

**MEDUANAROSTRUM, A NEW MIDDLE PRAGIAN RHYNCHONELLID (BRACHIOPOD)
GENUS FROM THE ARMORICAN MASSIF, NW FRANCE,
AND MEDUANAROSTRIDAE NOV. FAM.**

Meduanarostrium, un nouveau genre de rhynchonellide (brachiopode) du Praguien moyen du Massif Armoricaïn, NW France et Meduanarostridae nov. fam.

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(Plates X and XI)

Abstract. — A new rhynchonellid genus, *Meduanarostrium*, with type species *M. letissieri* (Oehlert, 1877), is described from the Laval Synclinorium, Armorican Massif, where it is present in a restricted area along the Mayenne river valley. A middle Pragian age is attributed to the new genus after evaluation of the scanty stratigraphic information found in the literature. *Meduanarostrium* nov. gen. is designated as the type genus for the new family Meduanarostridae.

Résumé. — L'auteur décrit un nouveau genre rhynchonellide, *Meduanarostrium*, avec *M. letissieri* (Oehlert, 1877) comme espèce-type, en provenance du Synclinorium de Laval dans le Massif Armoricaïn, où elle est présente dans une aire limitée le long de la vallée de la Mayenne. Par suite de l'évaluation de la maigre information stratigraphique trouvée dans la littérature un âge praguïen moyen est attribué au nouveau genre. *Meduanarostrium* nov. gen. est désigné comme type de la nouvelle famille Meduanarostridae.

Keywords : Devonian, France, paleontology, stratigraphy, systematics.

Mots-clés : Dévonien, France, paléontologie, stratigraphie, systématique.

I. — INTRODUCTION

The early Emsian genus *Straelenia* Maillieux, 1935, and various species that have been assigned to it at one time or another, are in the process of being re-evaluated. One of them, *S. letissieri* (Oehlert, 1877), coming from the Armorican Massif, is revised in the present paper.

Crest of tongue located considerably lower than the maximum shell thickness. Costae numerous, low, regular, simple, starting at or near to the beaks; parietal costae present. Dental plates, septum, and divided hinge plate thick. Septalium small. Crura raduliform, closely set, Phrygian cap-shaped in section. Cardinal process stocky, bilobed with tattered top, overlapping the hinge plate.

MEDUANAROSTRUM nov. gen.

II. — SYSTEMATIC PALAEOLOGY

Order RHYNCHONELLIDA Kuhn, 1949

MEDUANAROSTRIDAE nov. fam.

Type genus: *Meduanarostrium* nov. gen.

Diagnosis: Shell of medium-large to large size. Profile moderately gibbous. Outline subcircular to longitudinally ovoid. Hinge line long. Commissure slightly serrate. Sulcus very shallow, starts generally anterior to mid-length. Fold very low. Tongue low, trapezoidal. Apical angle wide. Valves thickest around mid-length.

Derivatio nominis : *Meduana* = Latin name for the Mayenne River on the east bank of which all available specimens of *Rhynchonella Le Tissieri* Oehlert, 1877 have been collected in the past.

Type species: *Rhynchonella Le Tissieri* Oehlert, 1877.

Diagnosis : Shell of medium-large to large size. Profile gibbous. Both valves semi-elliptical in transverse profile, thickest around mid-length. Outline subcircular to longitudinally ovoid. Hinge line long. Well developed ventral lunulae. *Squamae* and *glottae* present. Sulcus very shallow, fold very low, wide at front, start around mid-length. Apical angle wide. Tongue low. Costae numerous, very low, regular, start near the beaks or at the beaks; parietal costae present. Shell thick posteriorly. Teeth stout. Dental plates thick. Umbonal cavities reduced. Septum thick. Septalium small, uncovered. Hinge plate divided. Crura closely set. Phrygian cap-shaped in section. Cardinal process bilobed, stocky, overlapping the hinge plate.

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Unnamed forms assigned to the genus : No other species than the type species can presently be assigned to *Meduanarostrum* nov. gen., but representatives of the genus may be found in existing collections. These include six specimens (A-146) the author had the privilege to examine in September 1977 in the Department of Geology of the University of Oviedo (Spain). They are identified as *Straelenia* sp. and come from the Nogueras Formation west of Mezquita de Loscos in the Eastern Iberian Chains. The precise stratigraphic level indicated on the label accompanying the specimens is “D2cβ (parte alta)”, which indicate the upper part of the Nogueras Formation corresponding to the lower part of the Pragian. It is strange that Carls, who, for many years, studied various sections in the Eastern Iberian Chains in great detail, never mentioned any Pragian rhynchonellid. In a collection of the Peabody Museum, Yale University (USA), kindly loaned to the author, a single damaged dorsal valve from the Oriskany Sandstone of Maryland (Cumberland, Allegany County) could belong to the genus; it is identified as *Plethorhyncha barrandi* (Hall, 1857), and is catalogued under the number 222459.

Description

Shell of medium-large to large size. Profile moderately gibbous (both valves moderately inflated); both valves semi-elliptical in transverse profile. Outer dorsal flanks falling abruptly toward the commissure where they become sometimes vertical; ventral flanks gently convex. Dorsibiconvex with dorsal valve generally around two times thickness of ventral valve. Outline subcircular (generally) to longitudinally ovoid. Hinge line long. Postero-lateral margins concave near the commissure with, as a result, the cardinal commissure sticking out; anterior and lateral commissures sharp, slightly and very slightly serrate, respectively. *Squamae* and *glottae* present. Very shallow sulcus and very low fold, wide at front, only well delineated near front, start around mid-length, generally anterior to mid-length. Both valves thickest around mid-length, and sloping towards front margin. Maximum width anterior to mid-length. Maximum thickness around mid-length. Apical angle wide. Ventral beak wide, slightly incurved, applied on the dorsal umbonal region. Well developed ventral *lunulae* defined by strong and blunt ridges; dorsal *lunulae* reduced. Sulcus extended dorsally as low tongue with trapezoidal outline, bottom of sulcus slightly convex. Crest of tongue slightly convex, located considerably lower than the maximum shell thickness. Dorsal umbo tangent to a vertical plane. Costae numerous, well marked, very low, simple, regular, angular to angular with rounded top, starting near to the beaks or at the beaks. Parietal costae present, transitional between median and lateral costae. Shell thick posteriorly. Teeth stout, short, cyrtomatodont. Dental plates thick, short. Dental sockets wide, short. Umbonal cavities reduced. Septum thick, persisting for half shell length. Septalium small (narrow and shallow), uncovered. Hinge plate divided, thick; outer hinge plates subhorizontal, passing without sign of crural bases into raduliform crura. Crura closely set, Phrygian cap-shaped in section, almost not curved distally. Cardinal process bilobed, stocky, overlapping the hinge plate, and entering the dental sockets; its top is tattered and sticks out at both extremities. Muscular scars not observed.

Comparisons

The species *letissieri* Oehlert 1877 has been generally assigned in the literature to the genus *Rhynchonella* Fischer de Waldheim, 1809, exceptionally to the genus *Camarotoechia* Hall & Clarke, 1893, and, since 1935, to the early Emsian genus *Straelenia* Maillieux, 1935. *Straelenia* is

distinct from *Meduanarostrum* nov. gen. in a small to medium size, slightly dorsibiconvex profile, greatest width around mid-length, less deeply serrated commissure, rarely divided costae, thin dental plates, large umbonal cavities, and simple cardinal process.

The upper Emsian genus *Astraelenia* Sartenaer, 2009 and *Meduanarostrum* nov. gen., and thus the families of which they are the types, have some characters in common, e. g. a long hinge line; the presence of *squamae*, *glottae*, and well defined ventral *lunulae*; the maximum width generally located anterior to mid-length; a wide apical angle; numerous, well marked, low, regular, and simple costae, starting at or very near to the beaks; the presence of parietal costae; thick dental plates; small umbonal cavities; stout and short teeth; a small septalium; a thick divided hinge plate; and raduliform and closely set crura.

