GEOLOGICA BELGICA (2019) 22/1-2: 47-89

An annotated catalogue of types of Silurian–Devonian brachiopod species from southern Belgium and northern France in the Royal Belgian Institute of Natural Sciences (1870–1945), with notes on those curated in other Belgian and foreign institutions

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ABSTRACT. The type material of 45 Pridolian–Devonian brachiopod species, described in southern Belgium and northern France (1870–1945) and curated at the Royal Belgian Institute of Natural Sciences (Brussels), is re-investigated and illustrated in order to facilitate future taxonomic revision; such a catalogue should allow a better assessment of the brachiopod diversity during the considered time span. Furthermore, 28 other Silurian–Devonian species originally described in Belgium (1850-1950), but housed in other Belgian or foreign institutions, are also discussed. For taxonomical purposes, the lectotypes of several species are selected; the latter were described by Asselberghs (*Stropheodonta couviniensis*, *Plethorhyncha percostata* var. *gdoumontensis*, *Athyris dorlodoti*, *Retzia gdoumontensis*, *Dielasma maillieuxi*), Béclard (*Orthis dorsoplicata*, *Orthis musischura*, *Rhynchonella parvula* (non *R. parvula* Eudes-Deslongchamps)), de Ryckholt (*Lingula amayana*), Dewalque (*Crania corneti*), and Maillieux (*Discina* (*Discina*) *forrierensis*, *Pholidostrophia extensa*, *Anoplia theorassensis*, *Schuchertella durbutensis*, *Streptorhynchus rahiri*, *Pentamerus loei*). Re-investigation of the ambocoeliid *Spirifer pentameroides* Stainier highlighted the homonymy between *Diazoma* Dürkoop, 1970 (Brachiopoda) and *Diazoma* Lamarck, 1816 (Tunicata); the former genus must be rejected and replaced by a valid synonym, namely *Kelusia* Mamedov, 1978.

KEYWORDS: Brachiopoda, Pridoli, Devonian, Belgium, France.

1. Introduction

The Silurian (Pridoli) and Devonian marine succession of southern Belgium and northern France (Fig. 1) is particularly rich in invertebrates and notably in brachiopods (northern France means herein the area comprised between Mondrepuis (Aisne), to the west and Givet (Ardennes), to the east). This geographically restricted area is famous worldwide as several internationally recognized Devonian stages were firstly defined there such as the Givetian and the Famennian. During the interval ranging from 1870 to 1945, numerous new brachiopod species and varieties were erected on the basis of material from this area especially by E. Asselberghs (1889-1959) and E. Maillieux (1875-1946); the type material of most of them is now curated at the Royal Belgian Institute of Natural Sciences (Brussels). Whereas international palaeontological databases are built for assessing the evolution of the biodiversity through time, many of these brachiopod species and 'varieties' described in the course of the second half of the 19th century and the first half of the 20th century have never been revised so far; they are still only known by embellished drawings or poor-quality photographs.

The aim of this paper is to contribute to the assessment of the brachiopod diversity during the considered stratigraphic timespan in promoting and facilitating future taxonomic studies. For this reason, the type material of almost each species deposited at Brussels is illustrated photographically (sometimes for the first time) and discussed. For the species which remain poorly known notably due to the deficient state of preservation of the type material and/or limited material, this annotated catalogue should be considered only as a first step in their reassessment, pending the study of further material. Moreover, other species originally described in Belgium (1850-1950), but curated in Belgian universities and foreign institutions (France, Germany, USA), are also discussed.

2. Stratigraphy

At the end of the Silurian (Pridoli) and during the Devonian, southern Belgium and northern France were located along the southeastern margin of Laurussia. Pridolian units developed on the margins of the Cambro-Ordovician Givonne and Stavelot massifs (Fig. 1) were notably discussed by Vandenven (1991), Godefroid (1995a), Godefroid & Cravatte (1999), Belanger & Ghysel (2017),

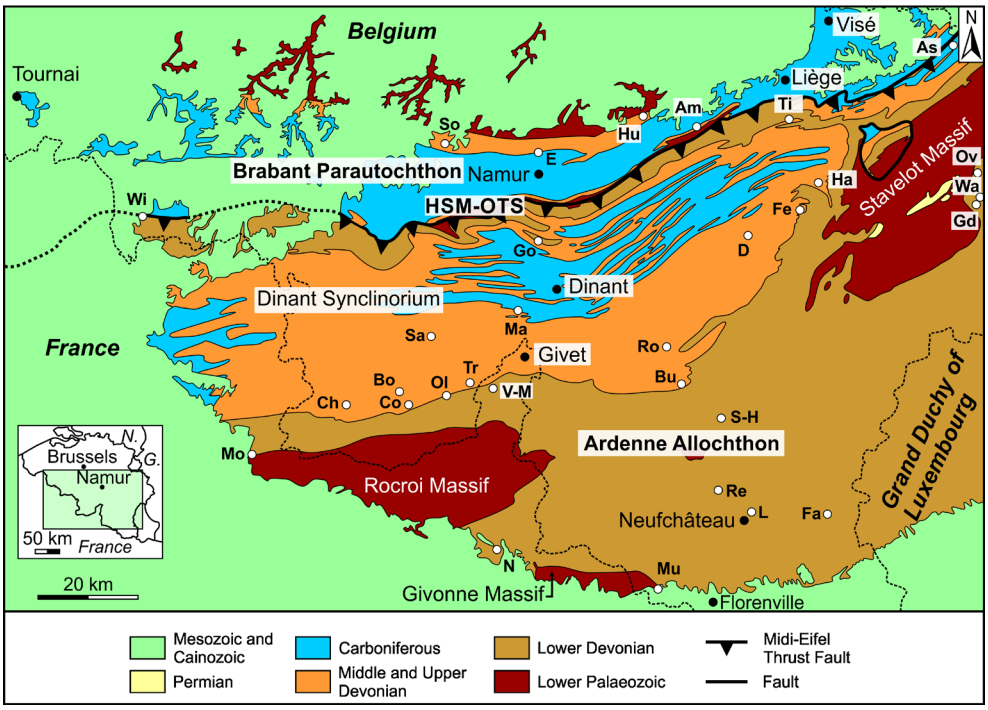

Figure 1. Location and schematic geological map of southern Belgium and northern France with indication of the localities cited in the text (modified from de Béthune, 1954). Abbreviations: Am, Amay; As, Astenet; Bo, Boussu-en-Fagne; Bu, Bure; Ch, Chimay; Co, Couvin; D, Durbuy; E, Emines; Fa, Fauvillers; Fe, Ferrières; Gd, Gdoumont; Go, Godinne; Ha, Harzé; HSM-OTS, Haine-Sambre-Meuse Overturned Thrust Sheets (Belanger et al., 2012); Hu, Huccorgne; L, Longlier; Ma, Maurenne; Mo, Mondrepuis; Mu, Muno; N, Nouzonville; Ol, Olloy; Ov, Ovifat; Re, Recogne; Ro, Rochefort; Sa, Sautour; S-H, Saint-Hubert; So, Sombreffe; Ti, Tilff; Tr, Treignes; V-M, Vireux-Molhain; W, Waimes (Weismes in German); Wi, Wihéries.

https://doi.org/10.20341/gb.2019.005

and Marion et al. (in press). The lithostratigraphy of the Devonian units recognized in the Brabant Parautochton, Haine-Sambre-Meuse Overturned Thrust Sheets, and the Ardenne Allochthon (Dinant Synclinorium only) (Fig. 1) (for more details related to these Variscan units, see Belanger et al., 2012) was described by Godefroid et al. (1994) (Lower Devonian), Bultynck et al. (1991) (Middle Devonian), and Boulvain et al. (1999) (Upper Devonian, Frasnian only); an overview of the whole Devonian (except for the Variscan units located south of the Dinant Synclinorium) was provided by Bultynck & Dejonghe (2002). The reader is referred to these publications for more details, especially concerning the age of the lithostratigraphic units.

Due to the extreme scarcity of the conodonts in the essentially clastic Lower Devonian succession of southern Belgium, the Lower Devonian stage boundaries have been approximately positioned by Steemans (1989) by means of spores, who indirectly correlated his spore zonation defined in Belgium by way of Brittany (western France) with the chitinozoan zones also recognized in the Lower Devonian succession of Bohemia (see also Godefroid et al. (1994, fig. 2) and Bultynck et al. (2000, fig. 2) for the correlation between the old boundaries and those of the Subcommission on Devonian Stratigraphy). The use of the term 'Pragian' and 'Emsian' in the recent Belgian literature is quite different from the use of the 'Siegenian' and 'Emsian' in the sense of E. Maillieux or E. Asselberghs (see Godefroid et al., 1994, figs 2, 5) and the base of the Emsian in the German sense is older than that defined by Godefroid & Stainier (1982) in southern Belgium. Furthermore, as pointed out by Carls et al. (2008), the Pragian–Emsian boundary in the current Global Stratotype Section and Point (Zinzilban Gorge section, Uzbekistan; Yolkin et al., 1997) is much older than the Siegenian–Emsian boundary in the German sense. Consequently, as thoroughly explained by Jansen (2016) essentially for the Lower Devonian of the Rhenish Massif, the regional Gedinnian, Siegenian and Emsian stages are used here (Belgian sense!) because the stages recognized internationally but defined in pelagic facies on the basis of conodonts and graptolites, cannot be applied in southern Belgium with precision. Nevertheless, the age provided by Godefroid et al. (1994) and Bultynck & Dejonghe (2002) are also indicated, despite the discrepancies reported above.

The age of the Waimes Member (Marteau Formation), which is developed on the south-eastern margin of the Stavelot Massif, and its relationships with the Mondrepuis Formation were discussed by Godefroid & Cravatte (1999, fig. 5) (see also Bultynck et al., 2000, fig. 2) on the basis of the brachiopod associations. These authors correlated the fossiliferous beds of the Waimes Member with their upper Ruisseau des Roches brachiopod fauna defined at Muno and assigned an earliest Gedinnian age (Pridolian) to them (see also Jansen's (2016) discussion).

3. Material and methods

The bulk of the material is deposited at the Royal Belgian Institute of Natural Sciences (prefixed RBINS); the present catalogue benefited from the work of J. Godefroid, who patiently gathered the type specimens from all the Palaeozoic invertebrate collections of the RBINS during his career. Some type specimens from the palaeontological collections of the Liège University (prefixed ULg.PA.) are also illustrated.

The Silurian and Devonian species are described herein order by order, following the classification of Williams et al. (1996), and alphabetically classified by their specific name using their original generic assignment, and thus not stratigraphically classified. The names published with a diacritic mark have been corrected according the Article 32.5.2 of the International Code of Zoological Nomenclature (fourth edition, 1999). For each species, a synonymy list, which is focused essentially on the most important Belgian references, is provided in order to facilitate the future revision of the species if necessary. The type locality of a nominal species-group taxon is that of the name-bearing type (Article 76 of the Code); in order to protect the outcrops from unauthorized collecting and vandalism, precise locality information is voluntarily excluded from the present paper but is deposited with the studied material and available to qualified personnel. The localities cited in the text are plotted in Fig. 1. Concerning the syntypes (thus the paralectotypes if a lectotype was previously selected) curated at the RBINS, only the specimens illustrated in the original papers have been considered, but it is evident that others should be regarded as such. Nonetheless, the screening of the whole RBINS collections for the search of additional syntypes would have been a too time-consuming task for all the species discussed in this paper, and thus remains to be done.

It clearly appears that many species were erected on the basis of insufficiently preserved material or are only known by a very restricted material (sometimes only one specimen is available!). Had these species not been given a name, the present writer would have left them in open nomenclature.

The smallest specimens were photographed using a low-vacuum scanning electron microscope (ESEM FEI Quanta 200), but not coated with gold. The larger specimens were coated with ammonium chloride sublimate before being photographed.

In the legends of the figures, the original (old) names are followed by current names given in square brackets.

4. Brachiopods curated at the RBINS

4.1. Order Lingulida

Discina* (*Discina*) *forrierensis Maillieux, 1910a
(Fig. 2A-Q)

1910a *Discina* (*Discina*) *forrierensis* Maillieux: 345, 348-349.
1922a *Orbiculoidea forrierensis*; Maillieux: 13.
1932 *Roemerella forrierensis* (Maillieux); Maillieux: 11, 22, pl. 1, figs 3-13.
1933 *Roemerella forrierensis*; Maillieux: 59.
1941a *Roemerella forrierensis* (Maillieux); Maillieux: 10, 14.
1941b *Roemerella forrierensis* (Maillieux); Maillieux: 2.
1946 *Roemerella forrierensis* (Maillieux); Asselberghs: 247, 330.

Type material. No type specimen was selected by Maillieux (1910a), who failed to provide illustrations of his new species. Two holotypes (RBINS a946, a951), one for dorsal valve and one for ventral valve, were designated as such by Maillieux (1932) among the syntypes in contrast with the Article 73.1 of the Code. The dorsal valve RBINS a946 (Maillieux, 1932, pl. 1, fig. 3, 3a, 4) is hereby designated as the lectotype (Fig. 2A-D); the paralectotypes RBINS a947-a955 (Maillieux, 1932, pl. 1, figs 5-13) are re-illustrated here (Fig. 2E-Q).

Type locality and horizon. Rochefort 8650 (see Maillieux, 1910a, 1932), top of the Chooz Formation (Emsian).

Description. See Maillieux (1910a, 1932).

Remarks. The strongly convexoconcave profile of this species led Maillieux (1932) to assign it to *Roemerella* Hall & Clarke, 1890 rather than to *Orbiculoidea* d'Orbigny, 1847 that includes strongly dorsibiconvex shells. Although Mergl (2006) considered the first genus as poorly known and possibly synonym of the latter, Maillieux's (1932, 1941a, 1941b) generic identification is maintained here, pending further investigation. Note that Maillieux (1910a, 1932) discussed the differences between *R. forrierensis* and the large-sized *Gigadiscina anomala* (Kayser, 1892) (see Mergl & Massa, 2005, fig. 1F) from the Siegenian of the Siegen area (Germany).

Current name. Roemerella forrierensis (Maillieux, 1910a).

4.2. Order Strophomenida

Stropheodonta* (*Leptostrophia*) *calcarifera Maillieux, 1938
(Fig. 2R-S)

1938 *Stropheodonta* (*Leptostrophia*) *calcarifera* Maillieux: 11 (cited as *S.* (*L.*) *calcar* [sic]), 35, pl. 1, fig. 3.
1941b *Leptostrophia calcarifera* Maillieux; Maillieux: 5.
?1955 *Leptostrophia calcarifera* (Maillieux); Asselberghs: 187, 189.
1973 *Stropheodonta* (*Leptostrophia*) *calcarifera* Maillieux, 1938; García-Alcalde: 48.
1978a *Stropheodonta* (*Leptostrophia*) *calcarifera* Maillieux, 1938; Harper & Boucot: 73.

Type material. The mould of a ventral valve (RBINS a1116; Fig. 2R-S) was selected as the holotype by Maillieux (1938, pl. 1, fig. 3).

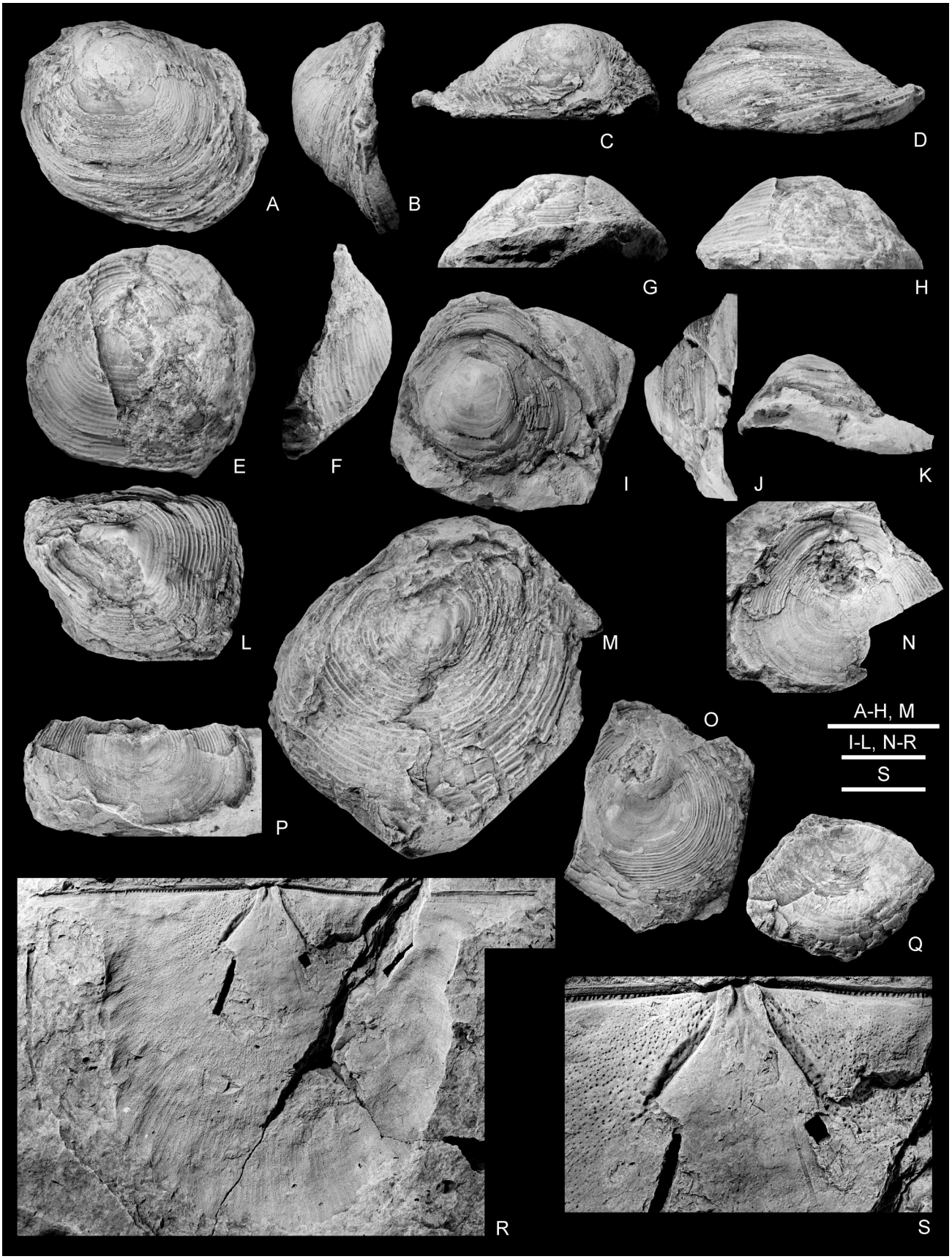

Figure 2. A-Q. *Discina* (*Discina*) *forrierensis* Maillieux, 1910a [*Roemerella forrierensis* (Maillieux, 1910a)]; Rochefort 8650, Chooz Formation. A-D. RBINS a946 (lectotype), dorsal valve in plan, lateral, posterior and anterior views. E-F. RBINS a948 (paralectotype), dorsal valve in plan, lateral, posterior and anterior views. I-K. RBINS a947 (paralectotype), dorsal valve in plan, lateral and anterior views. L. RBINS 949 (paralectotype), dorsal valve in plan view. M. RBINS a950 (paralectotype), dorsal valve in plan view. N. RBINS a951 (paralectotype), ventral valve in plan view. O. RBINS a953 (paralectotype), ventral external mould. P. RBINS a954 (paralectotype), incomplete ventral interior. Q. RBINS a955 (paralectotype), incomplete ventral external mould of ventral valve with shelly remains. BBB. R-S. *Stropheodonta* (*Leptostrophia*) *calcarifera* Maillieux, 1938 [*'Leptostrophia' calcarifera* (Maillieux, 1938)], RBINS a1116 (holotype), internal mould of ventral valve in plan view and close-up of muscle field; Rochefort 31 (2), Eau Noire Formation. Scale bars: 10 mm (A-R), 5 mm (S).

Type locality and horizon. Rochefort 31, Eau Noire Formation (most of this lithostratigraphic unit is late Emsian in age, the top is Eifelian).

Description. See Maillieux (1938).

Remarks. Until now, this species is only represented by the holotype, although Asselberghs (1955) reported its presence in the Eifelian Jemelle Formation on the southeast border of the Dinant Synclinorium, but without illustration. According to García-Alcalde (1973), it is close to representatives of *Gampholosia* Stainbrook, 1945 by its resupinate profile, the structure of its ventral muscle field and its parvicostellate ornamentation (it needs to be confirmed by the study of further material!), but the development of nervation is not revealed. Harper & Boucot (1978a) suggested that Maillieux's species could belong to a new leptostrophiid genus. According to U. Jansen (pers. com., March 2019), Maillieux's species has typical leptostrophiid muscle field and process cavities; *'Leptostrophia' palma* (Kayser, 1871) (hardly developed socket ridges) or *Leptostrophiella sera* (Fuchs, 1919) (with distinct socket ridges) seem to be more closely related although these do not show a resupinate profile. For the reasons cited above, the generic assignment of the species calcarifera still remains uncertain.

Current name. 'Leptostrophia' calcarifera (Maillieux, 1938).

Stropheodonta couviniensis Asselberghs, 1930
(Fig. 3A-L)

1922 *Stropheodonta triculta* Fuchs; Asselberghs: B133.
1923 *Stropheodonta triculta* Fuchs; Asselberghs: 19-20, 63, table 1, pl. 1, figs 1a-b, 2-3.
1930 *Stropheodonta couviniensis* Asselberghs: 29.
1933 *Stropheodonta couviniensis*; Maillieux: 67, pl. 4, fig. 82.
1938 *Stropheodonta couviniensis* Asselberghs; Maillieux: 11.
1941b *Stropheodonta couviniensis* Asselberghs; Maillieux: 5.
1977 *Bojodouvillina couviniensis* (E. Asselberghs, 1930); Bultynck & Boonen: 491-492.
1978b *Stropheodonta couviniensis* Asselberghs, 1930; Harper & Boucot: 45.
1981 *Stropheodonta couviniensis* Asselberghs; Jahnke: 157.

Type material. The ventral internal mould (RBINS a3146; Fig. 3A-E) illustrated by Asselberghs (1923, pl. 1, fig. 1a-b) is hereby designated as the lectotype whereas the two other ventral internal moulds (RBINS a3147-a3148; Fig. 3F-H, I-L) illustrated by Asselberghs (1923, pl. 1, figs 2-3) are paralectotypes.

Type locality and horizon. Bioul (Godinne), flanks of the Godinne anticlinal, Rivière Formation, Rouillon Member (Eifelian).

Description. See Asselberghs (1923).

Remarks. Stropheodonta couviniensis was considered as a synonym of *Strophomena taeniolata* Sandberger & Sandberger, 1856 by Jahnke (1981); the latter was selected by Jansen (2014) as the type species of his new genus *Gibbodouvillina.* However, the available ventral valves are clearly less convex than those of *G. taeniolata* as figured by Jansen (2014, figs 5A, E-F) or than those of *G. interstrialis* (Philips, 1841) (e.g. Biernat, 1966; Halamski, 2009). In point of fact, the morphology of the species couviniensis, both externally and internally, suggests an assignment to the flat-shelled genus *Mesodouvillina* Williams, 1950, but the examination of dorsal valves is required to confirm the generic identification and the complete reassessment of Asselberghs' species.

Current name. Mesodouvillina? *couviniensis* (Asselberghs, 1930).

Pholidostrophia extensa Maillieux, 1938
(Figs 3M-BB, 4A-C)

1938 *Pholidostrophia extensa* Maillieux: 21, 36, pl. 1, figs 4-6.
1941b *Pholidostrophia extensa* Maillieux; Maillieux: 6.
1967 *P.* [*Pholidostrophia*] *extensa* Maillieux; Harper et al.: 417.

Type material. Maillieux (1938) illustrated three specimens that he considered as the types of his new species. Nevertheless, he did not select a holotype among them. The articulated specimen RBINS a1119 (Maillieux, 1938, pl. 1, fig. 6), the better preserved one in terms of ornamentation, is hereby designated as the lectotype (Figs 3W-BB, 4A-C); the two other specimens RBINS a1117-a1118 (Maillieux, 1938, pl. 1, figs 4, 5) are thus paralectotypes (Fig. 3M-Q, R-V).

Type locality and horizon. Olloy 7970, Jemelle Formation (Eifelian).

Description. See Maillieux (1938).

Remarks. Harper et al. (1967) questionably assigned this species to *Mesopholidostrophia* Williams, 1950, which was considered by these authors as a subgenus of *Pholidostrophia* Hall & Clarke, 1892. Nevertheless, none of the types displays the internal morphology that is crucial for generic identification. On the basis of the external morphology, it is not at all excluded that Maillieux's species is a synonym of *Pholidostrophia* (*Mesopholidostrophia*) *semicircularis* (Kayser, 1871) from the Eifelian of the Eifel as re-illustrated by Harper et al. (1967, text-figs 4-8).

Current name. Pholidostrophia extensa Maillieux, 1938.

4.3. Order Productida

4.3.1. Suborder Chonetidina

Anoplia theorassensis Maillieux, 1941a
(Fig. 4D-I)

1941a *Anoplia theorassensis* Maillieux: 34-36, figs 2, 3, 4.
1941b *Anoplia theorassensis* Maillieux; Maillieux: 8.
1941c *Anoplia theorassensis* Maillieux; Maillieux: 7.
1946 *Anoplia theorassensis* Maillieux; Asselberghs: 268, 331.
1962 *Anoplia theorassensis* Maillieux, 1941; Muir-Wood: 53, 54, fig. 10c (copy of Maillieux, 1941a, fig. 2).
1968 *Anoplia theorassensis* Maillieux, 1941; Boucot & Harper: 168.
1981 *Anoplia theorassensis* Maillieux; Racheboeuf: 269, 273.
1988 *Anoplia theorassensis* Maillieux, 1941; Godefroid & Stainier: 111, 139.
1994 *Anoplia theorassensis* Maillieux, 1941; Godefroid in Godefroid et al.: 16, fig. 10.
1995 *Anoplia theorassensis* Maillieux, 1941; Racheboeuf: 225.
2016 *Anoplia theorassensis* Maillieux, 1941; Jansen: 86.

Type material. The ventral internal mould RBINS a7779 (Maillieux, 1941a, figs 2, 4?) is designated hereby as the lectotype (Fig. 4D-F) whereas the dorsal internal mould RBINS a7780 (Maillieux, 1941a, fig. 3) (Fig. 4G-I) is a paralectotype. Both specimens are located on the same slab including six additional internal moulds of ventral valves that are not illustrated here, but they have to be considered as additional paralectotypes according to the Article 74.1.3 of the Code.

Type locality and horizon. Couvin 8711, Hierges Formation (late Emsian).

Description. See Maillieux (1941a).

Remarks. This minute chonetidine ranks among the most abundant brachiopods of the Hierges Formation in Belgium and northern France. It is also reported in the Wiltz Formation (Eifel Synclines, Germany) by Jansen (2016), but its presence in the Lower Devonian of Portugal (Perdigão, 1973) needs to be confirmed (see Racheboeuf, 1981).

Current name. Anoplia theorassensis Maillieux, 1941a.

4.3.2. Suborder Productidina

Productus* (*Thomasina*) *demaneti Maillieux, 1938
(Fig. 4J-O)

1938 *Productus* (*Thomasina*) *demaneti* Maillieux: 21, 37, pl. 1, fig. 9, 9a-c.
1941b *Thomasina demaneti* Maillieux; Maillieux: 7.
1980 *Eopr.* [*Eoproductella*] *demaneti* (Maillieux, 1938); Rzhonsnitskaya: 60, 61.
1983 *Eoproductella demaneti*; Rzhonsnitskaya: 9, table 1.
1990 *Productus* (*Thomasina*) *demaneti* Maillieux, 1938; Lazarev: 49.

