Novaplatirostrum, late Famennian rhynchonellid brachiopod genus from Sauerland and Thuringia (Germany)

by Paul SARTENAER

Abstract

A new genus, Novaplatirostrum, with type species N. sauerlandense n. sp., is described from the late Famennian of northern Sauerland and southeastern Thuringia. From the latter region, lack of material precludes a description of the species, but serial transverse sections made from two specimens confirm the generic placement. Both species are rare and occur with goniatites in a deep water facies.

Key-words: Novaplatirostrum - rhynchonellid - brachiopod - late Famennian - Sauerland - Thuringia

Résumé

L'auteur fonde un nouveau genre, Novaplatirostrum, avec N. sauerlandense n. sp., du Famennien supérieur du Sauerland septentrional comme espèce-type. Le manque de matériel à la disposition de l'auteur interdit la description d'une autre espèce de la Thuringe sud-orientale, mais des sections sériées transverses ont été effectuées dans deux spécimens de cette espèce pour en confirmer l'appartenance générique. Les deux espèces sont rares et associées à des goniatites dans un facies d'eau profonde.

Mots-clefs: Novaplatirostrum - Rhynchonellide - Brachiopode - Famennien - Sauerland - Thuringe

Introduction

Although rare in Devonian deep water facies, brachiopods usually occur together with goniatites as a minor element of the fauna. This is the case in northern Sauerland where a rhynchonellid brachiopod, here designated as the type species of a new genus, is found at many horizons within the Wocklum Limestone. The rarity makes a study worthwhile, but not necessarily feasible, for a collection of acceptable size must be available. Such a collection has been assembled through the patient endeavour of various palaeontologists over the last 150 years.

Sartenaer (1986, pp. 145-150) recognized four stages in the evolution of the study of rhynchonellids. The fourth stage - increased breaking up - is the current phase. It runs alongside the continuation of the third stage - notable increase in the number of genera -, with the combination of both stages leading inevitably to a greater chronological accuracy. Novaplatirostrum n. gen. is an example that perfectly illustrates this approach. It results from a restriction of the meaning of the genus Planovatirostrum Sartenaer, 1970, which has become too encompassing due either to species erroneously assigned to it or to forms mistaken as a valid species of the genus. On the base of the literature Sartenaer (1982, p. 132, table 2) reported the following stratigraphical range for the genus in terms of the ammonoid succession: do (III)-IV,V,VI. Sartenaer & Xu (1989, p. 44) wrote that the do III age remained uncertain, and even doubtful, and that the do VI occurrence needed confirmation and corroboration. With the introduction of the new genus, the latest Famennian (do VI) age will now have to be ruled out, and do IV-V, as stated by Sartenaer & Xu (1989, p. 44), remains "the most reliable age for the genus Planovatirostrum". Thus Novaplatirostrum n. gen. succeeds Planovatirostrum in time.

When citing the species included in the genus Planovatirostrum, Sartenaer & Xu (1989, pp. 38-39) discussed briefly the way in which views evolved on Terebratula subcurvata von Münster, 1840 and T. Richteri Oppenhimer, 1916. The problems raised by forms assigned to both these species are here investigated further in order to answer questions related to their identity, geographical distribution, generic assignment, and age. Four regions are concerned: Upper Franconia, southeastern Thuringia, northern Sauerland (all three in Germany), and Moravia (Czech Republic). The intricate way in which views regarding these species evolved in course of time are elucidated and summarized in Table 1.