The genus *Astraelenia* can be easily separated due to a slightly smaller size; a strongly dorsibiconvex profile; the dorsal umbo extending beyond the ventral umbo; a subcircular to transversely suboval outline; a moderately to strongly serrate commissure; the maximum thickness of the ventral valve located around one third the length anterior to the beak; the maximum thickness of the dorsal valve exceptionally located around mid-length; a better marked and slightly deeper sulcus, starting more posteriorly; slightly higher fold and tongue; the tongue sometimes tending to become vertical near the commissure; a lower number of costae; a cardinal process crowned with numerous lamellae; a thinner septum; and the distal part of the crura strongly curving ventrally.

Meduanarostrum letissieri (Oehlert, 1877)

(Pl. X, fig. 1-15 ; Pl. XI, fig. 1-20)

- 1877 - *Rhynchonella* Le Tissieri, *Oehlert*; Oehlert, p. 597, pl. X, fig. 11, 11a
 1879 - *Rhynchonella* Le Tissieri; Oehlert & Davoust, p. 705
 1882 - *Rhynchonella* Le Tissieri Oehl.; Oehlert, p. 290
 non 1882 - *Rhynchonella Letissieri*, OEHLERT; Barrois, p. 269, 473, 485, 503
 non 1887 - *Rhynchonella* cf. *Letissieri*, Oehl.; Barrois, p. 160
 ? 1889 - *Rhynchonella Letissieri*, OEHL.; Oehlert, p. 750
 non 1889 - *Rhynchonella* cf. *Letissieri*, Oehl.; Barrois, p. 85, 251
 pp. 1889 - *Rhynchonella* Le Tissieri, Oehl.; Barrois, p. 328
 1902 - *Rhynchonella le Tissieri* OEHL.; Drevermann, p. 108
 non 1912 - *Rhynchonella Le Tissieri* OEHLERT; Collin, p. 42-43, 415
 non 1913a - *Rhynchonella* Le Tissieri? Oehlert; Asselberghs, p. 201, 209
 non 1913b - *Rhynchonella Le Tissieri?* Oehlert; Asselberghs, p. 30, 108-109, 128
 non 1913 - *Rhynchonella Le Tissieri?* Oehlert; Duvigneaud, p. 185
 non 1925 - *Rhynchonella Le Tissieri* OEHLERT, 1877; Couffon, p. 62
 non 1929 - *Rhynchonella Le Tissieri* OEHLERT; Péneau, p. 229-230, 263
 1935 - *Camarotoechia Le Tissieri* Oehl.; Renaud, p. 6
 1935 - *Straelenia Le Tissieri* (OEHLERT & DAVOUST); Maillieux, p. 12
 non 1936 - *Rhynchonella Letissieri* Oehlert; Termier, p. 310, 323, 1136
 1942 - *Straelenia Le Tissieri* Oehlert; Renaud, fasc. 1, p. 69, 101, 102
 non 1942 - *Straelenia Le Tissieri* Oehlert; Renaud, fasc. 1, p. 78, 84, 89; fasc. 2, p. 322-323

pp. 1942 - *Straelenia Le Tissieri* OEHLERT; Renaud, fasc. 2, p. 114-115, 358-359

pp. 1955 - *Straelenia letissieri* OEHLERT & DAVOUST; Schmidt, p. 115

non 1961 - *Rhynchonella letissieri* OEHLERT; Llopis Lladó, p. 265

non 1962 - *Straelenia le tissieri* (OEHLERT 1877); Pillet, p. 53

1988 - *Rhynchonella le tissieri*; Brice in Morzadec et al., p. 52

2009 - *Rhynchonella Le Tissieri* OEHLERT, 1877; Drevermann in Sartenaer, p. 28

Material : Twenty specimens in good state of preservation from the south-western part of the « Département de la Mayenne » in the Laval Synclinorium in the Armorican Massif: seven from Saint-Germain-le Fouilloux, five from La Baconnière, five from La Jaillerie, two from La Roussière (La Roussière quarry, now abandoned, southwest of Saint-Germain-le-Fouilloux), and one from Saint-Jean-sur-Mayenne.

Lectotype, topotypes, stratum typicum and locus typicus: All types are deposited in the collection of the « Musée des Sciences », Laval, with registration numbers prefixed ML-PAL (« Musée Laval-Paléontologie »).

Oehlert (1877, p. 597, 601, pl. X, figs 11, 11a), who had a few specimens at his disposal, figured only one specimen (dorsal and lateral views) of *Rhynchonella Le Tissieri*; it is here formally designated as the lectotype. The only stratigraphic information accompanying the original description of the species is « calcaire à *Spirigera undata* » in the “middle part of the Lower Devonian”.

Although he did not mention any precise locality in the « Département de la Mayenne », Oehlert (ibid., p. 578) indicated that La Baconnière, Saint-Germain-le-Fouilloux and Saint-Jean were the three localities he “explored with most care”. Therefore, it is reasonable to call the following specimens topotypes:

Topotypes A, ML-PAL-01453 (Pl. X, Figs 1-5), J, ML-PAL-01452. La Roussière quarry.

Topotypes B, ML-PAL-01454 (Pl. X, Figs 6-10), C, ML-PAL-01451 (Pl. X, Figs 11-15), F, ML-PAL-01459 (Pl. XI, Figs 11-15), H, ML-PAL-01455 (Fig. 1), K, ML-PAL-01457. Saint-Germain-le-Fouilloux.

Topotypes D, ML-PAL-01464 (Pl. XI, Figs 1-5), E, ML-PAL-01461 (Pl. XI, Figs 6-10), G, ML-PAL-01462 (Pl. XI, Figs 16-20), L, ML-PAL-01462. La Jaillerie.

Topotype I, ML-PAL-01460 (Fig. 2). La Baconnière.

Although highly probable, it is not certain that Oehlert had at his disposal the material described in the present paper. Only one out of the twenty specimens (Pl. 1, Figs 6-10) shows some resemblance to the specimen figured by Oehlert. This specimen is here formally designated the lectotype of the species in accordance with the International Code of Zoological Nomenclature dealing with the designation of lectotypes and type localities: Article 74.4 (“the fact that the specimen no longer exists or cannot be traced does not of itself invalidate the designation”), Article 76.1 (“if there are syntypes and no lectotype has been designated, the type locality encompasses the localities of all of them”), and Recommendation 76A.1.4 (“In ascertaining or clarifying a type locality, an author should take into account as a last resort and without prejudice to other clarification, localities within the known range of the taxon or from which specimens referred to the taxon had been taken”).

Description

Oehlert’s (1877) concise description of the external characters of the species is the only description of the species to be found in the literature; Renaud (1942, 2nd fasc., p. 115) gave an excerpt of this description.

What follows refers only to specific characters in need of further elaboration.

Width of hinge line between 59 and 77 per cent (mostly between 59 and 70 per cent) of shell width. Sulcus starts between 46 and 64 per cent (mostly between 46 and 56 per

cent) anterior to beak, or between 51 and 70 per cent (mostly between 51 and 57 per cent) of unrolled length of valve. Thickness of dorsal valve between 53 and 77 per cent (mostly between 59 and 64 per cent) of shell thickness. Maximum thickness of ventral valve located between one third and one half shell length anterior to beak. Maximum thickness of dorsal valve, and thus of shell, located between 46 and 62 per cent (mostly between 46 and 53 per cent) of shell length anterior to ventral beak. Apical angle between 102° and 125° (mostly between 107° and 117°).

