

GESORIACOROSTRUM, A NEW MIDDLE FRASNIAN RHYNCHONELLID (BRACHIOPOD) GENUS FROM BOULONNAIS (N FRANCE)

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(3 figures, 1 table)

ABSTRACT. *Gesoriacorostrum* n. gen., type species *G. boloniense* (d'ORBIGNY 1850), is described from the middle Frasnian of Boulonnais (N France). On account of the very brief original description, and its scarcity, the species has been the subject to various interpretations and so is here redescribed. This is based only on the lectotype of the species and four specimens very like it from the type locality.

KEY-WORDS: rhynchonellid, *Gesoriacorostrum* n. gen., middle Frasnian, Boulonnais, systematics, stratigraphy.

RESUME. L'auteur décrit *Gesoriacorostrum* n. gen., avec *G. boloniense* (d'ORBIGNY 1850) du Frasnien moyen du Boulonnais (N France) comme espèce-type. Vu sa très brève description originale et sa rareté, l'espèce a fait l'objet d'interprétations diverses et est, en conséquence, redécrite ici. L'étude est basée uniquement sur le lectotype de l'espèce et sur quatre spécimens d'aspect semblable en provenance de la localité-type.

MOTS-CLES: Rhynchonellide,
Gesoriacorostrum n. gen., Frasnien moyen, Boulonnais, systématique, stratigraphie.

1. Introduction

Atrypa Boloniensis d'ORBIGNY 1850 from Ferques (Boulonnais) appeared in a Prodrômus with the following "description": "Espèce voisine de l'*A. livonica*, encore moins élevée, plus large, à côtes plus nombreuses". These two lines are not a description, but a comparison that is enough to make the species valid. It is no wonder then, that the species was misunderstood thereafter, and interpreted differently by various authors according to their conceptions of *Terebratula livonica* von BUCH 1834, and their own appraisal of height, width, and number of costae of both species, other characters being left to personal interpretation. Consequently various forms were erroneously assigned to the French species: (1) In rocks of Frasnian age from the type area: Gosselet, 1860 (p.127), 1871 (p.323), 1877a (pp.260, 265), 1880a (p.498); de Verneuil 1867 (p.128); Gosselet & Bertraut, 1874 (p.82); Rigaux, 1878 (p.437, table, p.441); Barrois, 1881 (pp.11, 12); Pellat *et al.*, 1881 (p.43). (2) In rocks of Givetian, Frasnian and Famennian age from the Namur Basin (the eastward extension of the Ferques Basin in Belgium), and the Dinant Basin (Belgium and France): Gosselet, 1860 (pp.84, 86, 87, 88, 90, 92, 93, 94), 1863 (p.171), 1871 (pp.300, 319, 320, 321),

1874a (p.685), 1874b (pp.101, 109), 1876 (p.48), 1877a (pp.251, 252, 258, 259, 260, 264, 265; a variety of *Rhynchonella boloniensis* is recognized in the southern border of the Dinant Basin), 1877b (pp.315, 319), 1879a (p.133), 1879b (pp.393, 399), 1880a (pp.493, 496), 1880b (pp.49, 101, 105); Dewalque, 1862 (p.150), 1863a (p.323), 1863b (pp.836, 839, 840, 841), 1868 (pp.72, 87, 88, 318), 1880 (pp.82, 99, 100, 101, 358); de la Vallée-Poussin in Dupont, 1863 (p.878; several varieties of *R. boloniensis* are recognized in the Namur and Dinant Basins); Murlon, 1873 (pp.126, 129), 1880 (pp.81, 82, 84, 87), 1881 (p.15); Ladrière, 1875 (p.79); Malaise, 1875 (p.33).

(3) In rocks of Upper Devonian age from a bore-hole in London (western extension of the Ferques Basin): Prestwich, 1878 (p.904).

(4) In rocks of Devonian age from other regions: de Verneuil in Viquesnel, 1850 (N Iran, p.501); d'Archiac in d'Archiac, Fischer & de Verneuil, 1866 (*Antitaurus*, p.X); de Verneuil in d'Archiac, Fischer & de Verneuil, 1866 (*Antitaurus*, p.12); d'Archiac & de Verneuil, 1867 (*Antitaurus*, pp.1218, 1220); de Tschihatcheff, 1867 (*Antitaurus*, p.684); de Verneuil 1867 (the Vosges mountains, p.127); de Verneuil in d'Archiac, Fischer & de Verneuil, 1869 (*Antitaurus*, table, p.442).

It was only when Oehlert (1884, pp.417-419, pl.XX, figs.1, 1a-c) figured one specimen from d'Orbigny's original collection and accompanied it by a short, but good, description, that the species started to be comprehended. Figures and some elements of the description were duplicated by Thevenin (1906, p.194, pl.XXI, figs.7-10), and this specimen is again illustrated here (Fig.1, 1a-c).