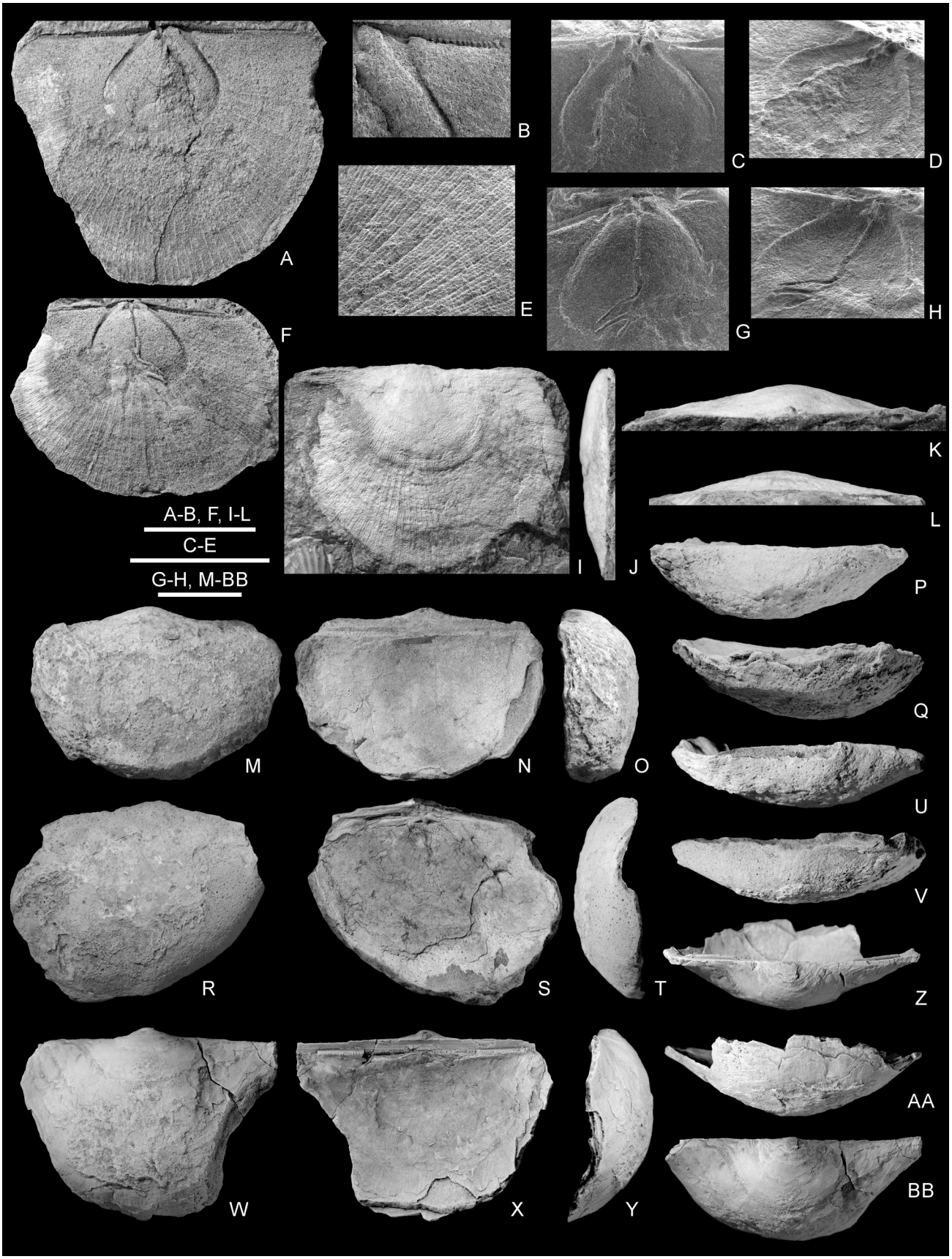

Figure 3. A-L. *Stropheodonta couviniensis* Asselberghs, 1930 [*Mesodouvillina*? *couviniensis* (Asselberghs, 1930)]; Godinne (flanks of the Godinne anticline), Rivière Formation. A-E. RBINS a3146 (lectotype), internal mould of a ventral valve in plan view, close-up of denticulate hinge line, cast of muscle field, oblique anterolateral view of cast of muscle field, detail of external mould. F-H. RBINS a3147 (paralectotype), internal mould of a ventral valve in plan view, cast of muscle field, oblique anterolateral view of cast of muscle field. I-L. RBINS a3148 (paralectotype), exfoliated ventral valve in ventral, lateral, posterior and anterior views. M-BB. *Pholidostrophia extensa* Maillieux, 1938; Olloy 7970, Jemelle Formation. M-Q. RBINS a1117 (paralectotype), articulated specimen in ventral, dorsal, lateral, posterior and anterior views. R-V. RBINS a1118 (paralectotype), articulated specimen in ventral, dorsal, lateral, posterior and anterior views. W-BB. RBINS a1119 (lectotype), articulated specimen (removed from the matrix) in ventral, dorsal, lateral, posterior, anterior and posteroventral views (see also Fig. 4A-C). Scale bars: 10 mm (A, C-D, F, I-L, M-BB), 5 mm (B, E, G-H).

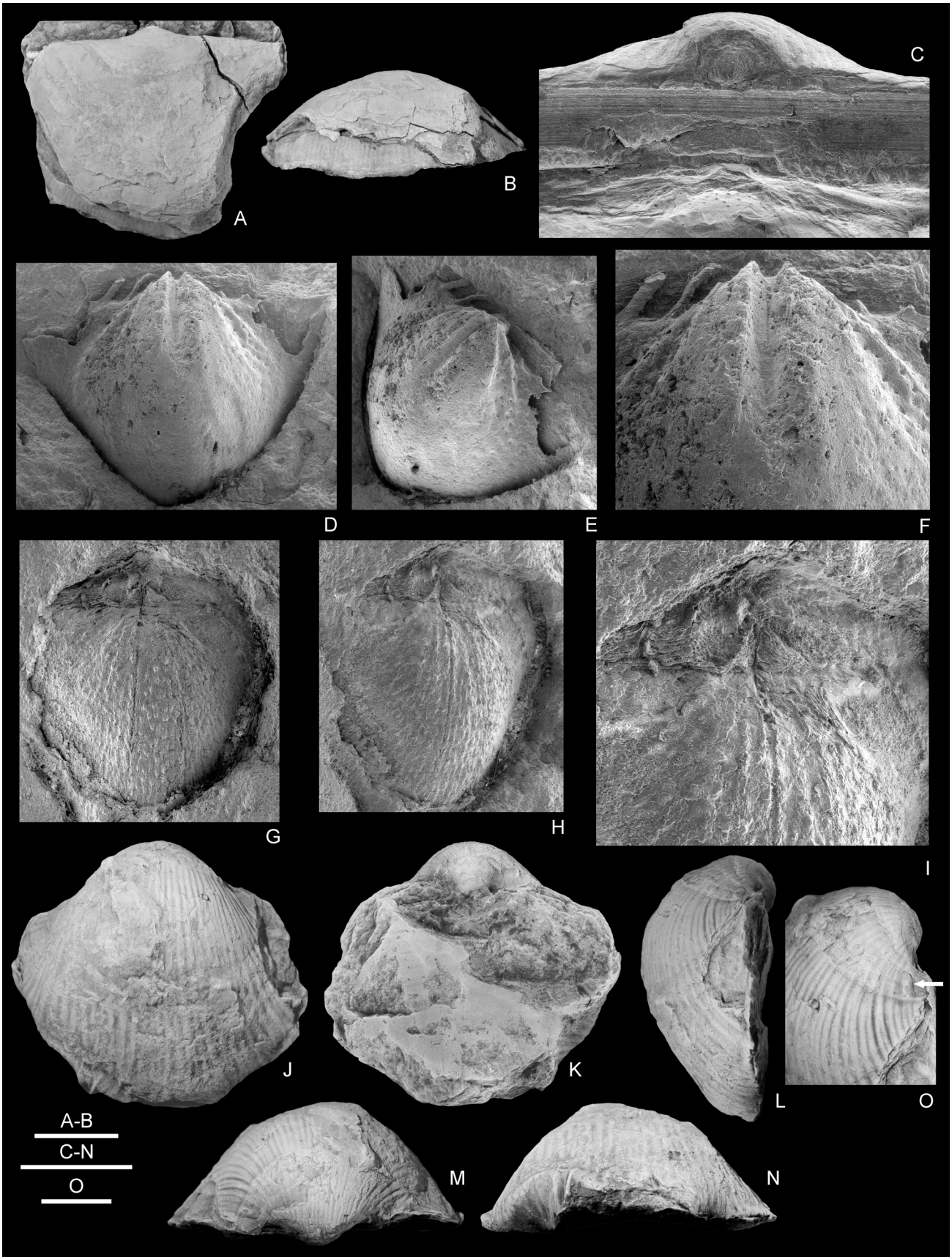

Figure 4. A-C. *Pholidostrophia extensa* Maillieux, 1938, RBINS a1119 (lectotype), articulated specimen in ventral and anterior (ventral valve on top; enclosed in matrix as illustrated by Maillieux (1938)) views and close-up of the interareas (see also Fig. 3W-BB); Olloy 7970, Jemelle Formation. D-I. *Anoplia theorassensis* Maillieux, 1941a; Couvin 8711, Hierges Formation; all SEM. D-F. RBINS a7779 (lectotype), internal mould of ventral valve in plan and oblique posterolateral views, and detail of umbonal region. G-I. RBINS a7780 (paralectotype), interior of dorsal valve (with shelly remains) in plan and oblique lateral views, and detail of the cardinalia. J-O. *Productus* (*Thomasina*) *demaneti* Maillieux, 1938 [*'Productina' demaneti* (Maillieux, 1938)], RBINS a1120 (holotype), articulated specimen with dorsal valve covered by carbonate matrix in ventral, dorsal, lateral, posterior and anterior views (ventral valve on top for M and N), and detail of ornamentation and flank spine (arrow); Rochefort 7273, Jemelle Formation. Scale bars: 10 mm (A-B, J-N), 1 mm (C-E, G-H), 0.5 mm (F, I), 5 mm (O).

Type material. The holotype (RBINS a1120; Fig. 4J-O), selected by Maillieux (1938, pl. 1, fig. 9, 9a-c), corresponds to an articulated specimen of which the dorsal valve is covered by carbonate matrix.

Type locality and horizon. Rochefort 7273, Jemelle Formation (Eifelian).

Description. See Maillieux (1938).

Remarks. The holotype – the only specimen available – is characterized by flattened ribs increasing by bifurcation and numerous growth lines; only one flank spine base was observed close to the hinge line on the right side of the ventral valve (Fig. 4L-M). Rzhonsnitskaya (1980) included Maillieux's (1938) species, which ranks among the oldest Productidina from southern Belgium, within her new genus *Eoproductella,* but this generic assignment was rightly challenged by Lazarev (1990) on the basis of its coarser radial ornamentation. Moreover, the disposition of the spines in the type species of *Eoproductella* is markedly distinct (compare with Rzhonsnitskaya, 1980, pl. 18, figs 1a-b, 3-4). The lack of knowledge about the internal morphology precludes a satisfactory generic assignment even if the external morphology is very close to the productellid genera *Productina* Sutton, 1938 and *Argentiproductus* Cooper & Muir-Wood, 1951 as revised by Brunton & Mundy (1993), which are both clearly younger stratigraphically. Further material is thus needed to reach a better generic identification, but the species demaneti is temporarily referred to Sutton's genus due to its external features.

Current name. 'Productina' demaneti (Maillieux, 1938).

4.4. Order Orthotetida

Schuchertellopsis durbutensis Maillieux, 1939

1939 *Schuchertellopsis durbutensis* Maillieux: 6-8, figs 1-6.
1941b *Schuchertellopsis durbutensis* Maillieux; Maillieux: 6.
1965 *Schuchertellopsis durbutensis*; Williams: H408.
1974a *Schuchertellopsis durbutensis* Maillieux, E., 1939; Sartenaer: 6, 10.
2000 *Schuchertellopsis* (*Schuchertellopsis*) *durbutensis*; Williams & Brunton: 667, fig. 480.5a-c.
2005 *Schuchertellopsis* (*Schuchertellopsis*) *durbutensis* Maillieux, 1939; Long & Brunton: cited many times, figs 1a-b, 2, 4, 5-15.
2005a *Schuchertellopsis* (*Schuchertellopsis*) *durbutensis* Maillieux, 1939; Mottequin: 2, 294, 312, 317, pl. 35, fig. 3.
2007 *Schuchertellopsis* (*Schuchertellopsis*) *durbutensis*; Brunton: 2674, 2677, fig. 1782a-b.
2008a *Schuchertellopsis* (*Schuchertellopsis*) *durbutensis* Maillieux, 1939; Mottequin: 1060, 1069, figs 10.1, 23.

Type material. Maillieux (1939) did not select a holotype for his new species and no lectotype was designated by Long & Brunton (2005), who just mentioned the expression types 1 (RBINS a1140), 2 (RBINS a1142A), and 3 (RBINS a1139). I choose the ventral valve RBINS a1140 (Maillieux, 1939, fig. 2; Long & Brunton, 2005, fig. 1a-b) as lectotype. The specimens RBINS a1139, 1141A-B, 1142A-B, which were illustrated by Maillieux (1939, figs 1, 3-6) (see also Long & Brunton, 2005, figs 2, 4), are paralectotypes.

Type locality and horizon. Durbuy 5337, Barvaux Formation (late Frasnian).

Description. See Maillieux (1939) and Long & Brunton (2005).

Remarks. This particular schuchertellid is one of the numerous epizoans (e.g. tabulate corals, bryozoans, brachiopods) of the cyrtospiriferids occurring in the Barvaux Formation, but it is markedly less abundant than the representatives of the craniide genus *Petrocrania* Raymond, 1911 (Mottequin, 2005a). The shell was fixed by complete cementation of the ventral valve on its host, but without simulating the morphology of the latter as is the case of *Petrocrania*, and located close to the anterior margin of the host, either on dorsal or ventral valve (Long & Brunton, 2005).

Current name. Schuchertellopsis (*Schuchertellopsis*) *durbutensis* Maillieux, 1939.

Streptorhynchus rahiri Maillieux, 1909a
(Fig. 5A-Q)

1909a *Streptorhynchus Rahiri* Maillieux: 119, 142, 148-149, fig. 2a-c.
1912 *Orthothetes* [sic] *Rahiri*; Asselberghs: 7.
1912 *Orthothetes* [sic] *Rahiri*; Maillieux: 47.
1927 *Schuchertella Rahiri* Maillieux; Maillieux in Asselberghs & Maillieux: 160.
1933 *Schellwienella Rahiri*; Maillieux: 81.
? 1936 *Schellwienella Rahiri* (Maillieux); Asselberghs: 257, 313, 316.
1939 *'Streptorhynchus' Rahiri* Maillieux; Maillieux: 8.
1940a *Schuchertellopsis Rahiri* (Maillieux); Maillieux: 7.
1941b *Schuchertellopsis rahiri* (Maillieux); Maillieux: 6.
1988 *Streptorhynchus rahiri*; Brice: 341.

Type material. The articulated specimen RBINS a1670 (Maillieux, 1909a, fig. 2a) is hereby designated as the lectotype (Fig. 5A-E); the paralectotypes are the specimens RBINS a1671-1672 (Maillieux, 1909a, fig. 2b, c) (Fig. 5F-L, M-Q) and a fourth poorly preserved one (RBINS a1673), which was not illustrated by Maillieux (1909a).

Type locality and horizon. Couvin 8705, Nismes Formation (early Frasnian). Except its Givetian lowermost part, the Nismes Formation is early Frasnian in age (e.g. Bultynck & Dejonghe, 2002).

Description. See Maillieux (1909a).

Remarks. The investigation of the available material did not reveal the development of extropunctae. From the generic viewpoint, this species, which was considered as scarce by Maillieux (1909a), is doubtfully referred to the areostrophiid genus *Floweria* Cooper & Dutro, 1982 rather than to the related genus *Eoschuchertella* Gratsianova, 1974 on the basis of its aequibiconvex shell with ribs increasing by intercalation. At the ventral valve, the muscle field is poorly impressed (Fig. 5F) whereas the pseudodeltidium is strongly convex, complemented at the dorsal valve, by a large, medianly grooved chilidium (Fig. 5K-L). According to Brice (1988), Maillieux's species is very close to *Eoschuchertella bouchardi* (Rigaux, 1873) and would only differ from the latter by the absence of a shallow median depression on the dorsal valve. Nonetheless, the revision of both species is needed.

Current name. Floweria? *rahiri* (Maillieux, 1909a).

4.5. Orthida

Fascicostella belgica Maillieux, 1941a
(Fig. 5R-V)

1941a *Fascicostella belgica* Maillieux: 10, 17-18, fig. 1, 1a.
1941b *Fascicostella belgica* Maillieux; Maillieux: 3.
1946 *Fascicostella belgica* Maillieux; Asselberghs: 267, 330.
1971 *Fascicostella belgica* Maillieux, 1941; Walmsley & Boucot: 522-523.
1994 *Fascicostella belgica* Maillieux, 1941; Godefroid in Godefroid et al.: 16, fig. 10.

Type material. According to Maillieux (1941a), only an incomplete dorsal internal mould (RBINS a7778; Fig. 5R-V) was available for study; it is thus the holotype by monotypy.

Type locality and horizon. Couvin 8711, Hierges Formation (late Emsian).

Description. See Maillieux (1941a).

Remarks. According to Walmsley & Boucot (1971), Maillieux's species needs further study before assignment to *Fascicostella* Schuchert & Cooper, 1931 due to its poor original illustration. On the basis of the holotype, it is obvious that this species cannot be referred to that genus as there is no sign of fasciculation at all. Such a type of ornamentation should have left traces on the internal mould. The internal morphology of the holotype is consistent with the concept of the genus *Resserella* Bancroft, 1928 (U. Jansen, pers. com., March 2019) and strongly resembles that of the Emsian species *Resserella triangularis* (Zeiler, 1857) from Germany illustrated by Maurer (1889, pl. 3, figs 8-12) and Walmsley & Boucot (1971, pl. 101, figs 1-2). More

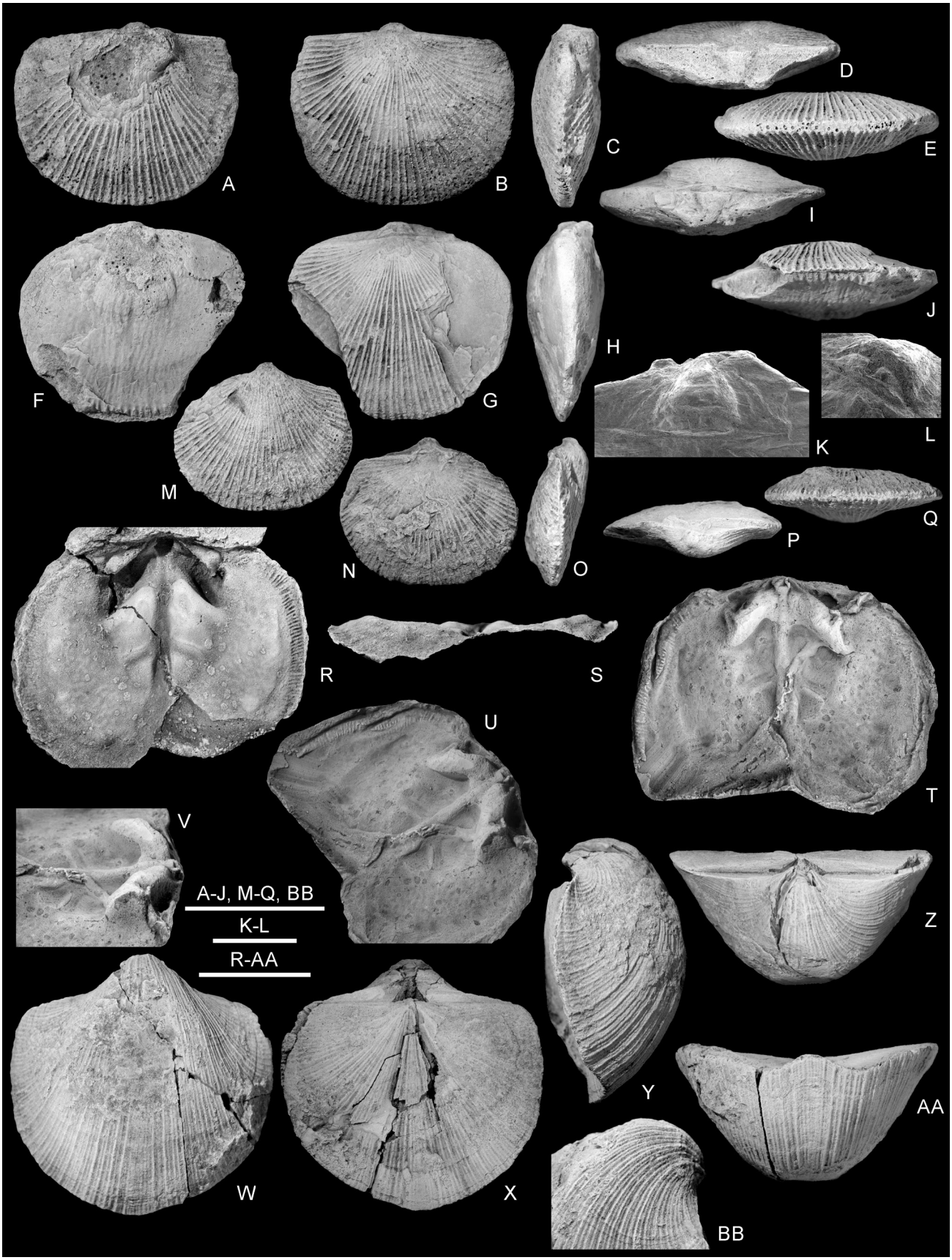

Figure 5. A-Q. *Streptorhynchus rahiri* Maillieux, 1909a [*Floweria*? *rahiri* (Maillieux, 1909a)]; Couvin 8705, Nismes Formation. A-E. RBINS a1670 (lectotype), articulated specimen in ventral, dorsal, lateral, posterior and anterior views. F-L. RBINS a1671 (paralectotype), articulated specimen in ventral, dorsal, lateral, posterior and anterior views, and close-up (SEM) of central part of ventral interarea (pseudodeltidium, chilidium). M-Q. RBINS a1672 (paralectotype), articulated juvenile specimen in ventral, dorsal, lateral, posterior and anterior views. R-V. *Fascicostella belgica* Maillieux, 1941a [*Resserella belgica* (Maillieux, 1941a)], RBINS a7778 (holotype), internal mould of dorsal valve in plan and anterior views, putty cast in plan, oblique anterolateral views, and lateral view of the cardinalia; Couvin 8711, Hierges Formation. W-BB. *Orthis dorsoplicata* Béclard, 1891 [*Parmorthina*? *dorsoplicata* (Béclard, 1891)], RBINS a1696, articulated specimen in ventral, dorsal, lateral, posterior and anterior views, and detail of the ornamentation on the right side of the ventral umbo; Grupont (Bure), Eau Noire Formation. Scale bars: 10 mm (A-J, M-Q, R-AA, BB), 2.5 mm (K-L).

specimens are required to reach a better species characterization and to discuss its relationships with *R. triangularis*.

Current name. Resserella belgica (Maillieux, 1941a).

Orthis dorsoplicata Béclard, 1891
(Fig. 5W-BB)

1891 *Orthis dorsoplicata* Béclard: 99-100, pl. 3, figs 6-8.
1922a *Rhipidomella dorsoplicata*; Maillieux: 14.
1932 *Orthis* [*Fascicostella*] *dorsoplicata* Béclard; Schuchert & Cooper: 130.
1933 *Fascicostella dorsoplicata*; Maillieux: 66
1938 *Fascicostella dorsoplicata* (Béclard); Maillieux: 11.
1941a *Fascicostella dorsoplicata* (Béclard); Maillieux: 17.
1941b *Fascicostella dorsoplicata* (Béclard); Maillieux: 3.
1971 *Orthis dorsoplicata* Béclard; Walmsley & Boucot: 522-523.
1975 *Orthis dorsoplicata* Béclard, 1891; Drot: 12.
2015 *Orthis dorsoplicata* Béclard, 1891; García-Alcalde: 66.

Type material. Of the three specimens illustrated by Béclard (1891), only the largest (RBINS a1696) was traced (Béclard, 1891, pl. 3, fig. 8, 8a-d) and is the lectotype (Fig. 5W-BB) by present designation.

Type locality and horizon. Grupont (Bure), Eau Noire Formation (late Emsian–Eifelian).

Description. See Béclard (1891).

Remarks. The species seems to be rare according to the few poorly preserved specimens present in the RBINS collections. Béclard (1891) cited his new species in Lesterny and Bure where it was associated to *Rhynchonella parvula* Béclard, 1891 (non *R. parvula* Eudes-Deslongchamps, 1862) and *Terebratula loxogonia* Béclard, 1891 (see below for remarks related to these two species). Schuchert & Cooper (1932) assigned *Orthis dorsoplicata* to the genus *Fascicostella* Schuchert & Cooper, 1931, an opinion followed by Maillieux (1938, 1941a, 1941b), but this assignment was rightly questioned by Walmsley & Boucot (1971) because its ornamentation is not as coarsely fascicostellate as in *Fascicostella*. The main external features of the lectotype are the following: shell strongly planoconvex, median ventral flattening, ventral interarea concave and apsacline, dorsal sulcus with raised median area, dorsal interarea as half as long as ventral one, plane catacline, and ornamentation finely fascicostellate. The lack of data related to the internal morphology precludes a definite generic assignment, but the type of ornamentation consisting of angular costellae arranged in poor bundles with strongly accentuated primary costellae may suggest an assignment to the dalmanellid *Parmorthina* Havlíček, 1975.

Current name. Parmorthina? *dorsoplicata* (Béclard, 1891).

Orthis musischura Béclard, 1891
(Figs 6A-X, 7A-C)

1891 *Orthis musischura* Béclard: 101-102, pl. 4, figs 1-6.
1904 *Orthis musischura* Béclard, 1892 [sic]; Drevermann: 264.
1910b *Orthis musischura* Béclard; Maillieux: 194.
1911 *Orthis musischura* Béclard; Maillieux: 178.
1912a *Orthis musischura* Béclard; Leriche: 26, 27.
1931 *Orthis musischura* Béclard; Maillieux: 11.

Type material. The articulated internal mould (RBINS a1699; Fig. 6A-F) illustrated by Béclard (1891, pl. 4, figs 3, 5) is hereby designated as the lectotype. The paralectotypes correspond to the dorsal internal mould RBINS a1701 (Béclard, 1891, pl. 4, fig. 6) (Fig. 6G-J), the ventral internal moulds RBINS a1698 (Béclard, 1891, pl. 4, fig. 2) (Fig. 6K-M) and RBINS a1700 (Béclard, 1891, pl. 4, fig. 4) (Fig. 6N-P), and the dorsal valve RBINS a1702 (Béclard, 1891, pl. 4, fig. 1f) (Fig. 6Q-X). The articulated internal mould RBINS a1697 (Béclard, 1891, pl. 4, fig. 1, 1a-e) has not been traced; only the artificial cast of the dorsal valve was recovered (Fig. 7A-C).

Type locality and horizon. Saint-Hubert 3 (23), Villé Formation (Siegenian; Pragian).

Description. See Béclard (1891).

Remarks. Drevermann (1904) and Maillieux (1910b, 1911, 1931) regarded Béclard's species as a synonym of *Proschizophoria personata* (Zeiler, 1857), the type species of the proschizophoriid genus *Proschizophoria* Maillieux, 1911 (see Boucot et al., 1966; Carls, 1974), which is common in the Siegenian of southern Belgium (Godefroid in Godefroid et al., 1994, fig. 10). Carls (1974) discussed some of the proschizophoriids recognized in Belgium and transferred the specimens previously identified as *Proschizophoria torifera* (Fuchs, 1919) by Asselberghs (1930) and Boucot (1960) to *Fulcriphoria* cf. *havliceki* Carls, 1974 whereas the dorsal valve illustrated by Maillieux (1931, pl. 1, fig. 1) as *P. personata,* which was rejected by Boucot et al. (1966) from Maillieux's genus, was doubtfully referred to *Fulcriphoria* sp. T as well as the material illustrated by Renouf (1972, text-figs 6A, 7A). Re-examination of the Devonian representatives of this family in Belgium and northern France is badly needed.

Current name. Proschizophoria personata (Zeiler, 1857).

4.6. Order Pentamerida

Pentamerus broecki Maillieux, 1909b
(Fig. 7D-H)

1909b *Pentamerus Broecki* Maillieux: 232, fig. 4a-c.
1974 *Neometabolipa broecki* (Maillieux, E., 1909); Godefroid: 35-41, table 5, text-figs 11, 16, pl. 7, figs 3-5 (see this author for a more complete synonymy).
1999 *Neometabolipa broecki;* Godefroid & Sartenaer in Boulvain et al.: 19, fig. BIO4.

Type material. The articulated specimen RBINS a223 (Maillieux, 1909b, fig. 4a-c) was selected as the lectotype by Godefroid (1974, pl. 7, fig. 5a-e); it is re-illustrated in Fig. 7D-H.

Type horizon and age. Couvin 8174 (45), Grands Breux Formation, Lion Member (middle Frasnian).

Description. See Maillieux (1909b) and Godefroid (1974).

Remarks. Maillieux's species was assigned by Godefroid (1974) to his new genus *Neometabolipa* (see remarks concerning *Pentamerus greindli).*

Current name. Neometabolipa broecki (Maillieux, 1909b).

Pentamerus greindli Maillieux, 1909b
(Fig. 7I-N)

1909b *Pentamerus Greindli* Maillieux: 230, fig. 3a-c.
1974 *Metabolipa greindli* (Maillieux, E., 1909); Godefroid: 7-23, tables 1-2, text-figs 3-7, 16, pl. 1, figs 1-7, pl. 2, figs 1-6, pl. 3, figs 1-6, pl. 4, figs 1-5, pl. 5, figs 1, 2 (see this author for a more complete synonymy).
1983 *Metabolipa greindli*; Godefroid in Robaszynski & Dupuis: pl. 1, fig. 6.
1999 *Metabolipa greindli*; Godefroid & Sartenaer in Boulvain et al.: 19, fig. BIO4.

Type material. The articulated specimen RBINS a222 (Maillieux, 1909b, text-fig. 3a-c) was selected as the lectotype by Godefroid (1974, pl. 3, fig. 1a-e) and is re-illustrated here in Fig. 7I-N. The paralectotypes include the specimens RBINS a224-226 (Godefroid, 1974).