Measurements of ten specimens, of which seven have been photographed, are given on Table I. Width of sulcus at front between 54 and 66 per cent (mostly between 56 and 60 per cent) of shell width. Crest of tongue located between 24 and 46 per cent (mostly between 28 and 40 per cent) below maximum shell thickness. Width of median costae at front between one and two mm. The general costal formula in median, parietal, and lateral categories derived from at least 75 per cent of the available specimens (17) in each category is $\frac{8-10}{7-9}$; $\frac{1-1}{1-1}$ to $\frac{2-2}{2-2}$; $\frac{17-24}{18-25}$; ratios of costae are given on

Table II.

Comparisons

According to Oehlert (1877, p. 601), *Rhynchonella Le Tissieri* is distinct from the late Famennian *R. laticosta* Phillips, 1841, and from the Wenlock species *R. Stricklandi* (Sowerby, J. de C. in Murchison, 1839) in its higher number of costae and its more elongated shape. Drevermann (1902, pp. 108-109), who received a few specimens from Oehlert, saw some analogy between *R. le Tissieri* and the early Emsian Eifel species *R. Dunensis* Drevermann, 1902, but declared it different in a considerably larger size, a large number of costae, and the *paries geniculatus* of the ventral valve.

Asselberghs (1913a, p. 201 and 1913b, pp. 108-109 as *R. Le Tissieri*?), who had only one strongly crushed specimen from the late Siegenian «quartzophyllades de Royvaux» of the Neufchâteau Synclinorium at his disposal, compared the species to the two lower Emsian species, *R. Dannenbergi* Kayser, 1883 from eastern Taunus, and *R. Dannebergi* mut *minor* Drevermann, 1902 from the Eifel area, and the middle Siegenian *R. papilio* Krantz, 1857 from the middle Rhine valley, and also to the New York *R. oblata* Hall, 1857 and *R. multistriata* Hall, 1857 from the Oriskany Sandstone. [Remark: Asselbergh’s specimen has been included by Maillieux (1935, p. 13) in the synonymy of *Straelenia minor*, and by Maillieux (1936, p. 9; 1941, p. 37) in the synonymy of *S. Dunensis*]. Drot (1964, p. 157) considered *Straelenia letissieri* as « très proche » to *S. losseni* (Kayser, 1880), but stated that specimens of the former are flatter.

All these comparisons do not deserve too much attention. The only comparison in the literature that carries some weight is the one made by Oehlert & Davoust (1879, p. 705) with another large Armorican species, *R. Chaignoni* Oehlert & Davoust, 1879 that they considered different in its larger size, the compression and gibbosity of its dorsal valve, its more elongated shape, and deeper sulcus. Renaud (1942, 2nd fasc., p. 115) followed suit in considering *R. Le Tissieri* and *R. Chaignoni*, also named *Straelenia? Chaignoni*, as « voisines ». The generic assignment of *Rhynchonella Chaignoni* will be discussed by the author in a forthcoming publication.

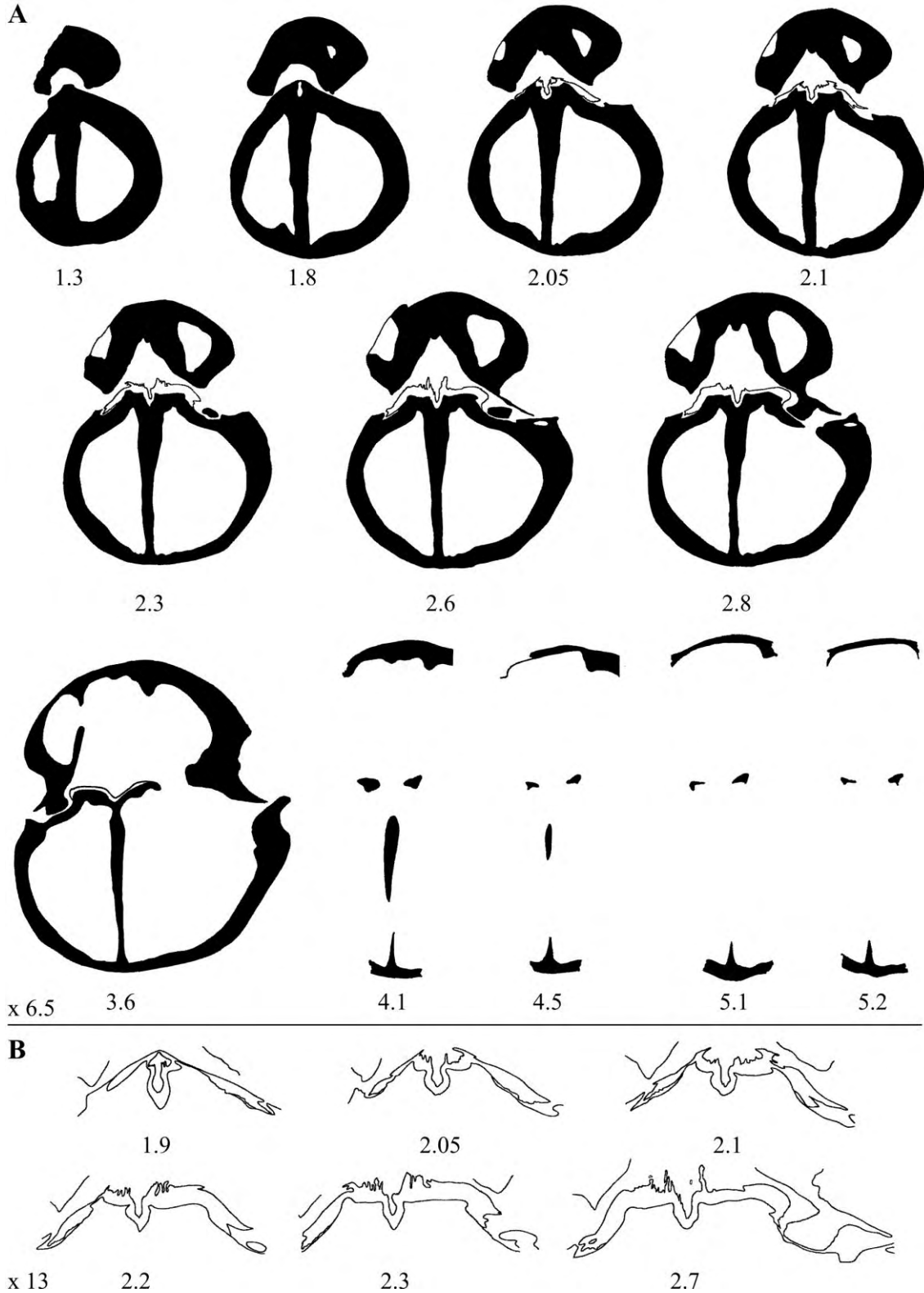


Fig. 1. — *Meduanarostrum letissieri* (Oehlert, 1877). Camera lucida drawings of serial transverse sections; figures are distances in mm forward of the ventral umbo. Topotype H, ML-PAL-01455. Saint-Germain-le-Fouilloux, « Département de la Mayenne », Laval Synclinorium, Armorican Massif. Saint-Cénére Formation, Middle Pragian. Measurements: length = 27.8 mm; width = 32.5 mm; thickness = 23.5 mm.

Fig. 1. — *Meduanarostrum letissieri* (Oehlert, 1877). Sections sériées transverses dessinées à la chambre claire; les distances sont en mm depuis l'umbo ventral. Topotype H, ML-PAL-01455. Saint-Germain-le-Fouilloux, Département de la Mayenne, Synclinorium de Laval, Massif Armoricain. Formation de Saint-Cénére, Praguien Moyen. Mesures: longueur = 27.8 mm; largeur = 32.5 mm; hauteur = 23.5 mm.

