



Lower Devonian Lingulata from the well Ursynów 1 (E Poland)

Gertruda BIERNAT, Lech TELLER

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New data are presented for the poorly known Devonian lingulate fauna. Late Lochkovian members of the lingulate genera: ?*Lingularia*, "*Trigonoglossa*", *Lingulodiscina*, *Orbiculoidea* and *Schizotreta* are described. The material is from a depth 2858.1–2979.1 m of the well Ursynów 1, situated in the NW part of the Radom–Lublin area (E Poland), together with a simplified lithological section of the Lower Devonian.

Gertruda Biernat, Institute of Palaeobiology, Polish Academy of Sciences, Twarda 51/55, 00-818 Warszawa, Poland, e-mail: gbiernat(a)twarda.pan.pl; Lech Teller, Institute of Palaeobiology, Polish Academy of Sciences, Twarda 51/55, 00-818 Warszawa, Poland, e-mail: teller(a)twarda.pan.pl. (received: 31.08.1998; accepted: 26.10.1998).

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INTRODUCTION

Taxonomic knowledge of Early Devonian lingulates is still inadequate. The available data are very scanty especially on shell morphology, mainly the shell interiors (anatomy). One of the main reasons for this situation is that available records, although not rare, often have only few complete specimens and preserve few, if any, elements of internal structure (L. R. M. Cocks, 1978). These problems are noted by e.g. M. G. Bassett (1986) mainly in the context of the unsatisfactory knowledge of "inarticulates" of Silurian/Devonian age and the consequences for their taxonomy and evolution. Early Devonian "inarticulates" in Poland have not been, up to now, described in detail and illustrated. This preliminary note is the first documentation of this group. It is expected that this study will be continued in the future on the basis of complementary collections in preparation.

MATERIAL

The Lochkovian phosphatic brachiopods were found in a section where only little information was as yet been recorded (M. Rubel, L. Teller, 1978; L. Teller, 1997).

The collection although unsatisfactory in terms of the number and poor state of preservation of specimens (generally incomplete) is relatively diverse. It includes, among others, a few conical discinids (one almost complete), several lingulids, trigonoglossids, lingulodiscinids, schizotretids. These all, with some exceptions of rare juveniles within for example *Orbiculoidea* and the Lingulidae, represent adult individuals and, for the most part, are small. In addition, there is also a comparatively high content of unidentified shell fragments.

The collection contains about 50 specimens of separate dorsal and ventral valves. Most are preserved as mainly damaged, external and internal moulds. These all, although in

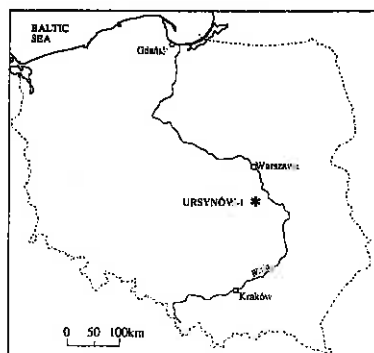


Fig. 1. Sketch-map of the Ursynów 1 well locality
Lokalizacja otworu wiertniczego Ursynów 1

various degrees of completeness and exfoliation, generally preserve useful characteristics like for example shell outline, some details of the beak area and also surface ornamentation, occasionally sufficiently impressed on internal moulds and on the external shell, where preserved. In some cases the concentric lines are unusually thickened all over of shell surface, along the midline and/or on the posterior portion.

Few specimens bear sporadic traces of some anomalies in the pattern of ornamentation expressed as breaks and/or gashes of filar drapes like those in A. Williams and L. E. Holmer (1992) and a number of variously deformed and repaired pattern of concentric lines observed for example in bivalves (L. Liljedahl, 1984). Common are traces of post-mortem, pre- and/or after burial mechanical damage and fractures.

The collection is deposited in the archives of the Institute of Palaeobiology of the Polish Academy of Sciences, for which abbreviation ZPAL.Bp.U1 is used.

GEOLOGICAL SETTING

The Ursynów 1 well was located near the Kożenice village (Fig. 1). It was drilled by the Wołomin Oil Prospecting Enterprise from 19.11.1967 until 17.11.1968 and stopped at a depth of 3001.7 m in the Lower Devonian (upper Lochkovian).

The Early Devonian sediments occur under the Carboniferous at a depth of 2218.6 m and are about 783.7 m thick. The first description of the Early Devonian section was done in 1978 by the second author. Samples have been taken altogether from 32 cored intervals which gave 168.9 m of core. That corresponds to about 21.5% of the whole cored Lower Devonian. The uncored part of the Lower Devonian is about 614.8 m thick corresponding to 78.5% of the obtained profile.

The Carboniferous Viséan/Early Devonian boundary was fixed on the basis of geophysical data at a depth of 2218.0 m. A very condensed lithological profile is as follows:

Depth (m)	Lithology
2245.8–2332.5	Greenish mudstone partly laminated with sandy material.
2232.5–2339.0	Dark cherry mudstone in part greenish with slickensides.
2339.0–2575.0	White light grey or greenish grey quartzitic fine-grained sandstone with coarse-grained intercalations and laminated cross bedding. In parts thin greenish mudstone intercalations with detached grey claystones are present.
2575.0–2580.5	Greenish mudstone with scarce lingulids at the top.
2580.5–2800.0	Greenish mudstone with mica partly brownish with bivalves and tentaculites in top 10 cm (at the depth of 2730.0–2736.0 m light grey fine-grained sandstones with flora remains).
2800.0–2881.7	Greenish sandstone with mica and very rich bivalves, lingulids, traces of worms, tentaculites and a single terebratuloid brachiopod <i>Mutationella polonica</i> Kozłowski.
2881.7–3001.7	Dark grey claystone with seldom greenish mudstone intercalations very rich in bivalves, articulate brachiopods, tentaculites and few ostracods. Among brachiopods the following occur: <i>Protathyris infantyle</i> Kozłowski, (abundant) <i>Brachyprion subinterstitialis</i> Kozłowski, <i>Howeella angustiplicata</i> (Kozłowski), <i>Brachyzyga pentameroides</i> (Kozłowski), and others (M. Rubel, L. Teller, 1978). The Lower Devonian section in the Ursynów 1 well represents the upper Lochkovian, the entire Pragian and most probably the lower Emsian. The phosphatic brachiopods discussed here are of late Lochkovian age.

SYSTEMATIC PALAEOLOGY

Family *Lingulidae* Menke, 1828

Genus ?*Lingularia* Biernat et Emig, 1993

Type species: *Lingularia similis* Biernat et Emig, 1993, p. 11, figs. 3–6

Diagnosis: See G. Biernat, Ch. Emig (1993, p. 11).

Remarks. — A few lingulide morphotypes are recognized here based on some of the only available external shell morphology including shell shape and outline, size of the adult shell and/or nature of the surface ornamentation. In general, these types seem to fit sufficiently well with some of the well known Silurian species, like e.g.: *Lingula squamiformis* Phillips, 1836, "*L.* *lewisii* Sowerby, 1839, "*L.* *minima* Sowerby, 1839, "*L.* *cornea* Sowerby, 1839, as repeating, although in a somewhat varying degree, some of the above morphological features characteristic of particular genera and/or species. The small differences observed may require new taxonomic names on specific level.

The lingulide species studied are, for the present, attributed (tentatively) to the genus *Lingularia* Biernat et Emig, 1993. It is probable that they represent a new genus but this

can not be sufficiently documented here because of the poor material currently available.

Undoubtedly, they show more external similarity to *Lingularia similis* Biernat et Emig, 1993, type species of the genus and to its members discussed by G. Biernat and Ch. Emig (1993), rather than to the recent *Lingula*. As is known, presence of the *Lingula s. s.* in the Palaeozoic strata is controversial (M. G. Bassett, 1979, 1986; G. Biernat, Ch. Emig, 1993; A. J. Rowell, 1970) and new generic names are probably needed. All "L." in brackets in the present text correspond to Silurian/Early Devonian lingulide species discussed and figured by M. G. Bassett (1986) whose generic status, according to him, should be changed on the basis of available material.

Lingularia sp. cf. "*Lingula*" *lewisii* Sowerby, 1839 type
(Pl. I, Figs. 1, 2, 4)

Material: Six external or internal moulds of dorsal and ventral (2) valves, all, to a varying degree, decorticated, many indeterminate fragments of valves.

Type locality: Ursynów 1 well; depth: U1/4 — 2973.0–2979.0 m, U1/137 — 2862.1–2866.1 m, U1/28 — 2858.1–2862.1 m.

Diagnosis: Like "*L. lewisii*" Sowerby figured by M. G. Bassett (1986, pl. 10A) but is less spatulate and much more narrowly elongate, anterior margin more truncate, growth lines densely spaced and of more varied prominence.

Dimensions (mm)¹:

	L	Wp	Wm	Wa
ZPAL.Bp.U1/4	5	5	9.1	7.1
ZPAL.Bp.U1/11	2	2.5	4.1	5
ZPAL.Bp.U1/137	3	3.2	6	4.1
ZPAL.Bp.U1/138	2.5	3	4	4.4

Description. — Shell medium sized, almost equi-valve, about two times as long as wide; convexity of ventral valve moderate, that of the dorsal valve more marked on the umbonal part and somewhat flattened anterolaterally. Posterior margin evenly arcuate and, often, forming structure somewhat like a "shoulder" meeting parallel or almost so lateral margins; anterolateral angles broadly rounded, anterior margin truncate to very weakly rounded; ventral beak with pointed apex. Surface ornamentation consists of dense, sub-concentric ridges; these are variable in thickness and are arranged in bundles (3 to 4 ridges per bundle) separated by distinct and narrow interspaces. Very fine radial fila are discernible.

General outline of concentric ridges varies, particularly along the midlength of valve, from more elongately oval on the posterior half of shell to much less oval on the anterior one

in correspondence to the nearly truncate anterior margin (Pl. I, Fig. 4) like for example *Pseudolingula spatula* Williams (1974, pl. 5, fig. 1).

Interior not preserved.

Remarks. — The species is very similar to "*Lingula*" *lewisii* Sowerby, from the Silurian (Ludlow, Aymestry Limestone) species from England, figured in R. I. Murchison (1839, pl. 6, fig. 9) and, in turn refigured by M. G. Bassett (1986, Text-fig. 1B-1:A). It has a similar outline, distinctly parallel lateral margins and truncate to weakly subtruncate anterior margin. It differs, in being more narrowly elongate (about two times longer than wide) and in having postero- and/or anterolateral angles varying from more marked to less angular. The species seems to be intermediate between "*L. lewisii*" (see M. G. Bassett, 1986, fig. 1B-1:A) and *L. squamiformis* Phillips, illustrated by K. Graham (1970, pl. 16, figs. 6, 9) from the Scottish Carboniferous.