Type locality and horizon. Couvin 6149 (38), Moulin Liénaux Formation, Arche Member (middle Frasnian).

Description. See Maillieux (1909b) and Godefroid (1974).

Remarks. This species was selected by Godefroid (1974) as the type species of his new genus *Metabolipa* and fully re-described. Note that Blodgett et al. (2002) considered *Metabolipa* and *Neometabolipa* as synonyms of *Gypidula* Hall, 1867 but the distinctive characters stated by Godefroid (1974) and specified later (Godefroid, 1979) appear to Mottequin (2008b) sufficient to distinguish Hall's genus from *Metabolipa* and *Neometabolipa.*

Current name. Metabolipa greindli (Maillieux, 1909b).

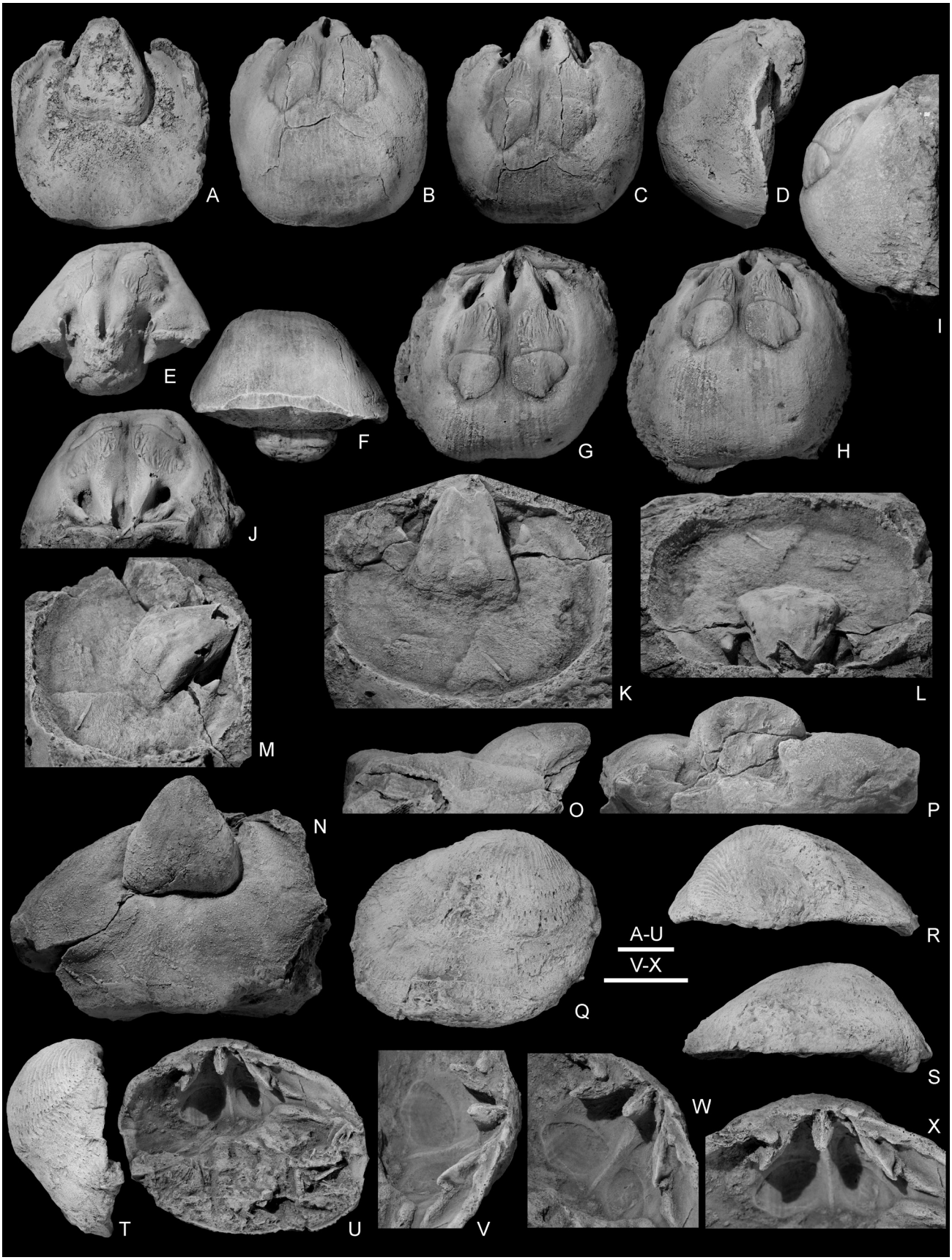

Figure 6. *Orthis musischura* Béclard, 1891 [*Proschizophoria personata* (Zeiler, 1857)]; Saint-Hubert 3 (23), Villé Formation (A-M, Q-X); Nouzonville, Villé Formation (N-P). A-F. RBINS a1699 (lectotype), internal mould of an articulated specimen in ventral, dorsal, posterodorsal, lateral, posterior and anterior views. G-J. RBINS a1701 (paralectotype), internal mould of a dorsal valve in posterodorsal, plan, lateral and posterior views. K-M. RBINS a1698 (paralectotype), internal mould of ventral valve in plan, posteroventral and oblique lateral views. N-P. RBINS a1700 (paralectotype), internal mould of ventral valve in plan, lateral and posterior views. Q-X. RBINS a1702 (paralectotype), deformed dorsal valve in external, posterior, anterior, lateral and internal views, and close-up of cardinalia (V-X). Scale bars are all 10 mm.

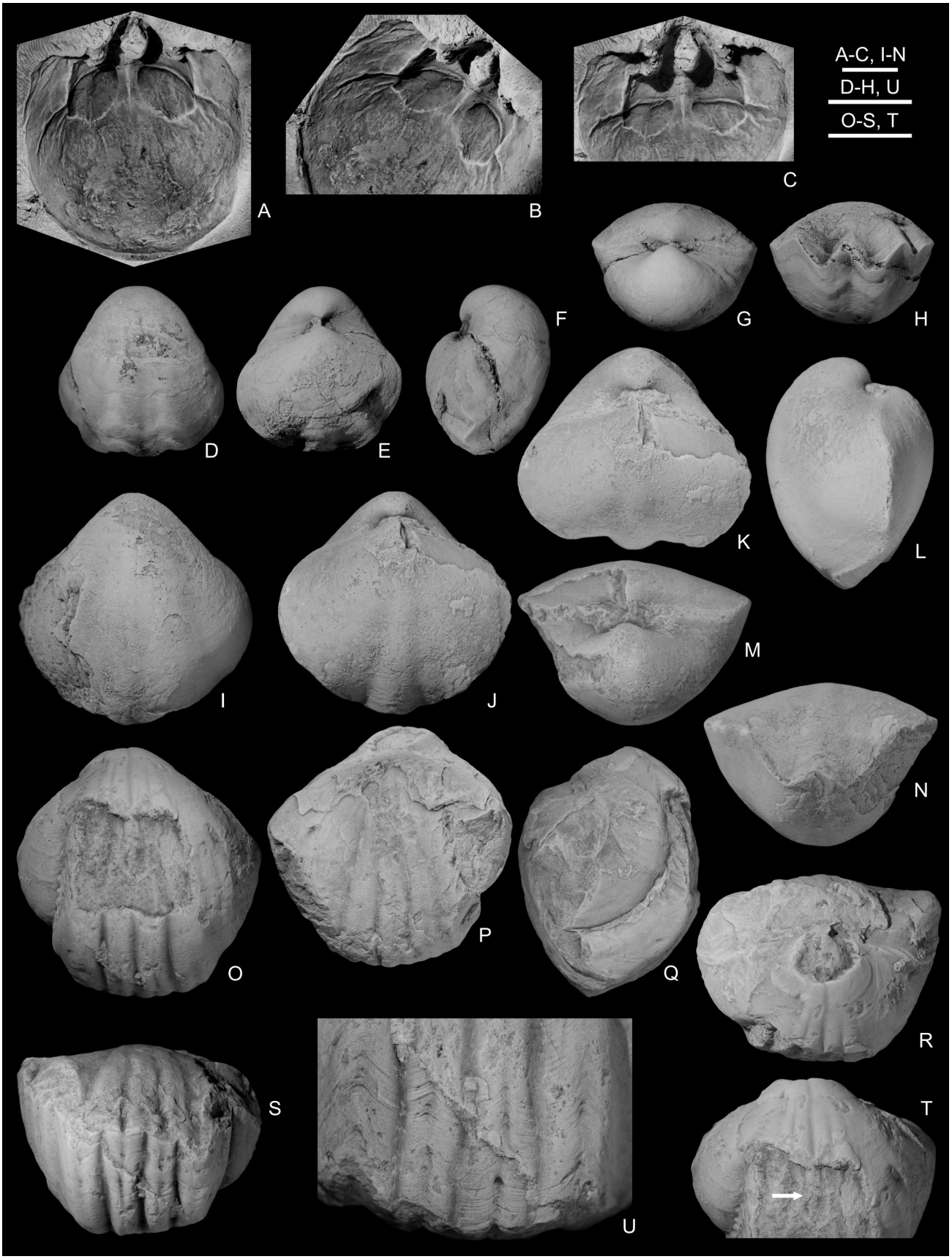

Figure 7. A-C. *Orthis musischura* Béclard, 1891 [*Proschizophoria personata* (Zeiler, 1857)], RBINS a1697, putty cast of dorsal interior in plan, oblique lateral and inclined plan (muscle field and cardinalia) views; Saint-Hubert 3 (23), Villé Formation. D-H. *Pentamerus broecki* Maillieux, 1909b [*Neometabolipa broecki* (Maillieux, 1909b)], RBINS a223 (lectotype), articulated specimen in ventral, dorsal, lateral, posterior and anterior views; Couvin 8174 (45), Grands Breux Formation (Lion Member). I-N. *Pentamerus greindli* Maillieux, 1909b [*Metabolipa greindli* (Maillieux, 1909b)], RBINS a222 (lectotype), articulated specimen in ventral, dorsal, posterodorsal, lateral, posterior and anterior views; Couvin 6149 (38), Moulin Liénaux Formation (Arche Member). O-U. *Pentamerus loei* Maillieux, 1908a [*Ivdelinia* (*Ivdelinia*) *loei* (Maillieux, 1908a)], RBINS a9574 (lectotype), incomplete and slightly deformed articulated specimen in ventral, dorsal, lateral, posterior, anterior and inclined ventral (arrow: median septum) views, and close-up of ribs and growth lines on the fold near the anterior margin; Couvin 80, Jemelle Formation. Scale bars: 10 mm (A-C, O-S, T), 5 mm (D-H, I-N, U).

Pentamerus loei Maillieux, 1908a
(Fig. 7O-U)

1908a *Pentamerus Loëi* Maillieux: 339-340, figs a-b.
1912 *Pentamerus Loëi*: Maillieux: 52.
1922a *G.* [*Gypidula*] *Loei*; Maillieux: 15.
1938 *Gypidula Loei* (Maillieux); Maillieux: 21.
1941b *Gypidula loei* (Maillieux); Maillieux: 4.
? 1970 *Gypidula loeï* [sic] Maillieux; Bultynck: 42, 44.
? 1970 *Gypidula loei* Maillieux; Bultynck: pl. 36.
1971 *Pentamerus loëi* Maillieux, 1909 [sic]; Godefroid: 47.
1995b [*Ivdelinia*] *loei* (Maillieux, 1909) [sic]; Godefroid: 83.

Type material. Among the RBINS collections, only one poorly preserved specimen (RBINS a9574; Fig. 7O-U) identified as such was recovered so far and considered as the type (= lectotype) by Godefroid (1971); Godefroid (1995b) reported that this species is known by a single specimen. The latter is accompanied by several labels bearing Maillieux's handwriting but it is not absolutely certain that this specimen corresponds to that illustrated by Maillieux (1908a, figs a-b). Maillieux's line drawings show a complete but slightly distorted specimen in contrast with the specimen RBINS a9574 that is also distorted, but of which the measurements do not match those indicated by Maillieux (1908a). However, it is not excluded that this author strongly embellished the drawings. This specimen is the only one that can be considered as the model for Maillieux's description. If it would turn out that it is really the only one, it would be considered as the holotype by monotypy. A certainty about this is, however, highly improbable.

Type locality and horizon. Couvin 80, Jemelle Formation (limestone lens) (Eifelian).

Description. See Maillieux (1908a).

Remarks. Maillieux's publication is part of the minutes of the session of the *Société belge de Géologie, de Paléontologie et d'Hydrologie* that took place on 18 November 1908; they were published in 1908. According to Godefroid (1995b), the type of ornamentation of *Pentamerus loei,* which consists of wide, medianly grooved costae (Fig. 7U) separated from each other by narrower and subangulose intercostal grooves, is characteristic of the genus *Ivdelinia* Andronov, 1961. The presence of a ventral median septum (Fig. 7O, T) suggests an assignment to the nominal subgenus *Ivdelinia* (*I.*). The pentamerides from the disused unit 'Co2d' (= Hanonet Formation) identified by Godefroid (1971) as *Ivdelinia* cf. *loei* (Maillieux) were referred to *Gypidula abunda abunda* Struve, 1992 by Godefroid (1995b), but those from the 'Co2c' (= Jemelle Formation) need to be re-investigated. Bultynck (1970) cited the species in the Couvin area, notably in its locus typicus (see also Bultynck, 1965), but due to the lack of illustration, it is impossible to confirm that it is really the one erected by Maillieux (1908a).

Current name. Ivdelinia (*Ivdelinia*) *loei* (Maillieux, 1908a).

4.7. Order Rhynchonellida

Rhynchonella*? *gosseleti Oehlert, 1893

1893 *Rhynchonella? Gosseleti* Oehlert: 125-131, text-figs 1-4, pl. 3, figs 5, 6, 7a-d.

Type material, locality and horizon. See Sartenaer & Plodowski (1975).

Remarks. As rightly exposed by Sartenaer & Plodowski (1975) in their comprehensive discussion, this species has to be considered as a junior synonym of *Araratella moresnetensis* (de Koninck, 1887) (see below).

Current name. Araratella moresnetensis (de Koninck, 1887).

Camarotoechia*? *ingens Maillieux, 1936a
(Fig. 8A-B)

1936a *Camarotoechia*? *ingens* Maillieux: 22, 26, 32, 88-89, pl. 1, fig. 6.
1940b *Camarotoechia ingens* Maillieux; Maillieux: 19.
1941b *Camarotoechia ingens* Maillieux; Maillieux: 8.
1941c *Camarotoechia*? *ingens* Maillieux; Maillieux: 3.
1946 *Camarotoechia ingens* (Maillieux) [sic]; Asselberghs: 150, 329.

Type material. The incomplete and deformed ventral valve RBINS a1068 was selected as the holotype by Maillieux (1936a, pl. 1, fig. 6) and is re-illustrated in Figure 8A-B.

Type locality and horizon. Fauvillers 6, Villé Formation (Siegenian; Pragian).

Description. See Maillieux (1936a).

Remarks. This large species was erected on the basis of a single ventral valve; additional material is required for its revision and to reach a better generic assignment.

Current name. 'Camarotoechia' ingens Maillieux, 1936a.

Terebratula* (*Atrypa*) *megistana Le Hon, 1870
(Fig. 8C-G)

1870 *Terebratula* (*Atrypa* D'Orb.) *megistana* Le Hon: 496-497, pl. 11, fig. 7, 7a.
1988 *Calvinaria megistana* (Le Hon, 1870); Sartenaer: 34-46, text-fig. 1, pl. 1, figs 1-3, pl. 2, figs 4-6, pl. 3, figs 7-13, pl. 4, figs 14-21 (see this author for a complete synonymy of this species).
1999 *Calvinaria megistana*; Godefroid & Sartenaer in Boulvain et al.: 21-22, figs BIO6-7.
2005a *Calvinaria megistana* (Le Hon, 1870); Mottequin: 2, 41, 104-105, 329, 376, text-fig. 3.20, pl. 2, figs 11-15.

Type material. A neotype (RBINS a2760) was selected, discussed and illustrated by Sartenaer (1988, pl. 1, fig. 2a-e); it is re-illustrated here (Fig. 8C-G).

Type locality and type horizon. Durbuy 8319, Neuville Formation (late Frasnian).

Description. See Le Hon (1870) and Sartenaer (1988).

Remarks. This species, which ranks among the largest Frasnian rhynchonellides, was assigned to the leiorhynchid genus *Calvinaria* Stainbrook, 1945 by Stainbrook (1948) and described in detail by Sartenaer (1988).

Current name. Calvinaria megistana (Le Hon, 1870).

Rhynchonella moresnetensis de Koninck, 1887

1887 *Rhynchonella Moresnetensis* de Koninck: 58-59, 145, table (unnumbered), pl. 13, figs 17-18.
1975 *Araratella moresnetensis* (de Koninck, L.-G., 1887); Sartenaer & Plodowski: 10-27, fig. (unnumbered), pl. 1, figs 1-5, pl. 2, figs 1-4, pl. 3, figs 1-16 (see these authors for a complete synonymy before 1975).
1983 *Araratella moresnetensis*; Sartenaer in Robaszynski & Dupuis: pl. 2, fig. 3.
1986 *Araratella moresnetensis*; Conil et al.: 22-23, table 1, fig. 3.
1995 *Araratella moresnetensis* (de Koninck); Legrand-Blain: 79, table 1.
2003 *Araratella moresnetensis*; Sartenaer & Plodowski: 341.
2016 *Araratella moresnetensis* (de Koninck, 1887); Mottequin & Brice: 125, fig. 5L-P.

Type material. The distorted articulated specimen (RBINS a1162) illustrated by de Koninck (1887, pl. 13, figs 17-18) was selected as the lectotype by Sartenaer and Plodowski (1975, pl. 1, fig. 4a-e), but has not been traced yet in the RBINS collection.

Type locality and horizon. Astenet, Dolhain Formation (latest Famennian).

Description. See de Koninck (1887) and Sartenaer & Plodowski (1975).

Remarks. This species is an excellent guide in the field to recognize the uppermost Famennian in southern Belgium (Sartenaer & Plodowski, 1975; Mottequin & Brice, 2016). Besides, Sartenaer & Plodowski (1975) discussed the Famennian species *Rhynchonella mourloni* Simoens, 1900, which has to be considered as a nomen nudum.

Current name. Araratella moresnetensis (de Koninck, 1887).

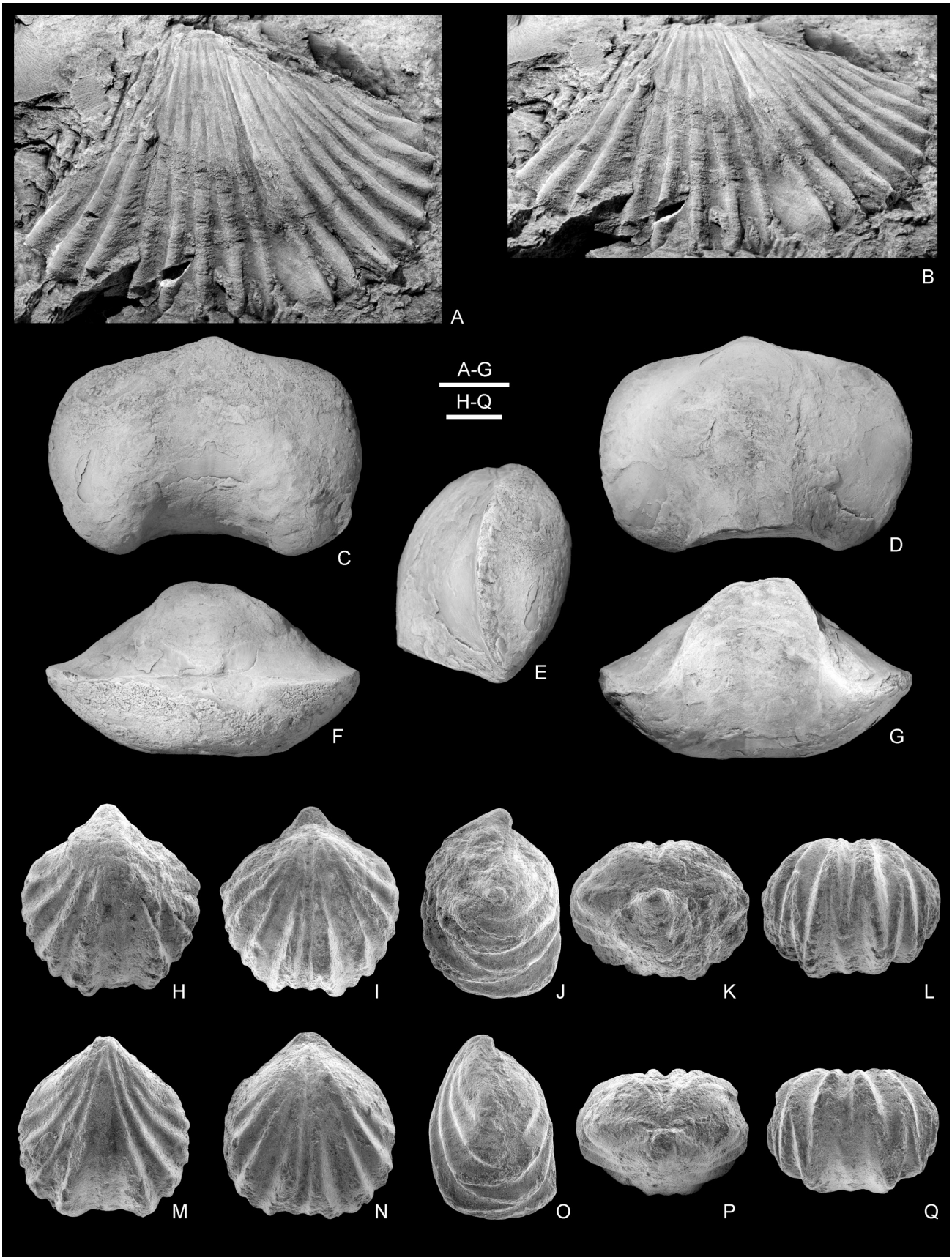

Figure 8. A-B. *Camarotoechia*? *ingens* Maillieux, 1936a [*'Camarotoechia' ingens* Maillieux, 1936a], RBINS a1068 (holotype), crushed incomplete ventral valve in plan and anteroventral views; Fauvillers 6, Villé Formation. C-G. *Terebratula* (*Atrypa*) *megistana* Le Hon, 1870 [*Calvinaria megistana* (Le Hon, 1870)], RBINS a2760 (neotype), articulated specimen in ventral, dorsal, lateral, posterior and anterior views; Durbuy 8319, Neuville Formation. H-Q. *Rhynchonella parvula* Béclard, 1891 [*Tetratomia*? *parvula* (Béclard, 1891)]; Rochefort 8679 (2), Eau Noire Formation. H-L. RBINS a1689 (lectotype), articulated specimen in ventral, dorsal, lateral, posterior and anterior views. M-Q. RBINS a1690 (paralectotype), articulated specimen in ventral, dorsal, lateral, posterior and anterior views. Scale bars: 10 mm (A-G), 1 mm (H-Q).

Rhynchonella parvula Béclard, 1891
(Fig. 8H-Q)

1891 *Rhynchonella parvula* Béclard: 97-98, 99, 100, pl. 3, figs 1-2.
1913 *Retzia*? *parvula*; Maillieux: 10, 14.
1922a *Retzia parvula*; Maillieux: 14.
1933 *Ptychospira parvula* (Béclard); Maillieux: 66.
1941b *Ptychospira parvula* (Béclard); Maillieux: 12.
1965 *'Rhynchonella' parvula* Béclard 1891; Godefroid: B88, pl. (unnumbered), figs 4, 5a-c.
1967 *Tetratomia parvula*; Lecompte: 30, 43, pls 6, 16.
1968 *Tetratomia*? *parvula* (Béclard, 1891); Godefroid: cited many times, pls 4-5, 8-9.
1970 *Tetratomia*? *parvula*; Bultynck: cited many times, pls 36, 37.
1970 *Tetratomia parvula*; Lecompte: 62, table 2.
1971 *Tetratomia*? *parvula*; Tsien: 123.
1982 *Tetratomia parvula*; Bultynck et al.: 32-33, text-fig. 1.
1983 *Tetratomia parvula*; Rzhonsnitskaya: 7, 9, table 1.
1983 *Tetratomia parvula*; Sartenaer in Robaszynski & Dupuis: 193, pl. 2, fig. 20.
1983 *Tetratomia parvula*; Vandenven & Godefroid in Robaszynski & Dupuis: 126.
1994 *Tetratomia parvula* (Béclard, 1891); Godefroid in Godefroid et al.: 17, fig. 11.

Type material. The articulated specimen RBINS a1689 (Béclard, 1891, pl. 3, fig. 1; Godefroid, 1965, fig. 5a-c; Sartenaer in Robaszynski & Dupuis, 1983, pl. 2, fig. 20) is hereby designated as the lectotype and figured in Figure 8H-L. The articulated specimen RBINS a1690 (Béclard, 1891, pl. 3, fig. 2) is a paralectotype (Fig. 8M-Q). Béclard's (1891) drawings are clearly embellished.

Type locality and horizon. Rochefort 8679 (2), Eau Noire Formation (late Emsian).

Description. See Béclard (1891) and Godefroid (1965).

Remarks. The Jurassic species *Rhynchonella parvula* Eudes-Deslongchamps, 1862 (the type species of *Parvirhynchia* Buckman, 1918; see also Alméras & Lathuilière, 1984) and *Rhynchonella parvula* Béclard, 1891 from the Devonian of southern Belgium are primary homonyms (Articles 53.3, 57.2 of the Code). According to the Article 23.9.5 of the Code and the current survey of the literature, it appears that the Devonian species was not considered as belonging to the same genus after 1899, thus in order to preserve the nomenclature stability, Béclard's specific name is not replaced. From Lecompte (1967), Béclard's species has been transferred (doubtfully or otherwise) to *Tetratomia* Schmidt, 1946 by subsequent workers. Godefroid (1965) and García-Alcalde in Arbizu et al. (1979) considered the German species *Rhynchonella amanshauseri* Dahmer, 1923 as a synonym of Béclard's species, but this opinion was not accepted by Brice (1981), who was not convinced that the latter belongs to *Tetratomia.* The species *parvula* was listed on many occasions in the Emsian of the Cantabrian Mountains (Spain), notably by García-Alcalde (2015). However, *Tetratomia*? *parvula* urgently needs to be revised (internal features unknown, except the presence of a long dorsal septum illustrated by Godefroid (1965, fig. 4)) and its conspecificity with the Spanish form has to be confirmed (or otherwise) (J.L. García-Alcalde, pers. com., November 2018). That is why the Spanish records are not included in the synonymy list.

Current name. Tetratomia? *parvula* (Béclard, 1891).

Plethorhyncha*? *percostata* Fuchs, var. *gdoumontensis Asselberghs, 1930
(Fig. 9A-T)

1929 *Plethoryncha*? [sic] *percostata* Fuchs var. *gdoumontensis* Asselberghs [nomen nudum]: 758.
1930 *Plethoryncha*? [sic] *percostata* Fuchs, var. *gdoumontensis* Asselberghs: 33-34, 62.
1930 *Plethorhyncha*? *percostata* Fuchs, var. *gdoumontensis* Asselberghs: pl. 3, figs 20-24.
1941a *Camarotoechia percostata gdoumontensis* (Asselberghs); Maillieux: 8.
1942 *Camarotoechia sinuosa* (A. Fuchs 1923); Dahmer: 119, 129-132.
1943a *Plethorhyncha*? *percostata* var. *gdoumontensis*; Asselberghs: 7, 9.
1946 *Camarotoechia sinuosa* Fuchs; Asselberghs: 328.
1960 *'Camarotoechia' sinuosa* (Fuchs, 1923); Boucot: 309-310, tables 2, 3, pl. 15, figs 5-15, pl. 16, figs 1-2.
1973 *Bathyrhyncha sinuosa gdoumontensis* (Asselberghs 1930); Struve: 352, 357, fig. 17a-b.
1994 *Bathyrhyncha sinuosa* Fuchs, 1923; Godefroid in Godefroid et al.: 17, fig. 13.

Type material. The internal mould of a dorsal valve (RBINS a3226; Fig. 9A-D) figured by Asselberghs (1930, pl. 3, fig. 24) is hereby designated as the lectotype. The paralectotypes includes the external moulds of ventral and dorsal valves (RBINS a544 (also illustrated by Boucot, 1960, pl. 15, fig. 9); Fig. 9E-H), the internal and external moulds of a ventral valve (RBINS a3223; Fig. 9I-K), and the ventral internal moulds (RBINS a3224-3225; Fig. 9L-O, P-T) that were illustrated by Asselberghs (1930, pl. 3, figs 20-23).

Type locality and horizon. Malmedy 12 (Gdoumont), Marteau Formation, Waimes Member (earliest Gedinnian; Pridoli).

Description. See Asselberghs (1930), Dahmer (1942), and Boucot (1960).

Remarks. Asselberghs (1930) erected a new variety for *'Rhynchonella' percostata* Fuchs, 1919, a species which was assigned by Brice (1986) to her new genus *Pachanchorhynchia.* According to Dahmer (1942, 1951), Asselberghs' (1930) variety is identical with *Bathyrhyncha sinuosa* Fuchs, 1923 (see Table 1), an opinion followed by Asselberghs (1943a) and Boucot (1960).