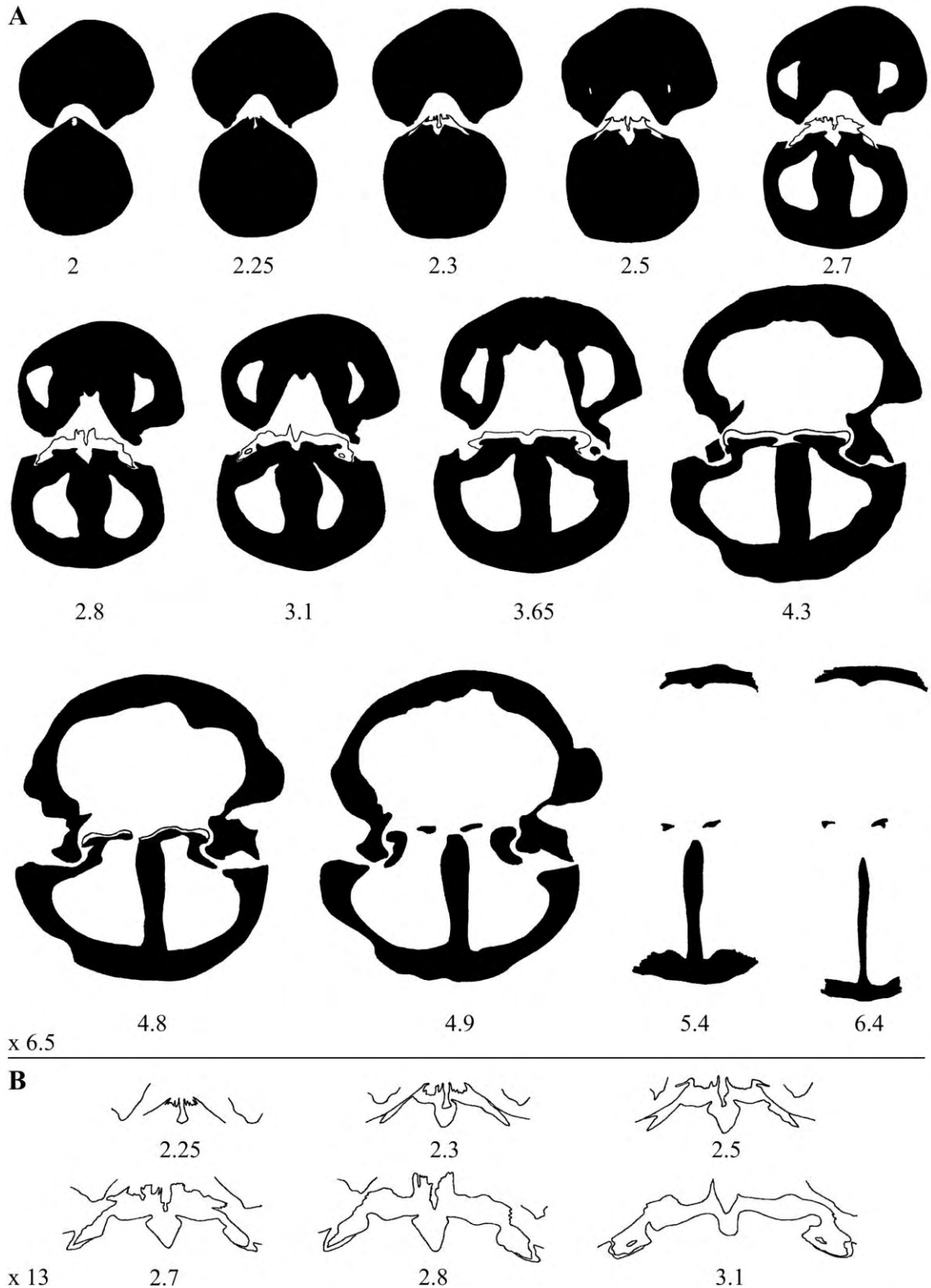


Fig. 2. — *Meduanarostrum letissieri* (Oehlert, 1877). Camera lucida drawings of serial transverse sections; figures are distances in mm forward of the ventral umbo. Topotype I, ML-PAL-01460. La Baconnière, « Département de la Mayenne », Laval Synclinorium, Armorican Massif. Saint-Cénére Formation, Middle Pragian. Measurements: length = 30.2 mm; width = 35.5 mm; thickness = 23.9 mm.

Fig. 2. — *Meduanarostrum letissieri* (Oehlert, 1877). Sections sériées transverses dessinées à la chambre claire; les distances sont en mm depuis l'umbo ventral. Topotype I, ML-PAL-01460. La Baconnière, Département de la Mayenne, Synclinorium de Laval, Massif Armoricain. Formation de Saint-Cénére, Praguïen Moyen. Mesures: longueur = 30.2 mm; largeur = 35.5 mm; hauteur = 23.9 mm.

Median costae			Parietal costae			Lateral costae		
Number of costae	Number of specimens	%	Number of costae	Number of specimens	%	Number of costae	Number of specimens	%
$\frac{7}{6}$	1	6	$\frac{1-1}{1-1}$	7	41	15+	1	6.5
$\frac{8}{7}$	5	29	$\frac{2-1}{2-1}$	2	12	$\frac{16}{17}$	1	6.5
$\frac{9}{8}$	6	35	$\frac{2-2}{2-2}$	7	41	17+	4	27
$\frac{10}{9}$	2	12	$\frac{3-3}{3-3}$	1	6	$\frac{17}{18}$	1	6.5
$\frac{11}{10}$	2	12		17	100	$\frac{18}{19}$	1	6.5
$\frac{12}{11}$	1	6				$\frac{19}{20}$	2	13.5
	17	100				$\frac{20}{21}$	2	13.5
						$\frac{24}{25}$	3	20
							15	100

Tab. I — *Meduanarostrum letissieri* (Oehlert, 1877). Number of median, parietal, and lateral costae.

Tabl. I — *Meduanarostrum letissieri* (Oehlert, 1877). Nombre de plis médians, pariétaux et latéraux.

in mm	Topotype A ML-PAL 01453	Topotype B ML-PAL 01454	Topotype E ML-PAL 01461	Topotype D ML-PAL 01464	Topotype C ML-PAL 01451	Topotype F ML-PAL 01459	Topotype J ML-PAL 01452	Topotype K ML-PAL 01456	Topotype L ML-PAL 01457	Topotype G ML-PAL 01462
l	40.7	39.1	40.7	36.7	(37.7)	35.2	(35)	(33.9)	33.2	32.1
vv unrolled	53.5	52.5	57	53	(47)	51	(46.5)	(41)	43.5	41.5
w	39.8	40.8	35.4	39.1	37.8	35.6	34.5	31.4	30.4	32
t	26.6	26.2	29.3	27.2	22	26.4	26.5	22.1	26	20.6
vv	8.1	9	9.8	7.8	6	12	11	7.6	9	9.7
tdv	18.5	17.2	19.5	19.4	16	14.4	15.5	14.5	17	10.9
l/w	1	0.96	1.15	0.94	(1)	0.99	(1)	(1.08)	1.09	1
t/w	0.67	0.64	0.83	0.70	0.58	0.74	0.77	0.70	0.86	0.64
t/l	0.65	0.67	0.72	0.74	(0.58)	0.75	(0.76)	(0.65)	0.78	0.64
Apical angle	117°	125°	102°	115°	117°	108°	?	?	(115°)	107°

Tab. II — *Meduanarostrum letissieri* (Oehlert, 1877). Measurements of ten specimens; figures in parentheses are reasonable estimates on damaged specimens. Abbreviations: l = length; w = width; t = thickness; vv = ventral valve; dv = dorsal valve.

Tabl. II — *Meduanarostrum letissieri* (Oehlert, 1877). Mesures de dix spécimens; les mesures entre parenthèses sont des estimations raisonnables sur des spécimens endommagés. Abréviations: l = longueur; w = largeur; t = hauteur; vv = valve ventrale; dv = valve dorsale.

Stratigraphic range and geographic distribution

Meduanarostrum letissieri is found in the middle Pragian in the southeastern part of the « Département de la Mayenne » in the Laval Synclinorium, Armorican Massif (see Material for details).