The first indication of the presence of the new genus here proposed possibly goes back to von Münster (1840, p. 78, pl. XIV, fig. 15), who identified a species found at Schübelhammer in Upper Franconia as Terebratula rotunda (Murchison, 1839). Caution must be observed however, because the species is described as "sehr gewölbt", and figure 15 is the dorsal view of a narrow specimen that unfortunately could not be located. Representatives of the species belonging to the new genus are never strongly convex, and narrow specimens are of exceptional occurrence. In any case this form has nothing in common with the Wenlock Shale species Atrypa rotunda described by Murchison (1839, p. 629, pl. 13,
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<td>1916</td>
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<td>e.p. Terebraula Richteri n.n., pp. 35-36</td>
<td>Terebraula Richteri n.sp., p. 6 e.p. Terebraula Richteri n.n., pp. 35-36, pl. I, figs. 13a,b</td>
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<td>1928</td>
<td>GALLWITZ</td>
<td>e.p. Liorhynchus subcurvata RICHT., p. 525</td>
<td>e.p. &quot;Liorhynchus subcurvatus (RH. RICHTER, 1856, non MÜNSTER, 1840)&quot;, p. 84</td>
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<td>1954</td>
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<td>Planovatrostrum richteri (Oppenheimer, 1916), p. 96-97, pl. II, figs. 1-5 (=pl. I, figs. 13a,b in OPPENHEIMER, 1966), fig. 6 in textu p. 96</td>
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<td>1979</td>
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<td>1995</td>
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<td>1996</td>
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<td>Planovatrostrum richteri (Oppenheimer) auct., fig.1, p. 21, p.23</td>
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*e.p. (= ex parte) and p.p. (= pro parte) mean that more than one region is concerned*
Fig. 7) to which von Münster refers. Thus, the first reliable mention of material belonging to the new genus is that of Richter (1848, p. 40, pl. V, figs. 153-155, 158, 159; not figs. 156, 157, 160, 161), who identified it as Terebratula at Bohlen and Pfaffenberg near Saalfeld, in southeastern Thuringia. Later, the same author (1856, p. 29) accepted at Bohlen the name T. subcurvata var. for one (figs. 6a,b) of the three varieties ("Spaletarten" or "Varietätten") of T. subcurvata introduced by von Münster (1840, p. 76, figs. 4a,b, 5a,b, 6a,b). He figured (pl. I, figs. 37-39) a small to middle-sized specimen with four costae on the fold and three in the sulcus, which has nothing in common with any of the varieties described and figured by von Münster. T. subcurvata itself is a species from the late Silurian Orthoceratidenkalk of Elbersreuth in Upper Franconia that is not discussed here, because it has nothing to do with any of the fossils mentioned in this paper to which its name has been given at either specific or generic level; it is probably not even a rhynchonellid. It is precisely on account of this absence of relationship ("keine Verwandtschaft") between T. subcurvata and a Moravian species "hauptsächlich im thüringischen Oberdevon verbreitet" that Oppenheimer (1916, p. 6, pp. 35-36) put Richter's (1856, pl. I, figs. 37-39) T. subcurvata into synonymy with a new Moravian species (figs. 13a,b), T. Richteri Oppenheimer, 1916. This species, collected near Brno in the "Ostracodenkalk" at the top of the "Mittleres Oberdevon", is rare (according to Havlíček, 1979, p. 96). The Thuringian and Moravian forms are thus considered conspecific.

Schmidt (1924, p. 145, p. 161, p. 162, p. 163), who was not aware of Oppenheimer's (1916) publication, thought he could recognize the forms called T. subcurvata var. by Richter (1856, p. 29, pl. I, figs. 37-39) from southeastern Thuringia in the "Dasbergschichten" (to Va, Vp, VI) of the northwestern part (Gerlingsen and Hasselbachtal) of Sauerland as well as in its northeastern part (Belecke and Eulenspiegel), and in the Kellerwald (Wildungen). He called them Liorhynchus subcurvata Richt. (non Mstr.). In turn Gallwitz (1928, p. 496, p. 519, p. 525) described L. subcurvata Richt. from "die Seiler bei Iserlohn" in the northwestern part of Sauerland, from beds considered as equivalent to the "Dasberg-Schichten B". The Thuringian and the Sauerlandian forms are thus considered to be conspecific.

Following the taxonomic position taken by Schmidt (1924) and Gallwitz (1928), Pfeiffer [1954, p. 69, pl. IX (= p. 104), fig. 7] gave the name L. subcurvata (Reinh. Richter) to the Thuringian form from Bohlen and declared it restricted to "Stufe VI". Weyrer (1972, p. 84) correctly expressed that he was unsatisfied with such a specific and generic assignment. Accordingly, in 1979 (p. 99, p. 103, pl. 4, fig. 13) he used the name Planovatirostrum cf. planovale (Nalivkin, 1937) for the form from Bohlen, immediately south of Saalfeld, which was correctly expressed that he was unsatisfied with such a specific and generic assignment. Accordingly, in 1979 (p. 99, p. 103, pl. 4, fig. 13) he used the name Planovatirostrum cf. planovale (Nalivkin, 1937) for the form from Bohlen, immediately south of Saalfeld, which was identified as Planovatirostrum richteri (Oppenheimer, 1916) a Moravian species that had fallen into oblivion. It had been collected near Brno on Hády Hill in the Hády Limestone (Famennian V or VI), and at Ostrov in beds of Famennian V age. Weyrer (1981, p. 5) adopted this name in Thuringia, using P. cf. richteri for a specimen collected in the Wocklumeria-Stufe in the Geipel quarry in Schleiz. Weyrer (in Bartzsch & Weyrer, 1986, pl. I, right column, fig. 4) also identified and figured as Planovatirostrum richteri a specimen from the lower part of the Wocklumeria-Stufe at Gosit-Felsen-Süd near Fischersdorf south of Saalfeld.

To conclude, one and the same species of the genus Planovatirostrum, P. richteri, is supposed to characterize beds of latest Famennian age in southeastern Thuringia, Moravia, and northern Sauerland. This is recalled by Becker (1988, p. 194), who collected [fig. 2, pp. 195, p. 196, p. 198, pl. 2 (= p. 213), figs. 17-19] fifteen specimens of the species from the Wocklum Limestone in the section of the southern slope of the Hasselbachtal, northwestern Sauerland. Twelve specimens were also collected by Becker (1996, fig. 1, p. 21, p. 23) in various beds of the same section.