Current name. Bathyrhyncha sinuosa Fuchs, 1923.

Leiorhynchus tumidus* var. *quadricostata Maillieux, 1930
(Fig. 9U-DD)

1930 *Leiorhynchus tumidus* (Kayser) var. *quadricostata* Maillieux: 108-109, pl. 3, fig. 4a-b.
1936b *Leiorhynchus tumidus* (Kayser) var. *quadricostata* Maillieux; Maillieux: 24.
1941b *Leiorhynchus tumidus quadricostatus* Maillieux; Maillieux: 9.
1968 *Leiorhynchus tumidus* (Kayser) var. *quadricostata* Maillieux; Sartenaer: 8.

Type material. The specimen RBINS a10301A (Maillieux, 1930, pl. 3, fig. 4a; Sartenaer, 1968, pl. 1, fig. 4a-e) was selected as the lectotype (Fig. 9U-Y) of Maillieux's variety by Sartenaer (1968) (see remarks below). According to the Article 74.1.3 of the Code, the specimens RBINS a10301C (Sartenaer, 1968, pl. 1, fig. 3a-e; Fig. 9Z-DD) and RBINS a10301B (lost!) (Maillieux, 1930, pl. 3, fig. 4b) are paralectotypes of this variety.

Type locality and horizon. Sautour 7605, Matagne Formation (late Frasnian).

Description. See Maillieux (1930, 1936b).

Remarks. Conformably to the Article 45.6.4 of the Code, Sartenaer (1968) pointed out that both varieties (*Leiorhynchus tumidus* var. *quadricostata* and *L. tumidus* var. *tricostata*) erected by Maillieux (1930) have a subspecific rank. Sartenaer (1968) considered them as synonyms of *Camarophoria tumida* Kayser, 1872, which is the type species of the genus *Ryocarhynchus* Sartenaer, 1984 and particularly abundant at the end of the Frasnian in southern Belgium, northern France and western Germany (Sartenaer, 1968, 1974b; Mottequin & Poty, 2016) but also in the upper Frasnian of southern Poland (Baliński 1979, 2002).

Current name. Ryocarhynchus tumidus (Kayser, 1872).

Leiorhynchus tumidus* var. *tricostata Maillieux, 1930

1930 *Leiorhynchus tumidus* (Kayser) var. *tricostata* Maillieux: 108, pl. 3, fig. 3a-b.

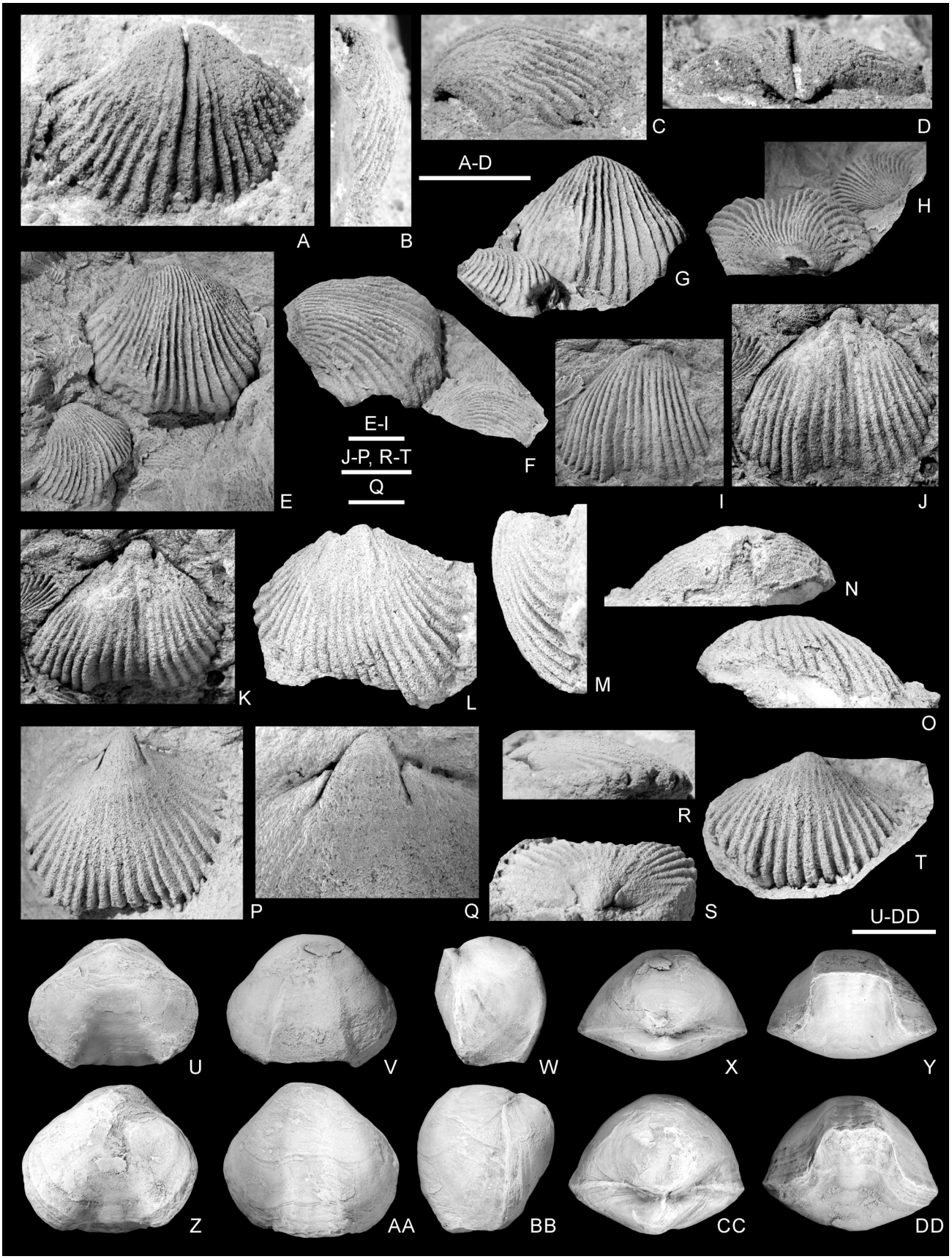

Figure 9. A-T. *Plethorhyncha*? *percostata* Fuchs, var. *gdoumontensis* Asselberghs, 1930 [*Bathyrhyncha sinuosa* Fuchs, 1923]; Malmedy 12 (Gdoumont), Marteau Formation (Waimes Member). A-D. RBINS a3226 (lectotype), internal mould of a dorsal valve in plan, lateral, oblique lateral and posterior views. E-H. RBINS a544, putty cast of the external moulds of ventral and dorsal valves in different views. I-K. RBINS a3223, putty cast of a ventral valve in plan view, and internal mould of a ventral valve in in plan and inclined plan views. L-O. RBINS a3224, internal mould of a ventral valve in plan, lateral, posterior and anterior views. P-T. RBINS a3225, internal mould of a ventral valve in plan, lateral, posterior and anteroventral views and close-up of the umbonal region (Q, SEM). U-DD. *Leiorhynchus tumidus* var. *quadricostata* Maillieux, 1930 [*Ryocarhynchus tumidus* (Kayser, 1872)]; Sautour 7605, Matagne Formation. U-Y. RBINS a10301A (lectotype), articulated specimen in ventral, dorsal, lateral, posterior and anterior views. Z-DD. RBINS a10301C, articulated specimen in ventral, dorsal, lateral, posterior and anterior views. Scale bars: 5 mm (A-D, E-I, J-P, R-T), 2 mm (Q), 10 mm (U-DD).

1936b *Leiorhynchus tumidus* (Kayser) var. *tricostata* Maillieux; Maillieux: 23.

1941b *Leiorhynchus tumidus tricostatus* Maillieux; Maillieux: 9.

1968 *Leiorhynchus tumidus* var. *tricostata* Maillieux; Sartenaer: 8.

Type material. Sartenaer (1968) selected the specimen RBINS a10300 (Maillieux, 1930, pl. 3, fig. 3a-b) as the lectotype of Maillieux's variety (see remarks above related to *Leiorhynchus tumidus* var. *quadricostata*), but it has not been traced in the RBINS collections.

Type locality and horizon. Sautour 7605, Matagne Formation (late Frasnian).

Description. See Maillieux (1930, 1936b).

Remarks. See Leiorhynchus tumidus var. *quadricostata.*

Current name. Ryocarhynchus tumidus (Kayser, 1872).

4.8. Order Athyridida

Retzia crassicosta Maillieux, 1932
(Fig. 10A-C)

1932 *Retzia crassicosta* Maillieux: 59, pl. 2, fig. 6.
1933 *Retzia crassicosta* Maillieux; Maillieux: 59.
1941a *Retzia crassicosta* Maillieux; Maillieux: 12, 59.
1941b *Retzia crassicosta* Maillieux; Maillieux: 12.
1946 *Retzia crassicosta* Maillieux; Asselberghs: 247, 330.
1989 *Retzia crassicosta* Mailieux [sic], 1932; Grunt: 90.

Type material. Maillieux (1932, pl. 2, fig. 6) illustrated an internal mould of a dorsal valve (RBINS a973; Fig. 10A-C), but failed to designate a holotype. As he clearly stated that this specimen is the single one available, it has thus to be considered as the holotype by monotypy.

Type locality and horizon. Vireux-Molhain 2 (France), base of the Hierges Formation according to Godefroid & Stainier (1988) (late Emsian).

Description. See Maillieux (1932).

Remarks. This poorly known species, which differs from *Retzia adrieni* (de Verneuil & d'Archiac, 1845) in the number of costae and the subtriangular outline of the dorsal valve according to Maillieux (1932), needs to be revised on the basis of further material.

Current name. Retzia crassicosta Maillieux, 1932.

Athyris dorlodoti Asselberghs, 1923
(Fig. 10D-V)

p 1895 *Athyris concentrica*, v. Buch; Kayser: 207, pl. 3, figs 8-9.

1922 *Athyris Dorlodoti* Asselberghs [nomen nudum]: B132, B134.

1923 *Athyris Dorlodoti* Asselberghs: 11, 34-35, 58, 59, tables 1-2, pl. 2, figs 6-8.

1933 *Athyris Dorlodoti*; Maillieux: 67.

1938 *Athyris Dorlodoti* Asselberghs; Maillieux: 12.

1941b *Athyris dorlodoti* Asselberghs; Maillieux: 12.

1955 *Athyris dorlodoti* Asselberghs; Asselberghs: 209.

1977 *Athyris dorlodoti* (E. Asselberghs, 1923); Bultynck & Boonen: 492.

1989 *Athyris dorlodoti* Asselberghs, 1929 [sic]; Grunt: 83.

Type material. Asselberghs (1923, legend of pl. 2, figs 6-8) considered the illustrated specimens as the types but he did not select a holotype. The internal mould of a ventral valve (with external mould) (RBINS a3167; Fig. 10H-L) figured by Asselberghs (1923, pl. 2, fig. 7a-b), which seems to have been deformed by fish bites, is hereby selected as the lectotype. The internal mould of a ventral valve (ULg.PA.2018.12.23/1; Fig. 10D-G) figured by Kayser (1895, pl. 3, fig. 8) and Asselberghs (1923, pl. 2, fig. 6), and that of an incomplete dorsal valve with external mould (RBINS a3168; Fig. 10L-V) illustrated by Asselberghs (1923, pl. 2, fig. 8a-c) are paralectotypes.

Type locality and horizon. Chênée 5381 (Tilff), Pépinster Formation (Eifelian–Givetian).

Description. See Asselberghs (1923).

Remarks. This species with a long dorsal myophragm is abundant within the Pépinster and Rivière formations according to Asselberghs (1923), but needs to be revised in order to be compared validly with the numerous athyridid species recognized in the Eifelian of western Germany (Struve, 1992; Alvarez et al., 1996; Grunt & Weyer, 2016).

Current name. Athyris dorlodoti Asselberghs, 1923.

Retzia gdoumontensis Asselberghs, 1930
(Fig. 11A-D)

1929 *Retzia gdoumontensis* Asselberghs [nomen nudum]: 758.

1930 *Retzia gdoumontensis* Asselberghs: 41, 63, pl. 5, figs 5-6.

1933 *Retzia gdoumontensis* Asselberghs; Maillieux: 43.

1941b *Retzia gdoumontensis* Asselberghs; Maillieux: 12.

1942 *Retzia gdoumontensis* Asselberghs; Dahmer: 120.

1943a *Retzia gdoumontensis* Asselberghs; Asselberghs: 10.

1943b *Retzia gdoumontensis* Asselberghs; Asselberghs: 7, 10, 12.

1946 *Retzia gdoumontensis* Asselberghs; Asselberghs: 328.

1960 *Homeospira gdoumontensis* (Asselberghs, 1930); Boucot: 317-318, tables 2, 3, pl. 17, figs 10-15.

1967 *Homeospira gdoumontensis*; Lecompte: 29.

1982 *Homeospira gdoumontensis* (Asselberghs, E., 1930); Godefroid: 126, table 3.

1989 *Homeospira gdoumontensis* Asselberghs, 1903 [sic]; Grunt: 91.

1994 *Homeospira gdoumontensis* (Asselberghs, 1930); Godefroid in Godefroid et al.: 19, fig. 13.

1999 *Homeospira gdoumontensis;* Godefroid & Cravatte: 12-13, table 1.

Type material. The external mould of a dorsal valve (RBINS a3245; Fig. 11A-B) figured by Asselberghs (1930, pl. 5, fig. 5) is hereby designated as the lectotype whereas the external mould of a ventral valve (RBINS a3246; Fig. 11C-D) illustrated in Asselberghs (1930, pl. 5, fig. 6) is a paralectotype.

Type locality and horizon. Malmedy 9 (Ovifat), Marteau Formation, Waimes Member (earliest Gedinnian; Pridoli).

Description. See Asselberghs (1930) and Boucot (1960).

Remarks. Markedly better preserved material was figured by Boucot (1960), who assigned Asselberghs' (1930) species to Homeospira Hall & Clarke, 1893.

Current name. Homeospira gdoumontensis (Asselberghs, 1930).

Meristella straeleni Asselberghs, 1930
(Fig. 11H-J)

1929 *Meristella Straeleni* Asselberghs [nomen nudum]: 758.

p 1930 *Meristella Straeleni* Asselberghs: 42, 63, pl. 5, figs 7-8 (see remarks below).

1933 *Meristella Staeleni* [sic] [corrected in the erratum]; Maillieux: 43.

1941b *Meristella straeleni* Asselberghs; Maillieux: 11.

1942 *Meristella straeleni* Asselberghs; Dahmer: 120.

1943a *Meristella straeleni* Asselberghs; Asselberghs: 10.

1943b *Meristella straeleni* Asselberghs; Asselberghs: 4, 7, 10, 12.

1946 *Meristella straeleni* Asselberghs; Asselberghs: 328.

1960 *Protathyris*? *straeleni* (Asselberghs, 1930); Boucot: 312-313, tables 2, 3, pl. 18, figs 15-16.

1982 *Protathyris*? *Straeleni* (Asselberghs, E., 1930); Godefroid: 126, table 3.

1989 *Meristella straeleni* Asselberghs, 1930; Grunt: 81.

1994 *Protathyris*? *straeleni* (Asselberghs, 1930); Godefroid in Godefroid et al.: 19, fig. 13.

1999 ? *Protathyris straeleni* (Asselberghs, 1930); Godefroid & Cravatte: 9, table 1, figs 3-4.

Type material. The illustrated syntypes include the dorsal internal mould (RBINS a583; Fig. 11H-J) illustrated by Asselberghs (1930, pl. 5, fig. 8) and Boucot (1960, pl. 18, fig. 16) and a poorly preserved internal mould of a juvenile ventral valve

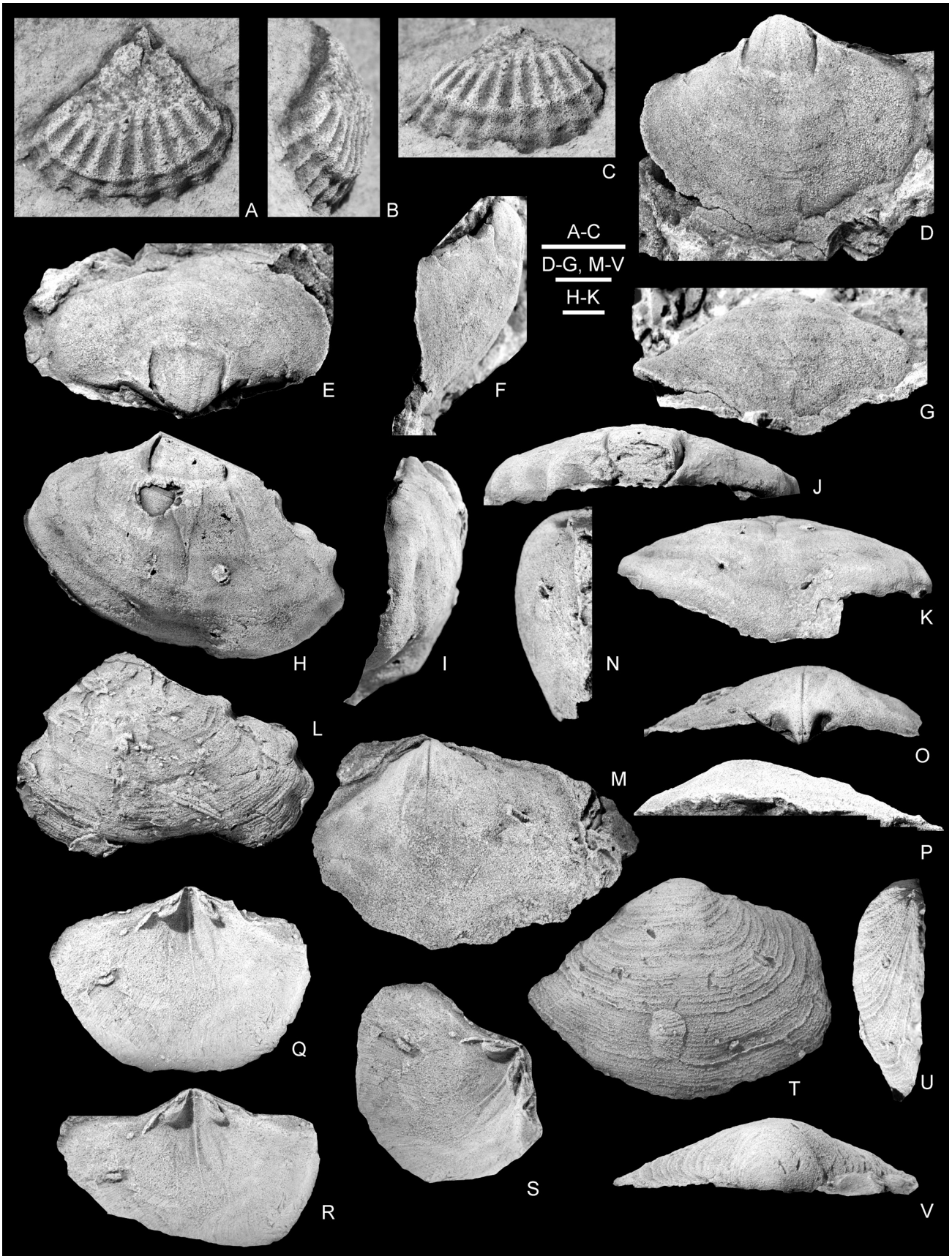

Figure 10. A-C. *Retzia crassicosta* Maillieux, 1932, RBINS a973 (holotype), internal mould of a dorsal valve in plan, lateral and anterodorsal views; Vireux-Molhain 2, Hierges Formation. D-V. *Athyris dorlodoti* Asselberghs, 1923; Chênée 5381 (Tilff), Pépinster Formation. D-G. ULg.PA.2018.12.23/1 (paralectotype), internal mould of a ventral valve in plan, posteroventral, slightly inclined lateral and anterior views. H-L. RBINS a3167 (lectotype), internal mould of a ventral valve in ventral, lateral, posterior and anterior views, and putty cast of exterior. M-V. RBINS a3168 (paralectotype), internal mould of a dorsal exterior in plan, lateral, posterior and anterior views (M-P), putty cast of interior in plan, anterodorsal, and oblique lateral views (Q-S), putty cast of exterior in plan, lateral and posterior views. Scale bars are 5 mm.

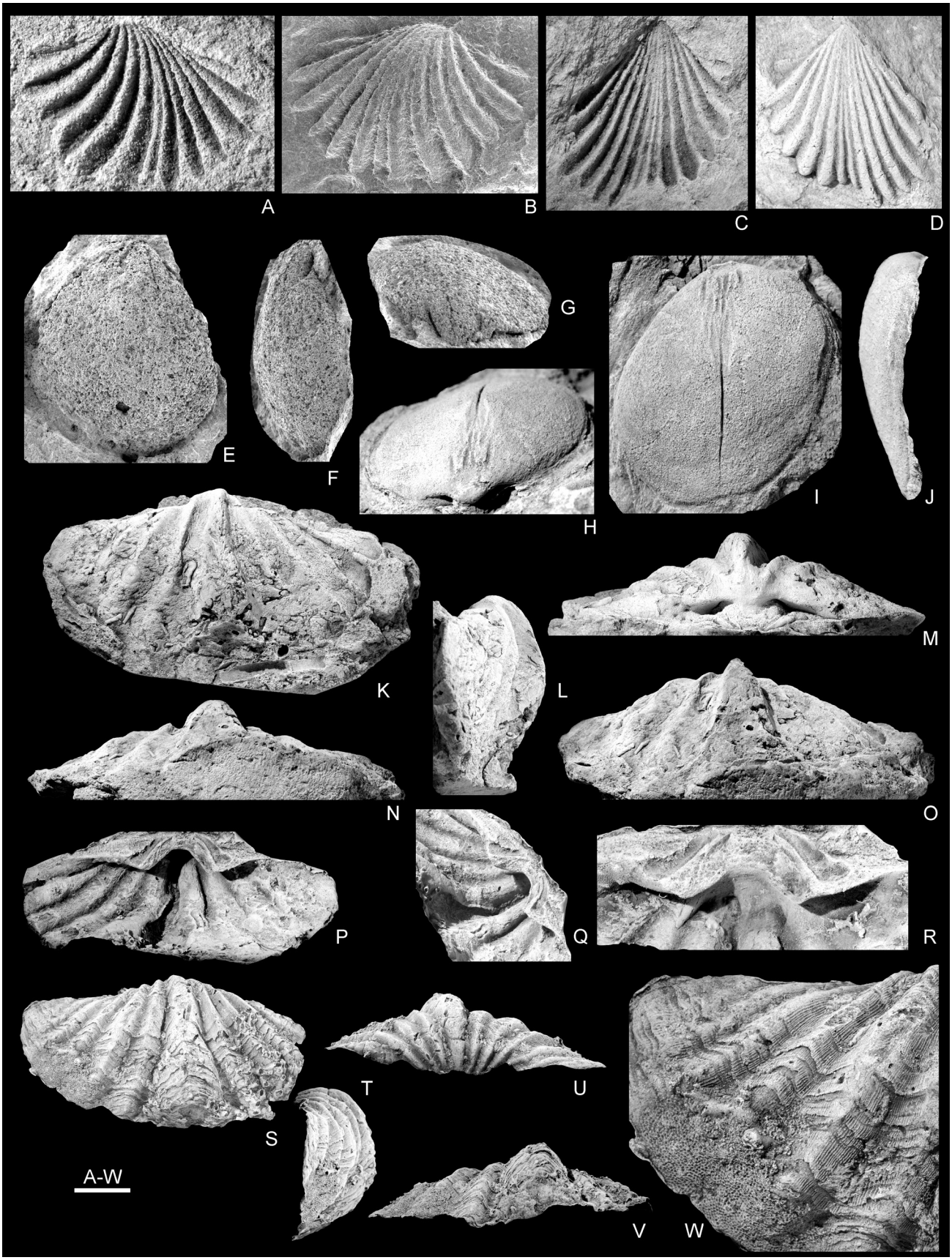

Figure 11. A-D. *Retzia gdoumontensis* Asselberghs, 1930 [*Homeospira gdoumontensis* (Asselberghs, 1930)]; Malmedy 9 (Ovifat), Marteau Formation (Waimes Member). A-B. RBINS a3245, dorsal external mould and putty cast (B; SEM). C-D. RBINS a3246, ventral external mould and putty cast. E-J. *Meristella straeleni* Asselberghs, 1930 [*Protathyris*? *straeleni* (Asselberghs, 1930)], syntypes illustrated by Asselberghs (1930); Marteau Formation (Waimes Member). E-G. RBINS a3247, juvenile ventral valve in ventral, oblique lateral and posteroventral views (SEM) (this specimen was rejected from the species by Boucot (1960)); Malmedy 12 (Gdoumont). H-J. *Meristella straeleni* Asselberghs, 1930, RBINS a583, dorsal valve in posterodorsal, dorsal and lateral views; Malmedy 9 (Ovifat). K-W. *Spirifer beaujeani* Béclard, 1887 [*Filispirifer*? *beaujeani* (Béclard, 1887)], RBINS a1254 (lectotype), internal mould of a dorsal valve in plan, lateral, posterior, anterior, and anterodorsal views (K-O), latex cast of dorsal internal mould in plan and oblique lateral views, detail of the cardinalia (P-R), latex cast of dorsal external mould (with bryozoans and tabulates) in plan, lateral, posterior and anterior views (S-V), and close-up of the left dorsal flank showing the microornament and the bryozoans (W); Saint-Hubert 3 (23), Villé Formation. Scale bar: 2.5 mm (A-B), 4 mm (C-D, H-J, W), 2 mm (E-G), 5 mm (R), 10 mm (K-Q, S-V).

(RBINS a3247; Fig. 11E-G) figured by Asselberghs (1930, pl. 5, fig. 7). The latter was rejected from the species *straeleni* by Boucot (1960, see his synonymy list), but not discussed. No lectotype is selected at this stage (see the discussion of the species *pruvosti* in paragraph 4.11).

Type locality and horizon. Malmedy 9 (Ovifat), Marteau Formation, Waimes Member (earliest Gedinnian; Pridoli).

Description. See Asselberghs (1930) and Boucot (1960).

Remarks. This species was doubtfully referred to *Protathyris* Kozłowski, 1929 by Boucot (1960), who pointed out the absence of ventral valve in the available material. He assigned the dorsal internal mould RBINS a582 (Asselberghs, 1930, pl. 4, fig. 3; Boucot, 1960, pl. 18, fig. 15; Fig. 19L-Q), which was part of the type material of *Dielasma pruvosti* Asselberghs, 1930, to *P*? *straeleni* (see a more detailed discussion in paragraph 4.11 concerning the species *pruvosti*).

Current name. Protathyris? *straeleni* (Asselberghs, 1930).

4.9. Order Atrypida

Atrypa gedinniana Fuchs, 1934
(Fig. 12A-G)

1876 *Atrypa reticularis* Linn.; de Koninck: 44.

1929 *Atrypa lorana* Fuchs; Asselberghs: 758.

1930 *Atrypa lorana* Fuchs; Asselberghs: 35-36, 63, pl. 4, figs 4-6.

1934 *Atrypa gedinniana* Fuchs: 402, 404.

p 1941b *Atrypa lorana* Fuchs; Maillieux: 11 (only those from the 'Gedinnian').

1942 *Atrypa gedinniana* A. Fuchs, 1934; Dahmer: 142, figs 18-19.

1943a *Atrypa gedinniana* A. Fuchs; Asselberghs: 7-8, 10.

1943b *Atrypa gedinniana*; Asselberghs: 7, 8, 10, 12.

1946 *Atrypa gedinniana* Fuchs; Asselberghs: 328.

1951 *Atrypa gedinniana* Fuchs 1934; Dahmer: 114, pl. 2, fig. 24a-c.

1960 *Atrypa gedinniana* Fuchs, 1934; Boucot: 310-311, pl. 16, figs 3-6, tables 2-3.

1982 *Atrypa gedinniana* Fuchs, A., 1934; Godefroid: 126, table 3.

1985 *Atrypa* (? *Atrypa*) *gedinniana* Fuchs 1934; Copper & Racheboeuf: 66, 74, text-fig. 5, pl. 5, figs 1-13.

1994 *Atrypa* (? *Atrypa*) *gedinniana* (Fuchs, 1934) [sic]; Godefroid in Godefroid et al.: 17, fig. 11.

1999 *Atrypa* (? *Atrypa*) *gedinniana* (Fuchs, 1934) [sic]; Godefroid & Cravatte: 8, 9, 10, 11, 12, 13, table 1, figs 3, 4.

Type material. The ventral external and internal moulds (RBINS a3231; Fig. 12A-C) illustrated by Asselberghs (1930, pl. 4, fig. 5a-b) was selected by Dahmer (1942) as the lectotype and re-illustrated by Copper & Racheboeuf (1985, pl. 5, figs 1-3). The specimens RBINS a3230 (Asselberghs, 1930, pl. 4, fig. 4a-b; Copper & Racheboeuf, 1985, pl. 5, figs 6, 8-9; Fig. 12E-G) and a3232 (Asselberghs, 1930, pl. 4, fig. 6; Copper & Racheboeuf, 1985, pl. 5, figs 4-5; Fig. 12D) are paralectotypes.

Type locality and horizon. Malmedy 9 (Ovifat), Marteau Formation, Waimes Member (earliest Gedinnian; Pridoli).