III. — DISCUSSION ON THE RANGE AND DISTRIBUTION OF *MEDUANAROSTRUM LETISSIERI*

The first expression referring to a level containing *Athyris undata* is due to de Tromelin & Lebesconte (1876, p. 165),

who mentioned the « Calcaires à *A. undata* » of Gahard, Izé, La Baconnière, etc., often mixed with shales, in the « Département d'Ille-et-Vilaine », and in the whole of Brittany. Oehlert (1877, p. 597, 601 ; 1882, p. 275, 288), and Oehlert (1889, p. 744, 745, 753, 755, 773, 778) were early users of similar terms: « Calcaire à *Spirigera undata* », « Calcaires à *Spirifer Rousseau* et *Athyris undata* », and « Calcaire à *A. undata* ».

In the Laval Synclinorium, this hybrid bio-, litho-, chronostratigraphic unit of the Lower Devonian has been widely used, and is still used under various names in the literature of the Armorican Massif, notably in the « Synclinorium Médian Armoricain » of Central Brittany: « calcaire à *A. undata* », « calcaires à *A. undata* », and more

generally as « schistes et calcaires à *A. undata* » or « Schistes et Calcaires à *A. undata* ». The unit has traditionally been considered as Middle Siegenian in age, and lying above a similarly vaguely defined Lower Siegenian « Grès à *Orthis Monnieri* » or « Grès à *Dalmanella monnieri* ».

Depending on its location in the Armorican Domain (North-, Central-, and South Armorican Domain) and on the author, the « Schistes et Calcaires à *Athyris undata* » or parts of them have sometimes been considered as belonging to the Lower or Upper Siegenian, and even to the Lower Emsian.

In a comparison between the Early Devonian of the “Eastern Iberian Chains and the east of Guadarrama”, Province of Aragón, and Brittany (three localities are specifically referred to: Saint-Cénére, Laval Synclinorium, « Département de la Mayenne »; Lanvéoc, « Rade de Brest », « Département du Finistère »; and near Angers, Saint-Julien de Vouvantes – Angers Synclinorium, « Département de Maine-et-Loire »), Carls (1971, p. 195, 197-198, 204-206) stated that the « Schistes et Calcaires à *A. undata* » ranged from “deep Gedinnian to Middle Siegenian”, the « Grès à *Orthis monnieri* » being of “Lower Gedinnian” age, because of similarity to the Nogueras Formation in their fauna, lithology and stratigraphic position. Carls based the “deep Gedinnian” correlation on conodonts, and the Upper Gedinnian-Middle Siegenian one on the evolution of the brachiopod *hystericus*- and *rousseaui*-groups. Carls in Brice *et al.* (2000, p. 77) went a step further in considering that “the formerly substage-like Armorican « Schistes et Calcaires à *Athyris undata* », now obsolete, have rich faunas that were used by error to date the “middle Siegenian”.

In the Laval Synclinorium, Racheboeuf (1976, p. 28, 30) proposed to substitute the « Formation de Saint-Cénére » for the designation « Schistes et Calcaires à *A. undata* », but this substitution was not accompanied by a better definition of the age of the unit. Commenting on the Lower Gedinnian age assigned by Carls to the lower part of the « Schistes et Calcaires à *A. undata* », Racheboeuf (1976, p. 31-32) stated that no decisive argument could be used for dating the base of the Saint-Cénére Formation, because, with the exception of the Saint-Cénére, L’Asnerie and Sablé sections, nothing allowed to believe that the beginning of the carbonate sedimentation was synchronous in the whole Laval Synclinorium. Racheboeuf gave a Siegenian age to the top of the formation at Montguyon based on identification of a conodont subspecies, *Icriodus hudlei curvicauda* Carls & Gandl, 1969, by Bultynck. This taxon is now considered of late Siegenian age by Bultynck (oral communication).

In the « Mémoire de la Société géologique et minéralogique de Bretagne » (coordinator: Lardeux, H.), published the same year (1976) and devoted to the « Étude des schistes et calcaires éodévoniens de Saint-Cénére », the Saint-Cénére Formation (p. 4, 5, fig. 2, p. 6) begins in “the Upper Lochkovian (upper part of the lower Gedinnian)”, and “extends into the Pragian (Siegenian)”. In the many publications by French geologists between 1976 and 1995, an Upper Lochkovian-Lower Pragian age is favoured for the « schistes et calcaires à *A. undata* » in the Laval Synclinorium.

The author considers that *Medunarostrum letissieri* is to be found in the segment of the Saint-Cénére Formation corresponding to the middle Pragian [Remark: the species has

not been found by Drot & L’Hotellier (1976) in the road-cut section 700 m south of the village of Saint-Cénére in spite of careful collecting. Some indirect information provided by a collection from the Eastern Iberian Chains (see above) supports this declaration].

Here follows a list of localities in which the presence of *letissieri* has been mentioned in and outside the Armorican Massif:

1 - « Département de la Mayenne » (west-central part)

Oehlert, 1877, p. 597, 601, pl. X, figs 11, 11a as *Rhynchonella Le Tissieri*, « Calcaire à *Spirigera undata* », middle part of the Lower Devonian; 1882, p. 290 as *R. Le Tissieri*, calcaire dévoniens; Oehlert & Davoust, 1879, p. 705 as *R. Le Tissieri*, Lower Devonian; Renaud, 1935, pp. 5-6 as *Camarotoechia Le Tissieri*, a few km NE Argentré (on the Jouanne River), Siegenian; 1942, 1st fasc., p. 69 as *Straelenia Le Tissieri*, La Baconnière, « Schistes et Calcaires à *Athyris undata* », Middle Siegenian, p. 101, 102 as *Straelenia Le Tissieri*, Grand Monceau near Argentré and Saint-Germain-le-Fouilloux, lower horizon (level) of the « grauwackes de la Mayenne », Upper Siegenian; 1942, 2nd fasc., p. 114-115, table, p. 358-359 as *S. Le Tissieri*, notably around Argentré, « Schistes et calcaires à *Athyris undata* », and Siegenian limestones; Brice in Morzadec *et al.* 1988, p. 52 as *Rhynchonella le tissieri*, La Roussière quarry, SW Saint-Germain-le-Fouilloux, Pragian.

2 - Outside the « Département de la Mayenne »

2a - In the nearby « Département de la Sarthe »

Barrois, 1882, p. 269 as *R. Letisseri*, « Aux Cortoisiers »; Renaud, 1942, 1st fasc., p. 78-79, 80 as *Straelenia Le Tissieri*, « Schistes et calcaires dévoniens de la Sarthe », including species of Siegenian, Emsian, and even Middle Devonian age.

2b - In the Saint-Julien-de-Vouvantes-Angers Synclinorium, « Département du Maine-et-Loire » et « Département de la Loire-Atlantique »

Barrois, 1887, p. 160 as *Rhynchonella cf. Letissieri*, Erbray, Erbray fauna; 1889, p. 85, 251, 328 as *R. cf. Letissieri*, one specimen in the fauna of the Erbray Limestone and in the « Faune coblenzienne de Bretagne »; Oehlert, 1889, p. 750 as *R. Letissieri*, Limestones in the immediate vicinity of Angers; Couffon, 1925, p. 62 as *R. Le Tissieri*, Saint-Barthélemy (Saint-Malo), « Département du Maine-et-Loire », Upper Coblenzian; Péneau, 1929, p. 229-230, 263 as *R. Le Tissieri*, « Calcaire d’Erbray et Calcaire d’Angers », Lower Devonian; Renaud, 1942, 2nd fasc., p. 114-115, 322-323 as *Straelenia Le Tissieri*, « calcaires d’Erbray » and « calcaires d’Angers », « Département de Loire-Inférieure » (now « Département de la Loire-Atlantique »), Lower Devonian; Pillet (1962, p. 53 as *S. le tissieri*), « Calcaire de Saint-Malo (Calcaire d’Angers) », Emsian.

