BULLETIN DE L'INSTITUT ROYAL DES SCIENCES NATURELLES DE BELGIQUE, SCIENCES DE LA TERRE, **62**: 121-138, 1992
BULLETIN VAN HET KONINKLIJK BELGISCH INSTITUUT VOOR NATUURWETENSCHAPPEN, AARDWETENSCHAPPEN, **62**: 121-138, 1992

New Lower Maastrichtian megathyridid Brachiopods from the Phosphatic Chalk of Ciply (Mons, Belgium).

by Eric SIMON

Abstract

The Phosphatic Chalk of Ciply (upper part of the lower Lower Maastrichtian) was investigated for microbrachiopods in the Van Damme quarry at Ciply. Samples of this chalk were treated with a super saturated Glauber salt solution (method of SURLYK, 1972). Among the microbrachiopods collected, two new Megathyrididae were recognized: *Megathiris bidiscoidea* n. sp. and *Argyrotheca popielae* n. sp. The presence of a new *Megathiris* species in this deposit is interesting because this genus is uncommon in Upper Cretaceous chalks.

Key-words: Brachiopods, Megathyrididae, Cretaceous, Maastrichtian, Ciply, Belgium.

Résumé.

Pour étudier les microbrachiopodes de la Craie Phosphatée de Ciply (partie supérieure de la partie inférieure du Maastrichtien Inférieur), des échantillons de craie ont été prélevés dans la carrière Van Damme à Ciply. Ils ont été traités au moyen d'une solution supersaturée de sulfate de sodium (méthode de SURLYK, 1972). Parmi les brachiopodes récoltés, deux nouvelles espèces de Megathyrididae ont été reconnues: *Megathiris bidiscoidea* n. sp. et *Argyrotheca popielae* n. sp. La présence d'une nouvelle espèce de *Megathiris* dans ces sédiments est intéressante car ce genre est peu fréquent dans les dépôts du Crétacé Supérieur.

Mots-clefs: Brachiopodes, Megathyrididae, Crétacé, Maastrichtien, Ciply, Belgique.

Introduction

For a long time, palaeontologists' attention has been drawn to the unusual lithological structure and the remarkable fossil wealth of the Phosphatic Chalk of Ciply (Mons area). This rather coarse-grained chalk is brownish in colour because it contains very large amounts of dark brown phosphate grains. For this deposit, CORNET & BRIART (1866) proposed a dating of Maastrichtian age. JELETZKY (1951) also considered it as belonging to the Upper Maastrichtian and moreover, thought that this Phosphatic Chalk of Ciply sedimentation had occurred in continuity whith the underlying "Craie de Spiennes" placed by him in the Lower Maastrichtian. JELETZKY's opinion was followed by MARLIERE (1954) and by HOFKER (1959, 1961). Very recently, however, ROBASZYNSKI & CHRISTENSEN (1989) restudied the Ciply area for foraminifera and belemnites. They concluded in favour of a good correlation between the brown Phosphatic Chalk of Ciply and the *obtusa* Zone. They found an abundance of *Belemnella (Pachybelemnella) obtusa* SCHULZ which is an excellent marker of the upper part of the lower Lower Maastrichtian. The same authors demonstrated also that the "Craie de Spiennes" is from the upper part of the Upper Campanian and that a discontinuity exists between this level and the Phosphatc Chalk of Ciply.

In the area of Ciply, most quarries are abandoned today. Nowadays, the only easily accessible place for sampling "brown chalk" is the Van Damme quarry, 8 km to the south of the town of Mons (Fig.1). A section of this quarry is illustrated in ROBASZYNSKI & CHRISTENSEN (1989, p. 400, fig. 4). The phosphatic chalk section starts with the "Poudingue de Cuesmes" (phosphatic pebbles) and reaches a thickness of 3 meters. The phosphatic chalk is overlain with a one meter thick hard-ground which contains anfractuosities filled with soft sediment of the same age (Maastrichtian). Finally the hard-ground is capped by high deposits of Danian age (Tuffeau de Ciply). The "Tuffeau de Saint-Symphorien" (Upper Maastrichtian) is not present in the Van Damme quarry. A large hiatus between the sediments of Lower Maastrichtian age and Danian deposits is observed here. Except the *Megathiris* specimen conserved in the Institut royal des Sciences naturelles de Belgique (I R Sc N B) Brussels, all specimens found in Ciply and presented in this paper were extracted from phosphatic chalk sampled in the Van Damme quarry.

VON HANSTEIN (1879) and PERON (1894) published on the macrobrachiopods from the Ciply Chalk. Other publications dealt partially with macrobrachiopods from the Ciply area and, among these, the following papers must be cited: de RYCKHOLT (1854), BINKHORST van DEN BINKHORST (1859), BOSQUET (1859), WOODWARD (1868), QUENSTEDT (1871) and CORNET & BRIART (1874). Although the papers cited above are from the last century, and though the species described

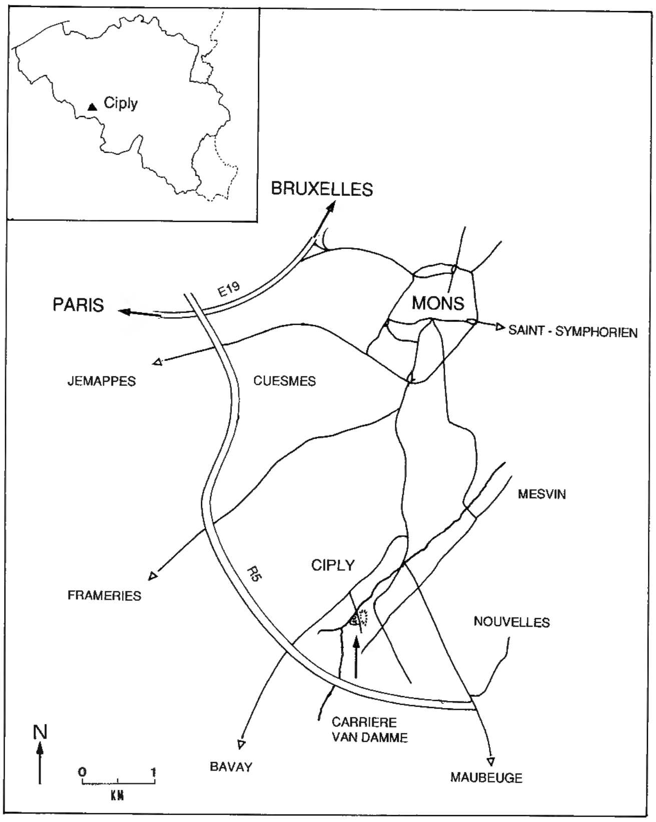

Fig. 1 — Map showing the situation of the Van Damme quarry in Ciply (Mons Basin, Belgium).

in them are in need of substantial revision, all this literature is an evidence of the great interest paid by numerous palaeontologists to this important brachiopods fauna.

More recent are papers of SAHNI (1929) dealing with Carneithyrididae, of BACKHAUS (1959) in which Thecideidae from Ciply are revised and of KRUYTZER (1969) who cited the *Crania* species founded in the chalk of Ciply.

Very detailed papers on the articulate brachiopods from the chalk of Rügen (Germany) were published by STEINICH (1963,1965, 1967, 1968a and 1968b). In these papers many microbrachiopods were described for the first time and STEINICH also took into consideration the stratigraphical value of this fauna. Therefore a new field of research was opened.

SURLYK (1970a, 1970b, 1971, 1972, 1973, 1974, 1979, 1982, 1983, 1984) studied brachiopods from northern Germany and Denmark and successfully used microbrachiopods for stratigraphical purposes. JOHANSEN (1987), JOHANSEN & SURLYK (1990) and SURLYK & JOHANSEN (1981 and 1984) carried on the use of microbrachiopods distribution for specifying the stratigraphy of Campanian and Maastrichtian Chalk in Denmark and in England (Norfolk). BITNER & PISERA (1979) paid attention to microbrachiopods in the Upper Cretaceous chalk of Mielnik (eastern Poland) and described two new genera.

However, detailed microbrachiopods studies are still lacking for Belgian Cretaceous chalks. For this reason, I began in 1990 to sample in the Ciply area. Though this chalk is not as rich in species as the Campanian-Maastrichtian chalks of Denmark and Norfolk, a reasonable amount of interesting brachiopods (macro- and micro-) were extracted. A further paper will be devoted to those results.

The present paper presents only two new species of Megathyrididae found in the Phosphatic Chalk of Ciply.

The first one, *Argyrotheca popielae* n.sp. is frequent in the sediment filling the anfractuosities of the hard-ground or in the chalk situated just under the hard-ground. The second one, *Megathiris bidiscoidea* n.sp. is very infrequent and was found mainly just below the hard-ground. This species is interesting because the genus *Megathiris* is mainly common in the Tertiary sediments (de MORGAN, 1883, DREGER, 1889, SACCO, 1902, MEZNERICS, 1943, BARCZYK & POPIEL-BARCZYK, 1977) whereas very few Upper Cretaceous species are known. For instance, no *Megathiris* species was discovered in Maastrichtian chalks from Rügen by STEINICH (op. cit.), nor in chalks from Denmark, Germany and England by SURLYK and JOHANSEN (op. cit.). The same remark is true for the results obtained by BITNER & PISERA (1979).

Only a few *Megathiris* species from the Cretaceous were described during the 19th century: *Megathiris depressa* d'ORBIGNY, 1847 from the white chalk (Campanian) of the Paris Basin, *Megathiris hexaglochis* (de RYCKHOLT, 1854) (= *Argiope Hexaglochis* de RYCKHOLT, 1854) from the Upper Campanian or Maastrichtian of Ciply and also *Megathiris davidsoni* (BOSQUET, 1859) (= *Argiope Davidsoni* BOSQUET, 1859) from the Upper Maastrichtian of the Limburg and Ciply areas.

For this reason, *Argyrotheca popielae* n. sp. and especially *Megathiris bidiscoidea* n. sp. constitue a useful complement to the knowledge of the brachiopods fauna of the Lower Maastrichtian.

