

Revision of some Devonian trilobites from Belgium

The genera *Astycoryphe*, *Tropidocoryphe*, *Eifliargès* and *Koneprusia*

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Abstract

Belgian Devonian trilobites have long been known, but remain comparatively poorly documented. A revision of the obsolete nomenclature seems long overdue, and additionally, a critical evaluation of listings of trilobite taxa by MAILLIEUX (1946) made over sixty years ago is called for. Herein a review of some Devonian trilobites from Belgium is presented, and on sections referred to as VML004 and ARD003 from Jemelle (Ardennes, Belgium) which yielded the new material. It also briefly discusses correlations of Middle Devonian (Eifelian) successions of the Ardennes and the Eifel (Germany), and describes four taxa (*Eifliargès caudimurus*, *Koneprusia maillieuxi*, *Tropidocoryphe barroisi* and *Astycoryphe senckenbergiana*) from Jemelle.

Key words: Trilobita, Devonian (Eifelian), Belgium.

Résumé

Les trilobites du Dévonien belge sont connus depuis longtemps mais restent peu documentés. Une révision de la nomenclature obsolète est urgente et une évaluation critique des listes de taxons de trilobites présentées par MAILLIEUX (1946) il y a plus de soixante ans est nécessaire. Dans l'article présent quelques trilobites du Dévonien belge sont présentés de sections qui sont nommées VML004 et ARD003 de Jemelle (Ardennes, Belgique). La corrélation du Dévonien moyen (Eifélien) des Ardennes et de l'Eifel est brièvement discutée et quatre taxa (*Eifliargès caudimurus*, *Koneprusia maillieuxi*, *Tropidocoryphe barroisi* et *Astycoryphe senckenbergiana*) de Jemelle sont décrits.

Mots-clefs: Trilobita, Dévonien (Eifélien), Belgique.

Introduction

As stated in MAGREAN & VAN VIERSEN, (2005) in a previous paper on Devonian trilobites, little work has been published on trilobites from Belgium. MAILLIEUX (1904, 1933, 1938) recorded a number of taxa, and his lists represent a fairly accurate view of published knowledge of Devonian trilobite faunas in Belgium. This review tries to update the work done by MAILLIEUX with a view to the strong correlations with the Eifel (herein the

Ahrdorf-Schichten of the Eifelium) for the genera *Astycoryphe*, *Tropidocoryphe*, *Eifliargès* and *Koneprusia*.

Between 1999 and 2005, the author conducted fieldwork in the Ardennes, in particular in the Dinant Synclorium, and this has yielded new trilobite material of Early to Late Devonian age. When comparing the lists of Devonian trilobites provided by MAILLIEUX (1904, 1933, 1938) and the newly collected specimens, the need for an extensive (nomenclatorial) review becomes obvious. Moreover, the new collections contain a number of taxa not previously recorded from the Ardennes.

Location and Stratigraphy

The abbreviation 'VML', that is used here, stands for 'Viersen Magrean Locality' and was assigned to each site together with a number that corresponds to the sequence of visits to those sites. The abbreviation 'ARD', that is used here, stands for 'Ardennes Locality' and was assigned by the author to each site combined with a number that corresponds to the sequence of fieldwork sites located in the Ardennes.

VML004: Area west of the railway station of Jemelle (southern border of the Dinant Synclorium). West of what is described and indicated on the map by GODEFROID (in BULTYNCK *et al.*, 1991, pp. 31, 35) as Coupe 1. Exposed is the Jemelle Fm. of Eifelian (Middle Devonian) age. Map in (MAGREAN & VAN VIERSEN, 2005, p. 2)

ARD003: Area west of the Lomme railway bridge of Jemelle (southern border of the Dinant Synclorium) described and indicated on the map by GODEFROID (in BULTYNCK *et al.*, 1991, p. 31, 35) as Coupe 2 (Aux Chavées). Exposed is the Jemelle Fm. of Eifelian (Middle Devonian) age.