2c- « Département du Finistère »

Renaud (1942, fasc. 1, p. 84, 89-90 as *Straelenia Le Tissieri*), Run-ar-Chranc, « Grauwacke du Faou » corresponding to the Lower Greywacke of the « Département de la Mayenne » (see above) = « niveau stratigraphique légèrement supérieur à celui des schistes et calcaires à *Athyris*

undata », probably Upper Siegenian [the internal cast of one specimen assigned to the species had already been mentioned by Collin (1912, p. 42-44, 415) in his published doctoral thesis at « la pointe Est de Run-ar-Chranc » in the « Troisième subdivision du Coblentzien supérieur » (= third subdivision from base of the five subdivisions recognized by him in the « Coblentzien supérieur »), equivalent to the « Grauwacke du Faou »]; Renaud (1942, fasc. 2, p. 114-115, table, p. 358-359 as *Straelenia Le Tissieri*), E Run-ar-C'hranc, Siegenian greywackes and limestones.

3 - Outside the Armorican Massif

3a - Neufchâteau Synclinorium (SE southern Ardennes)

Asselberghs (1913a, p. 201, 202, table, p. 209; 1913b, p. 29-30, 108-109, table, p. 128; and Duvigneaud (1913, p. 183, table, p. 184-185 as *Rhynchonella Le Tissieri*?). One specimen collected by Duvigneaud in the vicinity of Longlier from the « quartzophyllades de Royvaux » (corresponding to the « quartzophyllades de Longlier »), Lower Hunsrückian (Upper Siegenian). Maillieux (1935, p. 12-13) included the species in the genus *Straelenia* Maillieux, 1935, and put the specimen into the synonymy of *S. minor* (Drevermann 1902). When Maillieux (1936, p. 90) accepted Wolf's (1930, p. 68, 93) point of view that *Rhynchonella Dannenbergi* Kayser, 1880 mut. *minor* Drevermann, 1902 is a synonym of *R. Dunensis* Drevermann, 1902, he considered (p. 9) this specimen as a “very developed specimen of *S. dunensis*”, and, consequently, Maillieux (1941, p. 37) placed it into the synonymy of that species.

3b - Cantabrian Cordillera (Asturias)

Barrois (1882, p. 269, 473, 485, table, p. 503 as *R. Letissieri*), two incomplete specimens from the Arnao Limestone, Eifelian, and Nieva Limestone, Siegenian; Llopis Lladó (1961, p. 265 as *R. letissieri*), Cabo de Peñas, Nieva limestones, Upper Siegenian.

3c - Central Morocco

Termier, 1936, p. 309-310, 323, 1136 as *R. Letissieri*, one specimen from the « Calcaire de Sidi-Ahroun à *Pentamerus*

Sieberi » (Siegenian according to Maillieux), considered by Termier as the Moroccan “replica” of the Erbray Limestone.

IV. — CONCLUSIONS

The « schistes et calcaires à *A. undata* » should be properly replaced by well defined litho- or biostratigraphic units, and thus restricted or expanded, in the various localities where they have been referred to.

Precise stratigraphic information for positioning the species *Medunarostrum letissieri* is still not in sight to say the least. There is no convincing reason for disregarding the traditional Middle Pragian age given to the « schistes et calcaires à *A. undata* » on the right flank of the Mayenne River Valley North of Laval, where the lectotype of the species comes from.

All mentions of *letissieri*, with the exception of those in the western part of the “Département de la Mayenne”, are unacceptable. Some are mere citations, others are field identifications or based on collections that do not exist any more or are not available (see Synonymy). Contacts with various museums and universities of Brittany, outside of the « Musée des Sciences », Laval, have been vain. It would have been of interest, in particular, to find out if the species was actually present in the « faune des calcaires des environs immédiats d'Angers », where Oehlert (1889, p. 750), the founder of the species, mentioned its presence; Angers lies only 70 km south of Laval.

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BIBLIOGRAPHY

- ASSELBERGHS E. (1913a). — Description des fossiles découverts par M. J. Duvigneaud aux environs de Neufchâteau. *Bulletin de la Société belge de Géologie, de Paléontologie et d'Hydrologie*, 26 (1912): M189-213.
- ASSELBERGHS E. (1913b). — Le Dévonien inférieur du bassin de l'Eifel et de l'anticlinal de Givonne dans la région Sud-Est de l'Ardenne belge. *Mémoires de l'Institut Géologique de l'Université de Louvain*, 1: 1-175.
- BARROIS C. (1882). — Recherches sur les terrains anciens des Asturias et de la Galice. *Mémoires de la Société géologique du Nord*, 2 (1): 1-630.
- BARROIS C. (1887). — Note préliminaire sur la Faune d'Erbray (Loire-Inférieure). *Annales de la Société géologique du Nord*, 14 (1886-1887): 158-164.
- BARROIS C. (1889). — Faune du calcaire d'Erbray (Loire Inférieure). Contribution à l'étude du terrain dévonien de l'Ouest de la France. *Mémoires de la Société géologique du Nord*, 3: 1-348.
- BRICE D., CARLS P., COCKS L.R.M., COPPER P., GARCÍA-ALCALE J.L., GODEFROID J. & RACHEBOEUF P.R. (2000). — Brachiopoda. In: BULTYNCK P. (ed.), Fossil groups important for boundary definition. Subcommission on Devonian Stratigraphy. *Courier Forschungsinstitut Senckenberg*, 220: 65-86.
- CARLS P. (1971). — Stratigraphische Übereinstimmungen im höchsten Silur und tieferen Unter-Devon zwischen Keltiberien (Spanien) und Bretagne (Frankreich) und das Alter des Grès de Gdumont (Belgien). *Neues Jahrbuch für Geologie und Paläontologie, Monatshefte*, 4: 195-212.
- COLLIN L. (1912). — Étude de la région dévonienne occidentale du Finistère. Université de Paris, Thèse de Doctorat ès Sciences naturelles (15 juin, 1912): 469 p.
- COUFFON O. (1925). — Le Dévonien en Maine-et-Loire. *Bulletin de la Société d'Études Scientifiques d'Angers*, 54 (1924): 33-98.
- DREVERMANN F. (1902). — Die Fauna der Untercoblenszschichten von Oberstadtfeld bei Daun in der Eifel. *Palaeontographica*, 49: 73-119.