Lingularia sp. cf. "*Lingula*" *cornea* Sowerby, 1839
(Pl. I, Figs. 3, 6, 7)

Material: Five more or less complete external moulds of the dorsal and ventral valves; few fragments of particular valve.

Type locality: Ursynów 1 well; depth: U1/92 — 2913.5–2919.5 m, U1/31 — 2973.0–2979.5 m, U1/157 — 2973.0–2979.5 m.

Dimensions (mm):

	L	Wp	Wm	Wa
Dorsal valve ZPAL.Bp.U1/92	3.8	2.4	3	2.4
Ventral valve ZPAL.Bp.U1/31	6.5	3.1	4	—

Description. — The main characteristic of this species is its somewhat bulgy appearance, widely ovoid outline and blunt apex; shell is the widest at midlength and slightly more narrowed posteriorly than anteriorly; postero- and anterolateral angles widely rounded; lateral margins distinctly subarcuate, and the anterior moderately subarcuate to almost arcuate. Umbonal region (juvenile valve) is well marked constituting ca. 1/10 of the whole valve length (to about 0.1 mm long and 0.8 mm wide) of subtransversally — oval outline, bearing a few poor subconcentric and evenly subarcuate ridges, bordered by a thickened ridge and followed by a rather deeply marked furrow suggesting a short period of growth cessation. Further concentric ridges are, generally, of uneven thickness, coarsely thickened along midlength of valve, often irregularly arranged on different parts of valve steeply changing their outline from more elongately oval to subarcuate.

Interior not preserved.

Remarks. — This lingulid shows some general similarity to the lectotype of "*Lingula*" *cornea* Sowerby, the Silurian species from England (Downton Castle Sandstone Formation) figured by M. G. Bassett (1986, Text-fig. 18-1D) mostly in the shell outline and, to some extent, to the poor latex cast of "*Lingula*" sp. from Méricourt Beds (Méricourt)

¹Measurements of specimens presented as follows: L — maximum length, Wp — width posteriorly, Wm — width medially, Wa — width anteriorly, Aa — apex anteriorly, Ap — apex posteriorly, W — width, L — length, A/Am — anterior margin, A/Pm — posterior margin

defined by C. Barrois *et al.* (1922) as "*Lingula*" *lewisii* and refigured by M. G. Bassett (*op. cit.*, pl. 8, fig. 9).

Lingularia sp. A
(Pl. I, Fig. 5)

M a t e r i a l: Three specimens of ventral and/or dorsal valves, a few fragments of each valve.

T y p e l o c a l i t y: Ursynów 1 well; depth: U1/79, U1/125 — 2973.0–2979.5 m.

D i m e n s i o n s: ZPAL.Bp.U1/125: L — 7.1 mm, Wp — 3 mm, Wm — 4.1 mm, Wa — 3.1 mm.

D e s c r i p t i o n. — Characteristic is the elongately oval outline with a slight median furrow on the ventral valve like for example "*Lingula*" sp. A, refigured from C. Barrois *et al.* (1922) by M. G. Bassett (1986, pl. 8, fig. 4). It extends along the anterior 3/4 of the valve midlength and weakly incises the truncate and slightly narrowed anterior margin; antero- and posterolateral angles rounded, lateral margins almost parallel to evenly arcuate. Markedly exposed is the posterior 1/5 of the shell length (= young post-larval shell) well delineated by the elevated and thickened concentric ridge. Concentric lines are differentiated into 6 to 9 ridges, with markedly thickened edges and two to four thinner ones in interspaces.

Interior unknown.

R e m a r k s. — The species, in its very elongately oval shell, is similar to "*Lingula*" sp. (a poor latex cast from the C. Barrois *et al.* collection from the Angres Limestone — exact locality and horizon unknown — figured by M. G. Bassett (1986, pl. 8, figs. 7, 8) but differs in the more truncate anterior margin and in the almost parallel lateral margins. "*Lingula*" sp. A (in M. G. Bassett, 1986, pl. 8, figs. 1–4) is wider and more subquadrate, moreover, it has a shorter median furrow and is wider anteriorly in contrast to our species. There is also a great similarity to *Lingula mytilloides* Sowerby from the ?Plean Limestone Carboniferous of Scotland, figured by K. Graham (1970, pl. 14, figs. 4, 5) but differing mostly in the less arcuate anterior margin.

Lingularia sp. B
(Pl. I, Fig. 9; Pl. II, Figs. 10, 16)

M a t e r i a l: One complete but exfoliated ventral valve, two dorsal valves, a few valve fragments.

T y p e l o c a l i t y: Ursynów 1 well; depth: U1/29 — 2973.0–2979.5 m.

D i m e n s i o n s (mm):

	L	Wp	Wm	Wa
Dorsal valve ZPAL.Bp.U1/157	7.2	3.1	6	4.56
Ventral valve ZPAL.Bp.U1/29	3.1	1.5	2	1

D e s c r i p t i o n. — Characteristic is its elongately oval outline with a more narrowed anterior part than the posterior one; posterolateral angles broadly rounded forming a "shoulder"-like structure; evenly arcuate lateral margins gently converge to the anterior one. Valves convex posteriorly and along midline of the shell, lowering laterally and anteriorly; dorsal apex blunt. Concentric ridges coarse, interspaces bear 2 to 3 thinner fila of uneven appearance; radial fila observed.

R e m a r k s. — There are questions with definition and identification of the species.

Lingularia sp. cf. "*Lingula*" *mytilloides* Sowerby, 1812
(Pl. I, Figs. 8, 10, 11)

M a t e r i a l: Three poor specimens of the dorsal and ventral valves; few fragments of particular valve.