Following this, Chernyshev (1885, p.5; 1886, p.236) referred to *Rhynchonella boloniensis* GOSSELET (non d'ORB.) while Gosselet (1887, pp.188-189, 195) acknowledged that Oehlert "démontrait que la Rhynchonelle que j'avais nommée *Rh. boloniensis* n'était pas celle que d'Orbigny avait en vue", and that "J'avais cru pouvoir donner ce nom à la Rhynchonelle la plus fréquente de Ferques [*R. ferquensis*]". Consequently Gosselet (1887, pp.194, 195, 199-202, 203, 207, pl.I, figs.1a-d, 2d, 3a-d, 4d, 5a-d, 6a-d, 7a,c, 8a-d + references to pl.III, figs.1a-d in Gosselet, 1877b and pl.IV, fig.8 in Gosselet, 1880b as *R. boloniensis*) established a new species, *R. ferquensis* (already described in 1877a, p.264 as *R. boloniensis*), which he abundantly illustrated, mixing specimens from Ferques and Hestrud (west-central border of the Dinant Basin, Avesnois, France). In so doing Gosselet must have remembered the argument he had on this matter with Dewalque (1863a, p.323), who told him: "Je regrette beaucoup de ne connaître la *Terebratula boloniensis* que par une phrase du *Prodrome* de d'Orbigny".

Gosselet (1887, pp.200, 207) also pointed out that in establishing *R. letiensis* GOSSELET 1879 for the Famennian forms he had identified as *R. boloniensis* [i.e. 1860, pp.84, 86, 87, 94; 1863, p.171; 1871, pp.300, 321] he corrected another mistake: "Je l'ai cité par erreur dans le famennien et en particulier à Etroeungt; toutes ces prétendues Rhynchonelles *boloniensis* famenniennes sont des *R. letiensis*", "La *R. letiensis* est très voisine de la *R. ferquensis*....Je les ai souvent confondues. Les *R. boloniensis* que j'ai citées dans le famennien sont des *letiensis*".

Having made the corrections just mentioned Gosselet (1887, pp.188, 195) concluded that from now on "j'appliquerai en outre le nom de *R. boloniensis* proposé par d'Orbigny avec une caractéristique insuffisante", and that "L'espèce figurée par Monsieur Oehlert n'est connue jusqu'à présent que dans le devonien supérieur du Boulonnais".

In spite of the basic contributions of Oehlert (1884) and Gosselet (1887), who made the Boulonnais species *R. boloniensis* and *R. ferquensis* clearly known, the difficulty of separating them persisted in the literature. Rigaux (1892, pp.8, 9, 16, 17, table A), who played a major role in unravelling the Boulonnais Devonian, recorded the species (as *R. boloniensis*), as common, and one (or two) variety(ies) only at the base of the Frasnian, a level at which the species cannot be present (see be-

low). Rigaux (1908, p.23, table) indirectly recognized his mistake when he mentioned the rare occurrence of the species (as *Camarotoechia Boloniensis*) only in younger Frasnian rocks (Ferques Limestone), but he failed to illustrate the species and merely pointed out correctly that it differed from *Rhynchonella ferquensis* in two characters: the number of costae, about 30, as already indicated by Oehlert, 1884, p.417, and a less well marked sulcus. With the exception of this minimal differentiation by Rigaux (1908) the distinction of the two species remained an arduous, if not impossible, task after 1887, and so did the recognition of *R. boloniensis*. This state of things is best conveyed by the form of citation in Evans (1917, p.110): *R. boloniensis* d'ORB. (? *Rh. ferquensis* GOSS.). Thus all citations of *Rhynchonella boloniensis* (also as *Camarotoechia*, "*Camarotoechia*", *Camerophoria*, "*Trigonirhynchia*", *Ptychomaletoechia*, *Ripidiorhynchus*) between 1888 and now in rocks of Frasnian, Famennian, and earliest Carboniferous age in all parts of the world, other than from the type area, are erroneous. However, one or more of these misidentified forms could prove to belong to the new genus here described. Therefore, a long negative synonymy list is omitted in the present paper. It is enough to indicate the absence of the species in the following countries, and to refer only to papers including a description and/or an illustration: France [outside the type area, in particular in the roadstead of Brest in Finistère: Renaud, 1942, vol.1, p.159, 160, 161, 163, vol.2, pp.101-102, table, pp.356-357; the description is borrowed from Oehlert (1884)'s description of the species in Ferques, Boulonnais], Armenia, Azerbaidzhan, Belgium, England, Iran, Kazakhstan [Nalivkin, 1930, pp.61-62, pl.IV, figs.18a-d, 19a-d, 20a-d, 21a-d, 22a-d (late Famennian); 1937, p.72, pl.XII, figs.7a-d, 8a-d, 9a-d, 10a-d, 11a-d (late Famennian); Simorin, 1956, pp.225-227, pl.XXV, figs.9-16 (late Famennian); Martynova, 1961, pp.95-96, pl.VIII, figs.1-4 (late Famennian)], Kirgizstan, Latvia, Libya, Lithuania, Russia [Bashkiria (Mikryukov, 1955, p.231, pl.II, figs.7a,b, 8; late Famennian), Kuznetsk Basin (Rzhonsnitskaya, 1953, pp.164-165, pl.X, figs.10, 11; late Famennian), Tataria], Poland [Matyja & Zbirowska, 1974, pp.673-674, pl.2, figs.3a,b (lower Famennian)], Spain [Westbroek, 1964, pp.248-251, pl.II, figs.3a-d, 4a-d, 5a-d, 6a-d (late Frasnian or lower Famennian)], Tadzhikistan, Turkey.

The scarcity of material from the type area is another element that has hampered the understanding of *Rhynchonella boloniensis*. Contrary to *R. ferquensis* (which is frequent), *R. boloniensis* has been mentioned as rare by various authors, e.g. Rigaux (1908, p.23, table), Renaud (1942, p.102), Brice & Meats (1972, pp.225, 226), Brice (1981, pp.143, 144; in Brice *et al.*, 1981, p.164). Brice & Meats conceded that "in spite of their efforts they only managed to collect specimens doubtfully belonging to that species".

