

Leptoterorhynchus, new middle Famennian rhynchonellid genus from Poland and Germany

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Abstract

A new genus, *Leptoterorhynchus*, type species *L. magnus* (BIERNAT & RACKI, 1986b), is described from the middle Famennian of the southern Holy Cross Mountains and north-western Sauerland. The scarcity (two specimens) of the material from the latter region precludes a description of this species. The genus *Rozmanaria* WEYER, 1972 is reassessed, and its stratigraphical significance stressed.

Key-words: *Leptoterorhynchus* - rhynchonellid - brachiopod - Famennian - Poland - Germany

Résumé

L'auteur fonde un nouveau genre, *Leptoterorhynchus*, avec *L. magnus* (BIERNAT & RACKI, 1986b) du Famennien moyen de la partie méridionale des Monts Ste-Croix comme espèce-type; le genre est aussi présent dans le Sauerland nord-occidental. La rareté (deux spécimens) du matériel de cette dernière région interdit la description de cette espèce. Le genre *Rozmanaria* WEYER, 1972 fait l'objet d'une réévaluation et son importance stratigraphique est mise en évidence.

Mots-clefs: *Leptoterorhynchus* - Rhynchonellide - Brachiopode - Famennien - Pologne - Allemagne

Introduction

With the erroneous assignment of various species to *Rozmanaria* WEYER, 1972, this genus has progressively been deprived of any stratigraphical significance, despite the obvious intention of its founder (1972, p. 84): "Für diese [*Rozmanaria equitans* (SCHMIDT, 1924)]...wird ein neues Genus vorgeschlagen, dem sicherlich eine gewisse Bedeutung für die gegenwärtig international erarbeitete Rhynchonellida-Parachronologie des höheren Oberdevons (SARTENAER 1968) zukommen wird". I intend to demonstrate that the biochron of the genus is restricted to the *Wocklumeria*-Stufe (do VI), and that the genus is only represented by its type species, *Rozmanaria equitans*. Other species and forms included in it belong to other genera; *R. magna* BIERNAT & RACKI, 1986b, is here designated as type species of a new genus, *Leptoterorhynchus*, with restricted stratigraphical range.

Leptoterorhynchus n. gen.

DERIVATIO NOMINIS

Λεπτότερος, η, ον (Greek) = thinner; τὸ βύγχος (Greek, neuter) = beak. The name has been chosen to draw attention to the reduced thickness of the shell in comparison with representatives of the genus *Rozmanaria*.

TYPE SPECIES

Rozmanaria magna BIERNAT & RACKI, 1986b

BIERNAT & RACKI (1986a,b) have given a detailed account of this common species. They illustrated it with figures and good transverse serial sections as can be inferred from the following synonymy:

- 1986a *Rozmanaria magna* BIERNAT & RACKI - BIERNAT & RACKI, p. 52, text-fig. 1A, p. 49, text-fig. 2c, p. 51, pl. 1, figs 1a-d, 2a-c, 3a-c;
1986b *Rozmanaria magna* sp. n. - BIERNAT & RACKI, p. 85, p. 86, p. 89, p. 90, pp. 90-91, p. 95, p. 100, p. 102, p. 103, p. 104, p. 107, text-fig. 2B,C, p. 88, text-fig. 3, p. 92, text-fig. 4, p. 93, text-fig. 5, p. 94, text-fig. 8, p. 99, pl. 35, figs 1a,b,d, 2a,b,d, 3a-d, 4a-d, 5a-d, pl. 36, figs 1a-d (= pl. 1, figs 1a-d in BIERNAT & RACKI, 1986a), 2a-c, 3a,c,d, 4a-c, 5a-c, pl. 37, figs 3b-d, 4b-d, 5b-d (= pl. 1, figs 2a-c in BIERNAT & RACKI, 1986a), pl. 41, figs 4a,c,d, pl. 42, figs 1a-g, pl. 43, figs 1a-h;
1987 *Rozmanaria magna* Biernat and Racki - BIERNAT, p. 34;
1988 *Rozmanaria magna* Biernat and Racki - BIERNAT, p. 328, p. 329, fig. 2, p. 330, pl. 1 (= p. 331), figs 2a-d (= pl. 35, figs 5a-d in BIERNAT & RACKI, 1986b), pl. 2 (= p. 332), figs 6a,b.