T y p e l o c a l i t y: Ursynów 1 well; depth: U1/123, U1/69 — 2973.0–2979.5 m.

D i m e n s i o n s: ZPAL.Bp. U1/123: L — ca. 7 mm, Wm — ca. 4.5 mm.

R e m a r k s. — Moderate elliptical outline of shell, its more narrowed posterior part in comparison with the anterior one suggest some similarity to *Lingula mytilloides* Sowerby, 1812 figured by K. Graham (1970, pl. 14, figs. 8, 11, 12) from Scotland.

Genus *Trigonoglossa* Dunbar et Condra, 1932

Type species: *Lingula nebrascensis* Meek, 1872

R e m a r k s. — Broadly trigonal to subtrigonal in outline, coarse and, in places, regularly arranged concentric lines are suggestive of the genus *Trigonoglossa*; these specimens are, tentatively, included here.

?*Trigonoglossa* sp.
(Pl. I, Figs. 12, 13; Pl. II, Figs. 1, 2)

M a t e r i a l: Scarce and poorly preserved. It comprises one shell preserving both valves of which the dorsal is crushed in its anterior part and the umbo partly squeezed; four incomplete moulds and a few fragments of valves.

T y p e l o c a l i t y: Ursynów 1 well; depth: U1/171, U1/172, U1/173 — 2858.1–2862.8 m; U1/155 — 2858.1–2862.8 m; U1/166 — 2858.1–2862.8 m.

D i m e n s i o n s (mm) (data are approximate because of some deformation and damage to specimens):

	L	Wp	Wa
ZPAL.Bp.U1/171	11	6	11
ZPAL.Bp.U1/172	10	5	10
ZPAL.Bp.U1/173	10	ca. 4.5	10.5

D e s c r i p t i o n. — Shell comparatively thick, gently convex and broadly trigonal, maximum width close to the

anterior third of shell; umbonal areas evenly convex, umbonal cavity quite deep; lateral margins nearly straight along their length, strongly convergent posteriorly and widely divergent anteriorly; anterolateral angles markedly rounded, anterior margin evenly arcuate and/or nearly straight.

Surface ornamentation. The concentric macrolines (ridges) are of similar (often uneven) coarseness and, commonly, preserve prominently thick and elevated edges. Generally, they are markedly condensed and their spacing all over the shell surface is relatively regular, ca. 3 to 5 macrolines per 1 mm (Pl. II, Figs. 1, 2). The interspaces are flattened. Internal details not preserved; only some trace of dorsal septum can be recognized in one specimen (Pl. II, Fig. 1).

R e m a r k s . — *?Trigonoglossa* sp. appears to have a distinctive form, somewhat differing in some details from the other known members of the genus, mostly in shell outline, appearance of the umbonal areas and concentric lines. These together indicate a new genus and/or species, but this should be confirmed by a much better collection with data on the degree of intra and/or interspecific variation. In general, *T.* sp. is similar to *T. nebrascensis* Meek figured by A. J. Rowell (1965b, p. H263: 158; 6), differing somewhat in having a wider outline and less regularly spaced concentric lines. It is also similar to the Carboniferous *Trigonoglossa scotica* (Davidson) from Scotland, described and figured by K. Graham (1970, pl. 19, figs. 1, 2, 5, 6) particularly in the broadly trigonal outline and, to some degree, in the appearance of concentric lines; it differs in having a more uniform broadly trigonal outline, much less acuminate (narrowed) umbones and less narrowed posterior half of shell. In comparison with a lectotype of *T. ?thiryi* (Barrois, Prevost et Dubois) figured and discussed by M. G. Bassett (1986, pl. 9, figs. 1–3) from the Méricourt Beds l'Escarpelle shaft, our form is much less elongate and more acuminate posteriorly.

Genus *Schizotreta* Kutorga, 1848

?Schizotreta sp.1
(Pl. II, Fig. 8)

M a t e r i a l : One ventral valve, partly deformed, exfoliated with a damaged apical part.

T y p e l o c a l i t y : Ursynów 1 well; depth: U1/143 — 2913.5–2919.5 m.

D i m e n s i o n s : ZPAL.Bp.U1/143: L — ca. 10 mm; W — ca. 13 mm; Aa — 7 mm, Ap — 3 mm.

D e s c r i p t i o n . — Valve very low almost subconical, subcircular in outline, steeply narrowing anteriorly; posterolateral angles and lateral margins evenly rounded, the posterior margin feebly convex; beak low, subcentral (submarginal) lying some distance posterior of the valve mid-length; valve evenly flattened peripherally in posterior, lateral and anterior directions.

Surface concentric ridges relatively coarse and widely spaced, with 2 to finer lines in interspaces; radial fila are present.

R e m a r k s . — Although only one isolated valve is available, its general morphology suggests the genus *Schizotreta*. It is similar to *Schizotreta petita* Bassett, the Lochkovian species from the Méricourt borehole, France, described and figured by M. G. Bassett (1986, p. 91, pl. 9, fig. 6), differing, in being less oval in outline and, less narrow anteriorly. There is more similarity, mostly in the general appearance of the dorsal valve and of its beak to the Lochkovian *Schizotreta* sp. from the Grand-Vaast borehole figured by M. G. Bassett (1986, pl. 9, figs. 9, 10) but that species differs somewhat from form in having narrower interspaces.