During fieldwork in 1999 and 2005, a rich fauna was discovered with representatives of the trilobite orders Corynexochida (Scutelluinae), Phacopida (Asteropyginae, Phacopinae), Proetida (Proetinae, Otariioninae, Cornuproetinae, Tropidocoryphinae) and Lichida (Trochurinae, Odontopleurinae). As far as numbers of taxa are concerned, the majority of the material collected is assignable to the Phacopinae and Proetinae. Of note is the fact that most specimens collected at site VML004 represent internal moulds; the remainder of the material is of varying preservation states, ranging from eroded to some degree to more or less complete and well preserved. At site ARD003 several parts of specimens and complete specimens

with black exoskeletons in light grey limestone were collected. Their preservation is similar to the preservation in the Gees Location in the Eifel/Germany.

As described in MAGREAN. & VAN VIERSEN (2005), in the Rochefort area the Gemelle Fm. is one of the main units to have yielded Eifelian trilobites. According to GODEFROID (in BULTYNCK *et al.*, 1991, pp. 31-32, and pers. comm., May 2004) the VML004 site was assigned to the Cimetière and Chavées members of the Gemelle Fm. The ARD003 site is included in the Cimetière and Chavées members of the Gemelle Fm. according to GODEFROID (in BULTYNCK *et al.*, 1991, pp. 31-32). In the Eifel, these are part of the Ahrdorf Fm. (MAGREAN. & VAN VIERSEN, 2005, tab. 1),

Taxonomy

In the descriptions the terms 'sag.' (sagittal) and 'tr.' (transverse) are used in reference to directions along the axial line of the body and at right angle to this line, respectively. All specimens described herein are deposited at the 'Institut royal des Sciences naturelles de Belgique' (Brussels), abbreviated as 'IRScNB'. All specimens have been prepared, treated with ammonium chloride and photographed by Werner Kraus (RWTH Aachen University).

Order Proetida FORTEY & OWENS, 1975

Superfamily Proetoidea HAWLE & CORDA, 1847

Family Tropidocoryphidae PŘIBYL, 1946

Subfamily Tropidocoryphinae PŘIBYL, 1946

Genus and subgenus *Tropidocoryphe* NOVAK, 1890

TYPE SPECIES: *Proetus filicostatus* NOVAK, 1890

Tropidocoryphe barroisi MAILLIEUX, 1904

(Pl. 1, Figs. 2-6)

- v. 1917 — *Proetus barroisi* — MAILLIEUX, p. 581
- 1919 — *Tropidocoryphe barroisi* — RICHTER, R. & RICHTER, E., pp. 26-31.
- 1956 — *Tropidocoryphe barroisi* — RICHTER, R. & RICHTER, E., pl. 1, fig. 4.

MATERIAL

Exoskeleton of two pygidia and a librigena (IRSNB a 12204-a 12205; a 12213) from locality ARD003, Gemelle, Gemelle Fm. Exoskeleton of one pygidium (IRSNB a 12206) from locality Kirberg/Üxheim/Eifel, Nohn Fm. (Lower Eifelian).

DIAGNOSIS

See RICHTER, R. & RICHTER, E. (1919, pp. 26-31).

DESCRIPTION

Exoskeletons of two pygidia and a librigena were found. The material is in very good condition. Both, the pygidium from Gemelle and the one from Üxheim, show the typical characteristics of the taxon from the Ahrdorf Fm. of the Eifel region as described in RICHTER, R. & RICHTER, E. (1919, pp. 26-31)

COMPARISON

This is the first appearance of a librigena of *Tropidocoryphe barroisi* and the second appearance of the species in Belgium (the first was the holotype from MAILLIEUX, 1904: fig. a-d. from Couvin). The Eifel material from Gees from the Ahrdorf Fm. is also described as *T. barroisi* by (RICHTER, R. & RICHTER, E., 1919). Because of the poor preservation of the cast of the holotype, BASSE (2003: pp. 67-69) erected a new genus for the Eifel material. The material presented here from Gemelle and Üxheim makes it possible to follow RICHTER, R. & RICHTER, E. 1919; through comparison of the pygidia, both taxa belong to *T. barroisi*.

Genus and subgenus *Astycoryphe* RICHTER, R. & RICHTER, E., 1919

TYPE SPECIES: *Astycoryphe senckenbergiana* RICHTER, R. & RICHTER, E., 1919

Astycoryphe senckenbergiana RICHTER, R. &

RICHTER, E., 1919

(Pl. 1, Fig. 1)

- * 1919 — *Astycoryphe senckenbergiana* — RICHTER, R. & RICHTER, E., pp. 3-10.
- 2002 — *Astycoryphe senckenbergiana* — BASSE, p. 70.