Sartenaer & Xu (1989, p. 38) have already expressed their disagreement with the amalgamation of the Moravian and Thuringian forms into one and the same species.

Novaplatirostrum n. gen.

Derivatio nominis

The name is formed by rearrangement of the first seven letters of Planovatirostrum, to which the new genus bears great resemblance. It is more than a coincidence that nova and plati are parts of the name. "Nova" (novus, a, um = Latin adjective meaning new) indicates that new light is shed indirectly on the genus Planovatirostrum, and "platii" (πλατίς, εἶκα, ὑ = Greek adjective meaning flat) is meant to stress one of the characteristic external features of the new genus, its flatness.

Type species

Novaplatirostrum sauerlandense n. gen., n. sp.

Diagnostic features

Small- to medium-sized; flatly biconvex valves; outline variable, commonly distorted; sharp commissure; very shallow sulcus; very low fold; sulcus and tongue wide; top of tongue always located lower, often considerably lower, than top of shell; few, low, well marked, simple and wide median costae, restricted to anterior third of
Fig. 1 — *Novaplatirostrum sauerlandense* n. gen., n. sp. Camera lucida drawings of serial transverse sections; figures are distances in mm forward of the ventral umbo. Paratype J, SMF65008. Measurements: length = 23.2 mm; width = 27.3 mm; thickness = 10 mm.
shell; few lateral costae if any, and, when present, often
reduced to undulations of commissure; costellae present;
wide apical angle; thick shell; no dental plates; short
crura.

Species attributed to the genus
Besides the type species, one other species from sou-
eastern Thuringia is assigned to the genus. Various
generic and specific names have erroneously been given
to the latter species in the course of time (see Table 1). On
account of insufficient material this species is left in open
nomenclature. Nevertheless serial transverse sections
have been made in two specimens (MB.-B.1037, 1038),
and those of the former are figured (Text-Fig. 2).

Description
Size generally small to medium, rarely large. Flat. Uni-
licate to slightly parasulate. Valves flatly biconvex.
Outline variable, commonly subrounded (Pl. 1, Figs. 16-
20) to transversely subelliptical (Pl. 1, Figs. 1-5), rarely
subpentagonal (Pl. 1, Figs. 36-40), very rarely subrectan-
gular, and exceptionally subquadratic. On account of
asymmetry, outline is slightly distorted in about fifty
per cent of specimens. Transverse profile shallowly bi-
convex. Commissure sharp, projecting, clearly indented
by median costae, and lateral costae when present. Ex-
ternal median costae on fold rarely slightly higher than
middle ones, when frontal commissure has slight median
depression. Postero-lateral margins concave near
commissure.

Flanks of shallow pedicle valve flat to slightly convex,
sloping gently from umbonal region, which has slight
relief. Very shallow sulcus becoming well marked and
clearly separated from flanks in anterior third or less of
valve. Bottom of sulcus slightly convex or flat. Sulcus
starts wide, becoming very wide at front. Tongue wide,
very shallow, trapezoidal, well defined; its top is always
lower, often considerably lower, than top of shell. Beak
small, flat, erect to slightly incurved, overhanging car-
dinal line, often almost in contact with the dorsal umbonal
region. Interarea shallow, wide, clearly separated from
flanks. Neither foramen nor deltoidal plates have been
observed.

Brachial valve shallow, slightly and uniformly convex.
Although very low, fold is nevertheless well marked and
clearly separated from flanks in anterior third or less of
valve; it develops late, and is wide at front. Median part of
fold rarely depressed anteriorly; this depression affects
whole part of fold between external costae.

Costae few, clearly marked, relatively regular, simple,
wide, angular with rounded top, low or of reduced height.
Median costae develop late; they begin sometimes so-
ewhat anterior to, sometimes somewhat posterior to,
and sometimes on a level with the beginning of sulcus and
fold. Lateral costae when present are short, and often
mere undulations of the commissure. No parietal costae.
Costellae present.

Maximum depth of pedicle valve located posteriorly.
Top of brachial valve is never at frontal commissure, but
at variable point located either posteriorly or around mid-
length; from this point valve slopes rapidly towards fron-
tal commissure. Width always greatest dimension. Maxi-
num width of shell occurs between half and two thirds of
shell-length anterior to ventral beak. Both valves are low
and have subequal thicknesses. Wide apical angle and
angle of commissure.

Shell thick. Neither dental plates nor umbonal cavities
nor septum. Teeth small, wide and strong. Hinge plate
composed of two strong, flat to slightly concave parts. A
distinct layer of secondary shell, resting on the hinge
plate, is clearly observable in serial transverse sections.
Inner socket ridges of dental sockets moderately high and
extending ventro-laterally. Crura short, in serial transverse sections triangular proximally and
hooked distally.