- DROT J. (1964). — Rhynchonelloidea et Spiriferoidea siluro-dévonien du Maroc pré-saharien. *Notes et Mémoires du Service Géologique du Maroc*, 178.
- DROT J. & L'HOTELLIER J. (1976). — Les Brachiopodes Rhynchonellida. In: LARDEUX, H. (coordinateur), Les schistes et calcaires éodévonien de Saint-Cénére (Massif Armorica, France). Sédimentologie, paléontologie, stratigraphie. *Mémoires de la Société géologique et minéralogique de Bretagne*, 19: 263-271.
- DUVIGNEAUD J. (1913). — L'âge des couches de Royvaux. *Bulletin de la Société belge de Géologie, de Paléontologie et d'Hydrologie*, 26 (1912): 159-187.
- FISCHER de WALDHEIM G. (1809). — Notice sur des fossiles du Gouvernement de Moscou, 1, Sur les coquilles fossiles dites Térébratules. - Invitation à la séance publique de la Société Impériale des Naturalistes de Moscou, le 26 octobre 1809. *Société Impériale des Naturalistes de Moscou*, Moscou: 35 p.
- HALL J. (1857). — Descriptions of new species of Palaeozoic fossils from the Lower Helderberg, Oriskany sandstone, Upper Helderberg, Hamilton and Chemung groups, extracted from Report of the Regents of the University for 1856. Albany, Charles van Benthuyssen: 146 p.
- HALL J. & CLARKE J.M. (1893-1894). — Natural History of New York, Part VI, Palaeontology, vol. VIII: An introduction to the study of the genera of Palaeozoic Brachiopoda, Part II. Geological Survey of the State of New York, Albany.
- KAYSER E. (1880). — Über hercynische und silurische Typen im rheinischen Unterdevon. *Zeitschrift der Deutschen geologischen Gesellschaft*, 32 (4): 819-821.
- KAYSER E. (1883). — Beschreibung einiger neuen Goniatiten und Brachiopoden aus dem rheinischen Devon. *Zeitschrift der Deutschen geologischen Gesellschaft*, 35 (1): 306-317.
- KRANTZ A. (1857). — Ueber ein neues bei Menzenberg aufgeschlossenes Petrefakten-Lager in den devonischen Schichten. *Verhandlungen des Naturhistorischen Vereins des preussischen Rheinlandes und Westfalens*, 14: 143-165.
- KUHN O. (1949). — Lehrbuch der Paläozoologie. Schweizerbart'sche Verlagsbuchhandlung, Stuttgart.
- LARDEUX H. (coordinateur) (1976). — Les schistes et calcaires éodévonien de Saint-Cénére (Massif Armorica, France). Sédimentologie, paléontologie, stratigraphie. *Mémoires de la Société géologique et minéralogique de Bretagne*, 19 : 329 p.
- LLOPÍS LLADÓ N. (1961). — Estudio geológico de la región del Cabo de Peñas (Asturias). *Boletín del Instituto Geológico y Minero de España*, 72: 233-348.
- MAILLIEUX E. (1935). — Contribution à la connaissance de quelques Brachiopodes et Pélécyposes dévonien. *Mémoires du Musée royal d'Histoire naturelle de Belgique*, 70: 42 p.
- MAILLIEUX E. (1936). — La faune des quartzophyllades siegenien de Longlier. *Mémoires du Musée royal des Sciences naturelles de Belgique*, 73: 141 p.
- MAILLIEUX E. (1941). — Les Brachiopodes de l'Emsien de l'Ardenne. *Mémoires du Musée royal d'Histoire Naturelle de Belgique*, 96: 74 p.
- MORZADEC P., PARIS F. & RACHEBOEUF P. (1988). — Lower Devonian of the Armorican Massif. Guidebook of the Field Meeting. International Union of Geological Sciences, Subcommission on Devonian Stratigraphy, Brest – Rennes: 55 p.
- OEHLERT D. (1877). — Sur les fossiles dévonien du département de la Mayenne. *Bulletin de la Société géologique de France*, 5 (1876 à 1877): 578-603.
- OEHLERT D. (1882). — Notes géologiques sur le département de la Mayenne. *Bulletin de la Société d'Études scientifiques d'Angers*, 11-12 (1881-1882): 225-372.
- OEHLERT D.- P. (1889). — Sur le Dévonien des environs d'Angers. *Bulletin de la Société géologique de France*, 17 (9): 742-791.
- OEHLERT D. & DAVOUST F. (1879). — Sur le Dévonien du département de la Sarthe. *Bulletin de la Société géologique de France*, 7 (1878-1879): 697-717.
- PÉNEAU J. (1929). — Études stratigraphiques et paléontologiques dans le Sud-Est du Massif armorica (Synclinal de Sant-Julien-de-Vouvantes). *Bulletin de la Société des Sciences naturelles de l'Ouest de la France*, 8 (1928) (1-4): 1-300.
- PHILLIPS J. (1841). — Figures and descriptions of the Palaeozoic fossils of Cornwall, Devon and West Somerset. Longman, Brown, Green, & Longmans, London.
- PILLET J. (1962). — Contribution à l'étude du Dévonien Armorica. III. Note préliminaire sur la Faune des Calcaires d'Angers-Erbray. *Bulletin de la Société d'Études scientifiques de l'Anjou*, 3: 46-61.
- RACHEBOEUF P. (1976). — Chonetacea (Brachiopodes) du Dévonien inférieur du Bassin de Laval (Massif Armorica). *Palaeontographica*, Abteilung A, 152 (1-3): 14-89.
- RENAUD A. (1935). — La faune de la grauwacke dévonienne des environs d'Argenté. *Comptes rendus sommaires des séances de la Société géologique de Bretagne*, 2: 5-6.
- RENAUD A. (1942). — Le Dévonien du Synclinorium Médian Brest-Laval. *Mémoires de la Société Géologique et Minéralogique de Bretagne*, 7 (2 vols).
- SARTENAER P. (2009). — Two new late Emsian rhynchonellid (brachiopod) genera from the Eifel area. *Bulletin de l'Institut royal des Sciences naturelles de Belgique, Sciences de la Terre*, 79: 27-42.
- SCHMIDT H. (1955). — Devonische Gattungen der Rhynchonellacea (Brachiopoda). *Senckenbergiana lethaea*, 36 (1/2): 115-122.
- SOWERBY J. de C. (1839). — Mollusca and Conchifera. In: R. I. MURCHISON, The Silurian System, Part 2: Organic remains: 577-768. London.
- TERMIER H. (1936). — Études géologiques sur le Maroc central et le Moyen Atlas septentrional. Tome 1. Les Terrains Primaires et le Permo-Trias. Tome 3. *Paléontologie. Pétrographie*. Imprimerie officielle, Rabat: 1-743, 1083-1421.
- TROMELIN de G. & LEBESCONTE P. (1876). — Observations sur les terrains primaires du nord du département d'Ille-et-Vilaine et de quelques autres parties du massif breton. *Bulletin de la Société géologique de France*, 4 (1875 à 1876): 583-623.
- WOLF M. (1930). — Alter und Entstehung des Wall-Erbacher Roteisensteins (Grube Braut im Hunsrück) mit einer stratigraphischen Untersuchung der Umgebung. *Abhandlungen der Preussischen Geologischen Landesanstalt*, 105 p.

EXPLANATIONS OF PLATE X
EXPLICATIONS DE LA PLANCHE X

All figures are natural size

Toutes les figures sont grandeur naturelle

Meduanarostrum letissieri (Oehlert, 1877)

Fig. 1 – 5. — Topotype A, ML-PAL-01453. Dorsal, ventral, anterior, posterior, and lateral views. La Roussière, « Département de la Mayenne », Laval Synclinorium, Armorican Massif. Saint-Cénére Formation, Middle Pragian. Coastal formula: $\frac{8}{7}$; $\frac{2-1}{2-1}$; $\frac{19}{20}$.