In addition to the 121 specimens studied by BIERNAT & RACKI (1986a,b) (see below p. 125), eight other specimens (one from the Czarnocki collection) from Wola Quarry, were given to the author by Racki; six of them have been photographed.

This species is an eponym for an assemblage recognized by BIERNAT & RACKI (1986b, p. 103; 1987, p. 34; 1988, p. 328).

The following topotypes from the Wola Quarry near Kowala have been measured or/and photographed: Topotypes A, IRScNB a10626 (Pl. 1, Figs 1-5), B, IRScNB a10627 (Pl. 1,

Figs 6-10), C, IRScNB a10628 (Pl. 1, Figs 11-15), D, IRScNB a10629 (Pl. 1, Figs 16-20), E, IRScNB a10630 (Pl. 1, Figs 21-25), F, IRScNB a10631 (Pl. 1, Figs 26-30), G, IRScNB a10632, H, IRScNB a10633 (Text-Fig. 1). Measurements of six specimens, of which five have been photographed, are given on Table 1, columns 1 to 6; column 6 refers to an epehebic specimen.

DIAGNOSTIC FEATURES

Unisulcate. Medium sized. Flat. Smooth. Sub-quadratic to transversely sub-elliptical. Very low ventral fold and very shallow dorsal sulcus. Sulcus relatively narrow. Middle part of fold generally widely depressed. Very low but well defined tongue. Top of tongue located very low. Maximum thickness of shell and of both valves located posteriorly. Valves subequally high. Apical angle and angle of the cardinal commissure both very wide. Rudimentary dental plates. Contour of the posterior part of the delthyrial cavity extremely irregular. Neither septum nor septalium present.

SPECIES ATTRIBUTED TO THE GENUS

In addition to the type species, another species from north-western Sauerland is assigned to the genus, but on account of the fact that only two specimens have been collected so far, one of them being a juvenile, the species is left in open nomenclature; one specimen (MB.B.1111; RTB collection number Ob 6) is figured and has been measured (Pl. 1, Figs 31-35; Table 1, column 7).

DESCRIPTION

Unisulcate. Smooth. Medium sized. Both valves shallow. Anterior commissure moderately sulcate, commonly slightly to moderately intraplicate. Sub-quadratic to transversely sub-elliptical in ventral and dorsal views, i.e. rounded cardinal angles and lateral commissures in the form of parentheses. Ventral fold and dorsal sulcus beginning at between 30 and 40 per cent of shell-length. Commissure sharp, and projecting clearly postero-laterally where valve margins are concave. Cardinal line short.

Ventral flanks sloping gently from umbonal region, which has slight relief. Ventral fold very low. Middle part of fold generally widely depressed with, rarely, a corresponding swelling in the dorsal sulcus; this depression is slight to moderate. Ventral beak wide and flat, suberect to erect, not overhanging the cardinal line. Intera-area short and very low. Beak resorbed by a semicircular foramen.

Dorsal flanks sloping gently towards the commissure. Dorsal sulcus very shallow, relatively narrow - between 47 and 53 per cent of shell width for most specimens of the type species - at front. Bottom of sulcus flat to slightly convex. Very low but well defined trapezoidal tongue. Top of tongue located ventrally between 60 and 70 per cent of shell-thickness. Upper part of tongue elongated anteriorly, exceptionally tending to become vertical.

Maximum thickness of shell located posteriorly, as is the maximum thickness of both valves, which have a similar location at around one-third of the shell-length.