Family *Discinidae* Gray, 1840

Subfamily *Orbiculoideinae* Schuchert et Levene, 1929

Genus *Orbiculoidea* d'Orbigny, 1948

Orbiculoidea sp. cf. *Orbiculoidea siegenensis* Kayser, 1890
(Pl. II, Figs. 3–6)

M a t e r i a l : Three exteriors of the ventral (juvenile) and dorsal valves, partly exfoliated and deformed, a few very fragmentary valves.

T y p e l o c a l i t y : Ursynów 1 well; depth: U1/159, U1/161 — 2862.1–2865.1 m.

D i m e n s i o n s (mm):

	L	W	A/Am	A/Pm
ZPAL.Bp.U1/161	3.2	3.3	ca. 3	ca. 1
ZPAL.Bp.U1/159	7.5	7	5.5	2

D e s c r i p t i o n . — Valves low, nearly circular, evenly flattened in the posterior part, and slowly depressed towards the anterolateral margins; both apices are eccentric (the dorsal one tending to be submarginal) defined by a thickened ridge and situated ca. 1/7 the distance from the posterior to the anterior margins; ventral listrium short, only slightly longer than wide.

Surface concentric ridges are strongly developed like those of the Silurian *Schizotreta* sp. (G. Biernat, 1984, pl. 25, fig. 2) and coarsely lamellose, evenly widely spaced (1 or 2 per ca. 0.8 mm) with 2–3 mm, sometimes discontinuous, fila in interspaces.

R e m a r k s . — Circular (or almost so) outline with widely arranged and sharp concentric ridges distinguish this species from the other orbiculoids in the collection. It seems comparable, mostly in the appearance of concentric ridges, with a group of species displaying relatively thick and regularly spaced ridges like, for example *Orbiculoidea siegenensis* (E. Kayser, 1890) *sensu* C. Barrois *et al.* (1922) the Lochkovian form from the Grand-Vaast borehole figured by M. G. Bassett (1986, pl. 10, fig. 3–5) but differing from the latter in having a more eccentric beak and also a more circular outline, less densely spaced concentric ridges and probably in being of smaller size. *O. devillei* Barrois, Pruvost et Dubois, 1922, figured by M. G. Bassett (1986, pl. 10, fig. 1a–d holotype), has similarly arranged concentric ridges but a more convex apical part and the beak is slightly less eccentric. *O. rugata* Sowerby, 1839 figured by M. G. Bassett (1986, Text-

fig. 18-1F, G, H, I) from the Ludlow series (Ludfordian Stage) of England seems to have less regularly spaced concentric ridges and a less eccentric beak.

?Orbiculoidea sp.
(Pl. II, Fig. 7)

Material: One ventral valve greatly exfoliated, almost complete.
Type locality: Ursynów 1 well; depth: U1/173 — 2865.1 m.
Dimensions: ZPAL.Bp.U1/173: L — 7.9 mm, Wm — 6.2 mm.

Description. — Valve with elongate outline, highest centrally, bilaterally compressed, flattened in lateral view with beak nearly central, posterolateral slopes moderately? concave, and the anterior slope gently convex; few concentric ridges (L. E. Holmer, 1987; M. Mergl, 1994).

Genus *?Lingulodiscina* Whitfield, 1890
Type species: *Lingula exilis* Hall, 1860

Remarks. — This is a poorly known and rare, till now, genus of uncertain taxonomic status. A. J. Rowell (1965b: H285) suggested it is synonymous with *Orbiculoidea*. The original description of the taxon (R. P. Whitfield, 1890, p. 122) and the diagnosis (A. J. Rowell, *op. cit.*) noted the linguloid (elongately oval) appearance of the dorsal valve associated with a submarginal dorsal apex which defined the genus. G. Dahmer (1946, fig. 6; 1951, pl. 6, fig. 11) mentioned this morphological feature in connection with his *Lingulodiscina mamma*, the Devonian (Lochkovian) form from Westphalia, Germany.

The studied specimens from Ursynów 1 preserve an accentuated elongately oval dorsal valve and submarginal dorsal apex. These characters appear to be quite stable as generic criteria (anyway often one of a few available) particularly in the lack of (due to the state preservation) details of shell morphology, both internal and external.

?Lingulodiscina cf. *L. mamma* Dahmer, 1946
(Pl. II, Figs. 11–15)

Material: One specimen, with two valves preserved (ZPAL.Bp. U1/118), greatly decorticated with fragments of the surface ornament; few very fragmentary valves, undetermined.

Type locality: Ursynów 1 well; depth: U 1/118 — 2973.0–2979.0 m.

Diagnosis: Like *Lingulodiscina mamma* Dahmer, 1946 in the general shell appearance like: size and elongately oval outline about one third longer than wide, in lateral view gently convex posteriorly; dorsal valve of linguloid

outline with submarginal apex.

Dimensions: Figured complete specimen (L — 15 mm, W — 11 mm).

Description. — Specimen thick-shelled, longer than wide (85% as long as wide), elongately oval to subcircular in outline; dorsal valve evenly convex in lateral view with submarginal apex and internally preserving a trace of something like a ?median septum; ventral valve thickest in the posterior third, steeply sloping anteriorly and laterally (Pl. II, Fig. 13). Surface ornamentation generally badly preserved shows on some fragmentary shell patches sufficiently well thickened marginally concentric lines of nearly equal arrangement, encircling the posterior parts of shell.