MATERIAL

Exoskeleton of one pygidium (IRSNB a 12203) from locality ARD003, Gemelle, Gemelle Fm.

DIAGNOSIS

See RICHTER, R. & RICHTER, E. (1919, pp. 3-10).

DESCRIPTION

One exoskeleton of a pygidium was found during field-work. It is in very good condition. It shows the typical characteristics of the taxa from the Ahrdorf Fm. of the Eifel region as described in RICHTER, R. & RICHTER, E. (1919, pp. 3-10).

COMPARISON

This is the first reported appearance of *Astycoryphe senckenbergiana* from Eifelian strata of mainly the southern and eastern parts of the Dinant Synclorium. In the Eifel, *A. senckenbergiana* has been reported from the Nohn Fm. (Lower Eifelian) to the Freilingen Fm. (Upper Eifelian) by BASSE (2002, p. 70, pl. 28, pp. 561-569).

Order Lichida MOORE, 1959

Superfamily Lichoidea (sensu FORTEY 1991)

Family Lichidae HAWLE & CORDA, 1847

Subfamily Trochurinae PHLEGER, 1936

Eifliarges caudimurus RICHTER, R. & RICHTER, E., 1917

(Pl. 2, Figs. 1-6)

- v* 1917 — *Lichas (Eifliarges) caudimurus* — RICHTER, R. & RICHTER, E., pp. 55-71

- 1936 — *Eifliarges caudimurus* — PHLEGER, fig. 63-65.
 1952 — *Eifliarges caudimurus* — PŘIBYL & ERBEN, p. 151.
 1988 — *Eifliarges caudimurus* — THOMAS & HOLLOWAY, pl. 14, fig. 311.
 2004 — *Eifliarges caudimurus* — BASSE & MÜLLER 2004, p.115

MATERIAL

One internal mould and one external mould of a pygidium and of two cranidia (IRSNB a 12207-a 12210) from locality VML004, Jemelle, Jemelle Fm.

DIAGNOSIS

See RICHTER, R. & RICHTER, E. (1917, pp. 55-71).

DESCRIPTION

Both the cranidia and the pygidia resemble the drawings in RICHTER, R. & RICHTER, E. (1917, fig. 1c, p. 50).

COMPARISON

It is the second appearance of *Eifliarges caudimurus* reported from Eifelian strata of mainly the southern and eastern parts of the Dinant Synclinorium. In the Eifel, *E. caudimurus* has been reported from the Ahrdorf Fm. (Eifelian) by BASSE & MÜLLER (2004, p. 115), who also report an internal mould of *E. ssp.* (SMF 58968) from Couvin, Belgium (Chapelle Notre Dame de la Consolation) from the late Eifelian. According to BASSE & MÜLLER (2004, p. 115), this specimen has to be similar to *E. caudimurus*. This region has been assigned to the Jemelle Fm., Middle Eifelian, by MARION & BARCHY (1999, p. 32) in the new geological map of the Couvin area. Due to this categorization and to the comparison with the new material, this taxon can be assigned to *E. caudimurus*.

Superfamily Odontopleuroidea (sensu FORTEY, 1997)

Family Odontopleuridae BURMEISTER, 1843

Subfamily *Koneprusiinae* VANĚK & PEK, 1987

Genus *Koneprusia* PRANTL & PŘIBYL, 1949

TYPE SPECIES: *Acidaspis fuscina* NOVAK, 1883

DIAGNOSIS

See RAMSKÖLD (1991, pp. 129-131).

***Koneprusia maillieuxi* MAGREAN sp.n.**
 (Pl. 3, Figs. 1-4)

DERIVATIO NOMINIS

Eugène Maillieux (1875-1946) left his name associated with studies on the Devonian faunas of Belgium. At the beginning of his studies, he described *Tropidocoryphe barroisi* (MAILLEUX, 1904) in his first Belgium trilobite-related publication.

LOCUS TYPICUS

Location ARD003, Jemelle, Belgium

STRATUM TYPICUM

Jemelle Fm. of Eifelian (Middle Devonian) age

MATERIAL

One internal and the related external mould of a single articulated carapace (IRSNB a 12211, a 12212) from locality ARD003, Jemelle, Jemelle Fm. The external mould was cleaned and prepared by Werner Kraus (RWTH Aachen University). After having taken several photos, some major attributes such as the existence and length of the median pygidial spine still could not be fully ascertained. This is necessary for separating *Isoprusia* from *Koneprusia* and *Laethoprusia*. Therefore Werner Kraus prepared a cast of the external mould.