Material and methods

For the present paper, 7 samples of Phosphatic Chalk of Ciply were collected in the Van Damme quarry at different heights (Table 1). For each sample, enough chalk was excavated in order to have more or less 5 kg dry weight of analysis material. This quantity is considered as ideal for investigating microbrachiopods in chalk as a bigger sample would not generally increase the number of species (SURLYK, 1972). However, samples collected in the anfractuosities of the hard ground have a lower weight due to the modest volume of these small holes dispersed in the mass of the hard rock (Table 1). For this reason, 4 samples were taken in these anfractuosities and 3 samples in the underlying chalk.

The chalk collected was air dried at a temperature of 20°C during at least 2 weeks. When dry, each sample was weighed and treated with Glauber salt solution fol-

Table 1

Phosphatic Chalk samples collected in the Van Damme quarry at Ciply. The total number of brachiopods found in each sample is established by adding the highest number of isolated ventral or dorsal valves to the number of complete specimens found. The dry weight of samples, the number of brachiopods / kg chalk, the number of *Megathiris bidiscoidea* and of *Argyrotheca popielae* are indicated. For samples collected below the hard-ground, the position is measured (in cm) from the base of the hard-ground.

sample position with regard to hard-ground (cm)	Sample N°	Sample dry weight (kg)	Total number of Brachiopods	number of Brachiopods/ kg chalk	number of M.bidiscoidea	number of A. popielae
in the hard-ground	1	3.1	119	38.4	2	49
in the hard-ground	3	2.5	50	20.0	1	22
in the hard-ground	6	2.6	219	84.2	2	166
in the hard-ground	7	0.9	75	83.3	0	49
- 25	4	5.3	170	32.1	2	135
- 100	2	4.8	26	5.4	0	1
- 270	5	5.5	43	7.8	3	14

lowing the method of SURLYK (1972). The chalk was washed in a supersaturated Glauber salt solution (Na_2SO_4) at a temperature between 40 and 60 °C. After cooling, the salt/chalk mixture was frozen. This treatment was repeated 6 times for each sample. This number of boiling/freezing repetitions was sufficient for this kind of chalk as the fossils obtained were very clean.

The samples were washed and sieved with hot water for dissolving the salt residues. A 2 mm sieve was used for the large fractions, 0.5 mm and 0.1 mm sieves were used for smaller fractions. The sieved samples were dried slowly and brachiopods were picked out under a binocular microscope at a magnification of 6.4 x for the 2mm fraction and at a magnification of 16 x for the small fraction. The 0.1 mm fraction is being conserved for further studies.

To establish the total number of specimens found for each species in a sample, the highest number of isolated ventral or dorsal valves was added to the number of complete specimens found. The number of specimens/ kg chalk is very variable from one sample to another (Table 1). This indicates that a very large number of samples should be collected for obtaining accurate quantitative results.

The state of preservation is quite good for *Argyrotheca popielae* n. sp. whereas specimens of *Megathiris bidiscoidea* n. sp. were poorly preserved. Only one dorsal valve was found in a good state of preservation. For increasing the number of specimens for *Megathiris bidiscoidea* n. sp., collections of the Institut royal des Sciences naturelles de Belgique in Brussels were investigated and only one complete specimen was found among the Megathyrididae samples from Ciply.

The specimens illustrated in this paper were generally cleaned in a ultrasonic bath and photographed using a scanning electron microscope at the Institut royal des Sciences naturelles de Belgique in Brussels.

Morphological characters were measured as indicated in Figure 2.

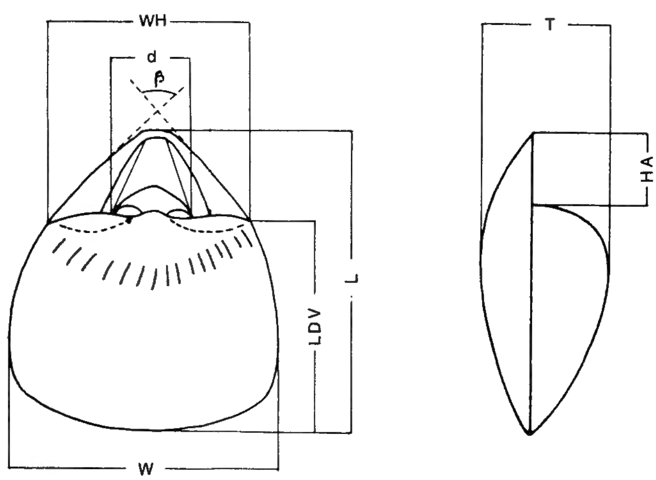

Fig. 2 — Schematic view of an *Argyrotheca* showing the morphological characters measured in this paper (in mm). L = length, LDV = length of the dorsal valve, W = width, WH = width of the hinge line, d = diameter of the foramen, T = thickness, HA = height of the area, ß = apical angle.

Taxonomy follows the Treatise on Invertebrate Palaeontology, volume H, Brachiopoda (MUIR-WOOD, STEHLI, ELLIOTT & HATAI in MOORE, 1965) whereas the terminology of WILLIAMS & ROWELL (1965) was followed. Characters described in systematic section of this paper are illustrated in Figure 3.

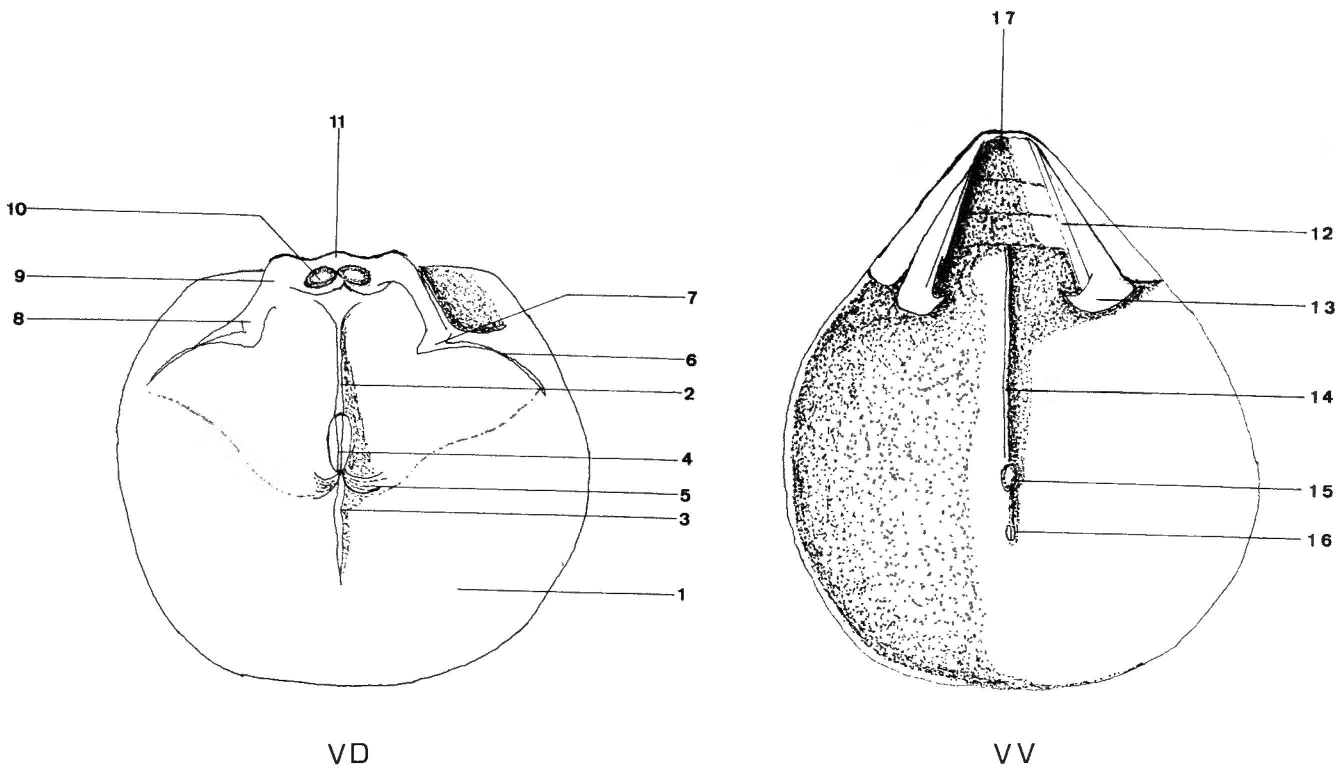

Fig. 3 — Schematic view of both dorsal and ventral valves of an *Argyrotheca* with the characters described in the systematic section of this paper. DV = dorsal valve, VV = ventral valve, 1 = inner side of the shell, 2 = dorsal septum, 3 = indentation of the anterior slope of the dorsal septum, 4 = top of the dorsal septum, 5 = loop attached to the septum, 6 = descending branches of the loop, 7 = crural process, 8 = crura, 9 = inner socket ridges, 10 = hinge plates, 11 = cardinal process, 12 = deltidial plates, 13 = hinge teeth, 14 = ventral septum, 15 = subcircular depression, 16 = secondary subcircular depression, 17 = pedicle collar.

Systematic descriptions

Phylum Brachiopoda DUMERIL, 1806
Class Articulata HUXLEY, 1869
Order Terebratulida WAAGEN, 1883
Suborder Terebratellidina MUIR-WOOD, 1955
Superfamily Terebratellacea KING, 1850
Family Megathyrididae DALL,1870
Genus *Megathiris* d'ORBIGNY, 1847

Type species *Anomia detruncata* J. F. GMELIN, 1792

Nomenclative note
The name *Megathiris* was originally written by d'ORBIGNY with an "i" though, etymologically, it should be written with a "y" as in the Family name Megathyrididae. Nevertheless, no correction is allowed due to rules of nomenclature.

Megathiris bidiscoidea **n.sp.**
Plate 1, Figures 1 - 8 and Plate 3, Figures 1 - 4.

Derivatio nominis: lat. *bi* = two and *discoideus* = more or less with a disc form. The name refers to the subdiscal form of the two hinge plates.

Holotype
Megathiris bidiscoidea n. sp., Plate 1, Figures 1 - 4, conserved at the Institut royal des Sciences naturelles de Belgique, IRScNB - ISTn°10511. The morphological characters measured on the holotype are indicated in Table 2.