Remarks. — This species is poorly preserved; the only shell, articulated (with both valves closed) is similar to *Lingulodiscina* Dahmer, 1946 or R. P. Whitfield (1890). However, no detailed comparison is possible based only on the illustrations given by the above authors. The species is similar to *L. mamma* (G. Dahmer, 1946, figs. 1, 2, 5) in general shell shape and outline differing somewhat in being of slightly larger size.

CONCLUSIONS

The Ursynów collection shows how poor detailed knowledge on the Devonian phosphatic brachiopods is and how much general taxonomic study is needed throughout the world, based on adequate records.

1. Any information on Devonian taxa is necessary, particularly on the degree of intraspecific variability and also on the anatomy of the species and their generic assignments.

2. The soft-bottom endofauna is relatively poorly documented, and is dominated by lingulide "species" and much less by the discinide.

3. A few "species" seem to merit separation as new taxa but this cannot be sufficiently supported by the material at hand.

4. The lingulide species seem to be more comparable with the genus *Lingularia* Biernat et Emig, 1993 than with the younger recent *Lingula*; a new generic status may be expected with more complete material.

5. Diversification of phosphatic brachiopods and of the associated fauna (see p. 452) indicate favourable environments for the development of the soft bottom benthos.

6. These fossils constitute life assemblages; juvenile common and adult shells occur together; transportation, if at all, occurred on a very limited scale.

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DOLNODEWOŃSKI LINGULATA Z OTWORU WIERTNICZEGO URSYNÓW 1 (WSCHODNIA POLSKA)

Streszczenie

Podano opisy kilku przedstawicieli rodzajów *Lingularia*, "*Trigonoglossa*", *Lingulodiscina*, *Orbiculoidea* oraz *Schizotreta*. Materiał pochodził z otworu wiertniczego Ursynów 1 z głębokości 2858,1–2979,1 m, usytuowa-

nego w NW części obszaru radomsko-lubelskiego (E Polska). Podano także skondensowany opis profilu litologicznego odwierconych osadów dewonu, a opisana fauna wskazuje na późnolochkowski wiek.

EXPLANATIONS OF PLATES

PLATE I

Figs. 1, 2, 4. *Lingularia* sp. cf. "*Lingula*" *lewistii* Sowerby, 1839 type

Fig. 1 — exterior of the ventral valve (zewnątrzna skorupka brzuszna), (ZPAL.Bp.U1/137), x 12; Fig. 2 — exterior of the exfoliated dorsal valve (zewnątrzna skorupka grzbietowa częściowo złuszczone) (ZPAL.Bp.U1/4), ca. x 9; Fig. 4 — anterior fragment of valve, arrangement and outline of concentric lines in agreement with anterolateral margins (fragment przedniej części skorupki z widocznym zarysem i ułożeniem linii koncentrycznych przebiegających zgodnie z przednio-bocznymi brzegami) (ZPAL.Bp.U1/28), ca. x 10; Ursynów 1, Lochkovian

Figs. 3, 6, 7. *Lingularia* sp. cf. "*Lingula*" *cornea* Sowerby, 1839

Fig. 3 — dorsal valve exterior elevation along midline marked (skorupka grzbietowa od strony zewnętrznej z zaznaczającym się środkowym wzniesieniem) (ZPAL.Bp.U1/157), ca. x 3; Fig. 6 — exterior of the ventral valve (skorupka brzuszna od strony zewnętrznej) (ZPAL.Bp.U1/31), ca. x 7; Fig. 7 — exterior of the dorsal valve: some irregularity in the appearance of concentric lines shown (skorupka grzbietowa od strony zewnętrznej; zaznacza się nieregularność w przebiegu linii koncentrycznych) (ZPAL.Bp.U1/92), ca. x. 9; Ursynów 1, Lochkovian

Fig. 5. *Lingularia* sp. A

Ventral valve slightly furrowed medially concentric lines greatly thickened (skorupka brzuszna z lekko zaznaczającą się bruzdką; linie koncentryczne pogrubione w części środkowej) (ZPAL.Bp.U1/125), ca. x 6; Ursynów 1, Lochkovian

Fig. 9. *Lingularia* sp. B

Exterior of a partly deformed and greatly exfoliated dorsal valve, concentric and radial striation traced (zewnętrzna częściowo zdeformowana i silnie złuszczone skorupka grzbietowa; słabo podkreślone koncentryczne i radialne prążkowanie) (ZPAL.Bp.U1/150), ca. x 15; Ursynów 1, Lochkovian

Figs. 8, 10, 11. *Lingularia* sp. cf. "*Lingula*" *mytiloides* Sowerby, 1812

Figs. 8, 10 — exterior of the ventral valve, greatly damaged, with preserved patches of the shell (skorupka brzusznna od strony zewnętrznej, bardzo zniszczona z zachowanymi niewielkimi fragmentami skorupki) (ZPAL.Bp.U1/123), ca. x 12; Fig. 11 — highly fossiliferous slab with lingulid species and traces of bivalves (fragment z licznie zachowanymi lingulidami i śladami małżów) (ZPAL.Bp.U1/69), ca. x 12; Ursynów 1, Lochkovian

Figs. 12, 13. ?*Trigonoglossa* sp.

Fig. 12 — fragmentary valve with a trace of the repaired local life injury (fragment skorupki ze śladami zaleczonego uszkodzenia) (ZPAL.Bp.U1/155), ca. x 6; Fig. 13 — dorsal valve exterior (skorupka grzbietowa od strony zewnętrznej) (ZPAL.Bp.U1/166), ca. x 5; Ursynów 1, Lochkovian

PLATE II

Figs. 1, 2. ?*Trigonoglossa* sp.