Table 1.

in mm	Topotype G a 10632	Topotype C a 10628	Topotype B a 10627	Topotype A a 10626	Topotype D a 10629	Topotype E a 10630	MB.- B.1111
l	20.60	18.50	18	17.90	17.50	13.90	15.80
w	25	(25.10)	24.30	24.90	23.50	19	21.90
lpv unrolled	23.50	23	19.50	22	20	16	19.50
t	11	11.40	9.80	11.60	10.70	8.40	8.70
tpv	6.50	6.40	5.50	6.90	5.60	4.80	5.30
tbv	4.50	5	4.30	4.70	5.10	3.60	3.40
l/w	0.82	(0.74)	0.74	0.72	0.74	0.73	0.72
t/w	0.44	(0.45)	0.40	0.47	0.46	0.44	0.40
t/l	0.53	0.62	0.54	0.65	0.61	0.60	0.55
apical angle	150°	(160°)	151°	158°	146°	155°	154°
angle of the commissure	160°	168°	158°	164°	158°	160°	159°

l = length; t = thickness; w = width; bv = brachial valve; pv = pedicle valve. Measurements shown in parentheses indicate a reasonable estimate on a damaged specimen.

Valves have subequal thicknesses, the pedicle valve being somewhat deeper. Width is by far and always the greatest dimension. Maximum width of shell occurs at a point located between 50 and 60 per cent of shell-length, anterior to ventral beak. Very wide apical angle (between 150° and 160°) and angle of the cardinal commissure (between 158° and 164°).

Rudimentary dental plates maintained as stout spurs anteriorly. Rudimentary umbonal cavities. Contour of delthyrial cavity extremely irregular in transverse serial sections. Teeth short and stout. Neither septum nor septalium present. Short divided hinge plate composed of two slender parts inclined towards each other. Relatively deep dental sockets with weakly marked inner socket ridges. Well marked crural bases passing progressively to short and slender crura ventrally curved at their distal end; crura are boomerang-shaped proximally and lancet-shaped medially in transverse serial sections. The following description of scars and impressions is taken from BIERNAT & RACKI (1986b, pp. 91, 95): "... (ventral) muscle field varying in length, myophragm very weak to absent; diductor scars distinct, enclosing small, elongate adductors; in some specimens ovarian markings present; impressions of main pallial sinuses divergent anteriorly giving off secondary lateral branches near the valve margin;... (dorsal) muscle field distinct with elongate posterior and anterior scars; thread-like myophragm sometimes present; ovaria, if present, large; pallial sinuses divergent anteriorly, branching additional ones near the valve margin".

COMPARISONS

If some of the essential features ("wesentliche Kennzeichen") of the genus *Rozmanaria* mentioned by WEYER (1972, p. 85) are present in *Leptoterorhynchus* n. gen., e.g. ventral fold, dorsal sulcus, smooth surface, no septum, several others are absent, e.g. strong ventral fold and dorsal sulcus, inequivalve, relatively inflated ventral umbonal region, wide sulcus, upper part of tongue recurved posteriorly. Furthermore, *Leptoterorhynchus* n. gen. has stronger internal structures, rudimentary dental plates, the surface of the delthyrial cavity very irregular, not to mention the interlocking of the valves and the contour of the shell, two differences that are striking in transverse serial sections. The new genus is also medium-sized, while *Rozmanaria* is always small-sized, and not small to medium-sized as indicated in the original diagnosis of the genus, and also in the emended diagnosis proposed by BIERNAT & RACKI (1986b, p. 89). In this emended diagnosis "rhynchonellids of almost equal biconvexity" has been added in order to include *R. magna* which was mistakenly assigned to *Rozmanaria*. If further comparison between the very different genera *Leptoterorhynchus* n. gen. and *Rozmanaria* is supererogatory, the contents of the latter is still in need of some clarification.

Four species have been assigned to *Rozmanaria* (in chronological order of their inclusion in the genus): *R. equitans*, *R. sichuanensis* CHEN, 1978, *R. krestovnikovi* (ROZMAN, 1960), and *R. magna*.