Locus typicus
Ciply, Van Damme quarry.

Stratum typicum
Upper part of the lower Lower Maastrichtian.

DIAGNOSIS
Small *Megathiris* species with a plano-convex, ornamented shell with 4-6 low ribs. Foramen generally hypothyridid. Strong beak pointing to ventral direction. Very large triangular area. Anterior commissure of both valves smooth, without submarginal tubercles. Cardinal process small, between the edges of the high inner socket ridges. Five septa in the dorsal valve. Loop present with two descending branches fused with the valve floor.

Table 2
Megathiris bidiscoidea n. sp. - Morphological characters measured on the holotype and on two separate valves, collected in the Van Damme quarry at Ciply. L = length, W = width, T = thickness, LDV = length of dorsal valve, WH = width of the hinge line, HA = height of the area, d = diameter of the foramen, ß = apical angle.

	L mm	W mm	T mm	LDV mm	WH mm	HA mm	d mm	ß	L/W	T/W	LDV/W	WH/W	d/W
Holotype	4.9	5.9	2.7	3.9	5.9	2.3	1.7	110°	0.8	0.5	0.7	1.0	0.3
Dorsal valve Plate 1, Fig. 5	—	3.6	—	2.7	3.6	—	—	—	—	—	0.8	1.0	—
Juvenile dorsal valve Plate 1, Fig. 5	—	2.0	—	1.5	2.0	—	—	—	—	—	0.8	1.0	—

Description

Material: see Table 1
The shell is small, rather thick, semicircular in outline, biconvex for young specimens and plano-convex for adults. The dorsal valve is plane or slightly convex whereas the ventral valve is strongly convex. The hinge line is straight. The anterior commissure is rectimarginate. Both ventral and dorsal valves show 4-6 low ribs, opposite at anterior commissure. These ribs are not protruding outside the commissure margin. Some growth lines are clearly visible on both valves. The beak is strong, pointing to ventral direction. The catacline to slightly apsacline triangular area is very large with disjunct deltidial plates. The hypothyridid to submesothyridid foramen is large and oval.

The inner side of the dorsal valve has a small cardinal process without knob. The inner socket ridges are high and bent. Strongly developed, nearly joined, slightly elevated, hinge plates are present, and they are separated from each other by a clearly visible furrow.

There are five septa. One median main septum is stretched from the hinge plates, almost reaching the anterior commissure. This septum is not serrate. The top of the septum is thickened and it seems cleaved in its posterior part. Two lateral, secondary septa, lower than the median septum are well developed in adult specimens. The posterior part of the lateral septa is free from the inner shell wall and supports the loop. Moreover, two rudimentary outer septa, much lower than the lateral septa, are observed in adult specimens.

Crura short, crural process not seen in our specimens, loop with two descending branches, fused with the valve floor and probably free near crura.

The inner side of the ventral valve is with small hinge teeth, without dental plates and with a short ventral septum.

The internal anterior commissure margin of both valves is smooth, neither papillate nor tuberculate. The outer and inner sides of both valves are with numerous circular pores. The pores of the inner side are smaller than those of the outer side, except near the commissure. Lophophore ptycholophous.

Differential description
In outline, *Megathiris bidiscoidea* n. sp. could be superficially similar to *Argyrotheca bronnii* (Roemer, 1841) from the Lower Maastrichtian of Rügen. The presence of five septa in the dorsal valve of *Megathiris bidiscoidea* avoids all possible confusion.

Although specimens with five septa were found in the Miocene *Megathiris detruncata* (Gmelin, 1792) by Dreger (1889) and Meznerics (1943), this species is quite different from *Megathiris bidiscoidea* n. sp. *Megathiris detruncata* has a more convex dorsal valve with 8 ribs, whereas *Megathiris bidiscoidea* has a maximum of 6 ribs and its dorsal valve is plane. The area plane of *Megathiris detruncata* cuts the commisural plane with an angle of nearly 135° and for this reason its foramen is completely visible in dorsal view. For *Megathiris bidiscoidea* this angle is nearly 90° and the foramen is not easily visible in dorsal view (Plate 1, Figures 1 and 13). Moreover, no separated hinge plates are observed in *Megathiris detruncata.*

Megathiris davidsoni (Bosquet, 1859) from the Upper Maastrichtian of Maastricht differs from *Megathiris bidiscoidea* by its more numerous and coarser ribs and by its length to width ratio of the dorsal valve (around 0.42 for *Megathiris davidsoni* and around 0.68 for *Megathiris bidiscoidea*). The commissure is rectimarginate with metacarinate foldings in *Megathiris davidsoni* whereas the metacarinate foldings are not observed in *Megathiris bidiscoidea. Megathiris davidsoni* possess only three septa and its hinge plates are not separated by a furrow. (Plate 1, Figure 11).

Although it was not possible to handle specimens of *Megathiris depressa* d'Orbigny, 1847 stated to come from the Campanian of Chavot and specimens of *Megathiris hexaglochis* (de Ryckholt, 1854) from Ciply (without precise age indication) we can be sure that these species are quite far from *Megathiris bidiscoidea* n. sp. *Megathiris depressa* has coarser and more numerous ribs and it possesses only three septa. *Megathiris hexaglochis* differs from *Megathiris bidiscoidea* by its ribs which protrude outside the commissure margin, by the fine ornamentation which covers the interribs surface and by its foramen which is smaller and subrectangular.

Remarks

The number of specimens found in my samples is not sufficient for determining the ontogeny of *Megathiris bidiscoidea* n. sp. But, five septa are already developed in specimens of 3.5 mm width. Juvenile specimens (1.5 mm - 2 mm) show only three septa; a median septum is well developed, whereas the two lateral septa are less developed.

The furrow separating the two hinge plates is always present even in the juvenile specimens. This furrow seems to be a good characteristic of *Megathiris bidiscoidea* as it is not observed in the other described species of *Megathiris*.

From an ecological point of view, *Megathiris bidiscoidea* n. sp. was able to use very small substrates in order to be attached by its pedicle.

Genus *Argyrotheca* DALL, 1900

Type species: *Terebratula cuneata* RISSO, 1826

Argyrotheca popielae n. sp.
Plate 2, Figures 1 - 13 and Plate 3, Figures 5 - 8

Derivatio nominis
The species name is in honour of EWA POPIEL-BARCZYK for her important contribution to the knowledge of Mezozoic Brachiopods.

Holotype
Argyrotheca popielae n. sp. Plate 2, Figure 3. The holotype is conserved in the Institut royal des Sciences naturelles de Belgique in Brussels, IRScNB - IST n° 10512. The morphological characters measured on the holotype are indicated in Table 3.

Locus typicus
Ciply, Van Damme quarry.

Stratum typicum
Upper part of the lower Lower Maastrichtian.

DIAGNOSIS
Very small *Argyrotheca* species with a subtriangular, biconvex, smooth shell. Foramen large and generally hypothyridid. Cardinal process small but distinct. Very small distinct hinge plates. Crura extremely short. Loop of two descending branches fused with the shell in its third posterior part. Dorsal septum high, with an indentation on its anterior slope. Anterior commisssure smooth, without submarginal tubercles. Ventral valve with a low septum.

DESCRIPTION

Material: see Table 1.
The shell is small and subtriangular in outline, biconvex with a dorsal valve more convex than the ventral valve. The convexity of the dorsal valve is stronger in the protegulum region and this characteristic determines distinct shoulders. The maximum width is situated near the anterior part of the shell. The anterior commissure is rectimarginate. The shell surface is smooth (except for the often visible numerous pores); without ribs, fold or sinus. When the external part of the shell is intact, this layer sometimes shows a multitude of small, radiating fibres especially in young individuals. A variable number of weak growth lines is visible on the shell. For example, a 1.5 mm wide specimen exhibits four growth lines. The variations of the ratios of length to width (L/W), of length of the dorsal valve to width (LDV/W), of hinge line width to width (WH/W), of thickness to width (T/W) and of foramen diameter to width (d/W) are illustrated in Figures 4 to 8.

The beak is broad, the beak ridges are low, not always distinct. The area is small.

Foramen large, trigonal and hypothyridid to submesothyridid, limited by two narrow, triangular deltidial plates and anteriorly by the dorsal cardinalia.

Cardinal process strongly reduced to a small, obtuse plate between posterior edges of inner socket ridges. Very small distinct hinge plates. Inner socket ridges very high posteriorly and diverging slightly anteriorly.

Crura short, crural process triangular, protruding ventrally. There is a loop of two descending branches fused with the valve floor in its third posterior part. The loop appears again in the anterior part of the valve and it adheres to the bottom and the lateral sides of the dorsal septum.

The dorsal septum is triangular in lateral profile with one indentation on its anterior slope. The septum has its maximum height slightly anteriorly from the middle of the valve.

The ventral valve has a well developed pedicle collar which often has a waved surface.

There are thick hinge teeth, clearly recurved ventrally, with a sharp end. A low ventral septum runs from the pedicle collar to the middle of the valve where it forms a ridge marked by a small circular depression which is the trace of contact with the apex of the dorsal septum.

The inner commissure margin of both valves is smooth, neither papillate nor tuberculate.

The morphological characters measured on 50 intact specimens are indicated in Table 3.