Description. See Asselberghs (1930), Fuchs (1934), Dahmer (1942), Boucot (1960), and Copper & Racheboeuf (1985).

Remarks. This species is one of the rare representatives of the Order Atrypida within the Pridolian–Emsian siliciclastic succession of southern Belgium (Godefroid in Godefroid et al., 1994). The specimens from the upper Emsian of the Armorican Massif (France) doubtfully assigned to Fuchs' species by Copper (1981) were subsequently considered as a new species (*Atrypa* (*A.*) *lezaisensis*) by Copper & Racheboeuf (1985).

Current name. Atrypa (*Atrypa*?) *gedinniana* Fuchs, 1934.

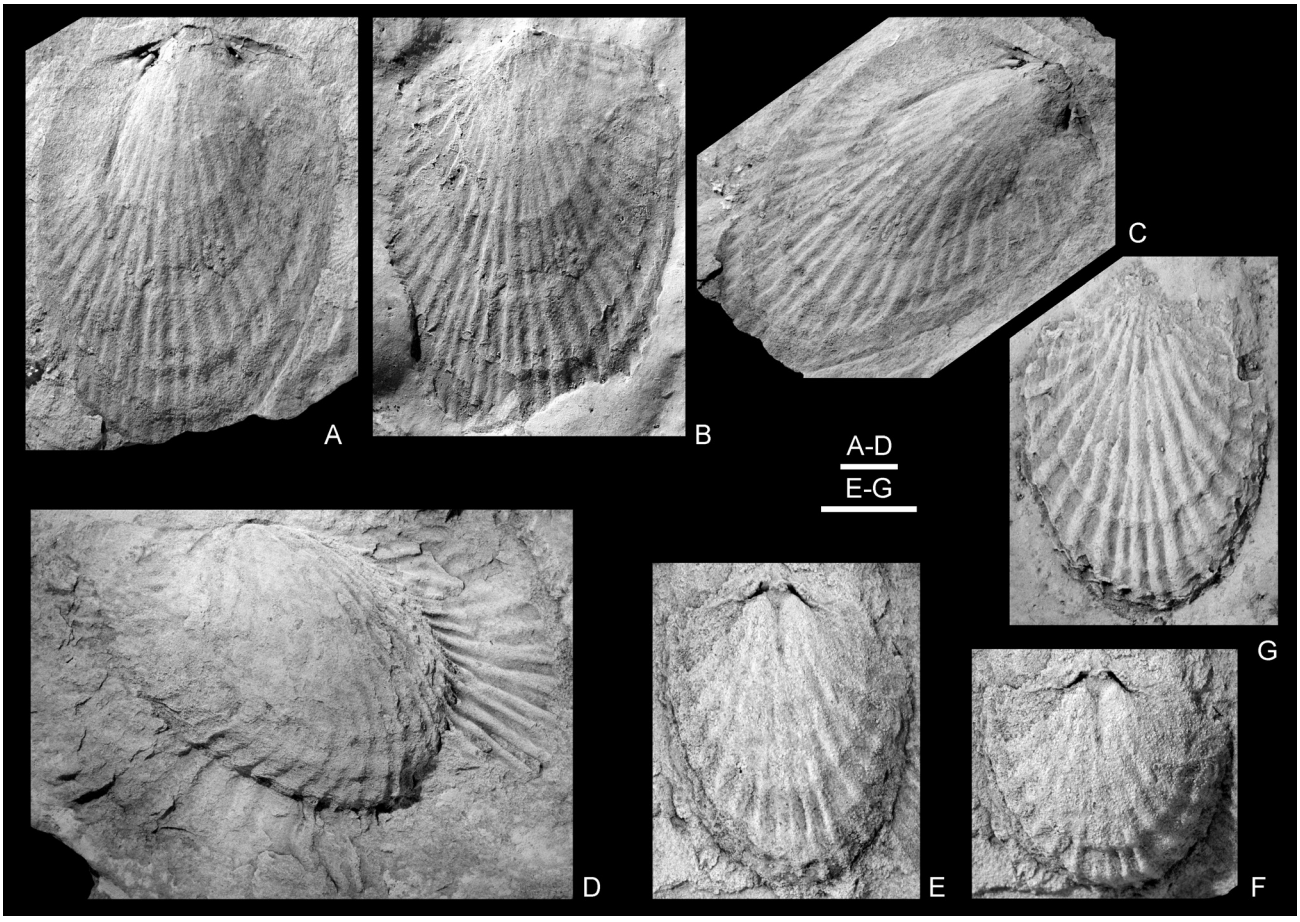

Figure 12. *Atrypa gedinniana* Fuchs, 1934 [*Atrypa* (*Atrypa*?) *gedinniana* Fuchs, 1934], Malmedy 9 (Ovifat), Marteau Formation (Waimes Member). A-C. RBINS a3231 (lectotype), ventral interior in plan view, ventral exterior (putty cast) in plan view, and ventral interior in oblique lateral view. D. RBINS a3232, dorsal interior in plan view (skirt partly preserved). E-G. RBINS a3230, dorsal interior of a juvenile specimen in plan and oblique posterior views, and ventral exterior (putty cast) in plan view. Scale bars: 5 mm.

4.10. Order Spiriferida

Spirifer beaujeani Béclard, 1887
(Figs 11K-W, 13A-F)

1887 *Spirifer Beaujeani* Béclard: 64, 73, pl. 3, figs 1-3.
1896a *Spirifer Beaujeani* F. Béclard, 1887; Béclard: 141, 146, pl. 11, fig. 3, 3a (= copy of Béclard, 1887, pl. 3, figs 1-2).
1896b *Spirifer Beaujeani* F. Béclard, 1887; Béclard: 265.
p 1910b *Spirifer primaevus* Stein.; Maillieux: 194.
p 1910c *Spirifer primaevus* Steininger; Maillieux: 345-348, 372, 376.
1963 *Acrospirifer beaujeani* (F. Béclard, 1887); Vandercammen: 6-12, 149, 152, text-figs 1-3, pl. 1, figs 1-12.
1967 *Acrospirifer beaujani* [sic]; Lecompte: 42, pl. 15.
1970 *Acrospirifer beaujeani* (Béclard, F., 1887); Vandercammen & Vandercammen-Goffinet: 6, 73.
1982 *Acrospirifer beaujani* [sic]; Godefroid & Stainier: 156-157, table 2a-b.
1989 *A.* [*Acrospirifer*] *beaujani* [sic] (Béclard, 1887); Gourvennec: 66-67.
1994 *Acrospirifer beaujani* [sic] (Béclard, 1887); Godefroid in Godefroid et al.: 17, fig. 11.
2001a *Filispirifer*? *beaujeani* (Béclard 1887); Jansen: 271, 272, 283, 284.
2001b *'Spirifer' beaujeani* Béclard, 1887; Jansen: 132, 133, 134, 138.
2008 ?*Filispirifer beaujeani* (Béclard, 1887); Schemm-Gregory: 63, 65, table 1.

Type material. The external and internal moulds of a dorsal valve (RBINS a1254; Fig. 11K-W) illustrated by Béclard (1887, pl. 3, figs 1-2; 1896a, pl. 11, figs 3, 3a) and Vandercammen (1963, pl. 1, figs 1-6) was designated as the hololectotype [sic] (= lectotype) by Vandercammen (1963). The paralectotype (paratype in Vandercammen, 1963) corresponds to the incomplete external mould of a ventral valve figured by Béclard (1887, pl. 3, fig. 3) and Vandercammen (1963, pl. 1, fig. 10). The external and internal moulds of a ventral valve (RBINS a1930; Fig. 13G-H) considered as a paratype by Vandercammen (1963, pl. 1, figs 7-9) cannot be regarded as such as it does not be part of Béclard's (1887) original material as it was sold to the RBINS by Maillieux in 1912.

Type locality and horizon. Saint-Hubert 3 (23), Villé Formation (Siegenian; Pragian).

Description. See Béclard (1887) and Vandercammen (1963).

Remarks. Soon after its first description, the autonomy of this species was challenged by several authors notably Frech (1889) and Barrois (1889). Eventually Béclard (1896a, 1896b) considered it as a synonym of *Acrospirifer primaevus* (Steininger, 1853) as did Maillieux (1910b; 1931, see his synonymy list of Steininger's species). An opinion followed by Gourvennec (1989), who considered that the material identified and illustrated by Vandercammen (1963) as *Acrospirifer beaujeani* should correspond to juvenile specimens of *A. primaevus* (Steininger, 1853), the type species of *Acrospirifer* Helmbrecht & Wedekind, 1923. The species was still considered as distinct from *primaevus* and assigned to *Acrospirifer* notably by Carls in Brice et al. (2000). Careful re-examination of the type material of Béclard's species by Jansen (2001a, 2001b), very clearly revealing a capillate micro-ornamentation, led him to doubtfully assign the Belgian species to *Filispirifer* Jansen, 2001a (see also Schemm-Gregory, 2008).

From the palaeobiological viewpoint, the lectotype of *F*? *beaujeani* shows numerous epizoans (bryozoans, tabulate corals) fixed both on the external and internal faces of the dorsal valve, reflecting post-mortem encrustation and maybe also during the life of the animal. These epizoans were not illustrated by Béclard (1887) and the poor quality of Vandercammen's (1963) pictures does not allow observing them easily. In Belgium, although Lower Devonian epizoans attached to bivalves were illustrated by Maillieux (1909c), it is the first time that Lower Devonian brachiopods with epizoans are documented whereas such associations were reported in the Upper Devonian (Lecompte, 1939; Mottequin, 2008a; Mottequin et al., 2016) and especially in the Tournaisian (Mottequin & Simon, 2017a, 2017b) successions of this country.

Current name. *Filispirifer*? *beaujeani* (Béclard, 1887).

Spirifer bisinus Le Hon, 1870
(Fig. 13I-P)

1870 *Spirifer bisinus* Le Hon: 497-499, pl. 11, fig. 9.
1982 *Geminisulcispirifer bisinus* (Le Hon, H., 1870); Sartenaer: 125-130, 149-153, table 1, pl. 1, figs 1-6, pl. 2, fig. 1 (see this author for a more complete synonymy prior 1982).
1999 *Geminisulcispirifer bisinus*; Godefroid & Sartenaer in Boulvain et al.: 21-23, figs BIO6-8.
2000 *Cyrtospirifer* (*Geminisulcispirifer*) *bisinus*; Bultynck et al.: fig. 12.
2006 *Geminisulcispirifer bisinus* (Le Hon, 1870); Johnson: 1727, fig. 1132, 2a-e (copy of Sartenaer, 1982, pl. 1, fig. 1a-e).

Type material. The specimen RBINS a2301 (Vandercammen, 1968, pl. 2, fig. 7) was selected as the lectotype by Sartenaer (1982, p. 150, pl. 1, fig 1a-e) and is fully re-illustrated herein (Fig. 13I-P). The paralectotypes RBINS a2302, a2303, and 2304 (Le Hon, 1870, pl. 11, fig. 9; Vandercammen, 1959a, pl. 4, fig. 7-10) were illustrated by Sartenaer (1982, pl. 1, fig. 2a-e, 3a-e, 5a-e) (see Sartenaer (1982) for more information related to the types).

Type locality and horizon. Givet (Fortress of Charlemont; France), Formation de Nismes, La Prée Member (early Frasnian).

Description. See Le Hon (1870), Vandercammen (1959a, 1968), and Sartenaer (1982).

Remarks. Le Hon's (1870) species is the type species of *Geminisulcispirifer* Sartenaer, 1982, which was described originally as a subgenus of *Cyrtospirifer* Nalivkin in Frederiks 1924 by Sartenaer (1982), although he did not follow the Article 6 of the Code.

Current name. *Geminisulcispirifer bisinus* (Le Hon, 1870).

Spirifer ferrierensis Maillieux, 1938
(Fig. 13Q-U)

1938 *Spirifer* (*Spirifer*?) *ferrierensis* Maillieux: 23, 41, pl. 2, fig. 5, 5a.
1941d *Spirifer ferrierensis* Maillieux; Maillieux: 4.
1970 *Spirifer ferrierensis* Maillieux, E., 1938; Vandercammen & Vandercammen-Goffinet: 25.

Type material. The holotype (RBINS a1123; Fig. 13Q-U), which corresponds to an incomplete ventral external mould, was selected and figured by Maillieux (1938, pl. 2, fig. 5, 5a).

Type locality and horizon. Ferrières 8351, Lomme Formation (Eifelian).

Description. See Maillieux (1938).

Remarks. This species is only known by the holotype of which the poor state of preservation precludes a description. Further material is thus required to reach a better generic assignment and valuable comparison with contemporaneous species.

Current name. 'Spirifer' ferrierensis Maillieux, 1938.

Spirifer gosseleti Béclard, 1887
(Fig. 14A-X)

1887 *Spirifer Gosseleti* Béclard: 64, 81, pl. 4, figs 1-6.
non 1895a *Spirifer Gosseleti* Dewalque: 36 (= *Uchtospirifer*? *fraiponti* (Dewalque, 1895b)).
1896a *Spirifer Gosseleti* Béclard, 1887: Béclard: 159, 165.
p 1896a *Spirifer hystericus-Gosseleti* [with or without a hyphen] Béclard; Béclard: 167, pl. 12, figs 1, 1a-b, 2 (copy of Béclard, 1887: pl. 4, figs 1-4), 4, 5-7, 9, non 3, 3a, 8, 10 (see Solle, 1963).
1896b *Spirifer Gosseleti* Béclard, 1887; Béclard: 271.
1908b *Spirifer hystericus* var. *Gosseleti* Béclard; Maillieux: 222, 223, 229.
? 1909c *Spirifer hystericus* var. *Gosseleti*; Maillieux: 196.
p 1910b *Spirifer excavatus* Kayser; Maillieux: 194.

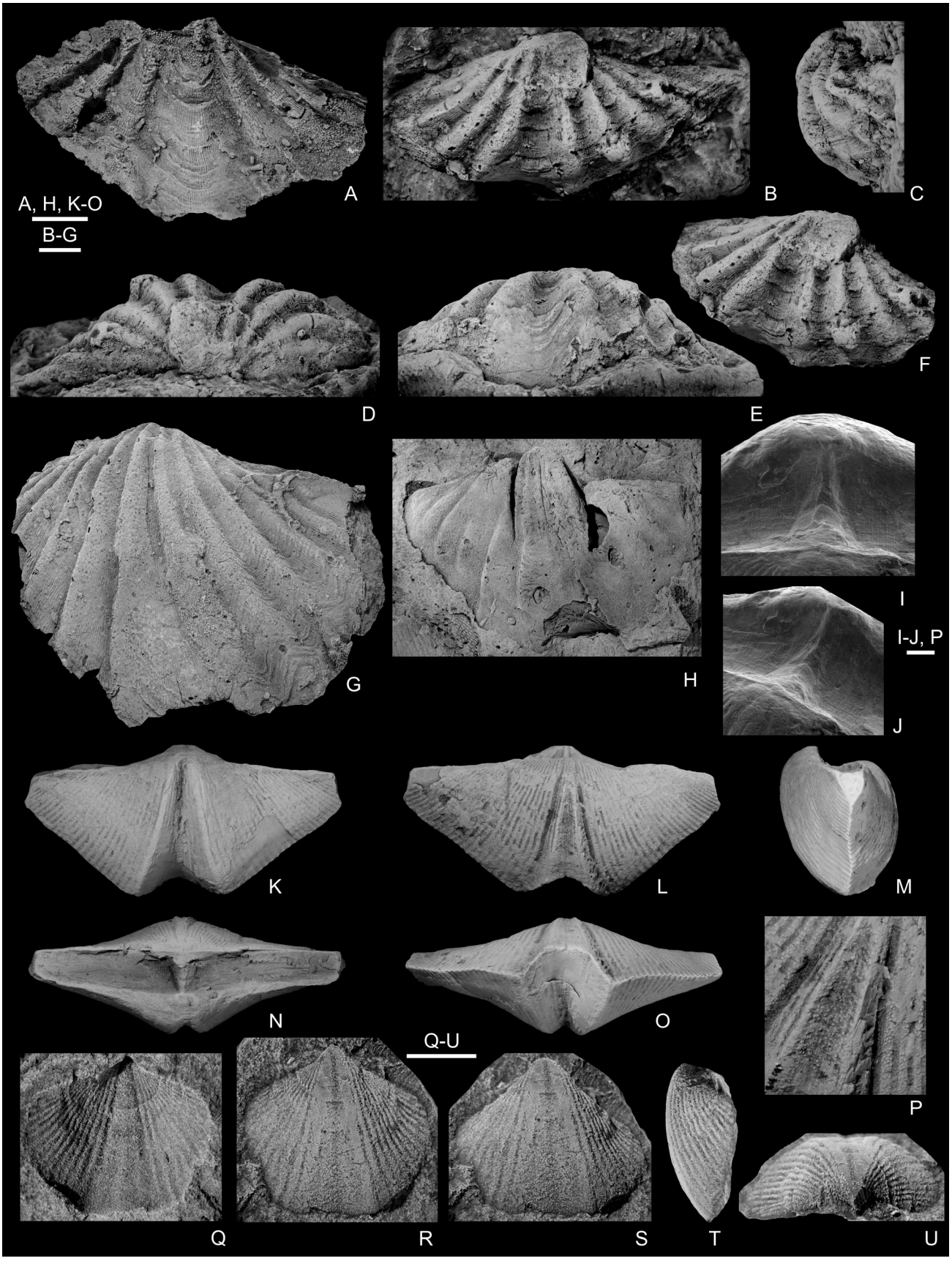

Figure 13. A-H. *Spirifer beaujeani* Béclard, 1887 [*Filispirifer*? *beaujeani* (Béclard, 1887)]. A-F. RBINS a1255 (paralectotype), incomplete external mould of a ventral valve, and putty cast in plan, lateral, posterior, anterior, and oblique lateraloventral (partim) views; Saint-Hubert 3 (23), Villé Formation. G-H. RBINS a1930, latex cast of ventral exterior (tabulates on the right flank, close to the posterior margin), and flattened, incomplete ventral internal mould; Neufchâteau 8449, Villé Formation. I-P. *Spirifer bisinus* Le Hon, 1870 [*Geminisulcispirifer bisinus* (Le Hon, 1870)], RBINS a2301 (lectotype), close-up of the pseudodeltidium in posterior and oblique lateral views (ventral valve on top) (I-J), almost complete articulated specimen in ventral, dorsal, lateral, posterior and anterior views (K-O), and detail of the spinose microornamentation on fold and flanks (P); Givet (Fort de Charlemont), Nismes Formation (La Prée Member). Q-U. *Spirifer ferrierensis* Maillieux, 1938 [*'Spirifer' ferrierensis* Maillieux, 1938], RBINS a1123 (holotype), external mould of a ventral valve and plastilina cast in plan, anteroventral, lateral and posteroventral views; Ferrières 8351, Lomme Formation. Scale bars: 5 mm (A, B-G, K-O, Q-U), 10 mm (H) and 1 mm (I-J, P).

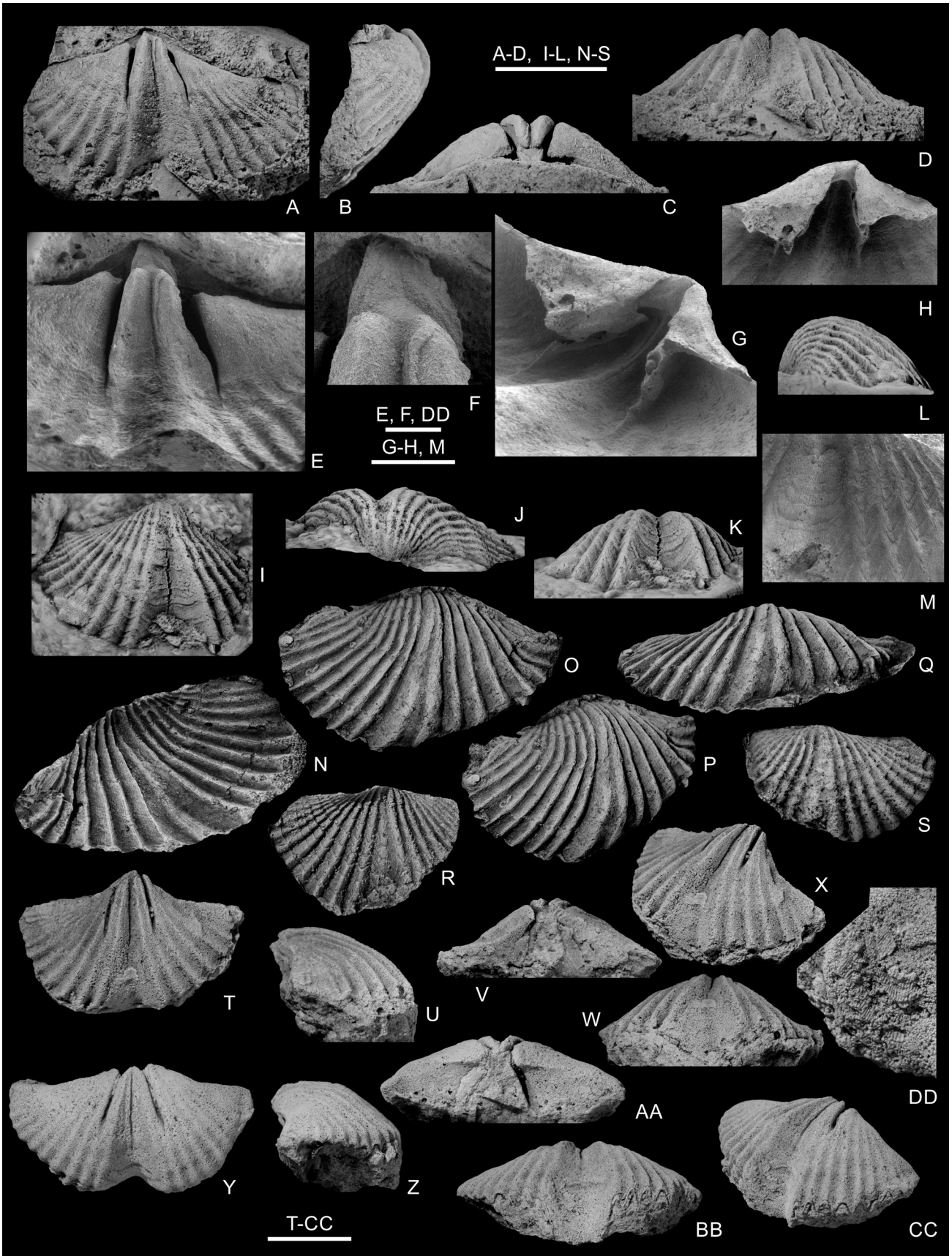

Figure 14. A-X. *Spirifer gosseleti* Béclard, 1887 [*Mauispirifer gosseleti* (Béclard, 1887)]; Saint-Hubert 3 (23), Villé Formation (A-S); Couvin 8724, Mirwart Formation (T-X). A-M. RBINS a1264 (lectotype), internal mould of a ventral valve in plan, lateral, posterior and anterior views (A-D), detail of the muscle field and of the septal pillow (E-F; SEM), latex cast of interior in lateral oblique and plan views (G-H; SEM), putty cast of exterior of ventral valve in plan, posterior, anterior and lateral views (I-L), and close-up of the external mould showing the poorly preserved microornamentation (M; SEM). N-Q. RBINS a1266 (paralectotype), oblique lateral view of external mould of a dorsal valve (M), latex cast of external mould in plan, lateral oblique, and anterodorsal views (O-Q). R-S. RBINS a1265 (paralectotype), external mould and putty cast of a dorsal valve in plan views. T-X. RBINS a1298, ventral internal mould in ventral, lateral, posterior, anterior, and oblique anterolateral views; Couvin 8724, Mirwart Formation. Y-DD. *Hysterolites hystericus pachypleura* Solle, 1963, RBINS a1297, ventral internal mould in ventral, lateral, posterior, anterior, and oblique anterolateral views and detail of remnants of microornament in sulcus; Couvin 8724, Mirwart Formation. Scale bars: 10 mm (A-D, I-L, N-S, T-CC), 2.5 mm (E, DD), 1 mm (F), 5 mm (G-H, M).

p 1910c *Spirifer hystericus* Schlotheim; Maillieux: 330-332, 371, 376, non figs 1, 1a, 2-3 (copy of Béclard, 1896a, pl. 12, figs 3, 8, 10).

p 1910c *Spirifer excavatus* Kayser; Maillieux: 330-332, 376, figs 4-7 (copy of Béclard, 1896a, pl. 12, figs 4-7).

non 1915 *Spirifer gosseletti* [sic] Vaughan: 42 (= *Sphenospira julii* (Dehée, 1929)).

1922b *Spirifer excavatus*; Maillieux: 41, fig. 18 (copy of Béclard, 1887, pl. 4, figs 1-4).

1933 *Spirifer* (*Hysterolites*) *excavatus*; Maillieux: 48, fig. 56a (copy of Béclard, 1887, pl. 4, figs 1-4).

1963 *Spirifer gosseleti* Béclard, 1887; Solle: 184-185.

p 1963 *Mauispirifer gosseleti* (F. Béclard); Vandercammen: 24-29, text-fig. 14, pl. 4, figs 14-19, 27.

1967 *Manispirifer* [sic] *gosseleti*; Lecompte: 42, pl. 15.

1970 *Mauispirifer gosseleti* (Béclard, F., 1887); Vandercammen & Vandercammen-Goffinet: 28-29, 75.

1982 *Mauispirifer gosseleti*; Godefroid & Stainier, 142, 155, 156, tables 1, 2a.

1994 *Mauispirifer gosseleti* (Béclard, 1887); Godefroid in Godefroid et al.: 17, fig. 11.

2016 *Mauispirifer gosseleti* (Béclard, 1887); Jansen: 74, 76, 77.

Type material. The internal and external moulds of a ventral valve (RBINS a1264; Fig. 14A-M) illustrated by Béclard (1887, pl. 4, figs 1-3; 1896a, pl. 12, figs 1a-c), Maillieux (1922b, fig. 18 (ventral valve only); 1933, fig. 56a (same remark)), and Vandercammen (1963, pl. 4, figs 16-18) were selected as the type (= lectotype) by Solle (1963). The paralectotypes correspond to two external moulds of dorsal valves, namely the specimens RBINS a1265 (Fig. 14R-S) figured by Béclard (1887, pl. 4, fig. 4; 1896a, pl. 12, fig. 2), Maillieux (1922b, fig. 18 (dorsal valve only); 1933, fig. 56a (same remark)), and Vandercammen (1963, pl. 4, fig. 19), and RBINS a1266 (Fig. 14N-Q) illustrated by Béclard (1887, pl. 4, fig. 5) and Vandercammen (1963, pl. 4, figs 14-15). The internal mould of a ventral valve (RBINS a1267) figured by Béclard (1887, pl. 4, fig. 6) has not been traced. The specimen RBINS a1266 was selected as the hololectotype [sic] by Vandercammen (1963) but his publication was released in December 1963, contrary to Solle's paper that was published in April of the same year (see Jahnke, 1971).

Type locality and horizon. Saint-Hubert 3 (23), Villé Formation (Siegenian; Pragian).

Description. See Béclard (1887) and Vandercammen (1963).

Remarks. Béclard's (1887) species was assigned to the genus *Mauispirifer* Allan, 1947 by Vandercammen (1963) and discussed by several authors (Solle, 1963; Jahnke, 1971; Gourvennec, 1989) whose conception of the species differs (see their respective synonymy list). From this viewpoint, two ventral internal moulds (RBINS a1297 (Fig. 14Y-DD), a1298 (Fig. 14T-X)) from the Mirwart Formation (Siegenian; mostly Pragian in age), which were originally identified and illustrated as *Hysterolites hystericus gosseleti* by Béclard (1896a), were figured on many occasions (see below) in the Belgian literature; they are fully illustrated here. According to Solle (1963), the specimen RBINS a1297 (Béclard, 1896a, pl. 12, fig. 3-3a; Maillieux, 1910c, fig. 1; Vandercammen, 1963, pl. 4, fig. 26) belongs to *Hysterolites hystericus pachypleura* Solle, 1963, contrary to the specimen RBINS a1298 (Béclard, 1896a, pl. 12, fig. 4; Maillieux, 1910c, fig. 7; Vandercammen, 1963, pl. 4, fig. 27).

During one meeting of the *Société géologique de Belgique* (17 December 1894), Dewalque (1895a) proposed to name *Spirifer gosseleti* the species previously identified as *S. orbelianus* Abich, 1858 – a Famennian species from Armenia – by Gosselet (1874a, 1874b, 1880, 1888, 1894). Two months later, also during a meeting of the same scientific society (17 February 1895), Dewalque (1895b) introduced a replacement name for *S. gosseleti*, namely *S. fraiponti*, as *S. gosseleti* Dewalque, 1895a was preoccupied by *S. gosseleti* Béclard, 1887. The specimen illustrated by Gosselet (1880, pl. 4, fig. 4) is probably lost according to Brice (1988). Surprisingly, only a small part of the palaeontological community used Dewalque's (1895b) name for this emblematic species of the Givetian–Frasnian boundary in the northern France and southern Belgium. Surprisingly, Sartenaer (1974c, 1982), who examined this issue in minute detail, overlooked Dewalque's publications as did Vandercammen (1959b). Dewalque's (1895b) species should be referred probably to *Uchtospirifer* Liashenko, 1957 or to a related genus.