HOLOTYPE

One internal and the related external mould of a single articulated exoskeleton (IRSNB a 12211) from locality ARD003, Jemelle, Jemelle Fm.

DIAGNOSIS

See RAMSKÖLD (1991, pp. 129-131). In addition to this: *Cephalon*: Due to disarticulation most of the attributes of the cephalon cannot be precisely seen. There is a large spine in the middle of the occipital ring. At the bottom of the posterior edge of the occipital ring there is a narrow band. *Thorax*: Ten thoracic segments. The length (tr.) of the segments 1 to 3 is shorter than the length of segment 4, which is the longest (8 mm). Segments 5 to 10 are successively shorter. The ratio of segment 4 to segment 10 is 1.5:1. There is a spine on each axial ring. There are 2 small pustules on the anterior band of each pleura nearer to the base of the pleura than at their distal end. On segments 6 to 10 there is a smaller pustule on the posterior band of each pleura, which combined with the 2 pustules on the anterior band form a triangle. At the distal end of each pleura there is a pair of spines, one directed upward and one directed downward. The holes in the internal mould of the holotype at the base of each upward spine are the base of the downward spine. On segments 1 to 3 the upward spine is directed inward at an angle (tr.) of (-10°). From segment 4 to 10 they are directed more outwards, and progressively backward to segment 10 at angles of 30° to 80°, and becoming the longest (6 mm) at the 9th segment.

Pygidium: The outline of the pygidium resembles a semi-circle, the ratio between the sag. length and the tr. length is 1:2. A stout median border pygidial spine (length 1 mm), that is shorter than the axis, can be seen. The outline resembles a triangle. There are no tiny secondary border spines present posterolaterally. The median border spine is lying flat between the two pygidial spines (length 4 mm), that rise with an angle of 45°.

DISCUSSION

Many efforts have been made to describe the genera *Koneprusia* PRANTL & PŘIBYL, 1949, *Isoprusia* BRUTON 1966 and *Laethoprusia* RAMSKÖLD, 1991. I assign the present taxon to *Koneprusia* based on the original diag-

nosis of BRUTON (1966), in which he states that the presence of a pygidial medial spine distinguishes *Koneprusia* PRANTL & PŘIBYL, 1949 from *Isoprusia* BRUTON 1966. RAMSKÖLD (1991, p. 131) in a cladistic analysis assigned some species with short medial spines questionably to *Isoprusia* BRUTON 1966. After discussion with D. Bruton, Oslo (pers.comm., June 2005), I decided to assign the present taxon to *Koneprusia* PRANTL & PŘIBYL, 1949 because of the stout median pygidial spine that appeared after the cleaning and preparation of a cast of the external mould. The pygidium of the specimen is semicircular in shape. That is typical for *Laethoprusia* RAMSKÖLD 1991 (fig. 6t). The main differences are the perforations (fenestrae) on the pygidium and the thorax.

COMPARISON

It is the first reported appearance of *Koneprusia* from Eifelian strata of the southern and eastern parts of the Dinant Synclinorium. In the Eifel, from the Ahrdorf Fm. (Lower Eifelian) only finds by private collectors have been reported (until now undescribed). From the Junkerberg Fm. of the Eifelian there is *Koneprusia?* *bucco* RICHTER, R. & RICHTER, E. 1918, but only cranidia are known. As long as the pygidium remains unknown a precise generic attribution remains impossible.

From Sauerland (Germany) BASSE & MÜLLER (2004 pp. 135-140) reported *Koneprusia eox* BASSE 1998. The major differences with *K. maillieuxi* are the following:

- The pygidial outline of *K. eox* is triangular.
- Tiny secondary border spines present posterolaterally.

- The length of the medial spine is 70% of the length of the main pygidial spines.
- The length of the main pygidial spines is significantly longer than the length (tr.) of the pygidium, making the medial pygidial spine a real spine, whereas the medial pygidial spine of *K. maillieuxi* is just a small stout spine with an outline of a triangle and its length is less than 25% of the length of the main pygidial spine.