Differential description
The typical megathiridid brachidium of *Argyrotheca popielae* n. sp. avoids all possible confusion with specimens belonging to other genera which show a similar

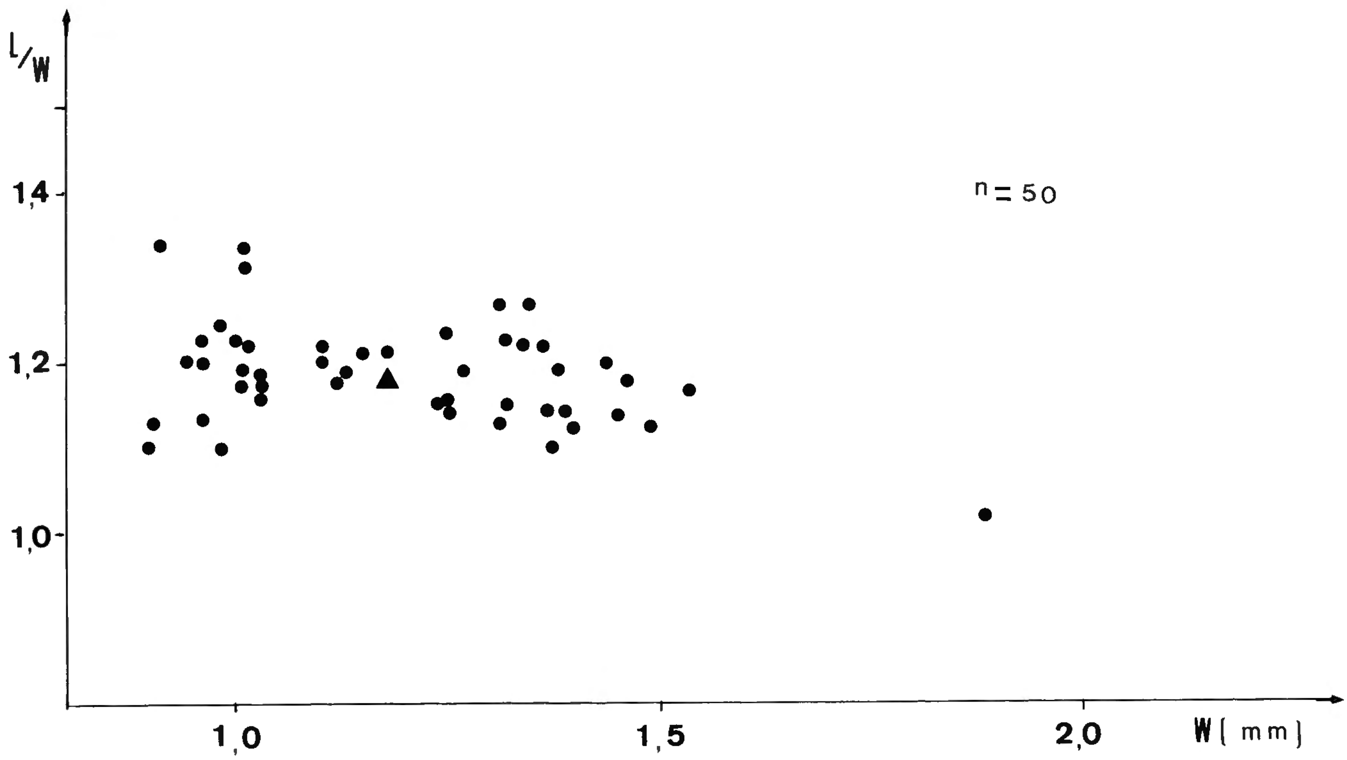

Fig. 4 — Scatter diagram of *Argyrotheca popielae* n. sp., Lower Maastrichtian. Ciply. Ratio shell length (L in mm) to width (W in mm). ▲: holotype. Sample n°4.

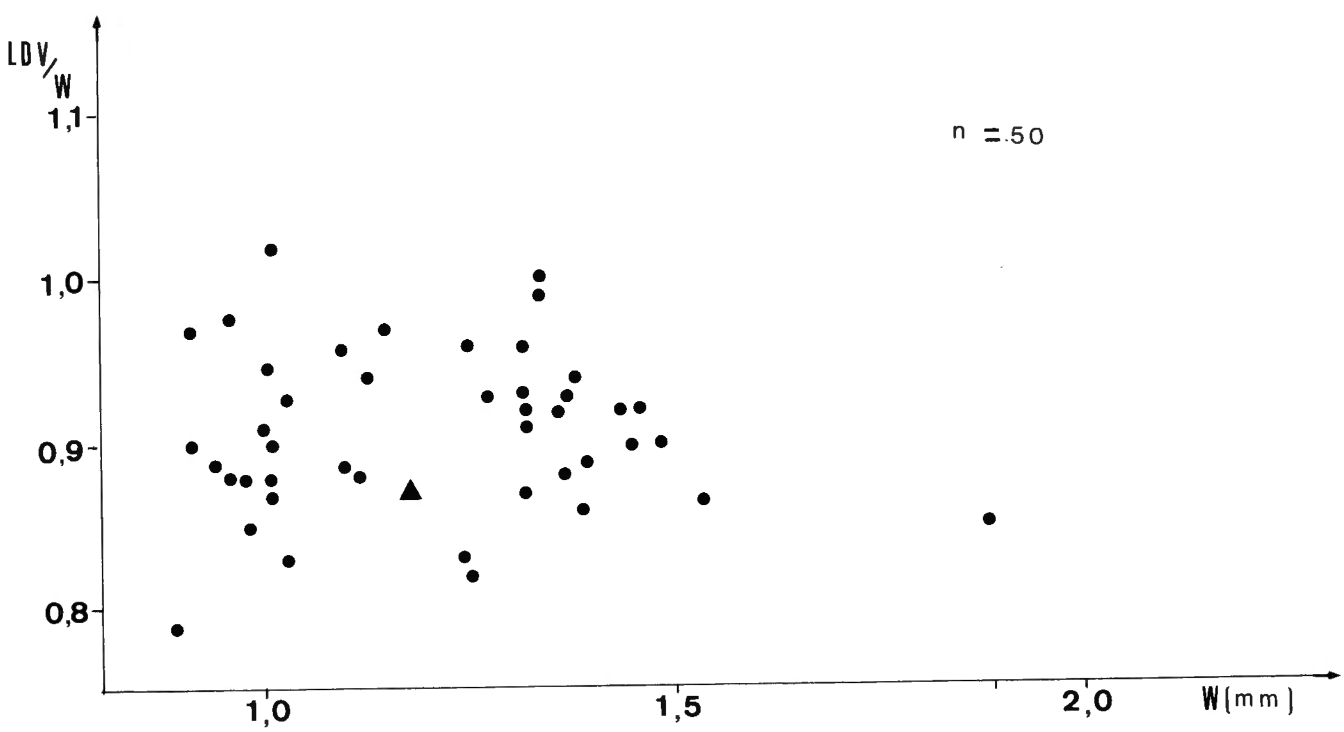

Fig. 5 — Scatter diagram of *Argyrotheca popielae* n. sp., Lower Maastrichtian. Ciply. Ratio dorsal valve length (LDV in mm) to width (W in mm). ▲: holotype. Sample n°4.

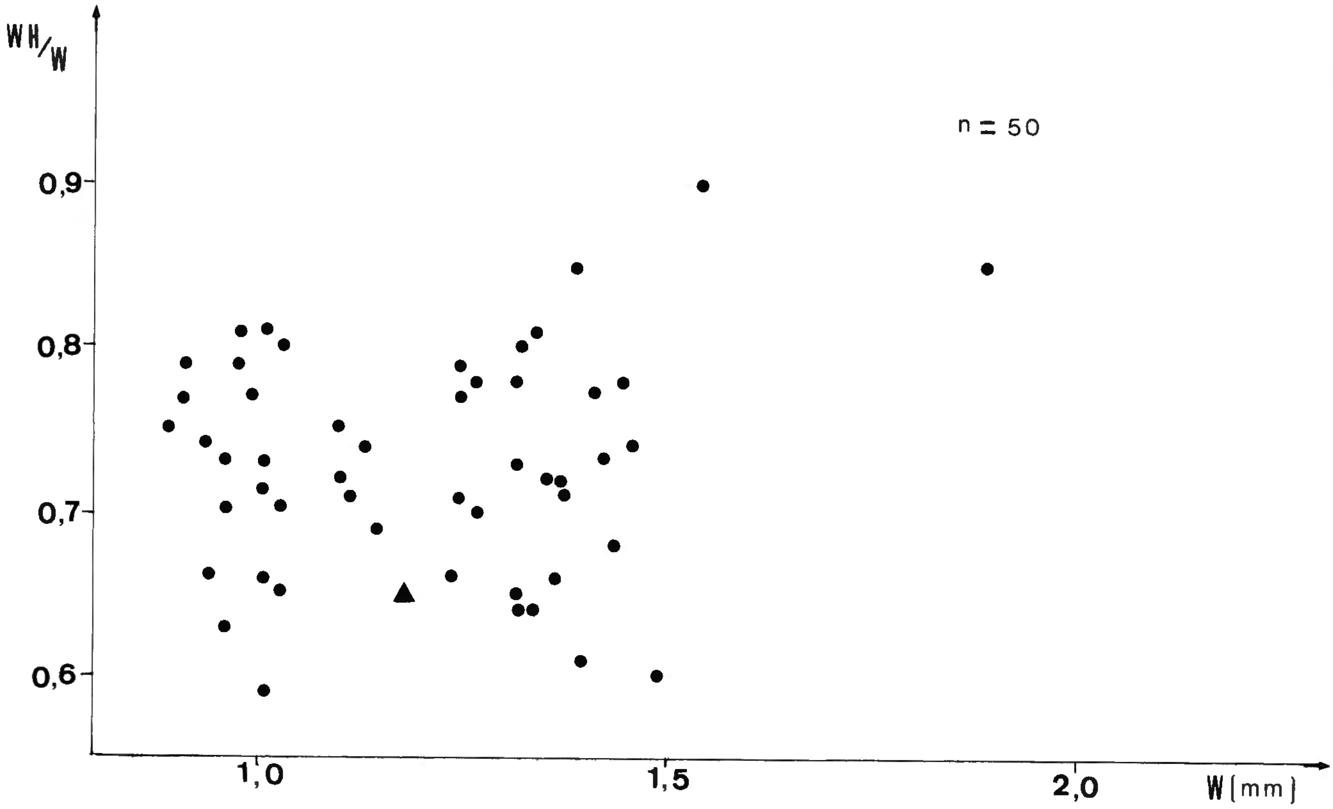

Fig. 6 — Scatter diagram of *Argyrotheca popielae* n. sp., Lower Maastrichtian. Ciply. Ratio hinge line width (WH in mm) to width (W in mm). ▲: holotype. Sample n° 4.