Comparisons
Novaplatirostrum n. gen. and Planovatirostrum have the
following features in common: flat appearance with gent-
ly biconvex profile; sharp commissure protruding, and
clearly indented by the median costae; flat to slightly
convex ventral flanks; very shallow sulcus and very low
fold, both well marked, beginning at some distance from
the beaks and wide at front; wide tongue, very shallow,
trapezoidal with sharp borders, standing out clearly; top
of tongue always lower than top of shell; small, erect to
slightly incurved beak, overhanging the cardinal line,
often almost in contact with the dorsal umbonal region;
long ventral interarea; few well marked and wide costae,
angular with rounded top; wide apical angle and angle of
the commissure; small, wide and strong teeth; a distinct
layer of secondary shell resting on the hinge plate; inner
socket ridges of dental sockets moderately high and
stretched ventro-laterally.

Many characters make Novaplatirostrum n. gen. dis-
tinct from Planovatirostrum; size usually smaller, i.e. it
does not reach a size commonly acquired by species of
Planovatirostrum; variable outline (always suboval in
Planovatirostrum), and then commonly (in around 50
per cent of specimens), slightly distorted on account of
asymmetry; median part of fold rarely marked by a slight
depression; sulcus and fold starting in the anterior third
(often less) of the valve, wider where they start, and
widening slowly; top of tongue often located lower;
costae lower and shorter, always simple; median costae
beginning a great distance from the beaks; lateral costae
more often absent, commonly reduced to mere undula-
tions of the commissure; shift, within the limits of similar
general costal formulae, of the number of median costae
towards higher values, the reverse being true for the
number of lateral costae; costellae present; greatest thick-
ness of shell commonly located more posteriorly, and
brachial valve sloping more rapidly from this point;
different ratios of dimensions: l/w (0.72 to 0.88 for Nova-
platirostrum; 0.70 to 0.79 for Planovatirostrum); w/l
(0.35 to 0.47 for Novaplatirostrum; 0.31 to 0.34 for
Planovatirostrum); l/l (0.41 to 0.54 for Novaplatirostrum;
0.41 to 0.47 for Planovatirostrum); thicker shell; absence
Fig. 2 — *Novaplatriostrum* sp. Specimen collected by D. Weyer, in 1969 at Bornleite near Obernik (Saalfeld), southeastern Thuringia, in the middle "Wocklumeria-Stufe". Camera lucida drawings of serial transverse sections; figures are distances in mm forward of the ventral umbo. MB.-B.1037. Measurements: length = 15.2 mm; width = 18.6 mm; thickness = 6.8 mm.
of dental plates, umbonal cavities and crural plates; shorter crura.

**Novaplatirostrum sauerlandense** n. gen., n. sp.

Plate 1, Figures 1-40, Text-figure 1

**Synonymy**

1924 *Liorhynchus subcurvata* Richt. (non MSTR.) - Schmidt, p. 145 pro parte, p. 161, p. 162 pro parte, non synonymia;

1928 *Liorhynchus subcurvatus* Richt. - Gallwitz, p. 496, p. 519, p. 525 pro parte;

*e.p.* 1972 "*Liorhynchus subcurvatus* (Richt. 1856, non Münster, 1840)" - Weyers, p. 84;

1988 *Planovatiostrum richteri* (Oppenheimer) - Becker, p. 194 pro parte, fig. 2, p. 195, p. 196, p. 198, pl. 2 (= p. 213), figs. 17-19;

1993 *Planovatiostrum richteri* - Becker in Kürschner et al., p. 603;

1993 *Planovatiostrum richteri* - Becker in Becker et al., fig. 17, p. 25 (= fig. 2, p. 195 in Becker, 1988, slightly updated), fig. 18, p. 26;

1996 *Planovatiostrum richteri* (Oppenheimer) auct. - Becker, fig. 1, p. 21, p. 23.

**Derivatio nominis**

From Sauerland in west-central Germany.

**Types**

Holotype, SMF50004 [Pl. 1, Figs. 16-20 = pl. 2 (= p. 213), figs. 17-19 in Becker, 1988 as *Planovatiostrum richteri*]. Paratype I, SMF50002. Respectively bed 23 and bed 18 (fig. 2, p. 195, p. 196 in Becker, 1888 as *P. richteri*) in the lower half of the Wocklum Limestone in the Hasselbachtal S-Section, northwestern Sauerland = lower half of the Kamptoclymenia endogona Subzone (lower Para-wocklumeria paradoxo Zone), do VIβ (see Becker, 1988, fig. 2, p. 194, p. 196). This age has been slightly modified (personal communication by Becker, R.T.) and is now: *Kosmoclymenia (Muessenbiaergia) bisulcata* Zone (see Becker, 1996, fig. 1, p. 21, table 1, p. 26, table 2, p. 28) = lower part of the Upper Kalloclymenia subarmata Zone sensu Korn (e.g.1986), do VIα.