The author considers the external characters of the species here named *Gesoriacorostrum boloniense* as properly known since Oehlert's description (1884). But, on account of the difficulties just mentioned and those that will be alluded to below, he will concentrate his study on the lectotype of the species and four specimens very like it, in the hope that in so doing he will preclude any further misinterpretation. The author will also demonstrate that the species *Rhynchonella boloniensis* and *R. ferquensis* are different not only at the specific level, but also at the generic one.

2. *Gesoriacorostrum* n. gen.

Derivatio nominis: *Gesoriacum* (Latin) = historical name of Boulogne-sur-Mer; *rostrum* (Latin, neuter) = beak. Boulogne is the nearest important city to the type locality (Ferques) of the type species.

Type and only species: *Atrypa Boloniensis* d'ORBIGNY, A. 1850.

The year of establishment of the species was given as 1847 by d'Orbigny (p.92); in the same publication d'Orbigny (1850, pp. LIX-LX) he explained the reason why this date was erroneously maintained.

Diagnosis: Medium-sized, rotund, subrounded. Sulcus and fold not sharply separated from valve flanks, beginning at some distance from beaks. Sulcus shallow to moderately deep, fold low with convex top. Shell thickest between mid-length and anterior margin. Numerous low, simple, regular costae starting at beaks. Parietal costae always present. Dental plates long and subparallel. Dorsal median septum relatively thick. Deep septalium covered anteriorly with a thin and very short connectivum.

Description: Medium-sized. Subrounded in ventral and dorsal views; this subrounded contour is especially characteristic in ventral view, because the postero-lateral borders of the pedicle valve are straight or only slightly concave. Dorsibiconvex, the brachial valve being clearly deeper (62 - 67% of shell thickness) than the pedicle valve. Shell thickest behind anterior margin. Commissure sharp, clearly indented by the costae. Sulcus and fold clearly but not sharply separated from flanks, beginning at some distance from beaks. Sulcus wide from inception, wide at front, shallow to moderately deep. Bottom of sulcus flat to slightly concave. Tongue moderately high to high, well defined, sub-trapezoidal with convex top, elongated, rarely tending to become vertical toward the anterior commissure. Crest of tongue lower than thickest part of shell. Ventral beak suberect to erect, projecting. Ventral interarea high, short, separated from flanks by sharp beak ridges. Fold low with convex top. Costae well marked, simple, regular, low, angular with more or less rounded crests, and starting at the beaks.

Numerous lateral costae, about twice the number of median costae. One or two parietal costae present on both flanks of sulcus and fold. Apical angle moderately wide. Deltidial plates very slender. Dental plates relatively slender, long and subparallel to slightly convergent anteriorly. Umbonal cavities large. Delthyrial cavity wide with regular contour in its apical part in serial transverse sections. Teeth stout, short and wide, faces slightly undulating. Septum relatively thick and persisting for about one-third length of valve. Septalium short, deep, cross-section narrow and amphora-shaped posteriorly, wide and V-shaped and almost as wide as deep anteriorly. Connectivum very thin, very short, slightly raised medially where it forms a low ridge; it covers only the most anterior part of the septalium, and extends beyond it. Dental sockets shallow with slightly undulating bottom. Inner socket ridges moderately high. Crural bases not well marked. Crura very short, crescent-shaped in transverse section.

Remark: Sartenær (2001, p.208) elevated the subfamily Ripidiorhynchinae SAVAGE 1996 to family rank, with *Ripidiorhynchus* as sole representative. He declined to put in this family the new genera resulting from a revision of the genus. At the same time he did not favour the establishment of monogeneric families, and those genera were provisionally included, with reservations, in the family Trigonirhynchiidae SCHMIDT 1965. *Gesoriacorostrum* n.gen. is likewise tentatively assigned to that family.

Comparison: As is commonly the case with long-standing taxa, the species here described as *Gesoriacorostrum boloniense* has been successively assigned to the genera *Terebratula* MÜLLER 1776, *Rhynchonella* FISCHER de WALDHEIM 1809, *Camarotoechia* HALL & CLARKE 1893 (also "*Camarotoechia*"), and occasionally to *Camerophoria* KING 1844 [Beugniers *et al.*, 1962, pp.205, 227; Beugniers, 1966, p.266], "*Trigonirhynchia*" COOPER 1942 [Westbroek, 1967, p.66], or *Ptychomaletoechia* SARTENÆR 1961 [Wallace, 1969a, table 1, p.90; 1969b, fig.2, p.369, p.370, fig.6, p.377, fig.7, p.378; Barkhatov, 1973, pp.460, 461; Zeiba, 1977, p.113]. Since 1979 the species has usually been assigned to the genus *Ripidiorhynchus* SARTENÆR 1966.

Several genera show features in common with *Gesoriacorostrum* n. gen. as detailed below, but the latter differs markedly in its plump appearance resulting from the combination of the following features: the subrounded contour in ventral and dorsal views; the even convexity of the pedicle valve; the low fold with convex top that almost blends into the general convexity of the brachial valve; the low costae; the anterior extremity of the bounding costae of the sulcus not protruding. The constancy of some characters (contour, number of costae, value of the apical angle) is also characteristic of the new genus.