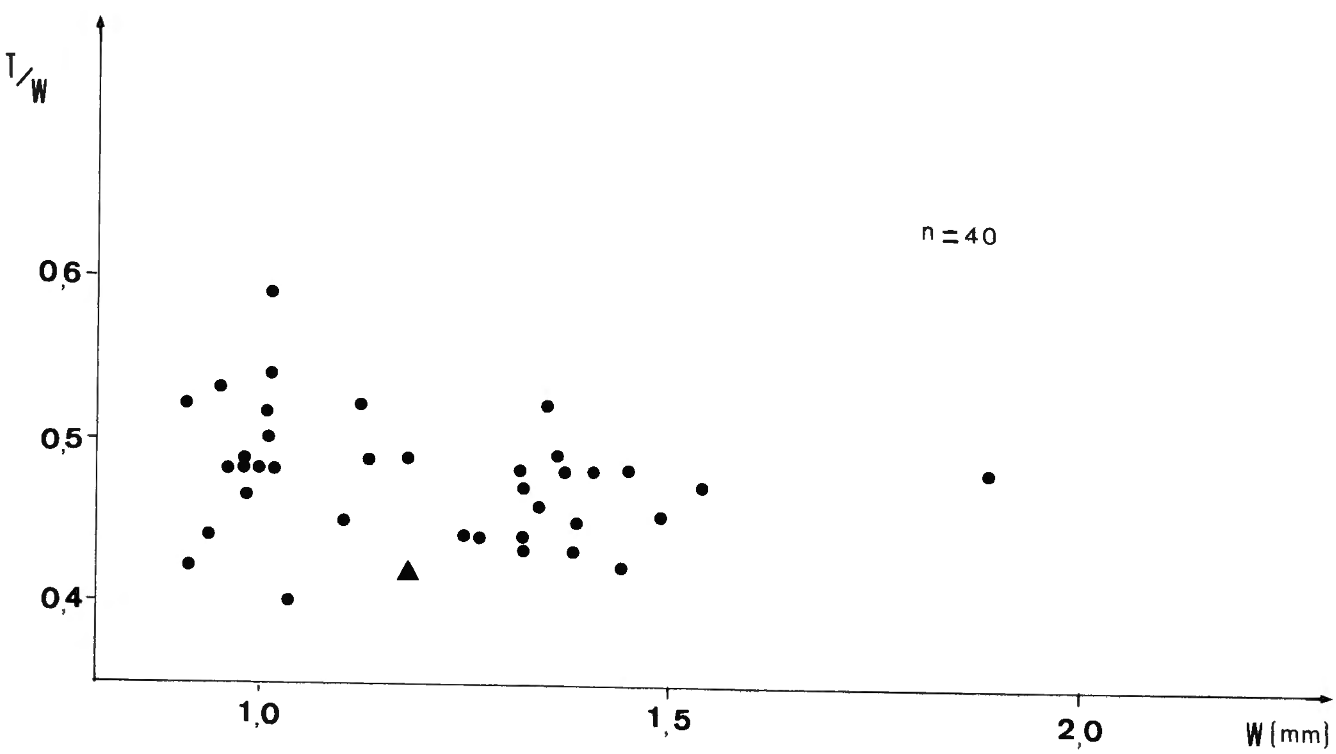

Fig. 7 —Scatter diagram of *Argyrotheca popielae* n. sp., Lower Maastrichtian. Ciply. Ratio thickness (T in mm) to width (W in mm). ▲: holotype. Sample n° 4.

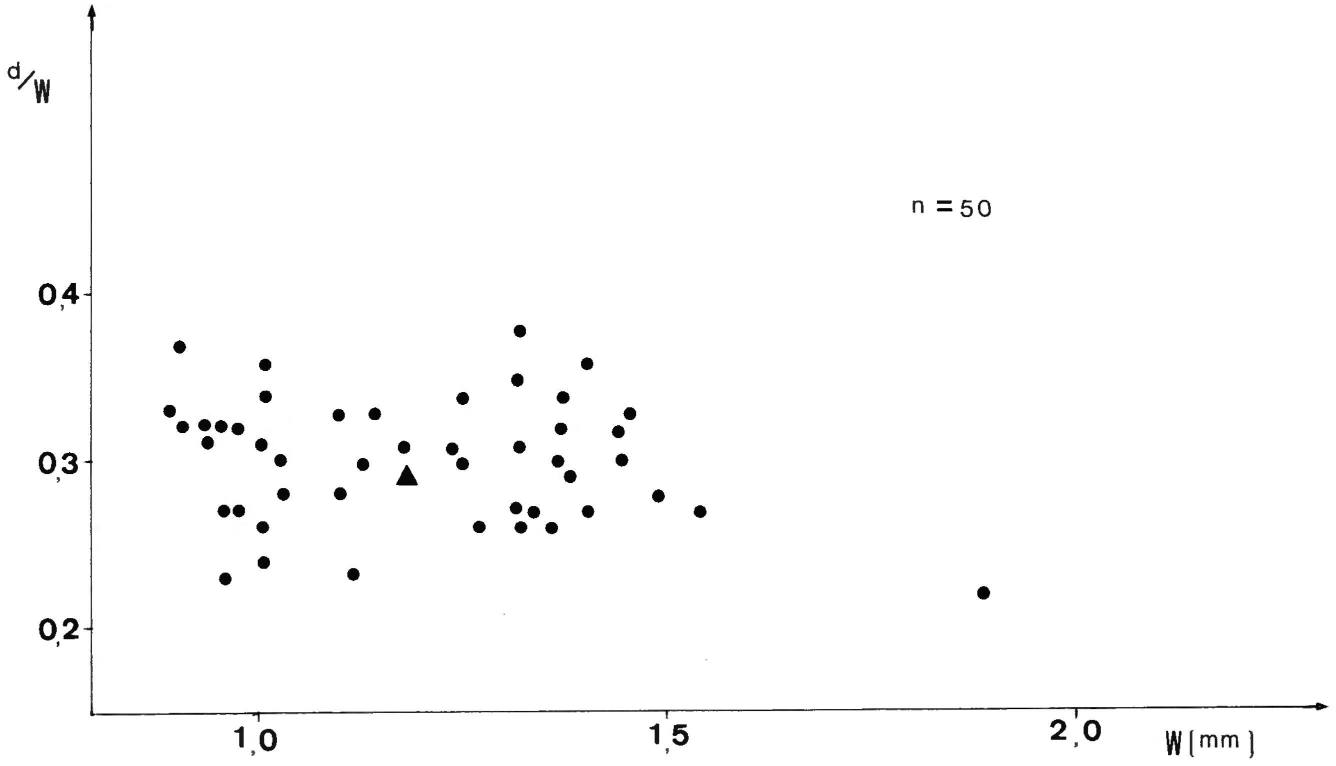

Fig. 8 — Scatter diagram of *Argyrotheca popielae* n. sp., Lower Maastrichtian. Ciply. Ratio foramen diameter (d / W in mm) to width (W in mm). ▲: holotype. Sample n°4.

Table 3
Argyrotheca popielae n. sp. - Morphological characters measured on the holotype and other intact specimens collected in the Van Damme quarry at Ciply (sample n° 4). L = length, W = width, T = thickness, LDV = length of dorsal valve, WH = width of the hinge line, HA = height of the area, d = diameter of the foramen, ß = apical angle, n = number of specimens. For the measurement of thickness, only 40 specimens were considered due to the fragility of the shells.

	L mm	W mm	T mm	LDV mm	WH mm	HA mm	d mm	ß	L/W	T/W	LDV/ W	WH/ W	d/W
Holotype	1.4	1.2	0.5	1.0	0.8	0.4	0.3	83°	1.2	0.4	0.9	0.7	0.3
Minimum value	1.0	0.9	0.4	0.7	0.6	0.2	0.2	—	1.0	0.4	0.8	0.6	0.2
Maximum value	1.9	1.9	0.9	1.6	1.4	0.5	0.5	—	1.3	0.6	1.0	0.9	0.4
Mean value	1.4	1.2	0.6	1.1	0.9	0.4	0.4	—	1.2	0.5	0.9	0.7	0.3
Standard error +/-	0.03	0.03	0.02	0.03	0.02	0.01	0.01	—	0.01	0.01	0.01	0.02	0.01
n	50	50	40	50	50	50	50	—	50	40	50	50	50

subtriangular outline, especially those possessing a well developed pedicle collar.

In dorsal view, for instance, confusion could arise with *Morrisia? suessi* BOSQUET, 1859 from the Maastrichtian of the Maastricht region and from the Upper Cretaceous of Ahlten near Hannover (Schloenbach, 1866). But this species has a flat dorsal valve and its brachidium shows a loop joining directly with the top of the septum. These differences prevent a confusion between *M. suessi* and *A. popielae*.

Other Cretaceous *Argyrotheca* species differ from *A. popielae* by their semicircular outline and by the ribs which ornament their shell. But the subtriangular outline of *A. popielae* brings it closer together Tertiary *Argyrotheca* species. Generally, Tertiary species are larger in size.

The Tertiary to recent *Argyrotheca cistellula* (WOOD, 1841) differs from *A. popielae* in its more quadrangular outline, in possessing a sinus on the dorsal valve and in having hinge teeth, a cardinal process and hinge plates of different form. Moreover, the internal commissure margin of both valves is tuberculated, whereas it is smooth in *A. popielae*.

Argyrotheca altavillensis (de MORGAN, 1883) from the Eocene of the Cotentin is also a large species which possesses sinuses on both valves and a massive septum stronger than that observed in *A. popielae*.

The Eocene *Argyrotheca puncticulata* (DESHAYES, 1861) from the Paris Basin was also found in belgian Eocene sediments by Vincent (1893). This larger species has also a subtriangular outline, but its hinge teeth are less developed and they are not protruding dorsally as the hinge teeth of *A. popielae*.

Argyrotheca ciplyana (de MORGAN, 1883) is a species collected from a white chalk in Ciply (chalk whith *Belemnitella paxillosus*, in de MORGAN, 1883). Its outline is more subcircular than that of *A. popielae* and its foramen is very different being anteriorly narrower. Internal parts of *A. ciplyana* are unknown.

Finally, *Argyrotheca anomala* COOPER, 1971 from Tonga (not *Argyrotheca anomala* Cooper, 1979 from the Middle Oligocene from Cuba) is also different from our species by its developed sinuses on both valves and its septum in the dorsal valve which shows a concave anterior slope whereas the septum of *Argyrotheca popielae* has a straight or slightly convex anterior slope.