**Material**

The material consists of seventy-three specimens deposited in four German scientific institutions; only sixty-three specimens were examined by the author.

Eight specimens from the following localities were examined in the Paläontologisches Museum des Museums für Naturkunde, Humboldt Universität zu Berlin: Eulenspiegel near Warstein [two specimens (MB.-B.1035,1036), one of them collected by A. Denckmann & H. Lotz, 1901; "Gonioclymenia-Schichten (Dasberg Stufe zu V)"; road trench near Geringen [one specimen (MB.-B.1029) collected by A. Denckmann & H. Lotz, 1900 in the "Wocklumeria Kalk (tow)"]; Henhausen [four specimens (MB.-B.1031-1034) in the K. Torley collection; "Dasberg-Schichten =to4"]; Bemberg above Henhausen, Hasselbachtal [one specimen (MB.-B.1030) collected by A. Denckmann, 1904 in the "Wocklumeria Kalk"; "Dasberg-Schichten =to4"];]. These specimens, with the exception of one from Eulenspiegel, have been identified as *Liorhynchus subcurvata* Richt. (non MSTR.) by Schmidt (1924, p. 98, p. 145), who examined them as well as six specimens [Belecke (one specimen), Hasselbachtal (one specimen), Wildungen (four specimens)], which the writer did not manage to locate in the collection.

Two specimens from Eulenspiegel near Warstein are deposited in the collection of the Geologisch-Paläontologisches Institut und Museum der Georg-August-Universität in Göttingen. They have also been examined and identified as *Liorhyn-
Fifteen specimens from the Hasselbachtal section (thirteen specimens, 88/3613) and from Riemke (two specimens, 88/3618a,b) were located in the collections of the Städtisches Museum in Menden (northern Sauerland). They were collected by Brakensiek, H., high school teacher, in the "Wocklumer-Kalk VI" and are identified as Leiorhynchus subcurvata Richter. 88/3613 and 3618a,b are catalogue numbers given by May, who brought the museum collections up-to-date in 1988, and published (1991) on some Givetian brachiopods and corals from northwestern Sauerland contained in them. They have received the following SMF numbers: 65000-65001 for 88/3618a,b, and 65002-650014 for 88/3613.

Thirty-three specimens from the southern slope section (= Hasselbachtal S-Section) of the Hasselbachtal are part of the collections of the Natur-Museum Senckenberg in Frankfurt/Main (SMF) and of the Paläontologisches Museum des Museums für Naturkunde, Humboldt Universität zu Berlin (HUB)/MB.-B.). Sixteen specimens were identified as Planovalvirostrum richteri (Oppenheimer) by Becker (1988, fig. 2, p. 195, p. 196, p. 198), who illustrated one of them [pl. 2 (= p. 213), figs. 17-19]; fifteen have the following catalogue numbers: SMF 50000/1-5, 50001/1,2, 50002, 50003, 50004 (photographed), 50005/1-3, 50006, 50007; a fragment of a brachial valve of a loose specimen did not receive a number. Thirteen specimens have been identified as P. richteri auct. by Becker (1996, fig. 1, p. 21, p. 23), who gave Ob numbers to twelve of them; they are catalogued under the following numbers: MB.-B.1008 (= Ob47), 1009 (= Ob71), 1010 (= Ob72), 1011 (= Ob73), 1012 (= Ob74), 1013.1 (= Ob83/1), 1013.2 (= Ob83/2), 1014 (= Ob56), 1015 (= Ob48), 1016.1 (= Ob70/1), 1016.2 (= Ob70/2), 1016.3 (= Ob70/3), 1017. Two specimens (MB.-B.1025,1026) have been collected in 1995 by Weyer, D. Two further specimens have been given up for studies on strontium isotope stratigraphy (see Korschner et al., 1993, p. 603).

Nine specimens from the northern slope of the Hasselbachtal (= Hasselbachtal N-Section), collected in 1993 and 1994 by D. Weyer were also deposited in the collection of the Paläontologisches Museum des Museums für Naturkunde, Humboldt Universität zu Berlin (HUB) under the catalogue numbers: MB.-B.1018-1024, 1027, 1028.

Thirty-five of the sixty-five specimens examined are in good state of preservation, sixteen satisfactory, and one poor; thirteen specimens are fragmental.

### Table 2 — Number of median and lateral costae.

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<td>Number of specimens</td>
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<tr>
<td>4/3</td>
<td>20</td>
</tr>
<tr>
<td>5/4</td>
<td>18</td>
</tr>
<tr>
<td>6/5</td>
<td>6</td>
</tr>
<tr>
<td><strong>46</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

**Description**

This refers only to specific characters in need of further detail.