Fig. 1 — interior view of a ventral valve, relatively deep umbonal cavity shown (skorupka brzusznna od strony zewnętrznej z widoczną dosyć głęboką jamą umbonalną) (ZPAL.Bp.U1/172), ca. x 4; Fig. 2 — dorsal valve view of an almost complete (articulated) shell, anterior of the dorsal valve damaged (widok od strony grzbietowej kompletnej muszli z uszkodzoną częścią przednią skorupki grzbietowej) (ZPAL.Bp.U1/171), ca. x 5.5; Ursynów 1, Lochkovian

Figs. 3–6. *Orbiculoidea* sp. cf. *Orbiculoidea siegenensis* Kayser, 1890

Figs. 3, 6 — two different dorsal valves (dwie różne skorupki grzbietowe): 3 — ZPAL.Bp.U1/159, ca. x 10, 6 — ZPAL.Bp.U1/169, ca. x 10; Fig. 4 — dorsal valve exterior (skorupka grzbietowa od strony zewnętrznej) (ZPAL.Bp.U1/94), ca. x 4; Fig. 5 — ventral valve (skorupka brzusznna) (ZPAL.Bp.U1/161), ca. x 10; Ursynów 1, Lochkovian

Fig. 7. ?*Orbiculoidea* sp.

Dorsal valve view (skorupka grzbietowa) (ZPAL.Bp.U1/173), x ca. 5; Ursynów 1, Lochkovian

Fig. 8. ?*Schizotreta* sp. 1

Ventral valve view (skorupka brzusznna) (ZPAL.Bp.U1/143), ca. x 6; Ursynów 1, Lochkovian

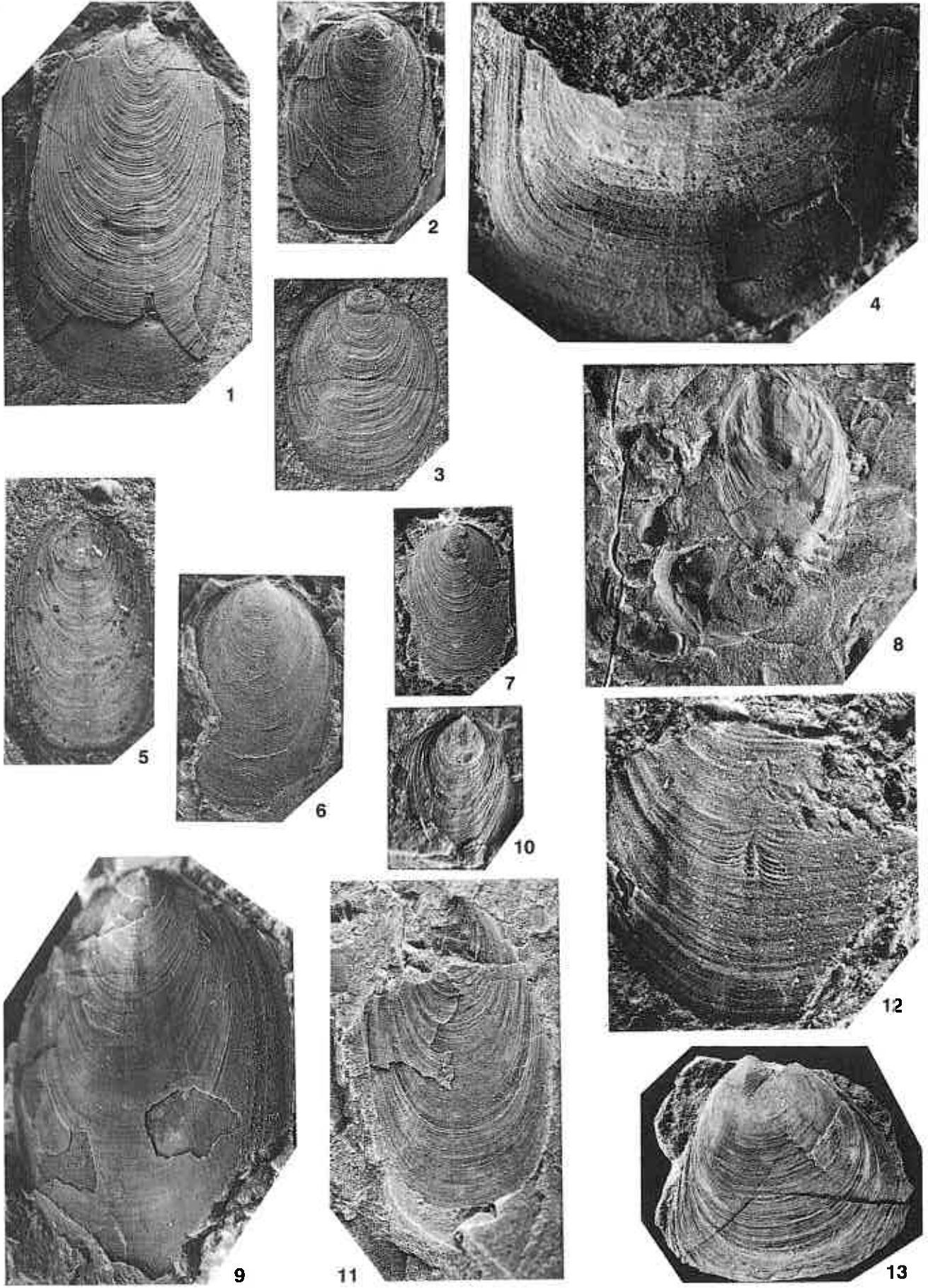
Fig. 9. Juvenile valves of unidentified orbiculoid and linguloid (młodociane skorupki niezidentyfikowanych orbiculoida i lingulida) (ZPAL.Bp.U1/128), ca. x 12