Remarks

Only few specimens show an external layer with a fibrous texture. The large individuals appear smooth. The smallest specimens have sometime a fibrous external layer, when they are observed under a binocular microscope.

For the intact specimens, the Table 3 gives the measurements of the main morphological characters. In this Table, the largest specimen has a width of 1.9 mm. But, the size range for this species is larger because an isolated dorsal valve was found which has a width of 2.5 mm.

It is very easy to open the shell because the hinge allows an unusual large aperture for such a small brachiopod. The separation of the valves occurs easily too. For this reason, separate valves are much more abundant in the samples than intact individuals. Complete brachidiums and intact hinge plates are found only rarely. In the ventral valve, the hinge teeth are especially fragile.

In some specimens, a second small depression was observed on the ventral ridge. This second depression is situated slightly anteriorly from the first one and it corresponds to a second contact with the dorsal septum and more precisely with a contact with the anterior indentation of the dorsal septum (Plate 2, Figure 10).

The very young individuals are oval in outline with their maximum width in the median part of the shell. When the specimens are larger, the maximum width moves to the anterior part of the shell. Subquadrangular specimens occur rarely (Plate 2, Fig. 1)

Argyrotheca popielae n. sp. is a relatively abundant microbrachiopod in the Phosphatic Chalk of Ciply. In some samples it is the most common brachiopod and it could be considered as a major element of this Lower Maastrichtian fauna.

From an ecological point of view, *Argyrotheca popielae* n. sp. is a small species which was able to use very small substrates in order to be fixed by its pedicle.

Acknowledgements

I want to express my sincere thanks to EWA POPIEL-BARCZYK for her kind advice concerning the systematic position of the *Argyrotheca* and *Megathiris* described in this paper.

I also want to thank MARIANNE BAGGE JOHANSEN for her very useful information concerning the methods of investigation for micromorphic brachiopods.

I am indebted to HUGO DE POTTER for useful advice for the preparation of the material which needed to be scanned.

I would like to express my grateful to JULIEN CILIS who took the fine photographs with the Scanning Electron Microscope.

For technical asistance, I thank FRANÇOISE CORBION, FRANÇOISE DECLERCQ and GEORGES SOUPART.

I am also grateful to Mr. VAN DAMME for the kind permission for collecting samples in his quarry.

References

BACKHAUS, E., 1959. Monographie der cretacischen Thecideidae (Brach.). *Mitteilungen aus dem geologischen Staatsinstitut Hamburg*, 28: 5-90.

BARCZYK, W. & POPIEL-BARCZYK, E., 1977. Brachiopods from the Korytnica basin (Middle Miocene; Holy Cross Mountains, Poland). *Acta Geologica Polonica*, 27 (2): 157-167.

BINKHORST VAN DEN BINKHORST, J. T., 1859. Esquisse géologique et paléontologique des couches crétacées du Limbourg. 265 pp., Van Osch, Maastricht.

BITNER, M. A. & PISERA, A., 1979. Brachiopods from the Upper Cretaceous chalk of Mielnik (Eastern Poland). *Acta Geologica Polonica* , 29 (1): 67-88.

BOSQUET, J., 1859. Monographie des brachiopodes fossiles du terrain Crétacé supérieur du Duché de Limbourg. Première partie. Mémoires pour servir à la description géologique de la Néerlande, 3: 1-50.

COOPER, G. A., 1971. Eocene Brachiopods From Eua, Tonga. *United States Geological survey professional paper* . 640 F: F1-F9.

COOPER, G. A., 1979. Tertiary and Cretaceous Brachiopods from Cuba and the Caribbean. *Smithsonian Contributions to Paleobiology* , 37: 1-30.

CORNET, F. L. & BRIART, A., 1866. Description minéralogique, paléontologique et géologique du Terrain Crétacé de la Province du Hainaut. 199 pp. Mons.

CORNET, F. L. & BRIART, A., 1874. Aperçu sur la Géologie des environs de Mons. *In* Comptes Rendus de la Réunion extraordinaire à Mons et à Avesnes. *Bulletin de la Société géologique de France* ,3 (2): 534-553.

DALL, W. H., 1870. A revision of the Terebratulidae and Lingulidae. *American Journal of Conchology* , 6: 88-168.

DALL, W. H., 1900. Some names which must be discarded. *Nautilus*, 14 (4): 44-45.

DESHAYES G. P., 1861. Dictionnaire universel d'Histoire Naturelle (*non vidi*).

DREGER, J., 1889. Die Tertiären Brachiopoden der Wiener Beckens. *Beiträge zur Paläontologie Oesterreich-Ungarns*, 7 (2): 179-192.

DUMERIL, A. M. C., 1806. Zoologie analytique ou méthode naturelle de classification des animaux: XXIV + 344 pp., Allais, Paris.

VON HANSTEIN, R., 1879. Die Brachiopoden der oberen Kreide von Ciply. Inaugural-Dissertation zur Erlangung der Doctorwürde bei der philosophischen Fakultät der Rheinischen Friedrich-Wilhems-Universität zu Bonn: 56 pp.

HOFKER, J., 1959. Les foraminifères du Crétacé supérieur de Harmignies, Bassin de Mons. *Annales de la Société Géologique de Belgique* , (92): B319-B333.

HOFKER, J., 1961. The foramininifera of the Upper Campanian-Maestrichtian boundary in south Limburg, Netherlands. *Publicaties van het Natuurhistorisch Genootschap in Limburg* : 46-54.

HUXLEY, T. H., 1869. An introduction to the classification of animals. 147 pp. (John Churchill & sons), London.

JELETZKY, J. A., 1951. Die Stratigraphie und Belemnitenfauna des Obercampan und Maastricht Westfalens, Nordwestdeutschlands und Dänemarks, sowie einige allgemeine Gliederungs-Probleme der jüngeren Oberkreide Eurasiens. *Beihefte zum Geologischem Jahrbuch* ,1: 142 pp.

JOHANSEN, M. B., 1987. Brachiopods from the Maastrichtian-Danian boundary sequence at Nye Kløv, Jylland, Denmark. *Fossils and strata*, 20: 1-57.

JOHANSEN, M. B. & SURLYK, F., 1990. Brachiopods and the Stratigraphy of the Upper Campanian and Lower Maastrichtian Chalk of Norfolk, England. *Palaeontology* , 33 (4): 823-872.

KING, W., 1850. A monograph of the Permian fossils of England. *Palaeontographical Society*, Mon. 3: xxxvii + 258 pp.

KRUYTZER, E. M., 1969. Le genre Crania du Crétacé supérieur et du Post-Maastrichtien de la Province de LImbourg néerlandais (Brachiopoda, Inarticulata). *Publicaties van het Natuurhistorisch Genootschap in Limburg*, XIX (3): 42 pp. Maastricht.

MARLIERE, R., 1954. Le Crétacé. *In*: Prodrome d'une description géologique de la Belgique. Société Géologique de Belgique, 417-444.

MEZNERICS,I., 1943. Die Brachiopoden des Ungarischen Tertiärs. *Annales historico-naturales Musei nationalis hungarici*, 36: 1-60. Budapest.

DE MORGAN, J., 1883. Note sur quelques espèces nouvelles de Megathyridés. *Bulletin de la Société zoologique de France*, 8: 371-396.

MUIR-WOOD, H., 1955. A history of the classification of the phylum Brachiopoda. 124 pp, British museum (Natural History), London.

MUIR-WOOD, H. M., STEHLI, F. G., ELLIOTT, G. F. & HATAI, K., 1965. in MOORE, R. C. (ed.). Treatise on Invertebrate Paleontology (H) Brachiopoda. 927 pp. Geological Society of America & University of Kansas Press, Lawrence.

D'ORBIGNY, A., 1847. Paléontologie Française. Terrains Crétacés. 4: 390 pp. Paris.

D'ORBIGNY, A., 1851. Paléontologie Française. Terrains Crétacés. Paris. Atlas: 109 pls. Paris.

PERON, M. A., 1894. Les Brachiopodes du terrain Crétacé supérieur de Ciply (Belgique). *Association Française pour l'Avancement des Sciences*, XXIII: 1-15.

QUENSTEDT, F. A., 1868-1871. Brachiopoden: 748 pp + atlas Leipzig.

RISSO, A., 1826. Histoire naturelle des principales Productions de l'Europe Méridionale et particulièrement de celles des environs de Nice et des Alpes Maritimes. (*non vidi*). Paris et Strasbourg.

ROBASZYNSKI, F. & CHRISTENSEN, W. K., 1989. The Upper Campanian-Lower Maastrichtian chalks of the Mons basin, Belgium: a preliminary study of belemnites and foraminifera in the Harmignies and Ciply areas. *Geologie en Mijnbouw*, 68: 391-408.

ROEMER, F. A., 1841. Die Versteinerungen des norddeutschen Kreidegebirges. 145 pp. Hannover.

DE RYCKHOLT, P., 1854. Mélanges Paléontologiques, deuxième partie: 205 pp., Bruxelles?

SACCO, F., 1902. I Brachiopodi dei terreni terziarii del Piemonte e della Ligura: 49 pp. Torino.

SAHNI, M. R., 1929. A monograph of the Terebratulidae of British Chalk. *Palaeontographical Society (Monograph.)* : VI + 62 pp. London.

SCHULZ, M. G., 1979. Morphometrisch-variationsstatistiche Untersuchungen zur Phylogenie der Belemniten-Gattung *Belemnella* im Untermaastricht N. W.-Europas. *Geologisches Jahrbuch*, A47: 3-157.

SCHLOENBACH, U., 1866. Beiträge zur Paläontologie der Jura-und Kreide-Formation im nordwestlichen Deutschland. *Palaeontographica*, XIII: 265-332.

STEINICH, G., 1963. Drei neue Brachiopodengattungen der Subfamilie Cancellothyridinae Thomson. *Geologie*, 12 (6): 732-740.

STEINICH, G., 1965. Die artikulaten Brachiopoden der Rügener Schreibkreide (Unter-Maastricht). *Paläontologische Abhandlungen*, Abteilung A, Paläozoologie, II (1): 1-220. Berlin.