Gesoriacorostrum n. gen. and the early Frasnian genus *Ripidiorhynchus* exhibit some similar features: wide sulcus and fold starting forward of the beaks; ventral interarea high; fold rounded; simple, regular, well marked costae starting at the beaks; the presence of parietal costae; apical angle wide; dental plates subparallel to slightly convergent anteriorly; umbonal and delthyrial cavities wide; teeth short and stout; septalium short and deep, covered by a very short and thin connectivum anteriorly; and crura crescent-shaped proximally. *Gesoriacorostrum* is very different from *Ripidiorhynchus* externally, but slightly internally. *Gesoriacorostrum* is distinct in a relatively smaller thickness of the shell, and in particular of the pedicle valve; a shallow sulcus not sharply separated from the valve flanks and starting somewhat more anteriorly; lower tongue and fold; lower rounded costae which are more numerous medially; a constant and quite distinct general costal formula [4/3; 2-2/2-2 to 3-3/3-3; 9 to 13/10 to 14 in *R. livonicus* as opposed to 6/5; 1-1/1-1 or 2-1/2-1 or 2-2/2-2; 10 to 11/11 to 12 in *G. boloniense*]; top of shell never at front; a less variable apical angle; a shorter septalium which anteriorly has V-shaped rather than cup-shaped cross section; poorly differentiated crural bases; and lower inner socket ridges.

Gesoriacorostrum n. gen. and the middle to late Frasnian genus *Porthmorhynchus* SARTENAER 2001 have some characters in common, e.g.: sulcus and fold not beginning at the beaks; well marked, simple, and regular costae starting at the beaks; a high ventral interarea; subparallel dental plates; large umbonal cavities; a wide delthyrial cavity; stout and short teeth; the presence of a connectivum. *Gesoriacorostrum* can easily be separated from *Porthmorhynchus* by the following external features: subrounded contour (transversely subelliptical in *Porthmorhynchus*); larger size; smaller thickness; sulcus and fold less sharply separated from the flanks; sulcus usually shallower, starting wide and further away from the beaks; upper part of tongue never recurved posteriorly; lower fold with top always (sometimes strongly) convex; sharper beak ridges; a larger number of lower and more rounded median and lateral costae; a constant general costal formula; the constant presence of parietal costae which may number two on each flank of sulcus and fold; thickest part of shell never at front; width only slightly exceeding length; and a smaller apical angle with an almost constant value. Internal differences between the two genera are more difficult to assess. Serial transverse sections in more specimens will be needed in order to evaluate the validity and the constancy of the following slight differences observed in *Gesoriacorostrum*: a slightly longer septum, and a slightly deeper amphoro- to V-shaped septalium (the septalium of *Porthmorhynchus* is rather cup-shaped).

The late Frasnian genus *Saxulirostrum* SARTENAER 2001 and the middle to late Frasnian genus *Hypselorhynchus* SARTENAER 2001 can be immediately separated from *Gesoriacorostrum* n. gen. by a considerably smaller size. The new genus is also distinct from *Saxulirostrum* in many other external characters: a thicker pedicle valve; sulcus and fold less sharply separated from the flanks; a shallower sulcus; lower fold and tongue; top of fold always convex; a larger number of lower median and lateral costae; a constant general costal formula; top of shell never at front. Both genera have a connectivum, and their dental plates, septum and crura have similar length and thickness, but in *Saxulirostrum* the septalium is narrower and deeper, the dental sockets are deeper, and the connectivum is slightly thicker.

Outside its considerably larger size, *Gesoriacorostrum* is distinct from *Hypselorhynchus* in a different contour (subrounded in *Gesoriacorostrum*, transversely subelliptical in *Hypselorhynchus*); sulcus and fold beginning generally nearer to the beaks; a larger number of median costae; thickest part of shell never at front or very near to it; a more constant value of the apical angle. Internal features allow also an easy separation of the two genera, which both possess a thin connectivum. *Hypselorhynchus* differs by thicker dental plates and septum, and smaller umbonal cavities.

Villirhynchia CHERKESOVA 1999 and *Centrorhynchus* SARTENAER 1970 are very different from *Gesoriacorostrum* n. gen. Still, comparison is made with the former, because it has a similar age, and with the latter, because *Gesoriacorostrum boloniense* and the late Famennian *Centrorhynchus letiensis* (GOSSELET 1879b) have been occasionally confused. Many characters make *Gesoriacorostrum* distinct from the middle Frasnian (*Ancyrognathus triangularis* Zone) genus *Villirhynchia*: larger size; subrounded contour (transversely subelliptical in *Villirhynchia*); sulcus and fold not sharply separated from the flanks; shallower sulcus; lower fold; a larger number of median and lateral costae; a constant general costal formula; the constant presence of parietal costae which may number two on each flank of sulcus and fold; thickest part of shell never at front; smaller value of the apical angle; thicker dorsal median septum (lamellar in *Villirhynchia*); deeper septalium; the presence of a connectivum.

Gesoriacorostrum can easily be separated from *Centrorhynchus* by its more numerous and lower median and lateral costae. In *Gesoriacorostrum* internal structures are more slender (more particularly the connectivum), the umbonal cavities are larger, and the inner socket ridges are higher.

3. *Gesoriacorostrum boloniense* (d'ORBIGNY 1850)

Types: The type series of *Atrypa boloniensis* is housed in the Muséum d'Histoire Naturelle in Paris (Collection d'Orbigny 344), and includes three specimens: two are slightly distorted, the other (very well preserved) was first figured by Oehlert (1884, pl.XX, figs.1, 1a-c), then by Thevenin (1906, pl.XXI, figs.7-10), and in the present paper (Fig.1, 1a-c).