Rozmanaria equitans, the lectotype of which was designated by WEYER (1972, p. 87), is from the *Wocklumeria*-Stufe (do VI) of northern Sauerland. It is known also from beds of the same age in the Kellerwald, southern Thuringia, Lower Silesia, and the Holy Cross Mountains, and from older rocks in the Holy Cross Mountains, and in Russia (Pechora province, and the Urals). Although the matter has still to be investigated further, it is probable that we are dealing with one and the same latest Famennian species in Germany and Poland. Forms identified as *Rozmanaria equitans* or *Plectorhynchella equitans* in older Famennian strata in the Holy Cross Mountains, the Pechora province and the Urals belong neither to the genus nor to the species, on the base of the external characters alone; no transverse serial sections have been published so far. On the basis of a few poorly preserved specimens kindly shown to the author by D. Weyer, the occurrence of the species in the *Clymenia*-Stufe (do V) of the type area and southern Thuringia, as indicated by WEYER (1972, p. 84, p. 87, p. 90) seems doubtful. Finally, further investigation, including the examination of the internal structures, is needed in order to accept the presence of the species in the Lower Carboniferous as suggested by BARTZSCH & WEYER (1986, pl. I, right column, figs 1a,b), who mention it in the *Gattendorfia*-Stufe at Pfaffenberg-Nordost near Saalfeld-Obernitz in south-eastern Thuringia.

Rozmanaria sichuanensis is a medium-sized to large species with few (2 to 4) strong (wide and high) median costae starting from the beaks. It is from the undifferentiated Famennian Maoba Formation of Tahouba, Chongqing county, Sichuan Province, China. It has very little in common with the genus *Rozmanaria*.

Plectorhynchella krestovnikovi ROZMAN, 1960, from the *Cheiloceras* Zone of southern Urals (Ryauzyak river), has been rejected from the genus *Plectorhynchella* COOPER & MUIR-WOOD, 1951 by SARTENAER (1967, p. 1058), and doubtfully assigned to the genus *Rozmanaria* by BIERNAT & RACKI (1986a, fig. 2b, p. 51, p. 52; 1986b, p. 86, pp. 89-90), and BIERNAT (1988, p. 328, p. 329), although in the same last paper (p. 329) the doubts of the latter author appear to have been lifted. Early Famennian forms from the Holy Cross Mountains (well Bolechowice 1) and the Carnic Alps (Pizzo Collina) described, respectively, by ŽAKOWA (1967, p. 64, p. 67, p. 68, p. 69, table 2, p. 94, pl. VIII, figs 1a-d as *Plectorhynchella krestovnikovi*), and by FERRARI & VAI (1973, p. 182, fig. 8, p. 186 *pro parte*, fig. 9, p. 188 *pro parte*, pp. 203-204, pl. XXV, figs 9a-d, 10a-d as "*P.*" *krestovnikovi*) do not belong to the Uralian species. The species has been collected from one locality only, and, although abundant, its internal characters remain unknown; because the specimens are recrystallized, ROZMAN could not make transverse serial sections of them. But, various external characters mentioned by ROZMAN in her original description enable clear separation of the species from the genus *Rozmanaria*: very small size, rounded-pentagonal contour, slight transverse elongation, sulcus starting from the beak as a narrow groove. These characters,