STEINICH, G., 1967. Neue Brachiopoden aus der Rügener Schreibkreide (Unter-Maastricht). I Draciinae-eine neue Unterfamilie der Cancellothyrididae Thomson. *Geologie* , 16 (10): 1145-1155.

STEINICH, G., 1968 a. Neue Brachiopoden aus der Rügener Schreibkreide (Unter-Maastricht). II Die Platidiidae Thomson. *Geologie* , 17 (2): 192-209.

STEINICH, G., 1968 b. Neue Brachiopoden aus der Rügener Schreibkreide (Unter-Maastricht). III *Dalligas nobilis* gen. et sp. nov. und *Kingena* sp. *Geologie*, 17 (3): 336-347.

SURLYK, F., 1970 a. Two new brachiopods from the Danish White Chalk (Maastrichtian). *Bulletin of the Geological Society of Denmark*, 20: 152-161.

SURLYK, F., 1970 b. Die Stratigraphie des Maastricht von Dänemark und Norddeutschland auf grund von Brachiopoden. *Newsletters of Stratigraphy*, 12: 7-16.

SURLYK, F., 1971. Skrivekridtklinterne på Møn. *In* Floris,S., Hansen H. J., Håkansson, E., Krüger, J, & Surlyk F. (eds): Geologi på Øerne. *Varv ekskursionsforer*. 2: 4-24. Copenhagen.

SURLYK, F., 1972. Morphological adaptations and population structures of the Danish Chalk brachiopods (Maastrichtian, Upper Cretaceous). *Det Kongelige Danske Videnskabernes Selskab, Biologiske Skrifter*, 19 (2): 57 pp.

SURLYK, F., 1973. Autecology and taxonomy of two Upper Cretaceous craniacean brachiopods. *Bulletin of the Geological Society of Denmark*, 22: 219-243.

SURLYK, F., 1974. Life habit, feeding mechanism and population structure of the Cretaceous brachiopod genus *Aemula*. *Paleogeography, Paleoclimatology and Paleoecology*, 15: 185-203.

SURLYK, F., 1979. Maastrichtian brachiopods from Denmark. In Birkelund T. & Bromley, R. (eds): *Symposium on Cretaceous Tertiary boundary events* ,1: 45-50. Copenhagen.

SURLYK, F., 1982. Brachiopods from the Campanian-Maastrichtian boundary sequence, Kronsmoor (NW Germany). *Geologisches Jahrbuch*, A61: 259-277.

SURLYK, F., 1983. The Maastrichtian stage in NW Europe, and its brachiopod zonation. *In*: BIRKELUND, T., BROMLEY, R., CHRISTENSEN W. K., HÅKANSSON, E. & SURLYK, F. (eds). Cretaceous Stage Boundaries: 191-196. Copenhagen.

SURLYK, F., 1984. The Maastrichtian Stage in NW Europe, and its brachiopod zonation. *Bulletin of the Geological Society of Denmark*, 33, (1-2): 217-224.

SURLYK, F. & JOHANSEN, M. B., 1981. Extinction pattern of late Cretaceous brachiopods compatible with catastrophic change of the marine calcareous shelled biota. Abstract to symposium on the Cretaceous-Tertiary Boundary, American Association of Advanced Sciences.

SURLYK, F. & JOHANSEN, M. B., 1984. End Cretaceous brachiopod extinctions in the chalk of Denmark. *Science* 223: 1174-1177.

VINCENT, E., 1893. Contribution à la paléontologie des terrains tertiaires de la Belgique. Brachiopodes. *Annales de la Société Royale Malacologique de Belgique*, XXVIII: 38-64.

WAAGEN, W. H., 1883. Salt Range Fossils, Part 4 (2) Brachiopoda. *Memoirs of the Geological Survey of Palaeontologica Indica*, 13 (1): 391-546.

WILLIAMS, A. & ROWELL, A. J., 1965. Brachiopod anatomy and morphology. In MOORE, R. C. (ed). Treatise on Invertebrate Paleontology (H) Brachiopoda. 1: H6-H155. Geological Society of America & University of Kansas Press, Lawrence.

WOOD, S. V., 1841. A Catalogue of Shells from the Crag. *Annals and Magazine of Natural History*, 6: 243-253.

WOODWARD, S. P., 1868. A manual of the Mollusca: 518 pp., 270 figs., 23 pls. London.

Eric SIMON
Avenue des Longicornes, 3
1170 Bruxelles
Belgique

Typescript received: July 5, 1991
Corrected typescript received: December 12, 1991

PLATE 1

Fig. 1 — *Megathiris bidiscoidea* n. sp. Holotype, IRScNB - IST n° 10511, complete specimen in dorsal view. Ciply, Phosphatic Chalk. Upper part of the lower Lower Maastrichtian. 10X.

Fig. 2 — *Megathiris bidiscoidea* n. sp. Holotype, IRScNB - IST n° 10511, complete specimen in ventral view. Ciply, Phosphatic Chalk. Upper part of the lower Lower Maastrichtian. 10X.

Fig. 3 — *Megathiris bidiscoidea* n. sp. Holotype, IRScNB - IST n° 10511, complete specimen showing its anterior commissure. Ciply, Phosphatic Chalk. Upper part of the lower Lower Maastrichtian. 10X.

Fig. 4 — *Megathiris bidiscoidea* n. sp. Holotype, IRScNB - IST n° 10511, complete specimen in lateral view. Ciply, Phosphatic Chalk. Upper part of the lower Lower Maastrichtian. 10X.

Fig. 5 — *Megathiris bidiscoidea* n. sp. Interior of a young dorsal valve showing the five septa and the well defined hinge plates. The loop is partly preserved. Ciply, Phosphatic Chalk. Van Damme quarry. Sample n° 4. Upper part of the lower Lower Maastrichtian. 12X.

Fig. 6 — *Megathiris bidiscoidea* n. sp. Oblique view of the interior of a young dorsal valve showing the relative position of septa and the slightly elevated hinge plates. The contact between the loop and the main median septum is visible. Same specimen as Fig. 5. Ciply, Phosphatic Chalk. Van Damme quarry. Sample n° 4. Upper part of the lower Lower Maastrichtian. 12X.

Fig. 7 — *Megathiris bidiscoidea* n. sp. Lateral view of the interior of a young dorsal valve showing the height of the septa. Same specimen as in Fig. 5. Ciply, phosphatic Chalk. Van Damme quarry. Sample n° 4. Upper part of the lower Lower Maastrichtian. 24X.

Fig. 8 — *Megathiris bidiscoidea* n. sp. Interior of a juvenile dorsal valve. The development of the hinge plates is clearly visible. Three septa are developed. The two outer rudimentary septa begin their development. Ciply, Phosphatic Chalk. Van Damme quarry. Sample n° 4. Upper part of the lower Lower Maastrichtian. 20X.

Fig. 9 — *Megathiris davidsoni* (BOSQUET, 1859). Complete specimen in dorsal view. Montagne Saint-Pierre, near Maastricht. Coll. Bosquet, IRScNB, -IST n° 10513. Upper Maastrichtian. 10X.

Fig. 10 — *Megathiris davidsoni* (BOSQUET, 1859). The same specimen in anterior view. Montagne Saint-Pierre, near Maastricht. Coll. Bosquet, IRScNB, - IST n° 10513. Upper Maastrichtian. 10X.

Fig. 11 — *Megathiris davidsoni* (BOSQUET, 1859). Interior view of a dorsal valve. Three septa of same importance are visible. The intact loop is visible. Between Vilt and Sibbe. Coll. Bosquet, IRScNB, - IST n° 10514. Upper Maastrichtian. 10X.

Fig. 12 — *Megathiris davidsoni* (BOSQUET, 1859). Lateral view of the dorsal valve illustrated in fig. 11 showing the loop and the septa. The metacarinate foldings of the anterior commissure are clearly visible. 23X.

Fig. 13 — *Megathiris detruncata* (J. F. GMELIN, 1792). Complete specimen in dorsal view. Szczaworyż, Poland. Miocene. Muzeum ziemi w Warszawie, VIII Bra 1569. 10X.

Fig. 14 — *Megathiris detruncata* (J. F. GMELIN, 1792). The same specimen in anterior view. Szczaworyż, Poland. Miocene. Muzeum ziemi w Warszawie, VIII Bra 1569. 10X.

