. — Polish Jura Chain (Rokitno), Lower Muschelkalk.

Gen. et spec. indet. C
(Pl. 4, Fig. 4)

Material. — A mandible.
Dimensions. — Length 0.352, width 0.112 mm.
MIDDLE TRIASSIC POLYCHAETE JAW APPARATUS

Description. — Anterior part oval, elongate, with its surface covered with concentric lines upturning near the inner margin and with a slightly outlined ridge running through its center. A bent posterior part forms a distinct margin. Basal part shaped like a dorsally convex angleage.

Remarks. — The mandible here presented is most similar to those belonging to the jaw apparatus of Oxyprion compressus Szaniawski, 1968.

Occurrence. — Lower Silesia (Góraźdże), Lower Muschelkalk.

Gen. et spec. indet. D
(Pl. 4, Fig. 8)

Material. — One left, broken-off carriers.

Dimensions. — Length 0.368, width 0.208 mm.

Description. — A carriers probably belonging to an apparatus of the prionognathic type. Anterior margin arcuate, inner slightly and outer strongly concave. A section transverse to the plane of carriers is shaped like a narrow wedge which is caused by a posteroventral swelling of carriers. Dorsal side flat.

Remarks. — Similar carriers were described as Orthopelta mucronata Eisenack, 1939. The greatest similarities may be found in the supports of the jaw apparatus in Atraktoprion eudoxus Szaniawski, 1968.

Occurrence. — Polish Jura Chain (Rokitno), Lower Muschelkalk.

Incertae sedis
(Pl. 4, Fig. 10)

Material. — A few fragments of thin plates.

Dimensions. — Length of the specimen illustrated, 0.730 mm.

Description. — Thin, uniformly thick, smooth, transparent and light-brown fragments of plates, frequently coiled irregularly. Some of these margins display the presence of hooklike, regular teeth, uniform in size and direction of sloping.

Occurrence. — Lower Silesia (Góraźdże) Lower Muschelkalk.

Institute of Geology
of the Warsaw University
Warszawa 22, Al. Zwirki i Wigury 93
Warsaw, April 1971

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376

KRYSYNA ZAWIDZKA


— 1966. Polychaete jaw apparatuses from the Ordovician and Silurian of Poland and a comparison with modern forms. — Palaeontologia Polonica, no. 16. Warszawa.


1-4 — Jaw apparatus Detosites raridentatus Kozur emend. Zawidzka: 1a dorsal, 1b ventral side, 2 Mllr dorsal (a) and right lateral side (b), 3 Mll from ventral side, 4 Mll from dorsal side; Górażdże.

5 — "Ilfracites" anatinus (Stauffer); right jaw from dorsal (a) and ventral (b) side; Strzelce Opolskie.

6 — "Leodicites" crassimarginatus Eller; left jaw from ventral (a) and dorsal (b) side; Górażdże.

7-8 — "Leodicites" angiformis Eller; 7 left jaw from left lateral side, 8 right jaw from right lateral (a) and ventral (b) side; Górażdże.
Paranereites balticus Eisenack; left jaw from ventral (a) and dorsal (b) side; Rokitno.

"Nereidatus" nudus Taugourdeau; left jaw from dorsal side; Góraźdże.

"Nereidatus" nudus Taugourdeau; right jaw from dorsal (a) and ventral (b) side; Góraźdże.

Eunicites sp.; right lateral (a) and left (?) lateral (b) side; Góraźdże.

"Arabellites" magnidentatus Seidel; left jaw from dorsal (a) and ventral (b) side; Góraźdże.

"Arabellites" oblongus Seidel; right jaw from ventral side; Góraźdże.

"Arabellites" magnidentatus Seidel; left jaw from dorsal (a) and ventral (b) side; Góraźdże.
1-2 — "Leodicites" angiformis Eller; right jaws from right lateral side; Góraźdze.
3 - Goniada cuneata (Kozur); dorsal (a) and ventral (b) side; Góraźdze.
4 - "Palaeononites" sp.; left jaw from left lateral side; Góraźdze.
5 - "Ildraites" sp.; left jaw from left lateral (a), and ventral (b) side; Rokitno.
6-7 — Eunicites thuringensis? (Kozur); right jaws from dorsal (6a) and right lateral (6b and 7) side; Góraźdze.
8 - Gen. et spec. indet. A; ventral side; Góraźdze.
9 - "Lumbricomereites" sp. B; right jaw from right lateral (a), dorsal (b) and ventral (c) side; Góraźdze.
10 - "Lumbricomereites" sp. C; right jaw from right lateral (a), dorsal (b) and ventral (c) side; Góraźdze.
11 - "Arabellites" sp.; right jaw from ventral side; Góraźdze.
12 - "Arabellites" mammilatus sp. n.; holotype — No. 0175 (21-22) — left jaw from ventral side; Góraźdze.
1 - "Leodicites" falciformis (Stauffer); left jaw from dorsal (a) and ventral (b) side; Góraźdze.
2 - "Leodicites" magnificus (Stauffer); right jaw from ventral (a) and dorsal (b) side; Góraźdze.
3, 7, 9 - Delosites raridentatus? Kozur emend. Zawidzka; 3 joined carriers from dorsal side, Rokitno; 7 joined carriers from ventral side, Góraźdze; 9 joined carriers from ventral side (Strzelce Opolskie).
4 - Gen. et spec. indet. C; right mandible from dorsal side, Góraźdze.
5 - Gen. et spec. indet. B; from left lateral (a) and right lateral (b) side; Rokitno.
6 - "Ildrites" cf. serratus Kozur; from left lateral side, Góraźdze.
8 - Gen. et spec. indet. D; left carriers from ventral side, Rokitno.
10 - Incertae sedis, Góraźdze.
MIDDLE TRIASSIC POLYCHAETE JAW APPARATUS

K. ZAWIDZKA

APARAT SZCZEKOWY WIELOSZCZETA I SKOLEKODONTY
ZE ŚRODKOWEGO TRIASU POŁUDNIOWEJ POLSKI

(Streszczenie)


Zebrany materiał zawiera ponadto około 180 izolowanych szczęk opisywanego aparatu (fig. 3; pl. 1, fig. 2—4) oraz około 120 innych skolekodontów (por. pl. 1—4).

Instytut Geologii Podstawowej
Uniwersytetu Warszawskiego
Warszawa 22, Al. Zwirki i Wigury 93
Warszawa, w kwietniu 1971 r.