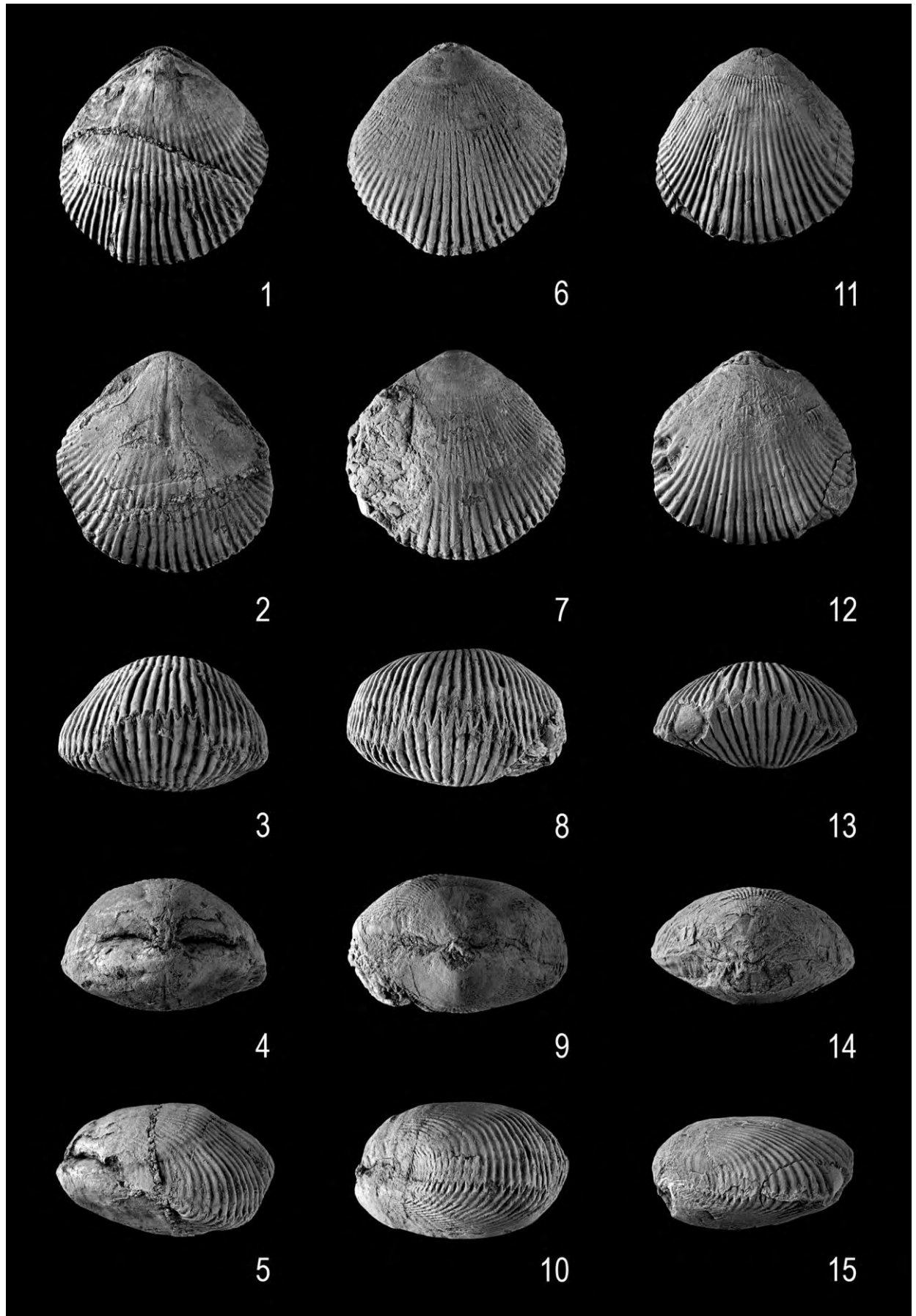
Fig. 1 – 5. — Topotype A, ML-PAL-01453. Vues dorsale, ventrale, antérieure, postérieure et latérale. La Roussière, Département de la Mayenne, Synclinorium de Laval, Massif Armoricain. Formation de Saint-Cénére, Praguien Moyen. Formule des plis: $\frac{8}{7}$; $\frac{2-1}{2-1}$; $\frac{19}{20}$.

Fig. 6 – 10. — Topotype B, ML-PAL-01454. Dorsal, ventral, anterior, posterior, and lateral views. Saint-Germain-le-Fouilloux, « Département de la Mayenne », Laval Synclinorium, Armorican Massif. Saint-Cénére Formation, Middle Pragian. Coastal formula: $\frac{9}{8}$; $\frac{2-2}{2-2}$; $\frac{24}{25}$. Shows some resemblance to the lectotype.

Fig. 6 – 10. — Topotype B, ML-PAL-01454. Vues dorsale, ventrale, antérieure, postérieure et latérale. Saint-Germain-le-Fouilloux, Département de la Mayenne, Synclinorium de Laval, Massif Armoricain. Formation de Saint-Cénére, Praguien Moyen. Formule des plis: $\frac{9}{8}$; $\frac{2-2}{2-2}$; $\frac{24}{25}$. Montre une certaine ressemblance au lectotype.

Fig. 11 – 15. — Topotype C, ML-PAL-01451. Dorsal, ventral, anterior, posterior, and lateral views. Saint-Germain-le-Fouilloux, « Département de la Mayenne », Laval Synclinorium, Armorican Massif. Saint-Cénére Formation, Middle Pragian. Coastal formula: $\frac{7}{6}$; $\frac{2-1}{2-1}$; 17+.

Fig. 11 – 15. — Topotype C, ML-PAL-01451. Vues dorsale, ventrale, antérieure, postérieure et latérale. Saint-Germain-le-Fouilloux, Département de la Mayenne, Synclinorium de Laval, Massif Armoricain. Formation de Saint-Cénére, Praguien Moyen. Formule des plis: $\frac{7}{6}$; $\frac{2-1}{2-1}$; 17+.



EXPLANATIONS OF PLATE XI
EXPLICATIONS DE LA PLANCHE XI

All figures are natural size

Toutes les figures sont grandeur naturelle

Meduanarostrum letissieri (Oehlert, 1877)

Fig. 1 – 5. — Topotype D, ML-PAL-01464. Dorsal, ventral, anterior, posterior, and lateral views. La Jaillerie, « Département de la Mayenne », Laval Synclinorium, Armorican Massif. Saint-Cénére Formation, Middle Pragian. Coastal formula: $\frac{11}{10}$;
 $\frac{2-2}{2-2}$; 17+.

*Fig. 1 – 5. — Topotype D, ML-PAL-01464. Vues dorsale, ventrale, antérieure, postérieure et latérale. La Jaillerie, Département de la Mayenne, Synclinorium de Laval, Massif Armoricain. Formation de Saint-Cénére, Praguien Moyen. Formule des plis: $\frac{11}{10}$;
 $\frac{2-2}{2-2}$; 17+.*

Fig. 6 – 10. — Topotype E, ML-PAL-01461. Dorsal, ventral, anterior, posterior, and lateral views. La Jaillerie, « Département de la Mayenne », Laval Synclinorium, Armorican Massif. Saint-Cénére Formation, Middle Pragian. Coastal formula: $\frac{8}{7}$;
 $\frac{2-2}{2-2}$; $\frac{18}{19}$.

*Fig. 6 – 10. — Topotype E, ML-PAL-01461. Vues dorsale, ventrale, antérieure, postérieure et latérale. La Jaillerie, Département de la Mayenne, Synclinorium de Laval, Massif Armoricain. Formation de Saint-Cénére, Praguien Moyen. Formule des plis: $\frac{8}{7}$;
 $\frac{2-2}{2-2}$; $\frac{18}{19}$.*

Fig. 11 – 15. — Topotype F, ML-PAL-01459. Dorsal, ventral, anterior, posterior, and lateral views. Saint-Germain-le-Fouilloux, « Département de la Mayenne », Laval Synclinorium, Armorican Massif. Saint-Cénére Formation, Middle Pragian. Coastal formula: $\frac{12}{11}$; $\frac{2-2}{2-2}$; $\frac{24}{25}$.

Fig. 11 – 15. — Topotype F, ML-PAL-01459. Vues dorsale, ventrale, antérieure, postérieure et latérale. Saint-Germain-le-Fouilloux, Département de la Mayenne, Synclinorium de Laval, Massif Armoricain. Formation de Saint-Cénére, Praguien Moyen. Formule des plis: $\frac{12}{11}$; $\frac{2-2}{2-2}$; $\frac{24}{25}$.

Fig. 16 – 20. — Topotype G, ML-PAL-01462. Dorsal, ventral, anterior, posterior, and lateral views. La Jaillerie, « Département de la Mayenne », Laval Synclinorium, Armorican Massif. Saint-Cénére Formation, Middle Pragian. Coastal formula: $\frac{11}{10}$;
 $\frac{1-1}{1-1}$; 24.

*Fig. 16 – 20. — Topotype G, ML-PAL-01462. Vues dorsale, ventrale, antérieure, postérieure et latérale. La Jaillerie, Département de la Mayenne, Synclinorium de Laval, Massif Armoricain. Formation de Saint-Cénére, Praguien Moyen. Formule des plis: $\frac{11}{10}$;
 $\frac{1-1}{1-1}$; 24.*