Contour slightly distorted in 54 per cent of specimens. In six specimens the external median costae on the fold are slightly higher than the middle ones.

Sulcus beginning at 66 to 81 per cent of the shell-length, most of the values varying from 69 to 76 per cent, or 57 to 80 per cent of the unrolled length of the valve, most of the values varying from 63 to 76 per cent. The sulcus starts with a width of 56 to 81 per cent of its width at the front, and reaches its greatest width (60 to 69 per cent of the shell-width, most of the values varying from 63 to 66 per cent) at the junction of the frontal and lateral commissures. Top of tongue 32 to 48 per cent lower than point of maximum shell-thickness. Length of ventral interarea varying from 43 to 74 per cent of shell-width. Median depression on the fold in six specimens.

The general costal formula, which is a grouping of at least 75 per cent of the specimens in median, parietal, and lateral categories, is $4^-5^+0^-; 0^+^-2^-; 3^-4^-0^-3^-$. The ratios of median and lateral costae (in specimens in which such observations were possible) are given in Table 2. Median costae begin at a distance of the beak varying from 65 to 85 per cent of shell-length, most of the values varying from 71 to 82 per cent. Width of costae at front generally varies from 2 to 3.5 mm, but the external median costae on both sides may reach a width as high as 5 mm. Lateral costae absent in 33.5 per cent of specimens. Costellae (5 mm at front) have been observed in two specimens.

Measurements of ten specimens, of which eight have been photographed, are given on Table 3. Columns 2 to 8 refer to adult specimens, column 1 to the largest specimen at hand, column 9 to an ephebic, and column 10 to a juvenile.

Top of pedicle valve located posteriorly at a variable point between 22 and 41 per cent of the shell-length, and top of brachial valve at a point varying between 28 and 53 per cent of the shell-length anterior to the ventral beak. Maximum width occurs at a point between 49 and 65 per
Novaplatirostrum, late Famennian rhynchonellid brachiopod genus from Sauerland and Thuringia

Table 3 — Measurements (in mm) based on 10 specimens; figures in parentheses are reasonable estimates on damaged specimens. Abbreviations used; l = length; w = width; t = thickness; pv = pedicle valve; bv = brachial valve.

<table>
<thead>
<tr>
<th>Paratype</th>
<th>Paratype</th>
<th>Paratype</th>
<th>Paratype</th>
<th>Holotype</th>
<th>Paratype</th>
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<tr>
<td></td>
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<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td>F</td>
<td>G</td>
<td>I</td>
</tr>
<tr>
<td>l</td>
<td>(23.4)</td>
<td>22.5</td>
<td>22.3</td>
<td>22.2</td>
<td>21.3</td>
<td>20.3</td>
<td>20.2</td>
<td>19.6</td>
<td>18.4</td>
</tr>
<tr>
<td>w</td>
<td>(32.3)</td>
<td>26.8</td>
<td>28.1</td>
<td>27.8</td>
<td>24.8</td>
<td>23.2</td>
<td>24.5</td>
<td>24.5</td>
<td>24.5</td>
</tr>
<tr>
<td>lv unrolled</td>
<td>(28.5)</td>
<td>27</td>
<td>26.5</td>
<td>25.5</td>
<td>24.5</td>
<td>24.5</td>
<td>24</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>t</td>
<td>11.4</td>
<td>(10.8)</td>
<td>10.9</td>
<td>9.9</td>
<td>10.6</td>
<td>10.9</td>
<td>10.3</td>
<td>10.3</td>
<td>7.6</td>
</tr>
<tr>
<td>tv</td>
<td>?</td>
<td>4.7</td>
<td>4.8</td>
<td>4.1</td>
<td>4.8</td>
<td>4.6</td>
<td>4.8</td>
<td>4.1</td>
<td>3.9</td>
</tr>
<tr>
<td>tbv</td>
<td>?</td>
<td>(6.1)</td>
<td>6.1</td>
<td>5.8</td>
<td>5.8</td>
<td>6.3</td>
<td>5.5</td>
<td>6.2</td>
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</tr>
<tr>
<td>l/w</td>
<td>(0.72)</td>
<td>0.84</td>
<td>0.79</td>
<td>0.8</td>
<td>0.86</td>
<td>0.88</td>
<td>0.82</td>
<td>0.79</td>
<td>0.88</td>
</tr>
<tr>
<td>t/w</td>
<td>(0.35)</td>
<td>(0.40)</td>
<td>0.39</td>
<td>0.36</td>
<td>0.43</td>
<td>0.47</td>
<td>0.42</td>
<td>0.42</td>
<td>0.36</td>
</tr>
<tr>
<td>t/l</td>
<td>(0.49)</td>
<td>(0.48)</td>
<td>0.49</td>
<td>0.45</td>
<td>0.5</td>
<td>0.54</td>
<td>0.51</td>
<td>0.53</td>
<td>0.41</td>
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<tr>
<td>apical angle</td>
<td>(146°)</td>
<td>140°</td>
<td>141°</td>
<td>139°</td>
<td>135°</td>
<td>?</td>
<td>141°</td>
<td>144°</td>
<td>(134°)</td>
</tr>
<tr>
<td>angle of the commissure</td>
<td>?</td>
<td>143°</td>
<td>145°</td>
<td>(142°)</td>
<td>138°</td>
<td>?</td>
<td>144°</td>
<td>?</td>
<td>?</td>
</tr>
</tbody>
</table>