Figs. 10, 16. *Lingularia* sp. B

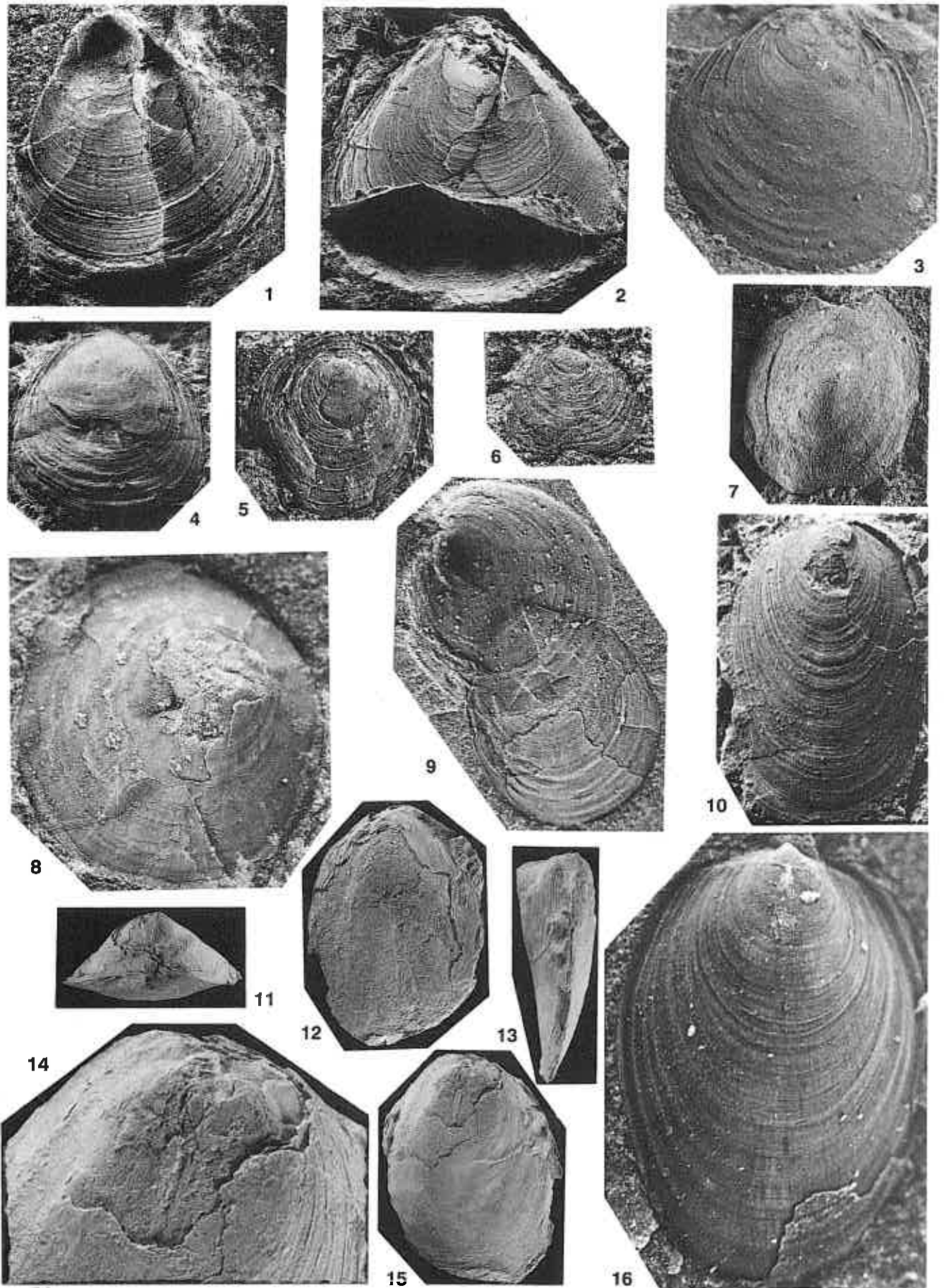
Fig. 10 — dorsal valve, concentric lines well visible (skorupka grzbietowa z widocznymi liniami koncentrycznymi) (ZPAL.Bp.U1/157), ca. x 6; Fig. 16 — adult ventral valve (skorupka brzusznna dorosłego osobnika) (ZPAL.Bp.U1/29), ca. x 9; Ursynów 1, Lochkovian

Figs. 11–15. ?*Lingulodiscina* cf. *L. mamma* Dahmer, 1946

Articulated shell in four views (kompletna muszla widziana z czterech stron): ventral (brzuszej) (Fig. 12), dorsal (grzbietowej) (Fig. 15), lateral (z boku) (Fig. 13), posterior (z tyłu) (Fig. 11), ca. x 3; Fig. 14 — enlarged posterior part of Fig. 15 with fragment of median septum (powiększona część tylna z fig. 15 z fragmentarycznym septum środkowym) (ZPAL.Bp.U1/118), ca. x 6; Ursynów 1, Lochkovian



Gertruda BIERNAT, Lech TELLER — Lower Devonian Lingulata from the well Ursynów 1 (E Poland)



Gertruda BIERNAT, Lech TELLER — Lower Devonian Lingulata from the well Ursynów 1 (E Poland)