Dehée (1929) introduced *Spirifer julii* in order to solve the problem of secondary homonymy created by the introduction of the specific name *Spirifer gosseletti* [sic] by Vaughan (1915). Dehée's species is from the uppermost Famennian and referred now to *Sphenospira* Cooper, 1954 (see Mottequin & Brice (2016) for the selection of the lectotype of *S. julii*).

Current name. Mauispirifer gosseleti (Béclard, 1887).

Spirifer mercurii Gosselet, 1880
(Fig. 15A-D)

1876 *Spirifer hystericus* Schlotheim; de Koninck: 40, pl. 1, fig. 8.

1880 *Spirifer Mercuri* Gosselet: 67.

1880 *Spirifer Mercurii* Gosselet: pl. 1, fig. 8.

1888 *Spirifer Mercurii*, Goss.; Gosselet: 190.

1896b *Spirifer Mercurii*, Gosselet, 1880; Béclard: 274.

1910c *Spirifer Mercurii* Gosselet; Maillieux: 329, 371, 376.

1911 *Spirifer Mercurii* Gosselet; Maillieux: 176.

1912a *Spirifer sulcatus*, Hisinger, 1831; Leriche: 27-29, 50, pl. 1, figs 31-34.

1912b *Spirifer sulcatus*, Hisinger (= *S. Mercurii*, Gosselet) [sic]; Leriche: 329.

1922a *Spirifer sulcatus*; Maillieux: 10-11.

1929 *Spirifer Mercurii*; Maillieux & Demanet: table 2.

1930 *Spirifer mercuri* Gosselet; Asselberghs: 36-38.

1933 *Spirifer* (*Hysterolites*) *Mercurii*; Maillieux: 43.

1941d *Hysterolites* (*Hysterolites*) *mercurii* (Gosselet); Maillieux: 3.

1943b *Hysterolites mercurii* Gosselet; Asselberghs: 3, 12.

1946 *Hysterolites mercuri* Gosselet; Asselberghs: 328.

1957a *Howellella mercuri* (Gosselet, 1880); Boucot: 315-317.

1960 *Howellella mercuri* (Gosselet, 1880); Boucot: 313-314, tables 2-3, pl. 16, figs 8-12.

1963 *Howellella mercuri* (J. Gosselet, 1880); Vandercammen: 116-119, text-figs 75-77, pl. 11, figs 9-16.

1967 *Howellella mercuri*; Lecompte: 29, 42, pls 5, 15.

1970 *Howellella mercuri* (Gosselet, J., 1880); Vandercammen & Vandercammen-Goffinet: 39-40, 75.

1982 *Howellella mercuri* (Gosselet, 1880); Godefroid: 102, 126,127, table 3.

1985 *Howellella mercurii* (Gosselet, 1880); Gourvennec: 149-154, pl. 1, figs 1-6, 9-10, 13-14, 16-19 fide Gourvennec, 1989) (see this author for a more complete synonymy before 1985).

1985 *Howellella* (*Howellella*) *mercurii mercurii* (Gosselet, 1880); Carls: 315, pl. 2, figs 36-37.

1989 *Howellella* (*Howellella*) *mercurii* (Gosselet, 1880); Gourvennec: 73-75, text-fig. 39, pl. 4, figs 7-18.

1994 *Howellella mercuri* (Gosselet, 1880); Godefroid: 17, fig. 11.

1999 *Howellella mercuri* (Gosselet, 1880); Godefroid & Cravatte: 9-13, 15-16, figs 3-5, pl. 3, figs 8-10.

2016 *Howellella mercurii* (Gosselet, 1880); Jansen: 67, 68, 69, 70, figs 3, 4b.

Type material. Carls (1985) selected the internal mould of a ventral valve (RBINS a556; Fig. 15A-D) as the neotype; it was previously illustrated by Leriche (1912a, pl. 1, fig. 32), Boucot (1960, 16, fig. 10), and Vandercammen (1963, pl. 11, figs 13-14).

Type locality and horizon. Mondrepuis (France), Mondrepuis Formation (early Gedinnian; Lochkovian).

Description. See Boucot (1960), Vandercammen (1963), Gourvennec (1985, 1989), and Carls (1985).

Remarks. As explained by Gourvennec (1985), the correct spelling of Gosselet's species, which was assigned to *Howellella* Kozłowski, 1946 by Boucot (1957a), is *mercurii* (from genitive of *Mercurius*) instead of *mercuri.*

Current name. Howellella (*Howellella*) *mercurii* (Gosselet, 1880).

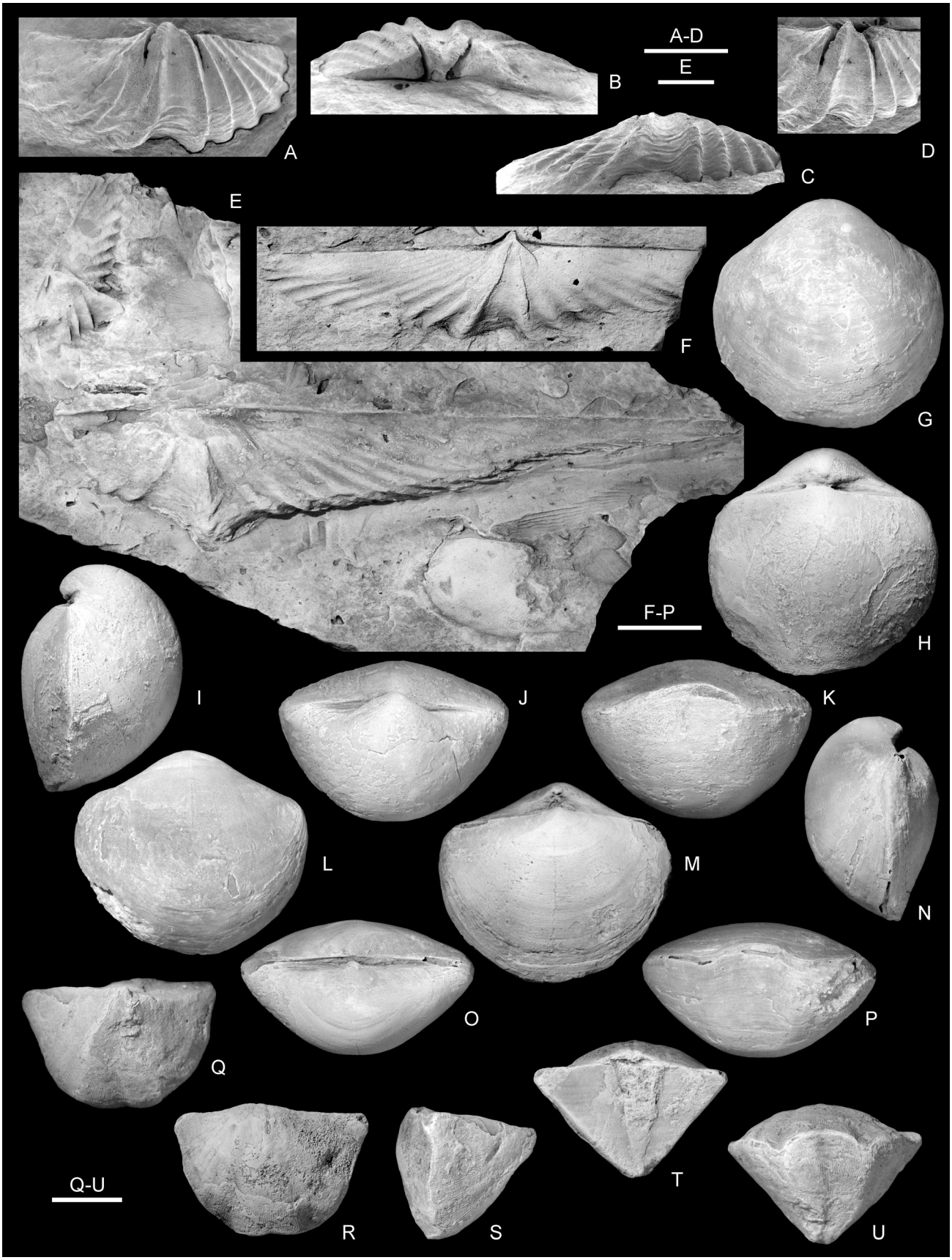

Figure 15. A-D. *Spirifer mercurii* Gosselet, 1880 [*Howellella* (*Howellella*) *mercurii* (Gosselet, 1880)], RBINS a556 (neotype), incomplete mould of a ventral valve in plan, posterior and anterior views, and detail of the median region (all SEM); Mondrepuis, Mondrepuis Formation. E-F. *Spirifer paradoxus* var. *obliqua* Asselberghs, 1913b [*Euryspirifer dunensis* (Kayser, 1889)]; Recogne (Les Blancs-Cailloux-Royvaux), Villé Formation. E. RBINS a3129 (lectotype), flattened, incomplete internal mould of a dorsal valve in plan view associated to a dorsal internal mould of a spiriferide and to the ventral internal mould of a chonetidine. F. RBINS a3131, flattened, incomplete internal mould of a ventral valve in plan view. G-P. *Spirifer pentameroides* Stainier, 1887 [*Kelusia pentameroides* (Stainier, 1887)]; Sombreffe 6189, Bois de Bordeaux Formation (Alvaux Member). G-K. RBINS a1848, articulated specimen in ventral, dorsal, lateral, posterior and anterior views. L-P. RBINS a1849 articulated specimen in ventral, dorsal, lateral, posterior and anterior views. Q-U. *Cyrtina rigauxi* Maillieux, 1909d [*Acutatheca rigauxi* (Maillieux, 1909d)], RBINS a9575 (lectotype), articulated specimen in ventral, dorsal, lateral, posterior and anterior views; Couvin M44 (6158B), Neuville Formation. Scale bars: 5 mm (A-D, Q-U), 10 mm (E, F-P).

Spirifer paradoxus* var. *obliqua Asselberghs, 1913a
(Fig. 15E-F)

1907 [no genus mentioned] *Epiparadoxus* Greindl: 107, unnumbered fig.

1913 *Spirifer paradoxus* var. *obliqua* Asselberghs [nomen nudum]; Asselberghs in Duvigneaud: 185 (copy of Asselberghs' (1913a) list of species).

1913a *Spirifer paradoxus* var. *obliqua* Asselberghs: 198-199, 209, figs 1 (copy of Greindl, 1907, unnumbered fig.), 2-3.

1913b *Spirifer paradoxus* var. *obliqua* Asselberghs; Asselberghs: 103, 128, pl. 3, fig. 8.

1931 *Spirifer paraxodus* var. *obliqua* Asselberghs, 1913; Maillieux: 49, 52.

1931 *Spirifer epiparaxodus* Greindl, 1907; Maillieux: 49, 52.

1946 *Spirifer pellico* Archiac et Verneuil; Asselberghs: fig. 12 (copy of Asselberghs, 1913a, fig. 2).

p 1994 *Euryspirifer dunensis* (Kayser, 1889); Godefroid: 63, 70, pl. 6, fig. 11 (copy of Greindl, 1907, unnumbered fig.).

2001a *Euryspirifer* sp. 3; Jansen: 194, 216, 220, 221.

Type material. The incomplete dorsal internal mould (RBINS a3129; Fig. 15E), illustrated by Greindl (1907, unnumbered fig.), Asselberghs (1913a, fig. 1; 1913b, fig. 8) and Godefroid (1994, pl. 6, fig. 11), was considered as the 'échantillon type' by Asselberghs (1913b, legend of the pl. 3, fig. 8); it is designated hereby as the lectotype. The ventral internal mould (RBINS a3131; Fig. 15F) figured by Asselberghs (1913a, fig. 3) is a paralectotype whereas the second internal mould of a dorsal valve illustrated by Asselberghs (1913a, fig. 2; 1946, fig. 12) was not traced.

Type locality and horizon. Recogne (Les Blancs-Cailloux-Royvaux), Villé Formation (Siegenian; Pragian).

Description. See Asselberghs (1913a, b) and Godefroid (1994).

Remarks. Greindl (1907) figured a large, incomplete internal mould of a dorsal valve (RBINS a3129; Fig. 15E) from the Neufchâteau area under the name *Epiparadoxus* [sic], but without description of the specimen. Moreover, the Principle of Binomial Nomenclature (Article 5 of the Code) is not respected (see also below). Asselberghs (1913b), Maillieux (1931), and Godefroid (1994) added the genus *Spirifer* (between brackets or not) to the epithet *epiparadoxus* (see their respective discussion and list of synonymy). However, the name *Spirifer epiparadoxus* Greindl, 1907 as cited by these authors is not available because it does not meet the criteria of availability, especially the Articles 11.4.3 and 11.9.3 of the Code. The specimen figured by Greindl (1907) was included by Asselberghs (1913a) in his *Spirifer paradoxus* var. *obliqua* whose name first appeared in Duvigneaud (1913), but without description. According to the Article 45.6.4 of the Code, the epithet *obliqua* has to be considered as of subspecific rank in Asselberghs' (1913a) publication. Maillieux (1931) subsequently identified Asselberghs' restricted material as *Spirifer* (*Acrospirifer*) *pellico* (= *Euryspirifer pellicoi* (de Verneuil & d'Archiac, 1845)) and considered that they were deformed tectonically, an opinion followed by Godefroid (1994), who transferred them to *E. dunensis* (Kayser, 1889). In contrast with Maillieux (1931) and Godefroid (1994), Jansen (2001a) included the specimens RBINS a3129 (see above) and a7927 (Godefroid, 1994: pl. 6, fig. 12) in *E.* sp. 3, but Godefroid (1994)'s opinion is provisionally followed here pending the reinvestigation of the material from the type locality. The other brachiopods observed on the lower and upper surfaces of the slab containing the lectotype clearly show signs of deformation and compaction (see Fig. 15E).

Current name. Euryspirifer dunensis (Kayser, 1889).

Spirifer pentameroides Stainier, 1887
(Fig. 15G-P)

1879 *Pentamerus brevirostris* Phil.; Malaise: 35.

1886 *Pentamerus globus*, Bronn; de Lapparent: pl. 5, figs 21-22.

1887 *Spirifer pentameroïdes* Stainier: 75-80, text-figs A-D, pl. 4, fig. 2a-g.

1888 *Spirifer pentameroïdes*; Dormal: 96.

1892 *Spirifer pentameroïdes*; Malaise & Stainier: 297, 298.

1892 *Spirifer pentameroides*; Malaise: 371.

1900 *Spirifer pentameroides* Stainier; Scupin: 249.

1900 *Spirifer pentameroides* Stainier; de Dorlodot: 139.

1910d *Spirifer pentameroïdes*; Maillieux: 221.

1922 *Spirifer pentameroides*; Asselberghs in Kaisin et al.: 84.

1927 *Spirifer pentameroides*; Asselberghs in Asselberghs & Maillieux: 186.

1929 *Spirifer pseudopachyrhynchus*; Maillieux: 65.

1929 *Spirifer pseudopachyrhynchus*; Maillieux & Demanet, table 2.

1933 *Reticularia pseudopachyrhyncha* (= *Spirifer pentameroides* Stainier) [sic]; Maillieux: 71, 76.

1936 *Reticularia pseudopachyrhyncha*; Asselberghs: 282, 305.

1940c *Martinia pseudopachyrhyncha* (Tschernyschew); Maillieux: 11, 12.

p 1941d *Martinia pseudopachyrhyncha* (Tschernyschew); Maillieux: 6 (only those from the Givetian).

p 1956 *Emanuella volhynica* A. V. Kelus, 1939; Vandercammen: 35-42, 44, text-figs 29-36, pl. 2, figs 16-32.

1959b *Emanuella pentameroides* (X. Stainier, 1887); Vandercammen: 4, 8, 10.

1970 *Emanuella volhynica* Kelus, A. von, 1939; Vandercammen & Vandercammen-Goffinet: 72-73, 74.

2016 *Diazoma pentameroides* (Stainier, 1887); Mottequin & Godefroid: 154, fig. 117G-I.

Type material. Contrary to the type material of the trilobite species *Dechenella striata* described by Stainier (1887) in the same publication, Stainier's figured specimens of *Spirifer pentameroides* have not been traced in the RBINS collections until now despite the fact that a label with Stainier's handwriting has been recovered accompanying fragments of two sectioned specimens and a poorly preserved ventral internal mould (RBINS general inventory no. 11312). Based on the available data, it is impossible to confirm (or otherwise) if these specimens can be considered as syntypes or not. Pending further research within the RBINS collections that may be conclusive, no neotype is selected, but two specimens from the type locality and closely resembling two of those illustrated by Stainier (1887) are figured here (Fig. 15G-P).

Type locality and horizon. Sombreffe 6189, Bois de Bordeaux Formation, Alvaux Member (Givetian).

Description. See Stainier (1887) and Vandercammen (1956, partim).

Remarks. As shown by the synonymy list, Stainier's (1887) species was firstly identified as a pentameride (Malaise, 1879; de Lapparent, 1886). It was then considered as a synonym of the Uralian species *Spirifer pseudopachyrinchus* Chernischev, 1887 notably by Scupin (1900) and Maillieux (1929, 1941d) or of the Ukrainian species *Emanuella volhynica* Kelus, 1939 by Vandercammen (1956), who overlooked the name proposed by Stainier (1887). Eventually Vandercammen (1959b) regarded the species *pentameroides* as a possible synonym of the Uralian species *'Spirifer' pachyrinchus* de Verneuil in Murchison et al., 1845 that he assigned to *Emanuella* Grabau, 1923 in 1923–1924.

From the generic viewpoint, it is clear that *Spirifer pentameroides* belongs to the same genus than that of *Emanuella volhynica* Kelus, 1939, but this complex group of very similar and potentially synonymous species urgently needs to be re-investigated. Furthermore, *E. volhynica* was selected as the type species of two genera: *Diazoma* Dürkoop, 1970 and *Kelusia* Mamedov, 1978. Mamedov's genus was rightly considered as a synonym of *Diazoma* Dürkoop, 1970 by Carter et al. (1994) and Johnson & Hou (2006a). Nevertheless, *Diazoma* Dürkoop, 1970 (Ambocoeliidae according to Zhang & Ma (2019)) is preoccupied by *Diazoma* Lamarck, 1816 (Tunicata) and *Diazoma* Wallengren, 1882 (Diptera) (the new name *Diazosma* Bergroth, 1913 was proposed for Wallengren's genus). Conformably to the Article 60 of the Code, which concerns the replacement of junior homonyms, *Diazoma* Dürkoop, 1970 must be rejected and replaced by a valid synonym in this case, namely *Kelusia* Mamedov, 1978.

Current name. Kelusia pentameroides (Stainier, 1887).

Cyrtina rigauxi Maillieux, 1909d
(Fig. 15Q-U)

1909d *Cyrtina Rigauxi* Maillieux: 10-11, figs a-c.

p 1912 *Cyrtyna* [sic] *Rigauxi*; Maillieux: 41 (to be added to Mottequin, 2005b).

non 1970 *Echinocoelia rigauxi* (Maillieux, E., 1910); Vandercammen & Vandercammen-Goffinet: 53-54 (= *Dionacoelia secessus* Mottequin, 2005b) (to be added to Mottequin, 2005b).

2005b *Acutatheca rigauxi* (Maillieux, 1909); Mottequin: 56-58, figs 3, 4, 9, table 1 (see this author for a more complete synonymy).

2008c *Acutatheca rigauxi* (Maillieux, 1909); Mottequin: 502-503, fig. 61.

Type material. The articulated specimen RBINS a9575 (Fig. 15Q-U) illustrated by line drawings in Maillieux (1909d, figs a-c) was selected as the lectotype by Mottequin (2005b, fig. 3.1-6).

Type locality and horizon. Couvin M44 (6158B), Neuville Formation (late Frasnian).

Description. See Maillieux (1909d) and Mottequin (2005b).

Remarks. Cyrtina rigauxi was transferred to the genus *Acutatheca* Stainbrook, 1945 by Mottequin (2005b), who demonstrated that this species was confused with *Dionacoelia secessus* Mottequin, 2005b soon after its original description. This catalogue is an opportunity to re-illustrate the holotype of *D. secessus* (RBINS a12111; Fig. 16A-F), which was incorrectly figured in Mottequin (2005b, fig. 5.1-5) due to an incomprehensible error that took place during the printing process of the volume no. 75 of the *Bulletin des Sciences naturelles de Belgique (Sciences de la Terre)*.

Current name. *Acutatheca rigauxi* (Maillieux, 1909d).

Cyrtina undosa* var. *brachyptera Maillieux, 1914
(Fig. 16G-Q)

p 1912 *Spirifer undosa*; Maillieux: 53.

1914 *Cyrtina undosa* Schnur sp. var. *brachyptera* Maillieux: 4-6, figs 3a-b, 4a-b.

1927 *Cyrtina undosa* var. *brachyptera* Maillieux; Maillieux in Asselberghs & Maillieux: 148.

1927 *Cyrtina undosa* var. *brachyptera* Maillieux; Van Tuijn: 162, 203, 258.

1938 *Cyrtinopsis undosa brachyptera* (Maillieux); Maillieux: 23.

1941d *Cyrtinopsis brachyptera* (Maillieux); Maillieux: 6.

1957b *Cyrtinopsis brachyptera* (Maillieux); Boucot: 40, 42.

p 1963 *Cyrtinopsis undosa (*J. Schnur, 1851); Vandercammen: 101-104, 149, 152-153, pl. 10, figs 3-5, 6-8 (see remarks below).

1965 *Cyrtinopsis brachyptera brachyptera* (Maillieux, 1914); Struve: 14-16.

1970 *Cyrtinopsis undosa* var. *brachyptera* (Maillieux, E., 1914); Vandercammen & Vandercammen-Goffinet: 69, 74.

p 1970 *Cyrtinopsis undosa;* Bultynck: 42, 43, pls 36-37.

1971 *Cyrtinopsis brachyptera* (Maillieux, 1914); Krans: 99.

p 1971 *Cyrtinopsis undosa* (Schnur, 1851); Krans: figs 2, 5.

Type material. Maillieux (1914) failed to designate a holotype for his new variety. The articulated specimen RBINS a10295 (Fig. 16G-L), illustrated by Maillieux (1914, fig. 4a-b), Vandercammen (1963, pl. 10, figs 3-5), and Krans (1971, figs 2, 5), was designated by Vandercammen (1963, in the legend of pl. 10, figs 3-5) as the holotype of Maillieux's variety (see below) whereas the incomplete specimen RBINS a10294 (Fig. 16M-Q) figured by Maillieux (1914, fig. 3a-b) was referenced as the paratype by Vandercammen (1963, in the legend of pl. 10, figs 6-8). According to the Article 74.5 of the Code, the misuse of the term 'holotype' by Vandercammen (1963) acts however as lectotype designation as this author explicitly indicated, when wrongly using the term 'holotype', that he was selecting from the type series the specimen RBINS a10295 to serve as the name-bearing type (see also Struve, 1965); the specimen RBINS a10294 is thus a paralectotype.

Type locality and horizon. Couvin 3, Jemelle Formation (Eifelian).

Description. See Maillieux (1914), Vandercammen (1963, partim), and Struve (1965).

Remarks. Conformably to the Article 45.6.4 of the Code, the variety *brachyptera* erected by Maillieux (1914) has a subspecific rank, but was subsequently promoted to a specific level by Maillieux (1941d). Struve (1965) split it into several subspecies. According to Struve (1965), the species is known from Belgium, Germany and North Africa.

Two poorly preserved specimens (RBINS a10292-10293) previously identified as *Cyrtinopsis undosa* (Schnur, 1851) by Maillieux (1914) and Vandercammen (1963) are refigured here, pending a thorough revision of the Belgian representatives of the genus *Cyrtinopsis* Scupin, 1896. Struve (1965) doubtfully included the specimen RBINS a10293 (Maillieux, 1914, fig. 2a-b; Vandercammen, 1963, pl. 10, figs 9-10; Krans, 1971, fig. 3; Fig. 16R-V) in the synonymy of his new subspecies *Cyrtinopsis brachyptera maillieuxi* whereas the specimen RBINS a10292 (Maillieux, 1914, fig. 1; Vandercammen, 1963, text-fig. 63, pl. 10, figs 1-2; Krans, 1971, figs 1, 4; Fig. 16W-Y) was tentatively included in the synonymy of *Cyrtinopsis crenata* (Steininger, 1853) by Struve (1965). Struve's opinion was not followed by Krans (1971), who placed all the specimens illustrated by Maillieux (1914) and Vandercammen (1963) in *C. undosa* whereas he recognized the species *brachyptera* in the introduction of his paper (see the synonymy list above)!

Current name. *Cyrtinopsis brachyptera brachyptera* (Maillieux, 1914).

Spirifer verneuili* var. *ambosulcata Maillieux, 1930
(Fig. 17A-E)

1930 *Spirifer Verneuili* var. *ambosulcata* Maillieux: 106-108, pl. 3, fig. 2a-b.

1939 *Spirifer* (*Cyrtospirifer*) *Verneuili ambosulcatus* Maillieux; Maillieux: 4-5.

1941d *Cyrtospirifer ambosulcatus* (Maillieux); Maillieux: 4.

? 1942 *Spirifer* (*Cyrtospirifer*) *verneuili* Murchison var. *ambosulcata* Maillieux; Paeckelmann: 121-123, text-fig. 58, pl. 4, fig. 6.

1959b *Spirifer verneuili* var. *ambosulcata* Maillieux, E., 1929 [sic]; Vandercammen: 127.

1970 *Spirifer verneuili* var. *ambosulcata* Maillieux, E., 1930; Vandercammen & Vandercammen-Goffinet: 72, 78.

Type material. Maillieux (1930, pl. 3, fig. 2a-b) selected the specimen RBINS a10299 (Fig. 17A-E) as the type of his variety. Conformably to the Article 73.1.1 of the Code, it is the holotype of Maillieux's variety.

Type locality and horizon. Durbuy 8319a, Barvaux Formation (late Frasnian).

Description. See Maillieux (1939).

Remarks. Maillieux's variety has nothing in common with *Cyrtospirifer verneuili* (Murchison, 1840) in terms of outline, profile of the ventral interarea, etc. (see Brice, 1988). It was promoted to the specific level by Maillieux (1941d), an opinion not followed by Paeckelmann (1942), who still considered it as a variety of *C. verneuili,* whereas Vandercammen (1959b) regarded it as a synonym of *C. grabaui* (Paeckelmann, 1942). Nevertheless, it is more probable that the reverse is true as Maillieux's species has the priority, but the revision of the cyrtospiriferids from the Barvaux Formation, which were first studied by Gosselet (1894), is needed to take a decision.

Current name. Cyrtospirifer ambosulcatus (Maillieux, 1930).

Spirifer* (*Hysterolites*) *virvanus Maillieux, 1938
(Fig. 17F-I)

1938 *Spirifer* (*Hysterolites*) *virvanus* Maillieux: 12, 40, pl. 1, fig. 8, 8a-b.

1941d *Hysterolites* (*Hysterolites*) *virvanus* Maillieux; Maillieux: 3.

1970 *Hysterolites virvanus* (Maillieux, E., 1938); Vandercammen & Vandercammen-Goffinet: 72, 75.