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

cent of the shell-length anterior to the ventral beak. Apical angle varying from 134° to 146° (most values are between 139° and 144°). Angle of the cardinal commissure varying from 138° to 145°.

Serial transverse sections of one specimen (paratype J, SMF 65008) are shown in Text-figure 1.

DISCUSSION OF SYNONYM
The synonymy given by SCHMIDT (1924) is here rejected entirely, because only the figures by RICHTER (1848, figs. 153-155, 158, 159) of two Thuringian specimens (mentioned above) relate to the new genus, and the author considers the species from Sauerland to be different from the species from Thuringia. e.p. and pro parte mean that the quotations apply also to other regions than northern Sauerland.

COMPARISONS
The species from Sauerland, here described as Novaplatirostrum sauerlandense n. gen., n. sp., and the species from Thuringia, here named N. sp., have been considered conspecific with the Moravian species Terebratula Richteri, assigned by HAVLIČEK (1979, pp. 96-97) to the genus Planovatirostrum.

The author’s knowledge of Novaplatirostrum sp. from the Wocklumeria-Stufe = do VI of southeastern Thuringia rests on the figures of six specimens (see Table 1) and on three specimens (MB.-B.1037-1039) received from Weyer in 1973. Serial transverse sections made from two (MB.-B.1037, 1038) of these three specimens leave no doubt about the assignment to Novaplatirostrum n. gen., but the author considers that it is not advisable to give it a formal specific name based on such a restricted number of specimens. However in the Thuringian species, which is generally smaller, the contour is usually suboval and more commonly asymmetrical, the costae are generally weaker, and the lateral costae more seldom present. The Thuringian species will be described in a joint paper with Weyer, D., who, in the course of time and by dint of hard work, succeeded in collecting some two hundred specimens of the species.

Terebratula Richteri is a rare species of small size described in the Proceedings of the Naturalists’ Society of Brno (Naturforschender Verein in Brünn) in Moravia. On account of the limited distribution of this local Proceedings, the species had sunk into complete oblivion until HAVLIČEK (1979) gave it a new life after sixty-three years, and named it Planovatirostrum richteri. Nevertheless, the species remains very poorly known. According to HAVLIČEK (1979, p. 96) it is represented by “4 shells and several incomplete valves”. When the author visited the National Museum in Prague (Národní Muzeum v Praze) in April 1980, and then, in October 1993, the Rokycany Museum near Prague, where the collection had been transferred, HAVLIČEK could only show him an almost complete specimen, and an incomplete specimen (the almost complete brachial valve + the cardinal part of the pedicle valve). However, the almost
Thuringian species is nowadays also accepted by the Oberdevon verbreitet". The identity of the Moravian and Terebratula Richteri (Richter) has a subrectangular and symmetrical outline, a different l/w ratio (73 to 94 per cent for Novaplatirostrum sp., about 71 per cent for the figured specimen of Terebratula Richteri), and narrower costae.

**Geographical location and stratigraphical position**

According to Becker (1988, p. 194, fig. 2, p. 195, p. 196, p. 198; 1996, fig. 1, p. 21, p. 23) and to stratigraphical information accompanying two specimens (MB.-B.1025, 1026) collected by D. Weyer in 1995, the species, identified as Planovatiostrum richteri, is found throughout the c. 2.71 m thick lower part of the Wocklum Limestone on the southern slope of the Hasselbachtal section (= Hasselbachtal S-Section). The upper part of the Wocklum Limestone was exposed for a short time in 1988 and was sampled by Korn (see Luppold et al., 1994, fig. 3, p. 17). In terms of the ammonoid succession (revised by Becker, 1996), Novaplatirostrum sauerlandense n. gen., n. sp. is found in the Sphenoclymenia brevispina Zone (= Lower Kalloclymenia subarmata Zone sensu Korn, e.g. 1986), with the exception of its lowermost part (seven specimens); the Kosmoclymenia (Muessenbiearia) bicusculata Zone (= lower part of Upper Kalloclymenia subarmata Zone sensu Korn, e.g. 1986) (seventeen specimens); the Balvia (Mayneoceras) lens Zone (= upper part of Upper Kalloclymenia subarmata Zone sensu Korn, e.g. 1986) (four specimens); and in the Lower Parawoklumleria paradoxo paradoxa Zone sensu Korn, e.g. 1986 (one specimen).