Koneprusia subterarmata BARRANDE 1846. LÜTKE (1965, p. 222) reports a pygidium from the Upper Emsian of the Harz-mountains (Germany) and BRUTON (1966, plate 57, figs. 15, 17, 18) shows 3 pygidia from the Suchmasty Limestones (Upper Emsian – Lower Eifelian from Měňany near Koněprusy, Czech Republic). These pygidia show a ratio (sag.) length to (tr.) length of 1:3, the outline being described as triangular. This is significantly wider (tr.) than the sag./tr. ratio 1:2 in *K. maillieuxi* in which the pygidium has the shape of a semicircle.

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Explanation of Plates

PLATE 1

- Fig. 1 — Exoskeleton of pygidium of *Astycoryphe senckenbergiana* RICHTER, R. & RICHTER, E. 1919 (IRSNB a 12203); location ARD003, Jemelle (Belgium); Jemelle Fm., Middle Eifelian; dorsal view, $\times 6.7$.
- Fig. 2 — Exoskeleton of pygidium of *Tropidocoryphe barroisi* MAILLIEUX, 1904 (IRSNB a 12204); location ARD003, Jemelle (Belgium); Jemelle Fm., Middle Eifelian; dorsal view, $\times 5.0$.
- Fig. 3-4 — Exoskeleton of pygidium of *Tropidocoryphe barroisi* MAILLIEUX, 1904 (IRSNB a 12205); location ARD003, Jemelle (Belgium); Jemelle Fm., Middle Eifelian; 3: dorsal view, $\times 3.8$; 4: dorsal view, $\times 10.0$.
- Fig. 5-6 — Exoskeleton of pygidium of *Tropidocoryphe barroisi* MAILLIEUX, 1904 (IRSNB a 12206), Üxheim (Germany); Nohn Fm., Lower Eifelian; 5: dorsal view on exoskeleton, $\times 3.4$; 6: dorsal view, $\times 9.0$.

PLATE 2

- Fig. 1-3 — External mould of pygidium of *Eifliarges caudimurus* RICHTER, R. & RICHTER, E. 1917 (IRSNB a 12207); location VML004, Jemelle (Belgium); Jemelle Fm., Middle Eifelian; 1: ventral view, $\times 6.3$; 2: ventral view (negative colours), $\times 6.3$; 3: ventral view, $\times 8.0$.
- Fig. 4 — Internal mould of pygidium of *Eifliarges caudimurus* RICHTER, R. & RICHTER, E. 1917 (IRSNB a 12208); Jemelle (Belgium); Jemelle Fm., Middle Eifelian; dorsal view on pygidium, $\times 10.0$;
- Fig. 5 — Internal mould of cranidia of *Eifliarges caudimurus* RICHTER, R. & RICHTER, E. 1917 (IRSNB a 12209); Jemelle (Belgium); Jemelle Fm., Middle Eifelian; 5: dorsal view, $\times 12.5$.
- Fig. 6 — Internal mould of cranidia of *Eifliarges caudimurus* RICHTER, R. & RICHTER, E. 1917 (IRSNB a 12210); Jemelle (Belgium); Jemelle Fm., Middle Eifelian; 6: dorsal view, $\times 9.5$.

PLATE 3

- Figs. 1-4 — Cast of external mould of carapace of *Koneprusia maillieuxi* MAGREAN sp.n. (IRSNB a 12211); location ARD003, Jemelle (Belgium); Jemelle Fm., Middle Eifelian; 1: dorsal view, $\times 9.5$; 2: dorsal view, $\times 7.0$; 3: sag. view, $\times 3.8$; 4: dorsal view, $\times 9.5$.

PLATE 4

- Fig. 1-3 — External mould of carapace of *Koneprusia maillieuxi* MAGREAN sp.n. (IRSNB a 12211); location ARD003, Jemelle (Belgium); Jemelle Fm., Middle Eifelian; 1: ventral view, $\times 10.5$; 2: ventral view on pygidium, $\times 11$; 3: ventral view on cephalon, $\times 11$.