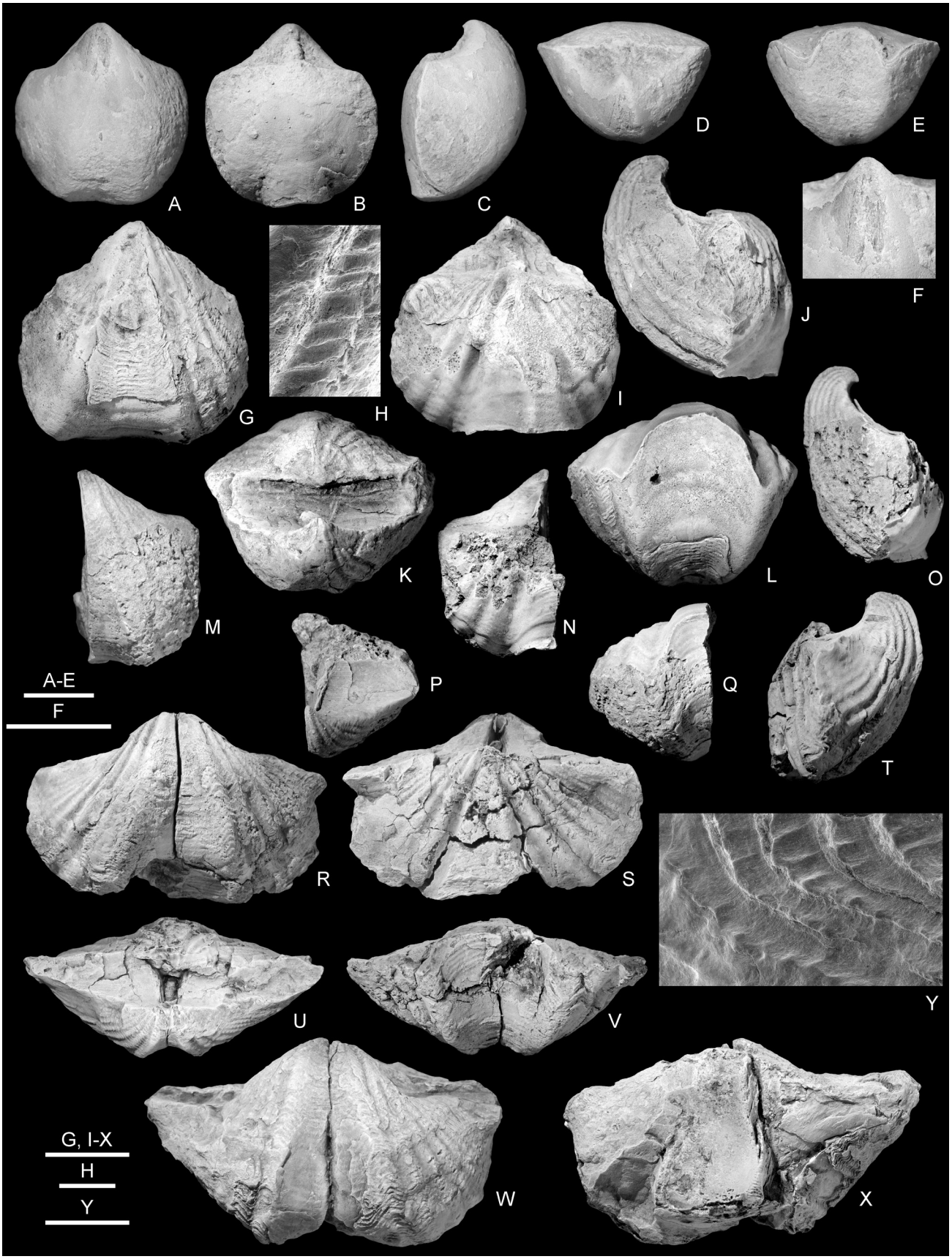

Figure 16. A-F. *Dionacoelia secessus* Mottequin, 2005b, RBINS a12111 (holotype), articulated specimen in ventral, dorsal, lateral, posterior and anterior views and close-up of the ventral umbo showing the slightly divergent dental plates; Boussu-en-Fagne, Moulin Liénaux Formation (Ermitage Member). G-Q. *Cyrtina undosa* var. *brachyptera* Maillieux, 1914 [*Cyrtinopsis brachyptera brachyptera* (Maillieux, 1914)]. G-L. RBINS a10295 (lectotype), articulated specimen in ventral, dorsal, lateral, posterior and anterior views, and close-up (SEM) of the poorly preserved microornament on the right ventral flank (H); Couvin 3, Jemelle Formation. M-Q. RBINS a10294 (paralectotype), incomplete articulated specimen in ventral, dorsal, lateral, posterior and anterior views; Couvin 11, Jemelle Formation. R-V. *Cyrtinopsis brachyptera maillieuxi* Struve, 1965 (?), RBINS a10293, slightly crushed articulated specimen in ventral, dorsal, lateral, posterior and anterior views; Couvin 11, Jemelle Formation. W-Y. *Cyrtinopsis crenata* (Steininger, 1853) (?), RBINS a10292, crushed articulated specimen in ventral and dorsal views and close-up (SEM) of the microornamentation in the sulcus. Scale bars: 5 mm (A-E, F), 10 mm (G, I-X), 1 mm (H, Y).

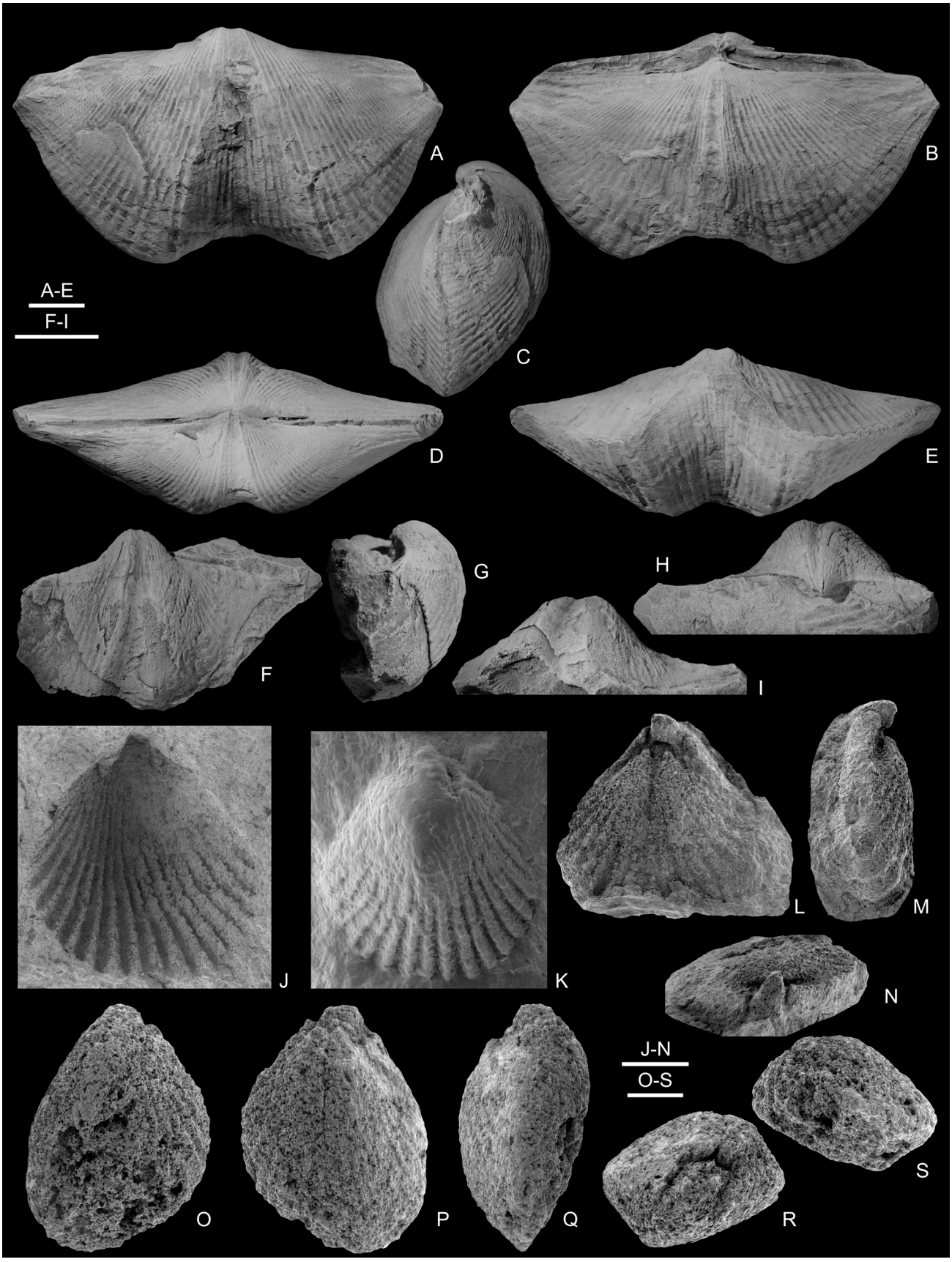

Figure 17. A-E. *Spirifer verneuili* var. *ambosulcata* Maillieux, 1930 [*Cyrtospirifer ambosulcatus* (Maillieux, 1930)], RBINS a10299 (holotype), slightly deformed articulated specimen in ventral, dorsal, lateral, posterior and anterior views; Durbuy 8319a, Barvaux Formation. F-I. *Spirifer* (*Hysterolites*) *virvanus* Maillieux, 1938 [*'Spirifer' virvanus* Maillieux, 1938], RBINS a1122 (holotype), incomplete and slightly deformed ventral valve in plan, lateral, posterior and anterior views; Treignes 8370a, Saint-Joseph Formation. J-K. *Trigeria barroisi* Asselberghs, 1930 [*Mutationella barroisi* (Asselberghs, 1930)], RBINS a3250, external mould of a ventral valve and putty cast (SEM); Malmedy 12 (Gdoumont), Marteau Formation (Waimes Member). L-S. *Bathyrhyncha* sp. indet., Malmedy 12 (Gdoumont), Marteau Formation (Waimes Member). L-N. RBINS a3249, articulated internal mould (with ventral valve partly included in matrix) in dorsal, lateral and posterior views (SEM). O-S. RBINS a3251, distorted and articulated internal mould in ventral, dorsal, lateral, posterior and anterior views (SEM). Scale bars: 10 mm (A-H), 2 mm (J-N, O-S).

Type material. Maillieux (1938, p. 40, pl. 1, fig. 8, 8a-b) selected an incomplete ventral valve (RBINS a1122; Fig. 17F-I) as the holotype. He also mentioned a second valve from the locality Treignes 3 (Eau Noire Formation), which has not been traced in the RBINS collections.

Type locality and horizon. Treignes 8370a, Saint-Joseph Formation (late Emsian).

Description. See Maillieux (1938).

Remarks. Our knowledge of Maillieux's species is based on a single ventral valve of which the slightly divergent dental plates can be seen in Fig. 17F, H. It is important to stress on the fact that many specimens identified as *Spinella incerta* (Fuchs, 1909) by Vandercammen (1963) are from the type locality of the species *virvanus*; thus they should be reinvestigated as they could permit to better understand the concept of the species introduced by Maillieux (1938) and to state on its validity. Note that the German species described by Fuchs (1909) from the upper Emsian Remscheid Group in Bergisches Land was renamed *Spirifer incertissimus* by Godefroid et al. (2002) due to a primary homonymy issue with a Carboniferous North American species, and then selected by Mittmeyer (2008) as the type species of his new genus *Incertia.* The material previously identified as *Spinella incerta* (Fuchs, 1909) in the Siegenian and lower Emsian of southern Belgium by Godefroid (in Godefroid et al., 1994) needs to be revised.

Current name. '*Spirifer' virvanus* Maillieux, 1938.

4.11. Order Terebratulida

Trigeria barroisi Asselberghs, 1930
(Fig. 17J-K)

1912a *Rhynchonella nucula* Sowerby; Leriche, 30-31, pl. 1, figs 8, 9, 11, 14, 15, 10 (?), 13 (?) fide Boucot (1960).

1929 *Trigeria Barroisi* Asselberghs [nomen nudum]: 758.

1930 *Trigeria Barroisi* Asselberghs: 43, 63, pl. 5, figs 1 (partim), 3-4, not fig. 2 (see remarks below).

1933 *Trigeria Barroisi* Asselberghs; Maillieux: 43.

1941b *Trigeria Barroisi* Asselberghs; Maillieux: 13.

1942 *Trigeria Barroisi* Asselberghs; Dahmer: 143-145, text-figs 35-38.

1943a *Trigeria barroisi* Asselberghs; Asselberghs: 10.

1943b *Trigeria barroisi* Asselberghs; Asselberghs: 3, 4, 7, 12.

1946 *Trigeria Barroisi* Asselberghs; Asselberghs: 328.

1960 *Mutationella barroisi* (Asselberghs, 1930); Boucot: 318-320, pl. 18, figs 1-8, tables 2, 3.

1982 *Mutationella barroisi* (Asselberghs, E., 1930); Godefroid: 126, table 3.

1986 *Mutationella barroisi* (Asselberghs, 1930); Rachebœuf: 137-139, text-fig. 27, pl. 21, figs 9-15.

1994 *Mutationella barroisi* (Asselberghs, 1930); Godefroid in Godefroid et al.: 19, fig. 13.

1999 *Mutationella barroisi*; Godefroid & Cravatte: 13, table 1.

Type material. Dahmer (1942) selected the lectotype (RBINS a3248C) among the three ventral internal moulds (lectotype and two paralectotypes (RBINS a3248A, B)) illustrated by Asselberghs (1930, pl. 5, figs 1a-b; the lectotype is that on the right in both pictures). The specimens RBINS a3248A and a3248B were illustrated once more by Boucot (1960, pl. 15, fig. 6), but identified as *'Camarotoechia' sinuosa* (Fuchs, 1923). Unfortunately, the slab with these three valves has not been traced yet and Boucot (1960) did not discuss his identification although he included these two paralectotypes in his synonymy of the species *barroisi.* The external mould of a ventral valve (RBINS a3250; Fig. 17J-K) figured by Asselberghs (1930, pl. 5, fig. 3) is a paralectotype. The internal moulds of two articulated specimens (RBINS a3249 (Fig. 17L-N, ventral valve partly embedded in matrix), a3251 (Fig. 17O-S)) illustrated by Asselberghs (1930, pl. 5, figs 2a, b, 4), display a septalium and are assigned to an unidentified *Bathyrhyncha* species (juveniles?).

Type locality and horizon. Malmedy 12 (Gdoumont), Marteau Formation, Waimes Member (earliest Gedinnian; Pridoli).

Description. See Asselberghs (1930), Dahmer (1942), Boucot (1960), and Rachebœuf (1986).

Remarks. Boucot (1960) transferred this species to the meganteridid genus *Mutationella* Kozłowski, 1929; numerous well-preserved specimens from the Artois were figured by Rachebœuf (1986). However, it is not excluded that the specimens identified as such by Boucot (1960) has nothing in common with the lectotype selected by Dahmer (1942).

Current name. Mutationella barroisi (Asselberghs, 1930).

Cryptonella gamedellensis Maillieux, 1938
(Fig. 18A-B)

1938 *Cryptonella gamedellensis* Maillieux: 12, 44, pl. 1, fig. 7.

1941b *Cryptonella gamedellensis* Maillieux; Maillieux: 14.

Type material. A poorly preserved ventral (?) valve (RBINS a1126; Fig. 18A-B) was selected as the holotype by Maillieux (1938, pl. 1, fig. 7).

Type locality and horizon. Rochefort 31 (6), Eau Noire Formation (Emsian–Eifelian).

Description. See Maillieux (1938).

Remarks. The ornamentation, which consists of regular, conspicuously spaced growth lamellae on which several growth lines are developed, resembles that of the genus *Zonathyris* Struve, 1992 (see Alvarez et al., 1996). The assignment to an athyridide or a terebratulide (no trace of endopunctation visible) genus has to be confirmed on the basis of new samples from the type locality.

Current name. *'Cryptonella' gamedellensis* Maillieux, 1938.

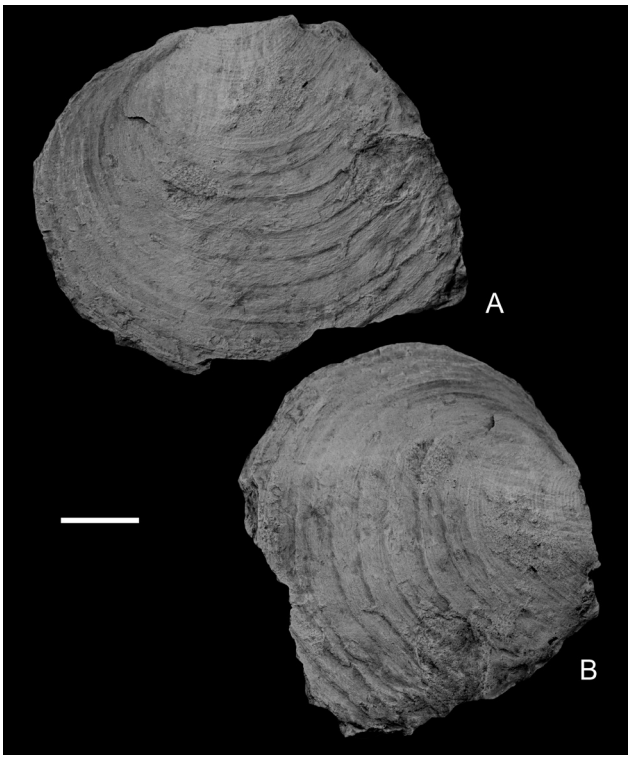

Figure 18. *Cryptonella gamedellensis* Maillieux, 1938 [*'Cryptonella' gamedellensis* Maillieux, 1938], RBINS a1126 (holotype), crushed, incomplete ventral (?) valve in plan and lateral oblique views; Rochefort 31 (6), Eau Noire Formation. Scale bar: 5 mm.

Terebratula loxogonia Béclard, 1891
(Fig. 19A-O)

1891 *Terebratula loxogonia* Béclard: 98-99, 100, pl. 3, figs 3-5.

1913 *Dielasma loxogonia*; Maillieux: 10, 14.

1922a *D.* [*Dielasma*] *loxogonia*; Maillieux: 14.

1929 *Dielasma loxogonia*; Maillieux & Demanet: table 2.

1933 *Dielasma loxogonia*; Maillieux: 66.

1938 *Cryptonella loxogonia* (Béclard); Maillieux: 12.

1941b *Cryptonella loxogonia* (Béclard); Maillieux: 14.

1965 *'Terebratula' loxogonia* Béclard 1891; Godefroid: pl. (unnumbered), fig. 6.

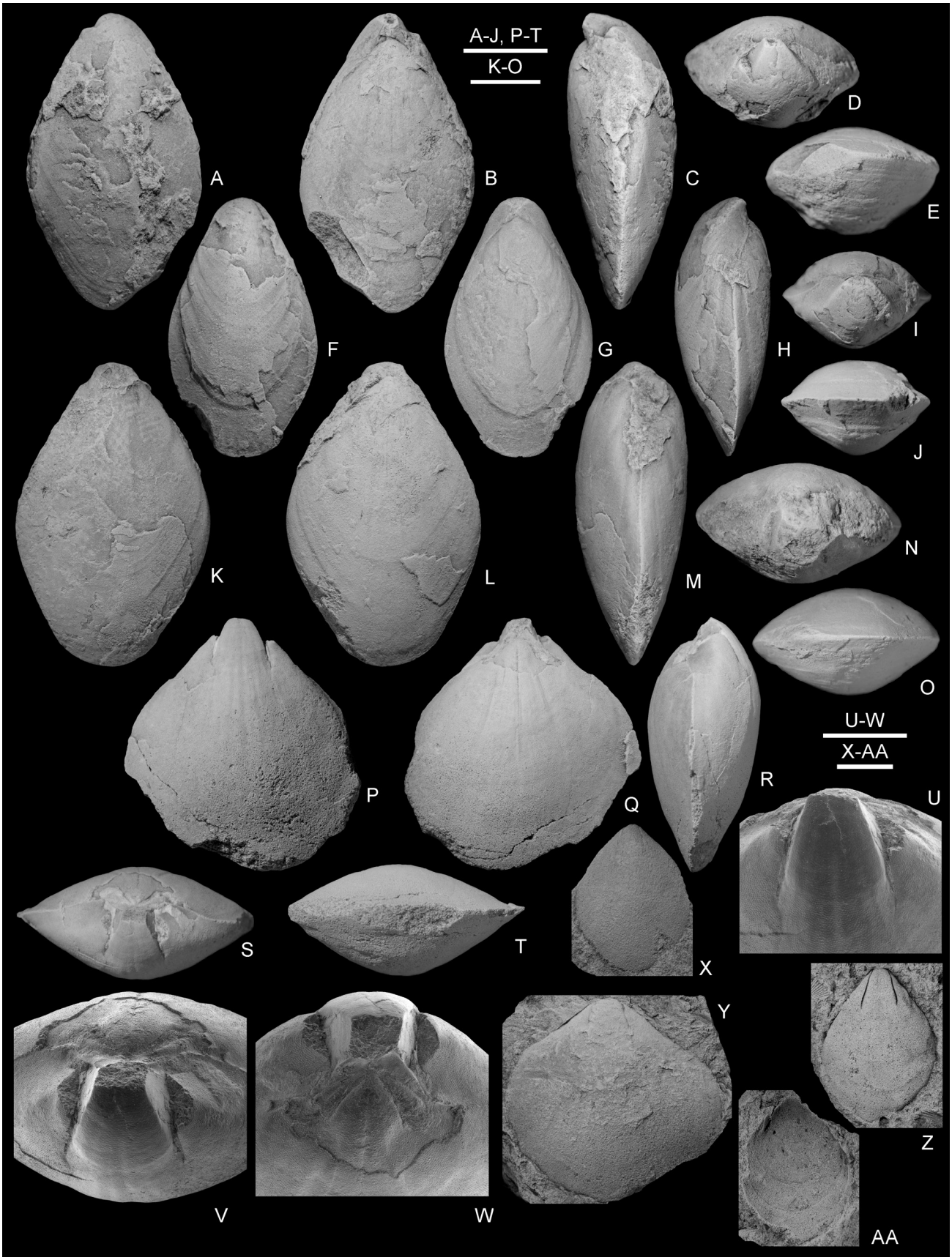

Figure 19. A-O. *Terebratula loxogonia* Béclard, 1891 [*Cimicinella loxogonia* (Béclard, 1891)]; Rochefort 8679 (2), upper part of the Saint-Joseph Formation or lower part of the Eau Noire Formation. A-E. RBINS a1693 (lectotype), articulated specimen in ventral, dorsal, lateral, posterior and anterior views. F-J. RBINS a1692 (paralectotype), articulated specimen in ventral, dorsal, lateral, posterior and anterior views. K-O. RBINS a1691 (paralectotype), articulated specimen in ventral, dorsal, lateral, posterior and anterior views. P-AA. *Dielasma maillieuxi* Asselberghs, 1923 [*Cimicinella*? *maillieuxi* (Asselberghs, 1923)]; Bioul (Godinne, flanks of the Godinne anticline), Rivière Formation. P-W. RBINS a3159 (lectotype), articulated internal mould in ventral, dorsal, lateral, posterior and anterior views, and close-up (SEM) of the ventral muscle field and the posterior margin (with ventral valve on top). X. RBINS a3157 (paralectotype), internal mould of a ventral valve. Y. RBINS a3158 (paralectotype), internal mould of a ventral valve. Z-AA. RBINS a3160 (paralectotype), internal and external moulds of a ventral valve. All scale bars are 5 mm except U-W (2.5 mm).

1968 *'Terebratula' loxogonia* Béclard 1891; Godefroid: cited many times, pls 4-5, 8-9.

1970 *'Terebratula' loxogonia;* Bultynck: cited many times, pls 36-37.

1971 *'Terebratula' loxogonia;* Tsien: 123.

1979 *Cimicinella loxogonia* (Béclard, 1891); García-Alcalde in Arbizu et al.: 108, 110, 111, 113, text-fig. 4, pl. 2, figs 11-13.

1982 *Cimicinella loxogonia;* Bultynck et al.: 32, text-fig. 1.

1983 *Cimicinella loxogonia;* Rzhonsnitskaya: 11, table 1.

1994 *Cimicinella loxogonia* (Béclard, 1891); Godefroid in Godefroid et al.: 19, fig. 13.

1999 *Cimicinella loxogonia* (Béclard, 1891); García-Alcalde: 173-175, figs 11, 15, 16, table 4.

2001 *Cimicinella loxogonia*; García-Alcalde: 124, fig. 2.

2013 *Cimicinella loxogonia* (Béclard, 1891); García-Alcalde: 163, figs 1-2, 108, 110.5-8 (see this author for a more complete synonymy of the Spanish specimens).

Type material. García-Alcalde (1999, fig. 16.1-4) selected the articulated specimen RBINS a1693 (Béclard, 1891, pl. 3, fig. 5, 5a-b; Godefroid, 1965, pl. (unnumbered), fig. 6; Fig. 19A-E) as the lectotype. The two other specimens illustrated by Béclard (1891, pl. 3, figs 3, 3a-b, 4, 4a-4b), namely RBINS a1691 (Fig. 19K-O) and a1692 (Fig. 19F-J), were designated as the paralectotypes by García-Alcalde (1999, fig. 16.5-12).

Type locality and horizon. Rochefort 8679 (2), upper part of the Saint-Joseph Formation or lower part of the Eau Noire Formation (late Emsian) (García-Alcalde, 1999).

Description. See Béclard (1891) and García-Alcalde (1999).

Remarks. Béclard's (1891) species was assigned to *Cimicinella* Schmidt, 1946 by García-Alcalde in Arbizu et al. (1979) who considered the type species of *Cimicinella*, namely *Terebratula cimex* Richter & Richter, 1918 (see Schmidt, 1946; Struve & Werner, 1964), as a synonym of *C. loxogonia.* Note that the internal morphology of the Belgian specimens still remains unknown whereas the stratigraphic range of the species in the Dinant Synclinorium was detailed notably by Godefroid (1968) and Bultynck et al. (1982).

Current name. Cimicinella loxogonia (Béclard, 1891).

Dielasma maillieuxi Asselberghs, 1923
(Fig. 19P-AA)

1922 *Dielasma Maillieuxi* Asselberghs [nomen nudum]: B133.

1923 *Dielasma Maillieuxi* Asselberghs: 26-27, pl. 1, figs 11-15.

1933 *Cryptonella Maillieuxi;* Maillieux: 67.

1938 *Cryptonella Maillieuxi* (Asselberghs); Maillieux: 12.

1941b *Cryptonella maillieuxi* (Asselberghs); Maillieux: 14.

1951 *Dielasma whidbornei* (Davidson); Asselberghs: 350, 352, 353.

1955 *Dielasma whidbornei* (Davidson); Asselberghs: 199, 208, 210.

1977 *Cimicinella maillieuxi* (E. Asselberghs, 1923); Bultynck & Boonen: 491.

Type material. Asselberghs (1923, legend of pl. 1, figs 11-15) considered the figured specimens as the types but did not select a lectotype. The articulated specimen RBINS a3159 (Asselberghs, 1923, pl. 1, fig. 14a-b; Fig. 19P-W) is hereby designated as the lectotype. The specimens RBINS a3157 (Fig. 19X), a3158 (Fig. 19Y) and a3160 (Fig. 19Z-AA), which were figured by Asselberghs (1923, pl. 1, figs 12, 13, 15a-b), are paralectotypes as is also the case of the articulated internal mould (Asselberghs, 1923, pl. 1, figs 11a-b) that has not been traced so far among the collections of either the Katholieke Universiteit Leuven, or the Université catholique de Louvain.

Type locality and horizon. Bioul (Godinne, flanks of the Godinne anticline), Rivière Formation (Eifelian).

Description. See Asselberghs (1923).

Remarks. Asselberghs (1955) regarded his species *Dielasma maillieuxi* as a synonym of *Waldheimia whidbornei* Davidson, 1882 (see Cloud, 1942) from the Middle Devonian of the Torquay area (England), as he did implicitly in 1951, whereas Bultynck & Boonen (1977) assigned the species *maillieuxi* to *Cimicinella* Schmidt, 1946, but it needs to be confirmed.

Current name. *Cimicinella*? *maillieuxi* (Asselberghs, 1923).

Cryptonella mediocostata Maillieux, 1932
(Fig. 20A-C)

1932 *Cryptonella mediocostata* Maillieux: 12, 39, pl. 2, fig. 5, 5a (cited as *Cryptonella medioplicata* in the plate).

1933 *Cryptonella mediocostata*; Maillieux: 59.

1941a *Cryptonella mediocostata* Maillieux; Maillieux: 64.

1941b *Cryptonella mediocostata* Maillieux; Maillieux: 14.

1942 *Cryptonella mediocostata* Maillieux, 1932; Cloud: 129.

1946 *Cryptonella mediocostata* Maillieux; Asselberghs: 248, 330.

1994 *Cryptonella mediocostata* Maillieux, 1932; Godefroid in Godefroid et al.: 19, fig. 13.

Type material. The internal mould of a ventral valve (RBINS a963; Fig. 20A-C) was selected as the holotype by Maillieux (1932, pl. 2, fig. 5, 5a); it is the only known specimen of this species.

Type locality and horizon. Vireux-Molhain 2 (France), base of the Hierges Formation according to Godefroid & Stainier (1988) (late Emsian).

Description. See Maillieux (1932).

Remarks. Contrary to what Maillieux (1932) stated, internal features can be observed easily. Long, slender dental plates circumscribe an unexcavated muscle field. The presence of low ribs near the anterior margin of sulcus is at the origin of the specific name, but additional material is required in order to revise this very poorly known species.

Current name. *'Cryptonella' mediocostata* Maillieux, 1932.

Dielasma pruvosti Asselberghs, 1930
(Fig. 20D-S)

1929 *Dielasma Pruvosti* Asselberghs [nomen nudum]: 758.

1930 *Dielasma Pruvosti* Asselberghs: 35, 62, pl. 4, figs 1-3 (see remarks below).

1933 *Cryptonella pruvosti*; Maillieux: 43.

1941b *Cryptonella pruvosti* (Asselberghs); Maillieux: 14.

1943b *Cryptonella pruvosti* (Asselberghs); Asselberghs: 4, 12.

1946 *Cryptonella pruvosti* (Asselberghs); Asselberghs: 328.

Type material. The illustrated syntypes include the internal mould of a ventral valve (with external mould) (RBINS a3327; Fig. 20D-I) figured by Asselberghs (1930, pl. 4, fig. 1a-b) and an internal mould of a dorsal valve (RBINS a3228; Fig. 20J-M) illustrated by Asselberghs (1930, pl. 4, fig. 2) as well as a second dorsal internal mould (RBINS a582; Fig. 20N-S), which was figured by Asselberghs (1930, pl. 4, fig. 3) and re-illustrated by Boucot (1960, pl. 18, fig. 15), who assigned it to *Protathyris*? *straeleni* (Asselberghs, 1930).

Type locality and horizon. Florenville 1 (Muno), Mondrepuis Formation (early Gedinnian; Lochkovian).

Description. See Asselberghs (1930).