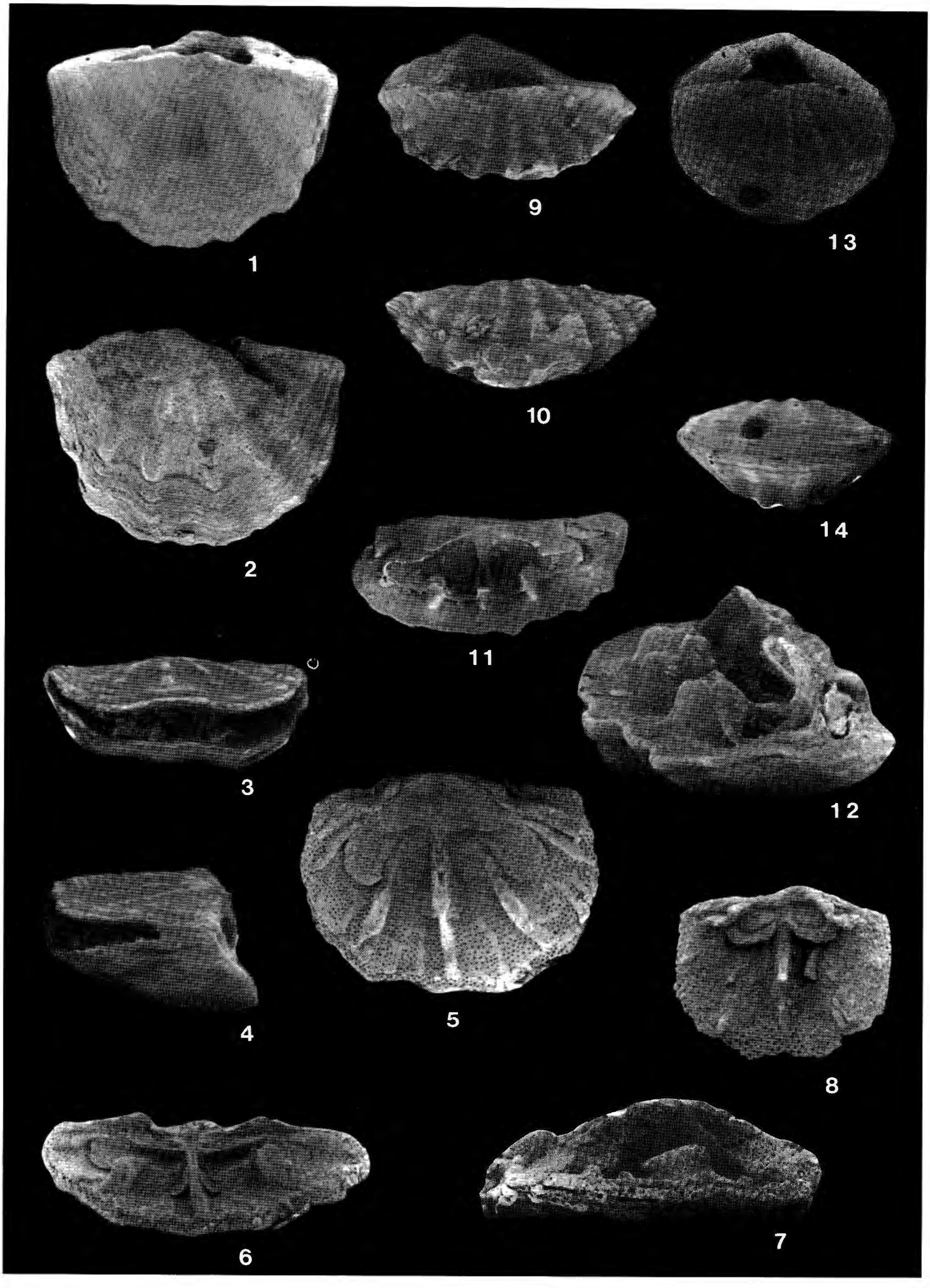
1
2
3
4
5
6
7
8
9
10
11
12
13
14

Plate 2

Argyrotheca popielae n. sp. Specimens from the Van Damme quarry in Ciply. Phosphatic Chalk. Upper part of the lower Lower Maastrichtian.

Fig. 1 — Complete, adult specimen in dorsal view. This specimen has an unusual quadrangular form. 27X. Sample n° 4.

Fig. 2 — Complete, adult specimen in dorsal view. The external layer of the shell is preserved. This subtriangular outline is the most common outline observed in this species. 27X. Sample n° 6.

Fig. 3 — Holotype in dorsal view conserved in the Institut royal des Sciences naturelles de Belgique: IRScNB - IST n° 10512. For the observed population, the holotype has a mean size. (see Table 3). 27X. Sample n° 4.

Fig. 4 — Juvenile specimen in dorsal view. 27X. Sample n° 3.

Fig. 5 — Complete specimen in lateral view. 45x. Sample n° 6.

Fig. 6 — Complete specimen with a slightly oblique lateral view. 45X. Sample n° 4.

Fig. 7 — Complete specimen in anterior view showing the rectimarginate commissure. 50X. Sample n°6.

Fig. 8 — Complete specimen in ventral view. Some weak growth lines are visible on the shell. 27X.

Fig. 9 — Interior view of a dorsal valve from a young specimen. The brachidium, the cardinal process, the hinge plates and the inner socket ridges are clearly visible. 45X. Sample n° 4.

Fig. 10 — Interior view of the ventral valve exhibiting the two depressions in the ventral ridge due to the contact with the dorsal septum. 47X. Sample n° 6.

Fig. 11 — Interior view of an adult ventral valve. 35X. Sample n°6.

Fig. 12 — A detailed view of the loop, the hinge plates and the inner socket ridges of the specimen illustrated in Fig. 9. 90X. Sample n° 4.

Fig. 13 — A detailed view of the hinge teeth and the waved pedicle collar. The hinge teeth are recurved to the dorsal direction. Same specimen as in Fig. 10. 70X. Sample n° 4.

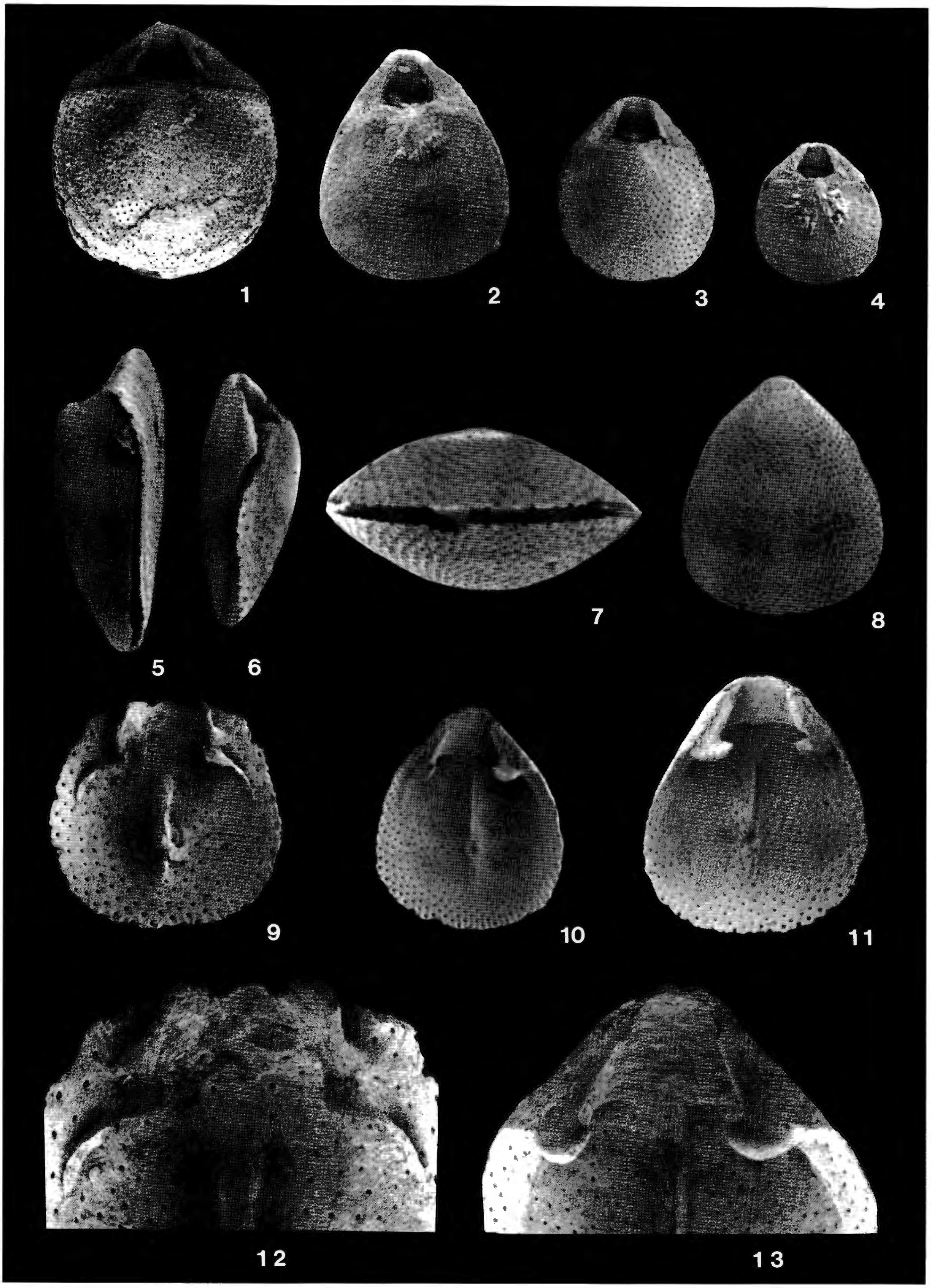
1
2
3
4
5
6
7
8
9
10
11
12
13

Plate 3

Fig 1 — *Megathiris bidiscoidea* n. sp. View of the large hinge plates which are separated by a furrow. Ciply, Van Damme quarry. Phosphatic Chalk. Upper part of the lower Lower Maastrichtian. Sample n° 4. Scale bar = 1mm.

Fig. 2 — *Megathiris bidiscoidea* n. sp. View of the lateral septum with a part of the loop joining with the posterior part of the septum. Behind, the main median septum is visible. Ciply, Van Damme quarry. Phosphatic Chalk. Upper part of the lower Lower Maastrichtian. Sample n° 4. Scale bar = 1mm.

Fig. 3 — *Megathiris bidiscoidea* n. sp. View of a pore of the external side of the dorsal valve. Holotype, IRScNB - IST n° 10511. Ciply. Phosphatic Chalk. Upper part of the lower Lower Maastrichtian. Sample n° 4. Scale bar = 0,01mm.

Fig. 4 — *Megathiris bidiscoidea* n. sp. View of a pore of the internal side of the dorsal valve from a young specimen. Ciply, Van Damme quarry. Phosphatic Chalk. Upper part of the lower Lower Maastrichtian. Sample n° 4. Scale bar = 0,01mm.

Fig. 5 — *Argyrotheca popielae* n. sp. Lateral view of the triangular dorsal septum: note the indentation of the anterior slope. The crural process and the loop are clearly visible. Ciply, Van Damme quarry. Phosphatic Chalk. Upper part of the lower Lower Maastrichtian. Sample n° 4. Scale bar = 0,1mm.

Fig. 6 — *Argyrotheca popielae* n. sp. View of two pores of the internal side of the ventral valve. Ciply, Van Damme quarry. Phosphatic Chalk. Upper part of the lower Lower Maastrichtian. Sample n° 4. Scale bar = 0,01mm.

Fig. 7 and Fig. 8 — *Argyrotheca popielae* n. sp. Fibrous outline of the external layer of the juvenile specimen illustrated Plate 2, Fig. 4. Fig. 7; scale bar = 0,1mm. Fig. 8; scale bar = 0,01mm.