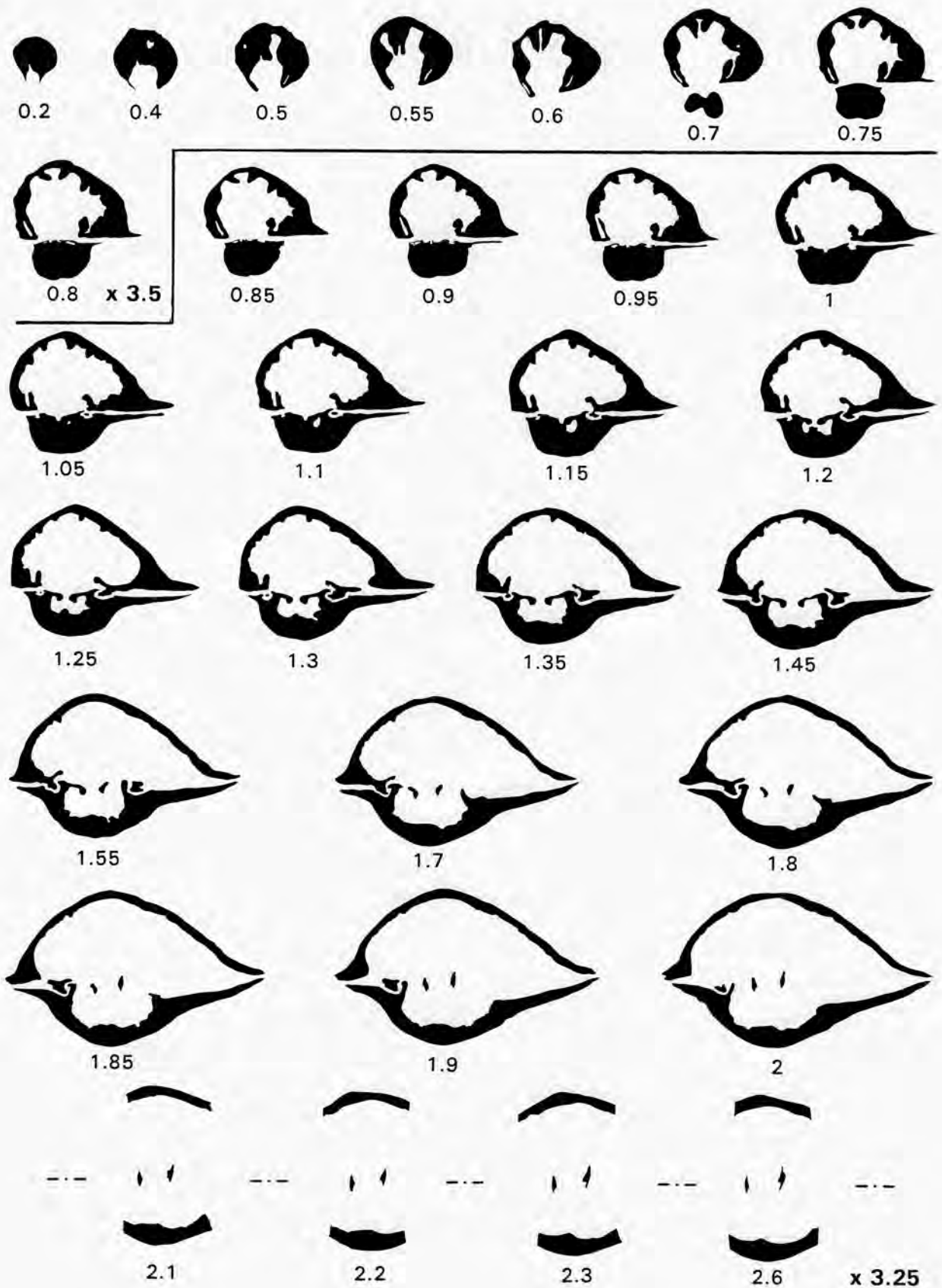


Fig. 1 — *Leptoterorhynchus magnus* (BIERNAT & RACKI, 1986b). Camera lucida drawings of serial transverse sections; figures are distances in mm forward of the ventral umbo. Topotype H, IRScNB a10633. Measurements: length = 18.6 mm; width = 24.6 mm; thickness = 12.4 mm.

as well as others (e.g. a reduced thickness) not mentioned by ROZMAN, strongly suggest that this species belongs to a new genus, which the author does not want to propose on the base of a type species of which the internal structures cannot be described. I conclude that the genus *Rozmanaria* is not present in the *Cheiloceras* Zone (do II α , β).