Brice & Meats (1972, pp.225, 226) incorrectly stated that the type series was restricted to a single specimen, which Brice (1981, p.143) considered as the holotype. However, much earlier de Verneuil (in d'Archiac *et al.*, 1866, p.12) had mentioned "les échantillons sur lesquels d'Orbigny avait fait cette espèce". The specimen figured by Oehlert (1884) is here designated lectotype.

Description: *Preliminary remark:* Although based on a single specimen (the lectotype), Oehlert's (1884) excellent description of the species should have put an end to any further confusion with other species. Some of the essential external characters mentioned in his description are incorporated in the author's description of the species and the new genus. Also included in this description are external characters mentioned in the extremely abbreviated descriptions and comparisons of the species at its type locality by d'Orbigny (1850, p.92), Thevenin (1906, p.194, Rigaux (1908, p.23), and Brice & Meats (1972, pp.225-226). The author is puzzled by the most recent description of the species by Brice (1981, pp.143-144, fig.1A, p.145, pl.VI, figs.1a-e, 2a-e, 3a-e, 4a,b), because he believes that the number of median + parietal costae of some of Brice's specimens (6/5 and 7/6), and their sharply marked costae, sulcus and fold (see pl.VI, figs.1a-e, 3a-e) are characters that are part of the definition of *Porthmorhynchus ferquensis*.