Seven juvenile specimens (MB.-B.1018-1024) have been collected by D. Weyer, in 1994, in the Wocklumeria sphaeroides Zone (= lower part of the Upper Parawoklumleria paradoxo Zone sensu Korn, e.g. 1986) of the upper part of the Wocklum Limestone on the northern slope of the Hasselbachtal (= Hasselbachtal N-Section). The entire Menden collection derives from the "Wocklumer-Kalk (VI)", and is identified as Leiorychus subcurvata Richter.

All specimens seen by the author in 1973 in the Berlin collection are either unidentified or were named Liorhynchus subcurvata Richt. (non Mstr.) by Schmidt (1924, p. 145, p. 161). Their assigned age is either "Dasberg-Schichten (to V)" or "Gonioclymenien-Schichten (Dastberg Stufe to V)" or "Wocklumer Kalk (to w)" according to the locality. As recalled by Sartenaer & Xu (1989, p. 39), Schmidt (1924, pp. 160-163), who examined the material, accepted a to V, to W, to VI age for the "Dasberg-Schichten" (= "Gonioclymenienstufe") [as defined by him (pp. 98-99)] in which the species was found. It must be borne in mind that this Berlin collection goes back to the beginning of this century, and the part of the "Dasberg-Schichten" containing Novaplatirostrum sauerlandense n. gen., n. sp. is now included in the Wocklum-
Novaplatirostrum, Late Famennian rhynchonellid brachiopod genus from Sauerland and Thuringia

Stufe. Anyhow, there is no trace of a Dasberg fauna in the Hasselbachtal.

In short, the range of *N. sauerlandense* n. gen., n. sp. is: Wocklum Limestone, with the exception of its lowermost part = *Sphenoclymenia brevispina* (with the exception of its lowermost part) to *Wocklumeria sphaeroides* Zones or *Linguaclymenia* (VI-A) (with the exception of its lowermost part), *Balvia* (VI-B), *Parawocklumeria* (VI-C), and *Wocklumeria* (VI-D) Genozones of the Wocklumian (= VI-A to VI-F).

The species is not only restricted stratigraphically; it is also restricted geographically. A few outcrops stretch on a distance of 50 km on the northern flanks of the Renscheid-Altena anticlinorium and Warstein antclinole in northern Sauerland. They are from W to E: Henkhausen, Hasselbachtal, Geringsen, Riemke, Belecke, and Eulenspiegel bei Warstein.

Outside Sauerland, four specimens of the species, identified as *Liorhynchus subcurvata* Richt. (non Mstr.), have been mentioned from Wildungen in the Kellerwald by SCHMIDT (1924, p. 145). Unfortunately, as stated above, these specimens could not be examined by the author; therefore, the Kellerwald occurrence is not included in the title of the present paper.

Acknowledgments

The author owes a special debt to R. THOMAS BECKER and Dieter WEYER, who put their material at his disposal, and provided the fundamental stratigraphical information in terms of the cephalopod zonation.

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References


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Explanation of Plate 1

Novaplatirostrum sauierlandense n. gen., n. sp.

Fig. 1-5 — Paratype A, SMF65002. Ventral, dorsal, frontal, apical, and lateral views. Costal formula: \( \frac{4}{5}; 0; \frac{2}{3} \).

Figs. 6-10 — Paratype B, SMF65003. Ventral, dorsal, frontal, apical, and lateral views. Costal formula: \( \frac{6}{5}; 0; 0 \).

Figs. 11-15 — Paratype C, SMF65004. Ventral, dorsal, frontal, apical, and lateral views. Costal formula: \( \frac{5}{4}; 0; 0 \).

Figs. 16-20 — Holotype, SMF50004. Ventral, dorsal, frontal, apical, and lateral views. Costal formula: \( \frac{3}{4}; 0; 0 \).

Figs. 21-25 — Paratype D, SMF65000. Ventral, dorsal, frontal, apical, and lateral views. Costal formula: \( \frac{4}{3}; 0; 0 \).

Figs. 26-30 — Paratype E, SMF65005. Ventral, dorsal, frontal, apical, and lateral views. Costal formula: \( \frac{4}{3}; 0; \frac{2}{3} \) and \( \frac{3}{4} \).

Figs. 31-35 — Paratype F, SMF65006. Ventral, dorsal, frontal, apical, and lateral views. Costal formula: \( \frac{3}{2}; 0; \frac{1}{2} \) and \( \frac{2}{3} \).

Figs. 36-40 — Paratype G, SMF65007. Ventral, dorsal, frontal, apical, and lateral views. Costal formula: \( \frac{4}{3}; 0; 0 \).
Novaplatirostrum, late Famennian rhynchonellid brachiopod genus from Sauerland and Thuringia

Plate 1