The fourth species so far included in the genus *Rozmanaria*, *R. magna*, is designated in the present paper as the type species of *Leptoterorhynchus* n. gen. This excludes the “?do III to do IV” age (see below) for *Rozmanaria*.

The following forms have also to be excluded from *Rozmanaria*: (1) *R.* sp. nov. and *R.* sp. mentioned, respectively, by YANG, P^{AN} & HOU (1981, table 3, p. 122) and by YANG (1986, table 10.1, p. 95) in the undifferentiated Famennian Maoba Formation of the Longmenshan area, Sichuan Province, China. These forms are related to *R. sichuanensis*, discussed above; (2) ?*R.* sp. BIERNAT (1988, fig. 2, p. 330) from the Lower *Palmatolepis marginifera* Zone of Kadzielnia (Holy Cross Mountains); (3) *R.*(?) sp. figured by BIERNAT & RACKI (1986a, fig. 2d, p. 51), from the Famennian of the Rhine area, and which the same year (1986b, pp. 100-101) they suggested could belong to *Planovatiostrum planoovalis* (NALIVKIN, 1937), is nothing other than the *Plectorhynchella?* nov. sp. from the *Wocklumeria*-Stufe of Höcklingen and from the railroad cut in the Hönnetal near Oberrödinghausen in northern Sauerland as discussed by WEYER (1972, p. 86, p. 89, pl. II, figs 7a-e, 8a-e). WEYER stressed the point that the internal characters, very different from those of *Rozmanaria*, supported its inclusion in a new genus.

In conclusion, the genus *Rozmanaria* is known only by its type species, and its stratigraphical range remains the one originally assigned to it – *Clymenia*-Stufe and *Wocklumeria*-Stufe – and which SARTENAER (1982, table 2) adopted. Still, as already indicated, the presence of *Rozmanaria* in the *Clymenia*-Stufe must be accepted with great reservation. Therefore, the author considers that the genus is restricted to the *Wocklumeria*-Stufe (do VI) of northern Sauerland, Kellerwald, south-eastern Thuringia and Lower Silesia, and to rocks of equivalent age in the Holy Cross Mountains.

Leptoterorhynchus n. gen. and the genus *Pugnaria* BIERNAT & RACKI, 1986b, to which these authors attributed the same age, have some similar features, e.g. size, smoothness, moderate biconvexity, absence of septum and septalium, and a divided hinge plate. Not only is *Leptoterorhynchus* n. gen. unisulcate, contrary to *Pugnaria*, but it can also be separated from it by:

- a sub-quadratic to transversely sub-elliptical outline (sub-circular in *Pugnaria*);
- an intraplicate anterior commissure (uniplicate to rec-timarginate in *Pugnaria*);
- a different projection in profile, on account both of the unisulcation and of the greatest thickness of the brachial valve being located more anteriorly;
- better developed sulcus, fold and tongue;

- a considerably wider apical angle (150° to 160° in *Leptoterorhynchus* n. gen., 128° to 138° in *Pugnaria*);
- a different delthyrial cavity contour;
- and the presence of rudimentary dental plates.

It has been the usual practice (HAVLÍČEK, 1982: p. 112; HAVLÍČEK, 1990: p. 211 and p. 214; BIERNAT & RACKI, 1986b: p. 89) to place the genera with an inverted position of the sulcus and fold in the subfamily Rozmanariinae HAVLÍČEK, 1982 of the family Pugnacidae RZHONSNITSKAYA, 1956. The author disagrees with this practice, because other characteristic features – varying from one genus to another – have to be considered together with the inversion: the more or less strong projection of the ventral region posterior to the ventral beak, the relative thickness of brachial and pedicle valves, the absence or presence of a median depression on the fold, etc. The author also does not agree with the inclusion in the family Pugnacidae of any of the genera assigned to the subfamily Rozmanariinae.