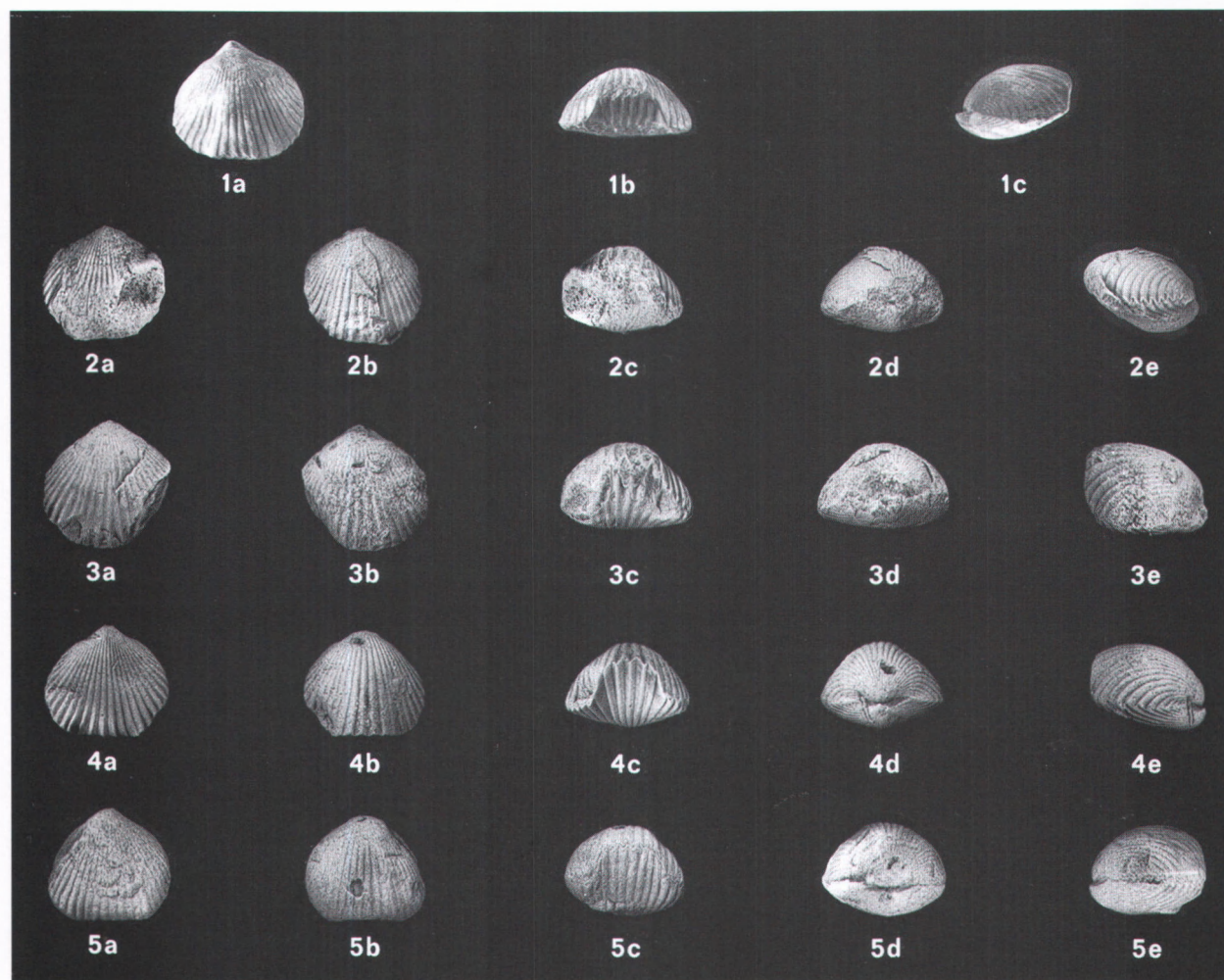
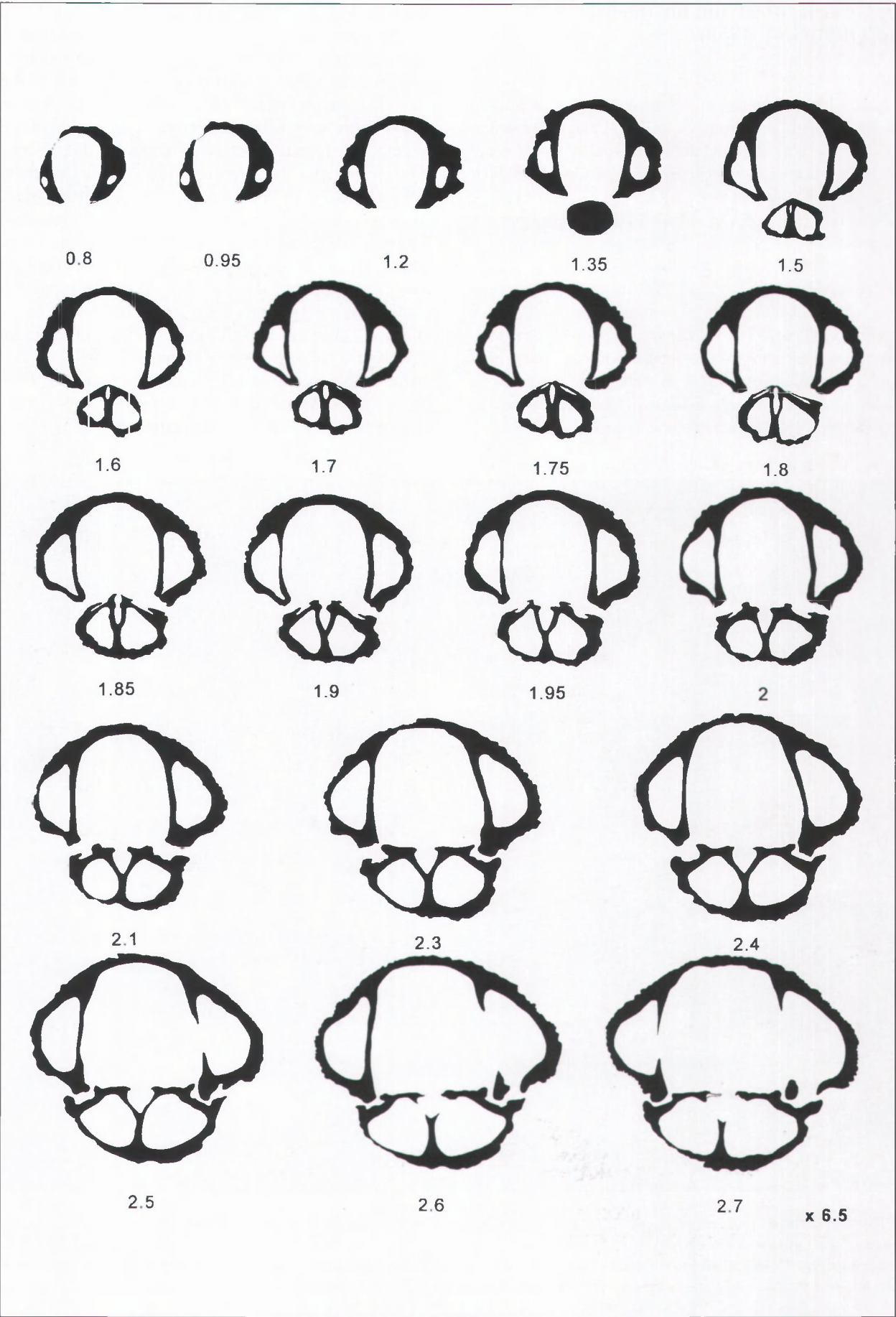
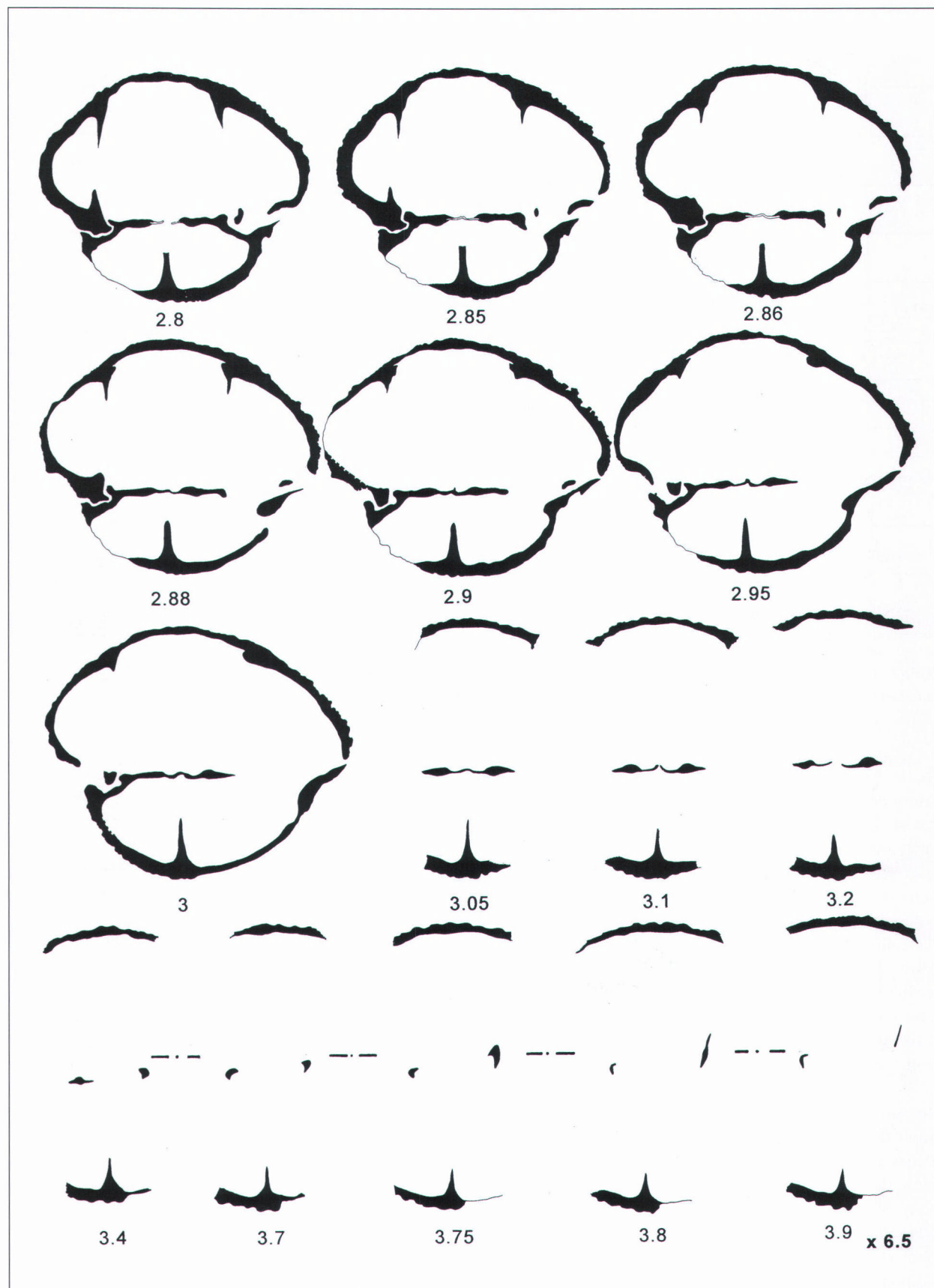