Remarks. Asselberghs' species was overlooked by Boucot (1960) and subsequent workers, most probably due to the poor state of preservation of the type material. However, it is not excluded that Asselberghs' (1930) species *Dielasma pruvosti* and *Protathyris*? *straeleni* are synonymous. The morphology (e.g. faint sulcus anteriorly developed, regular ornamentation, short and thin dental plates) of the ventral internal mould RBINS a3327 may suggest an assignment to *Protathyris*, but further material is required to reach a more confident opinion. Nevertheless, according to Principle of Priority (Article 23.1 of the Code), if the synonymy between both species is confirmed, the species *pruvosti* must be considered as the first described by Asselberghs (1930, page 35 vs. page 42 for *straeleni*). It is more cautious at this stage, pending the revision of the species *pruvosti* and *straeleni* on the basis of further and maybe better preserved material, to opt for the status quo and to not select the lectotypes of both species now.

Current name. 'Dielasma' pruvosti Asselberghs, 1930.

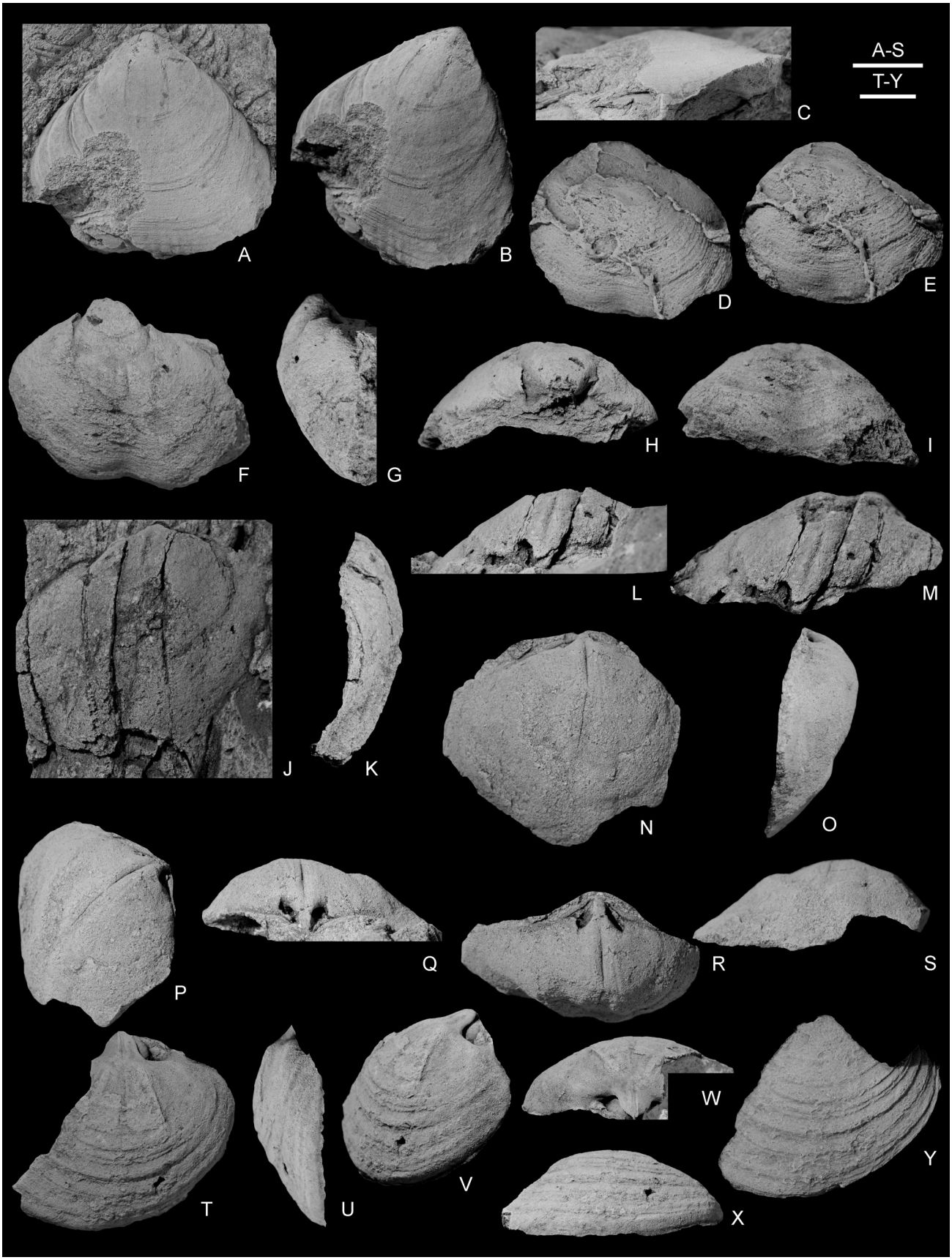

Figure 20. A-C. *Cryptonella mediocostata* Maillieux, 1932 [*'Cryptonella' mediocostata* Maillieux, 1932], RBINS a963 (holotype), incomplete mould of a ventral valve in plan, oblique lateral and anterior views; Vireux-Molhain 2, Hierges Formation. D-S. *Dielasma pruvosti* Asselberghs, 1930 [*'Dielasma' pruvosti* Asselberghs, 1930], syntypes illustrated by Asselberghs (1930); Florenville 1 (Muno), Mondrepuis Formation. D-I. RBINS 3227, ventral external mould in plan and anteroventral views, and ventral internal mould in plan, lateral, posterior and anterior views. J-M. RBINS a3228, dorsal internal mould in dorsal, lateral, posterior and posterodorsal views. N-S. RBINS 582 (this specimen was referred to *Protathyris*? *straeleni* by Boucot (1960)), internal mould of a dorsal valve in plan, lateral, oblique lateral, posterior, posterodorsal and anterior views. T-Y. *Cryptonella rugosa* Maillieux, 1931 [*Monsenella*? *minor* (Dahmer, 1931)], RBINS a927 (holotype), incomplete internal mould of a dorsal valve in plan, lateral, oblique lateral, posterior and anterior views, and putty cast of dorsal exterior; Harzé 4a, Solières Formation. All scale bars are 5 mm.

Cryptonella rugosa Maillieux, 1931
(Fig. 20T-Y)

1931 *Cryptonella rugosa* Maillieux: 7, 27-28, 86, pl. 1, fig. 12, 12a.
1936a *Cryptonella rugosa* Maillieux; Maillieux: 113-114.
1942 *Cryptonella rugosa* Maillieux, 1931; Cloud: 130.

Type material. The incomplete internal mould of a dorsal valve (with external mould) (RBINS a927; Fig. 20T-Y) was selected by Maillieux (1931, pl. 1, fig. 12, 12a) as the holotype.
Type locality and horizon. Harzé 4a, Solières Formation (Siegenian; Pragian).
Description. See Maillieux (1931).
Remarks. According to Maillieux (1936a), *Cryptonella rugosa* is synonymous with *C. rhenana* mut. *minor* Dahmer, 1931 and he reported the latter species as abundant in several Siegenian lithostratigraphic units of southern Belgium. Cloud (1942) rejected Maillieux's species from the genus *Cryptonella* Hall, 1861 and, more recently, García-Alcalde (2013) doubtfully referred Dahmer's species to his new cryptonellid genus *Monsenella*.
Current name. Monsenella? *minor* (Dahmer, 1931).

5. Further comments on Silurian (Pridoli)–Devonian brachiopods firstly described in Belgium (1850-1950)

Although the type material of the bulk of the Silurian and Devonian brachiopod species originally described in Belgium is curated now at the RBINS, that of a significant number of species is deposited in other institutions. In this chapter, we focus on those of which the type material is housed in Belgian universities (synonymy lists are provided only for the species illustrated herein); the others, which were described by de Koninck (1855), Gosselet (1877, 1887), and Fuchs (1914, 1923) are curated in foreign institutions and only listed (Table 1) in order to browse the most complete list as possible of brachiopod species. The Belgian material curated in foreign institutions and used by Grabau (1931-1933) and Paeckelmann (1942) for the erection of new varieties and species is not discussed herein.

5.1. Order Lingulida

Lingula amayana de Ryckholt, 1854
(Fig. 21A-C)

1854 *Lingula Amayana* de Ryckholt: 169-170, pl. 18, figs 10-11.
1868 *Lingula Amayana* de Ryckh.; Dewalque: 318.
1878 *Lingula Amayana* Ryckholt; Bigsby: 37.
1880 *Lingula Amayana* de Ryckh.; Dewalque: 358.
1881 *Lingula Amayana* de Ryckh.; Mourlon: 19.
? 1909a *Lingula Amayana* de Ryckh.; Maillieux: 138.

Type material. A partly exfoliated fragment of an indeterminate valve (ULg.PA.2018.12.23/2; Fig. 21A-C), identified as such on a green label typical of de Ryckholt's collection, has been recovered so far. It is hereby designated as the lectotype.
Type locality and horizon. Amay (with no other indication), Upper Devonian (Frasnian or Famennian).
Description. See de Ryckholt (1854).
Remarks. Maillieux (1909a) reported the presence of this species in the Frasnian of the Dinant Synclinorium, but after this report, de Ryckholt's species was not cited anymore in the Belgian literature to our knowledge. The available material does not permit to reach a better generic identification.
Current name. 'Lingula' amayana de Ryckholt, 1854.

Orbiculoidea namona de Ryckholt, 1851

1851 *Orbiculoïdea Namona* de Ryckholt: 174, pl. 10, figs 13-15.

Type material. Not traced, but the Devonian material of de Ryckholt should be present in the collections of the University of Liège as it was bought by Dewalque (Dewalque, 1879; Denayer et al., 2014).
Type locality and horizon. De Ryckholt (1851) only indicated that the species is from the Devonian, but no locality is provided. According to Dewalque (1868), it is from the Famennian in all likelihood, but as explained in his *Prodrome d'une description géologique de la Belgique*, the Frasnian rocks were considered as belonging to the 'Famennian System' at that time. Nevertheless,

Table 1. Brachiopod species first described in Belgium but of which the type specimen (selected or not (NS)) is deposited in France (MGL: Musée Gosselet (Musée d'Histoire naturelle), Lille), Germany (MB.B.: Museum für Naturkunde (Leibniz-Institut) der Humboldt-Universität zu Berlin), and the USA (HMCZ: Harvard Museum of Comparative Zoology, Cambridge, Massachusetts). Abbreviations for the brachiopod orders: A, Athyridida; At, Atrypida; L, Lingulida; O, Orthotetida; R, Rhynchonellida; S, Spiriferida. Abbreviations for the ages: Ei, Eifelian; Fa, Famennian; Ge, 'Gedinnian'; Gi, Givetian.

Species	Order	Age	Revision	Type
Tenuisinurostrum crenulatum (Gosselet, 1877)	R	Fa	Sartenaer (1967)	Lectotype (MGL)
Ptychomaletoechia dumonti (Gosselet, 1877)	R	Fa	Sartenaer (1969)	NS
'Lingula' gedinniana Fuchs, 1914	L	Ge	Nil	NS (MB.B.)
Ptychomaletoechia gonthieri (Gosselet, 1887)	R	Fa	Sartenaer (1969)	NS
Spirifer (*Quadrifarius*) *loculatus* Fuchs, 1923	S	Ge	Fuchs (1929), Dahmer (1942, 1951)	NS (MB.B.)
Pampoecilorhynchus nux (Gosselet, 1887)	R	Fa	Sartenaer (1958)	Lectotype (MGL)
Ptychomaletoechia omaliusi (Gosselet, 1877)	R	Fa	Sartenaer (1961)	Lectotype (MGL)
'Rhynchonella' palmata Gosselet, 1887	R	Fa	Nil	NS (MGL)
Floweria pseudoelegans (Gosselet, 1877)	O	Fa	Mottequin (2008a)	NS (MGL)
Crinisarina reticulata (Gosselet, 1877)	A	Fa	Mottequin (2008a)	Lectotype (MGL)
Bathyrhyncha sinuosa Fuchs, 1923	R	Ge	Dahmer (1942)	Lectotype (MB.B.)
Eoparaphorhynchus triaequalis (Gosselet, 1877)	R	Fa	Sartenaer (1957)	Lectotype (MGL)
Rugodavidsonia woodwardiana (de Koninck, 1855)	At	Ei–Gi	Copper (1996)	Neotype (HMCZ)

Dewalque's assertion cannot be confirmed and an older Devonian age is not excluded.

Description. Nil.

Remarks. This species is only known by de Ryckholt's (1851) drawings, which correspond to the ventral, dorsal, and lateral (one valve!) views of one or several specimens of which the ornamentation consists of numerous filae. Although de Ryckholt (1851) did not describe his new species, it is valid conformably to the Article 12.2.7 of the Code. This species is temporarily assigned to *Orbiculoidea* regarding the position of the apexes and the convexity of both valves.

Current name. Orbiculoidea? *namona* de Ryckholt, 1851.

Lingula racheneuri Leriche, 1948

1948 *Lingula Racheneuri* Leriche: 293-294, pl. 1, fig. 8.

Type material. Only one of the two specimens (Mons University collections) reported by Leriche (1948) was illustrated originally. It could be selected as the lectotype.

Type locality and horizon. Wihéries, Bois d'Ausse Formation (Siegenian; Pragian). According to the stratigraphical data available (Leriche, 1948; Blieck, 2015), the species is from the *Rhinopteraspis dunensis* Biozone of Pragian age.

Description. See Leriche (1948).

Remarks. Leriche's (1948) material is inadequate for the erection of new species (poorly preserved specimens, internal features unknown).

Current name. 'Lingula' racheneuri Leriche, 1948.

5.2. Order Craniida

Orbiculoidea cantraineana de Ryckholt, 1851

1851 *Orbicula Cantraineana* de Ryckholt: 92, 99 (a footnote on page 92 indicates 'lisez [read] *Orbiculoïdea*').

1851 *Orbiculoïdea Cantraineana* de Ryckholt: 174, pl. 4, figs 1-2.

Type material. Not traced (same remark as for the species *namona* above).

Type locality and horizon. De Ryckholt (1851) only mentioned that his material was from the Devonian of the Luxembourg, but this could also mean Devonian of the Luxembourg province (south-eastern Belgium) and not the Grand Duchy of Luxembourg.

Description. See de Ryckholt (1851)

Remarks. De Ryckholt (1851) reported five specimens fixed on an orthoconic cephalopod; the fact that they were attached to a hard substrate by the cementation of the ventral valve suggests a possible assignment to *Petrocrania* or to a closely related craniide genus. The species was cited at least by the same authors than *'Lingula' amayana* de Ryckholt, 1854 (see above), except Maillieux (1909a).

Current name. Petrocrania? *cantraineana* (de Ryckholt, 1851).

Orbiculoidea cimacensis de Ryckholt, 1851

1851 *Orbicula Cimacensis* de Ryckholt: 92, 99 (a footnote on page 92 indicates 'lisez [read] *Orbiculoïdea*').

1851 *Orbiculoïdea Cimacensis* de Ryckholt: 174, pl. 4, figs 3-4.

Type material. Not traced (same remark as for the species *namona* above).

Type locality and horizon. De Ryckholt (1851) reported his species in the Devonian of Chimay, as reflected by the specific epithet. According to Dewalque (1868), it is from the Famennian in all likelihood, but as explained in his *Prodrome d'une description géologique de la Belgique*, the Frasnian rocks were considered as belonging to the 'Famennian System' at that time. Nevertheless, Dewalque's assertion cannot be confirmed and an older Devonian age cannot be ruled out.

Description. See de Ryckholt (1851).

Remarks. De Ryckholt's (1851) coloured drawings clearly show the conical dorsal valve of a craniide attached to an unidentified brachiopod characterized by numerous thin ribs. He reported the presence of radial ribs that could correspond to the simulation of the ornamentation of its host. These features suggest an assignment to *Petrocrania* or to a related genus. This species was cited at least by Dewalque (1868, 1880), Bigsby (1878), and Mourlon (1881).

Current name. Petrocrania? *cimacensis* (de Ryckholt, 1851).

Crania corneti Dewalque, 1881
(Fig. 21D-F)

1875 *Crania Rutoti* Dewalque [nomen nudum]: 135.
1881 *Crania Corneti* Dewalque: 51, pl. 3, fig. 3a-b.
1888 *Crania Corneti* Dew.; Gosselet: 415.
1936 *Crania Corneti*; Asselberghs: 277.
1936 *Petrocrania Corneti* Dewalque; Asselberghs: 312.

Type material. According to Dewalque (1881), the ventral valve (ULg.PA.2018.12.23/3; Fig. 21D-F) fixed on the dorsal valve of an atrypide (*Desquamatia* (*Neatrypa*) sp.) was the only specimen available for study, it is thus the holotype by monotypy.

Type locality and horizon. Huccorgne (Dewalque 1881; Asselberghs, 1936), Bovesse Formation (early Frasnian).

Description. See Dewalque (1881).

Remarks. Crania corneti was previously reported as *C. rutoti* by Dewalque (1875) in a list of brachiopod species from the Frasnian of Huccorgne (see also Asselberghs, 1936), but the specific name *Crania rutoti* has to be considered as nomen nudum on the basis of the Article 12 of the Code. This species is doubtfully referred to the genus *Petrocrania;* the dorsal valve still remains unknown.

Current name. Petrocrania? *corneti* (Dewalque, 1881).

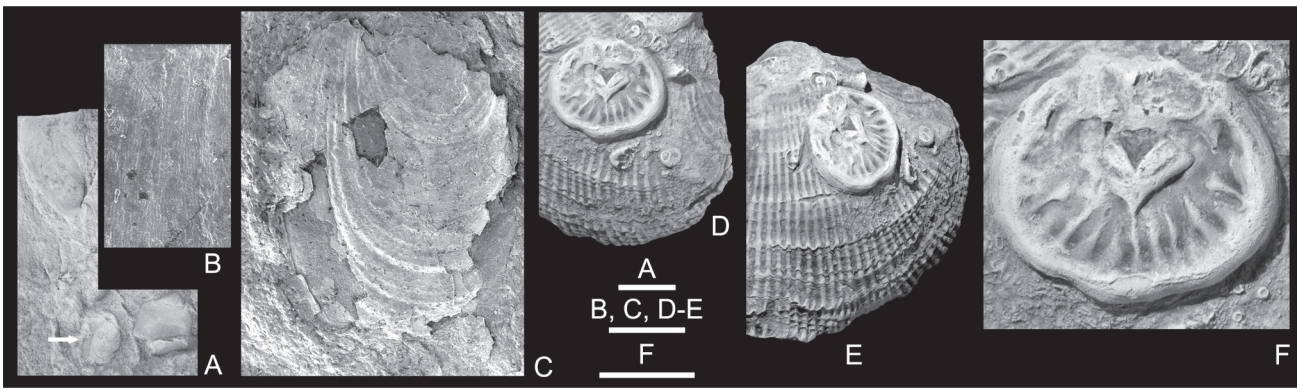

Figure 21. A-C. *Lingula amayana* de Ryckholt, 1854 [*'Lingula' amayana* de Ryckholt, 1854], ULg.PA.2018.12.23/2 (lectotype), incomplete undifferentiated valve (arrow) associated to a bivalve and a smooth rhynchonellide brachiopod (A), detail of the poorly preserved filae (B), and close-up (C); Amay, Upper Devonian shales (precise level unknown). D-F. *Crania corneti* Dewalque, 1881 [*Petrocrania*? *corneti* (Dewalque, 1881)], ULg. PA.2018.12.23/2 (lectotype), ventral valve (internal view) fixed on an incomplete dorsal valve of an atrypide brachiopod (*Desquamatia* (*Neatrypa*) sp.); Huccorgne, Bovesse Formation. Scale bars: A (5 mm), B (0.1 mm), C (1 mm), and D-F (10 mm).

5.3. Order Strophomenida

Stropheodonta dorlodoti Asselberghs, 1912

1912 *Stropheodonta Dorlodoti* Asselberghs: 5-6, pl. 1, figs 4-5.

Type material. Not traced until now, but it should be part of the collections of the Katholieke Universiteit Leuven or of the Université catholique de Louvain.

Type locality and horizon. Emines, Bovesse Formation (early Frasnian).

Description. See Asselberghs (1912).

Remarks. This small-sized species was assigned to the genus *Douvillina* by Maillieux (1940a), but based on the poor Asselberghs' pictures, it is impossible to reach a confident generic identification. This species is quite common within the Bovesse Formation according to Asselberghs (1912), who also reported it from the middle Frasnian Rhisnes Formation; Asselberghs (1936) mentioned it in both previous lithostratigraphic units and in the Franc-Waret Formation (late Frasnian).

Current name. Douvillina? *dorlodoti* Asselberghs, 1912.

Strophomenes rigida de Koninck, 1876

1876 *Strophomenes rigida* de Koninck: 35-36, 48, pl. 1, figs 5, 5a.

Type material. The line drawings of a dorsal valve of the Dewalque collection (ULg) provided by de Koninck (1876) are clearly embellished. No lectotype has been selected until now although Mottequin & Denayer (2015, fig. 1.3) illustrated a dorsal valve relatively close to de Koninck's drawings.

Type locality and horizon. De Koninck (1876) did not indicate the origin of his new species, but it is from Gdoumont, Marteau Formation, Waimes Member (earliest Gedinnian; Pridoli).

Description. See Boucot (1960).

Remarks. Boucot (1960) assigned this species to the genus *Shaleria* Caster, 1939 whereas Harper & Boucot (1978c) assigned it to their new subgenus *S.* (*Protoshaleria*), but the latter is considered as a synonym of the nominal subgenus by Cocks & Rong (2000). De Koninck's species was recently illustrated and discussed by Jahnke (1986), Godefroid & Cravatte (1999) and Jansen (2014).

Current name. Shaleria (*Shaleria*) *rigida* (de Koninck, 1876).

5.4. Order Productida/Suborder Chonetidina

Chonetes omaliana de Koninck, 1876

1876 *Chonetes Omaliana* de Koninck: 34-35, 48, pl. 1, fig. 4.

Type material. Dahmer (1942) selected the ventral valve (Dewalque's collection, ULg) figured by de Koninck (1876, pl. 1, fig. 4) as the type (= lectotype, not traced).

Type locality and horizon. Gdoumont, Marteau Formation, Waimes Member (earliest Gedinnian; Pridoli).

Description. See Boucot (1960).

Remarks. The generic assignment of this abundant but still imperfectly known species needs to be revised (Rachebœuf, 1995).

Current name. 'Chonetes' omaliana de Koninck, 1876.

5.5. Orthotetida

Orthotetes consimilis de Koninck, 1882

1882 *Orthotetes consimilis* de Koninck: 523-525, fig. 3.

Type material. The ventral valve illustrated by de Koninck (1882) has not been traced yet.

Type locality and horizon. No locality is cited by de Koninck (1882), who only mentioned that his new species is found everywhere in the middle Famennian (i.e. Souverain-Pré Formation), but scarcer in the upper Famennian (see Mourlon, 1882).

Description. See de Koninck (1882).

Remarks. This poorly known, although abundant (e.g. Mourlon, 1882) orthotetide needs to be investigated according to Mottequin (2008a) and Mottequin & Brice (2019).

Current name. 'Orthotetes' consimilis de Koninck, 1882.

5.6. Orthida

Orthis subvulvaria Asselberghs, 1913b

1913b *Orthis subvulvaria* Asselberghs: 89-93, pl. 3, figs 1-5.

Type material. Five ventral internal moulds were illustrated by Asselberghs (1913b), but no lectotype has been selected until now.

Type locality and horizon. Longlier, Villé Formation (Siegenian; Pragian).

Description. See Asselberghs (1913b).

Remarks. This species is a primary homonym of *Orthis subvulvaria* Maurer, 1886 (see Maillieux 1936a). Maurer's (1886) name was proposed for two internal moulds figured and identified as '*Orthis hipparionyx*? Vanuxem and J. Hall' by Davidson (1865, pl. 17, figs 9, 12) from Cornwall (UK). They were later referred to *Proschizophoria personata* (Zeiler, 1857) notably by Drevermann (1904) and Boucot et al. (1966) whereas the species erected by Asselberghs (1913b) was assigned doubtfully to *Protocortezorthis* Johnson & Talent, 1967 by Walmsley & Boucot (1975).

Current name. Protocortezorthis? *subvulvaria* (Asselberghs, 1913b).

Orthis verneuili de Koninck, 1876

1876 *Orthis verneuili* de Koninck: 36-38, 48, pl. 1, fig. 6.

Type material. No lectotype has been selected until now and de Koninck (1876) did not precise to which collection belong the illustrated specimens. However, de Koninck (1876, p. 26, footnote no. 2) clearly indicated that the material from Mondrepuis (France) was collected by G. Dewalque (collections of the University of Liège) and C. Malaise (not yet traced in the RBINS collections). Ventral and dorsal internal moulds from the former collection were illustrated by Mottequin & Denayer (2015, figs 5-6).

Type locality and horizon. Mondrepuis, Mondrepuis Formation (early Gedinnian; Lochkovian).

Description. See Boucot (1960) and Harper et al. (1969).

Remarks. This small orthide was assigned to *Platyorthis* Schuchert & Cooper, 1931 by Boucot (1960) and re-illustrated by Godefroid & Cravatte (1999).

Current name. Platyorthis verneuili (de Koninck, 1876).

5.7. Order Rhynchonellida

Rhynchonella aequicostata de Koninck, 1876

1876 *Rhynchonella æquicostata* de Koninck: 38-39, 48, pl. 1, fig. 7.

Type material. The lectotype has not been selected yet. As for *Platyorthis verneuili* (see above), de Koninck (1876) did not precise the collection to which both illustrated specimens belong. Mottequin & Denayer (2015, fig. 1.4) figured a specimen close to that figured by de Koninck (1876, pl. 1, fig. 7).

Type locality and horizon. The material identified as such by de Koninck in Dewalque's collection is from Gdoumont, Marteau Formation, Waimes Member (earliest Gedinnian; Pridoli).

Description. See Boucot (1960).

Remarks. This imperfectly known species (see also Dahmer (1942) and Godefroid & Cravatte (1999)) needs to be revised as is probably the case for the other rhynchonellides from the Pridoli–Lochkovian siliciclastic succession of southern Belgium. It is assigned to *Bathyrhyncha*.

Current name. Bathyrhyncha aequicostata (de Koninck, 1876).

5.8. Order Spiriferida

Spirifer aequicostatus de Koninck, 1882

1882 *Spirifer æquicostatus* de Koninck: 522-523, fig. 2.

Type material. Not traced.

Type locality and horizon. Maurenne, Etrœungt Formation (latest Famennian).

Description. See de Koninck (1882).

Remarks. This species is only known by the short description of the ventral valve provided by de Koninck (1882), but it is distinct from *Prospira struniana* (Gosselet, 1857), which is well-known in the uppermost Famennian of southern Belgium and northern France (Mottequin & Brice, 2016), by its less transverse outline and the development of its sulcus.

Current name. 'Spirifer' aequicostatus de Koninck, 1882.

Spirifer dumontianus de Koninck, 1876

1876 *Spirifer Dumontianus* de Koninck: 39-40, pl. 1, fig. 9.

Type material. The ventral internal mould (ULg. PA.2018.12.23/4) figured by de Koninck (1876, pl. 1, fig. 9) from Dewalque's collections, which was partly photographically illustrated by Mottequin & Denayer (2015, fig. 1.2), was selected as the type (= lectotype) by Dahmer (1942).

Type locality and horizon. Gdoumont, Marteau Formation, Waimes Member (earliest Gedinnian; Pridoli).

Description. See Asselberghs (1930), Boucot (1957a, 1960), and Vandercammen (1963).

Remarks. Asselberghs (1931) discussed the relationships existing between de Koninck's species and *Spirifer* (*Quadrifarius*) *loculatus* Fuchs, 1923 from Waimes, which was selected by Fuchs (1923) as the type of his new subgenus *Quadrifarius* (see also Fuchs, 1929): he considered that the latter species was a junior synonym of the former, an opinion followed by subsequent researchers (e.g. Dahmer, 1942; Boucot 1957a, 1960). *Quadrifarius* is considered as a subgenus of *Delthyris* Dalman, 1828 by Johnson & Hou (2006b) or as a distinct genus (e.g. Jansen, 2016). Godefroid & Cravatte (1999) and Jansen (2016) discussed the importance of this species for deciphering the Silurian-Devonian boundary.

Current name. Delthyris (*Quadrifarius*) *dumontianus* (de Koninck, 1876).

6. Acknowledgments

The author is very grateful to Julien Cillis (RBINS) who did the SEM photographic work, to Julien Denayer and Valentin Fischer (Université de Liège), who gave access to the collections of the Université de Liège, and to Jenaro García-Alcalde (Universidad de Oviedo) for fruitful discussions on the Devonian rhynchonellides from the Cantabrian Mountains. Martin Aberhan and Andreas Abele (Museum für Naturkunde Berlin), and Angela Ehling (Berlin Department of the Bundesanstalt für Geologie und Rohstoffe) are also thanked for having looked for specimens among Fuchs' material curated in their respective institution. The manuscript benefited from the thorough reviews of Andrzej Baliński (Instytut Paleobiologii PAN, Warsaw) and Ulrich Jansen (Senckenberg Forschungsinstitut und Naturmuseum, Frankfurt).

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Manuscript received 12.01.2019, accepted in revised form 06.06.2019, available on line 19.07.2019.