GEOGRAPHICAL LOCATION AND STRATIGRAPHICAL POSITION

According to BIERNAT & RACKI (1986b, pp. 86-87, 90), *Leptoterorhynchus magnus* (identified as *Rozmanaria magna*) was collected from three localities in the southern Holy Cross Mountains: (1) near the northern wall of Wola Quarry, south of Kowala (dumps): about hundred specimens, including the holotype, *marginifera* Zone and/or Lower *trachytera* Zone; (2) north-east of Łgawa Hill Quarry, south of Bolechowice (dumps): about twenty specimens, uppermost *marginifera* or *trachytera* Zones; and (3) northern wall of the Ostrówka Quarry, near Gałęzice (*in situ*): one specimen, not older than the Upper *marginifera* Zone. These authors sum up the age of the rocks containing the species as follows: “mostly late, but not latest Famennian (?do III to do IV) in age; restriction of (its) range to the *trachytera* Zone is possible”, although they previously (1986a, p. 48) wrote: “approximate age, based on the conodonts, is defined as later Famennian (?do III to do IV); restriction of (its) range to the uppermost *marginifera* to *trachytera* zones being possible”. A long span of time – “the *marginifera* Zone and/or *trachytera* Zone” – was suggested by BIERNAT (1987, p. 34), but one year later [1988, p. 328, fig. 2, p. 330, explanation of figs 2a-d, pl. 1 (= p. 331), figs 6a,b, pl. 2 (= p. 332)] she accepted the assignment to “the *trachytera* Zone (?III to do IV)” – assignment considered only as possible by BIERNAT & RACKI (1986b, p. 87; see above) –, as a definitive range for *L. magnus*. According to recent information published by SZULCZEWSKI (1996, fig. 8, p. 28) the “*Rozmanaria* assemblage” is included in “set J” of the “Kowala quarry and railroad cut” succession, and belongs to the “Uppermost *marginifera* Zone”.

The two only specimens from north-western Sauerland were collected by R.T. Becker in a small quarry extension in the northern part of the Nie brick-works quarry (“Ziegelei Nie”), one km N of Iserlohn-Letmathe on the northern flank of the Remscheid-Altena Anticline [see BECKER (1985, fig. 1, p. 22, p. 27, p. 29; 1993 (fig. 1, p. 136) for locality details and maps]. The outcrop exposed nodular limestones and shales with nodules of the

higher part of the "Hemberg-Schichten" (UD III-A to IV-A) as well as "Dasberg-Schichten" (UD IV-B; see BECKER 1992, pp. 12-14). It was open for collecting from 1974 to 1979. The figured specimen was found in the lower part of the *Prolobites delphinus* Zone (do III β = UD III-C), in beds of Member 3 of the Hemberg Formation (see BECKER, 1992, fig. 2, p. 8, p. 12). The second specimen was collected loose from the UD III C - IV B interval.

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Explanation of Plate 1

All figures are natural size

Leptoterorhynchus magnus (BIERNAT & RACKI, 1986b)

- Figs. 1-5 — Topotype A, IRScNB a10626. Ventral, dorsal, frontal, apical, and lateral views.
Figs. 6-10 — Topotype B, IRScNB a10627. Ventral, dorsal, frontal, apical, and lateral views.
Figs. 11-15 — Topotype C, IRScNB a10628. Ventral, dorsal, frontal, apical, and lateral views.
Figs. 16-20 — Topotype D, IRScNB a10629. Ventral, dorsal, frontal, apical, and lateral views.
Figs. 21-25 — Topotype E, IRScNB a10630. Ventral, dorsal, frontal, apical, and lateral views.
Figs. 26-30 — Topotype F, IRScNB a10631. Ventral, dorsal, frontal, apical, and lateral views.

Leptoterorhynchus sp.

- Figs. 31-35 — MB.B.1111. Ventral, dorsal, frontal, apical, and lateral views.

PLATE I