Figure 1. *Gesoriacorostrum boloniense* (d'ORBIGNY 1850). All figures are natural size. 1a-c: lectotype; dorsal, frontal and lateral views. 2a-e: topotype A, IRScNB a11918; ventral, dorsal, frontal, apical, and lateral views. This specimen has been ground (Figs.2,3). 3a-e: topotype B, IRScNB a11919; ventral, dorsal, frontal, apical, and lateral views. 4a-e: topotype C, IRScNB a11920; ventral, dorsal, frontal, apical, and lateral views. 5a-e, topotype D, IRScNB a11921; ventral, dorsal, frontal, apical, and lateral views.





Figures 2,3. *Gesoriacorostrum boloniense* (d'ORBIGNY 1850). Camera lucida drawings of serial transverse sections; figures are distances in mm forward of the ventral umbo. Topotype A, IRScNB a11918. Measurements: length = 15.7 mm; width = (16.9) mm; thickness = 11.9 mm. The specimen has been photographed before grinding (Fig. 1, 2a-e).

in mm	Lectotype	Topotype B IRScNB a 11919	Topotype A IRScNB a 11918	Topotype C IRScNB a 11920	Topotype D IRScNB a 11921
l	17.3	16	15.7	15.1	14.5
w	19	(18.6)	(16.9)	17.3	17.1
lpv unrolled	23	(23.5)	22	21.5	22
t	10.8	11.5	11.9	12.2	12.5
tpv	3.6	4.2	4.2	4.6	4.5
tbv	7.2	7.3	7.7	7.6	8
l/w	0.91	(0.86)	(0.93)	0.87	0.85
t/w	0.57	(0.62)	(0.70)	0.71	0.73
t/l	0.62	0.72	0.76	0.81	0.86
apical angle	111°	111°	(114°)	(112°)	(109°)
costal formula	$\frac{7}{6}; \frac{1-1}{1-1}; \frac{11}{12}$	$\frac{6}{5}; \frac{?-2}{?-2}; \frac{11}{12}$	$\frac{6}{5}; \frac{1-1}{1-1}; \frac{12}{13}$	$\frac{6}{5}; \frac{1-1}{1-1}; \frac{10}{11}$	$\frac{6}{5}; \frac{2-1}{2-1}; \frac{10}{11}$

Table 1. *Gesoriacorostrum boloniense* (d'ORBIGNY 1850). Measurements (in mm); figures in parentheses are reasonable estimates on damaged specimens. Abbreviations used: l = length; w = width; t = thickness; pv = pedicle valve; bv = brachial valve.

The author is also surprised that Brice's description is based on 25 specimens; this is a high figure for a species that has always been considered scarce (see above). It is partly on account of these reservations that the present description is restricted to the lectotype and four specimens very like it.

The following description refers only to specific characters in need of further elaboration. Sulcus beginning at 31-38 % of shell length or at 27-35 % of the unrolled valve length. Sulcus starting with a width about one third of the width of the sulcus at front. Width of sulcus at front varying between 61-66 % of shell width.

Measurements and costal formulae of the five photographed specimens are given in table 1. Maximum width occurs at a point between 61-69 % of shell length anterior to the ventral beak. Top of pedicle valve located relatively posteriorly, between 22-38 % of shell length. Top of brachial valve, and thus of shell, located between 58-79 % of shell length anterior to the ventral beak. From this point the valve slopes gently toward the front, where the top of the tongue is 12-24 % lower than the point of maximum shell thickness. Length of ventral interarea oscillating around half the shell width.

Serial transverse sections of one specimen (topotype A, IRScNB a 11918) are shown in Figures 2 and 3; this specimen was photographed (Fig. 1, 2a-e) before grinding.

Stratigraphical range: From 1850 to 1880 there was no reliable stratigraphical information in the literature: d'Orbigny (1850, p.92) only mentioned the locality (Ferques) where the original material was collected, and Gosselet, as explained above, acknowledged in 1887 that between 1860 and 1880 he erroneously gave the name of the species to specimens belonging to other taxa. After 1887 on, with the exception of Robinson (1921, p.231) who mentioned it in the Blacourt Limestone (Givetian), *Gesoriacorostrum boloniense* is considered as present in the Ferques Limestone (middle Frasnian), e.g. by Gosselet (1888, p.532), de Lapparent (1900, p.861), Rigaux (1908, p.23, table; Rigaux's citations of 1878 and 1892 are discussed above), Maillieux (1909, table, p.141), Wallace (1969a, table 1, p.90). Wallace (1969b, pp.367-368, fig.2, p.369, p.370, fig.6, p.377, fig.7, p.378) restricted the stratigraphical range of the species within the Ferques Limestone to two levels: (1) the "Thin Basal Limestone, 2 cm thick" equivalent to "the earliest development of limestone within the Calcaire de Ferques" corresponding to the base of the Bois Member, and (2) the "Upper

Beds" of the Ferques Limestone. The Ferques Limestone, now called the Ferques Formation, is 77.3–84.3 m thick and is currently subdivided into four members: Fiennes (14–21 m thick) at the base, Bois (15.8 m), La Parisienne (32.5 m), and Gris (15 m). In terms of the conodont zonation, the lower member is in the upper part of the old Middle *Mesotaxis asymmetrica* Zone (now *Palmatolepis punctata* Zone), the second and third members correspond to the Upper *Mesotaxis asymmetrica* Zone (most of the Early *Palmatolepis hassi* Zone), and the upper member is in the lower part of the *Ancyrognathus triangularis* Zone (Late *Palmatolepis hassi* + *P. jamieae* Zones). Brice (1981, pp.139, 143, 144) gave the following range for the species, similar to the one given by Wallace (1969b): from the base of the Bois Member to some ten metres below the top of the La Parisienne Member (i.e. "around the middle" of that member according to Brice in Brice *et al.*, 1981, p.164). But, as noted above, the description of the species by Brice seems to apply also to specimens that the present author is rather inclined to identify as *Porthmorhynchus ferquensis*. It is worthy of note that, according to Brice (1981, p.139, p.143), the two species occur together and for the first time at the base of the Bois Member (*P. ferquensis* slightly earlier than *Gesoriacorostrum boloniense* according to Brice in Brice *et al.*, 1981, fig.1, pp.160–161, p.164), run parallel through the member and most of the La Parisienne Member, with only *Porthmorhynchus ferquensis* ranging higher. Since 1981 *Gesoriacorostrum boloniense* has constantly been mentioned in the two members by Brice (1982, p.14, pl.1, figs.1a–e = pl.VI, figs.2a–e in Brice 1981; 1986, table 1, p.199; 1988, table 2, p.327). Brice (in Mistiaen *et al.*, 2002, fig.3, p.80), taking advantage of a temporary outcrop (Pâtures à Buissons trench north of La Parisienne quarry) in Spring 1997, found the species in the upper part [top of bed 2, beds 3–5 (abundant in the base of bed 4), base of bed 6] of term c of the Pâtures Member of the Beaulieu Formation. This formation is about 200 m thick and subdivided into three members: Cambresèque (about 80 m thick) at the base, Noces (20 m), and Pâtures (about 100 m). The Pâtures Member is in turn subdivided into four terms: a (4–5 m), b (about 30 m), c (20 m), d (about 40 m). In terms of the conodont zonation the Beaulieu Formation encompasses the Lowermost, Lower and most of the Middle *Mesotaxis asymmetrica* Zones (now *Mesotaxis falsiovalis* + *Palmatolepis transitans* + most of the *P. punctata* Zones). The species occurs in the middle part of the Middle *Mesotaxis asymmetrica* Zone (*Palmatolepis punctata* Zone). This places the first occurrence of the species about 60 to 70 m lower than was reported eleven years ago. The species had not previously been found in the Pâtures Member.

The stated aim of this paper being to clarify the systematic position of the Boulonnais species, to contribute to

its understanding, and to avoid further misinterpretations, the author will maintain his intention to concentrate on the lectotype and four specimens very like it collected by Peigy Wallace: three of Wallace's specimens came from the lower beds of the Ferques Limestone in the Bouton quarry, one from the Ferques Limestone in the Bois quarry East. The range of the species recognized on this basis almost corresponds with the old Upper *Mesotaxis asymmetrica* Zone (now most of the Early *Palmatolepis hassi* Zone).

If the numerous specimens recently collected by Brice (in Mistiaen *et al.*, 2002) should prove to belong to the species, its stratigraphical range would have to include the middle part of the Middle *Mesotaxis asymmetrica* Zone (now *Palmatolepis punctata* Zone). At the same time the species that has for more than 150 years been consistently reputed to be rare, would now have to be considered as abundant.

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