PLATE 5

- Fig. 1-2 — Internal mould of carapace of *Koneprusia maillieuxi* MAGREAN sp.n. (IRSNB a 12212); location ARD003, Jemelle (Belgium); Jemelle Fm., Middle Eifelian; 1: dorsal view, $\times 11.8$; 2: dorsal view on cephalon $\times 15.7$

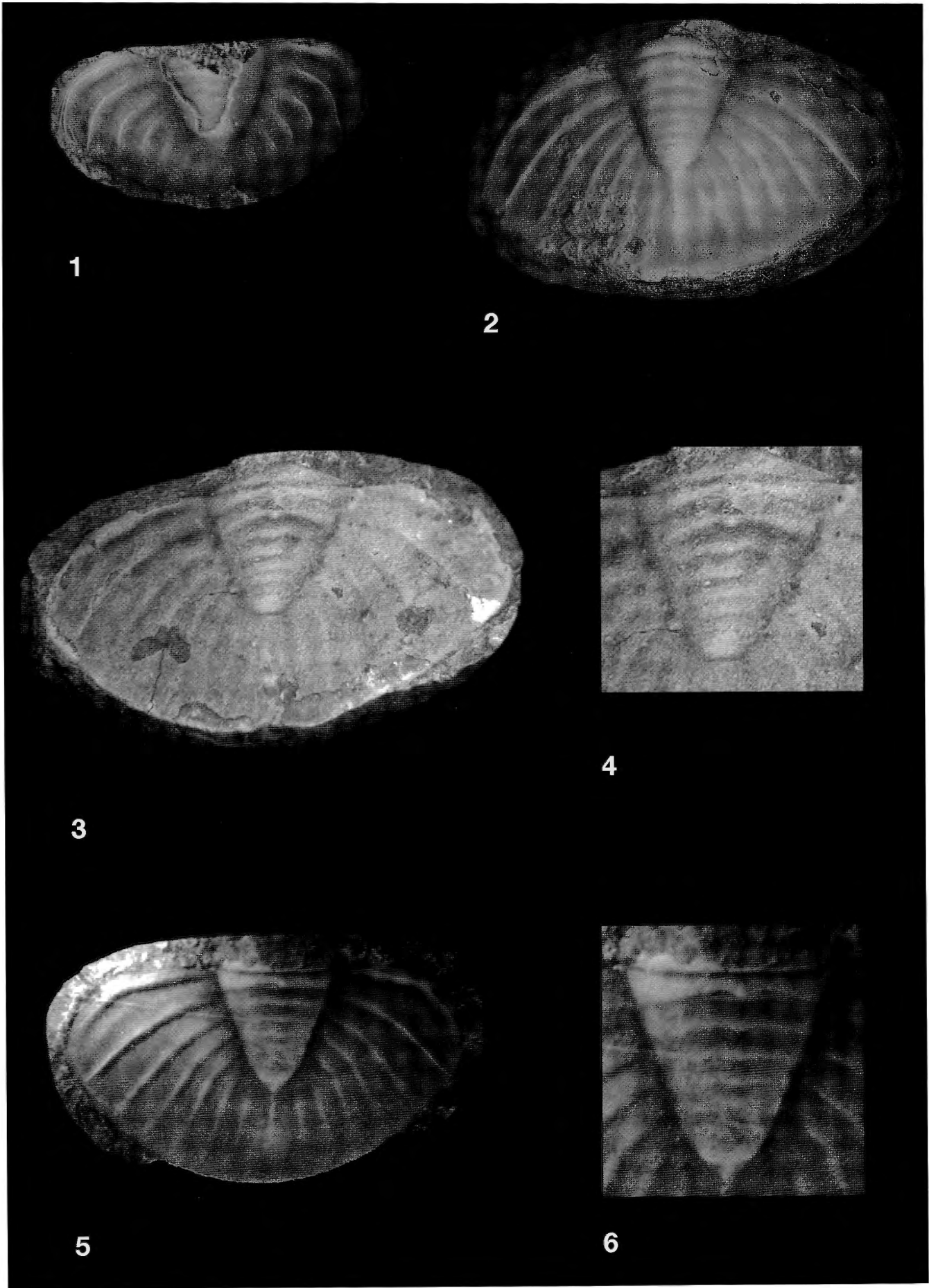


PLATE 1



1



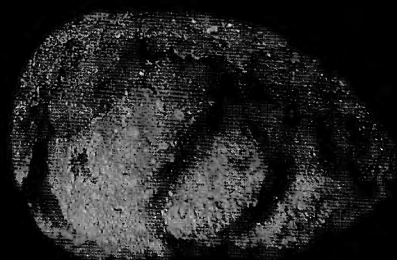
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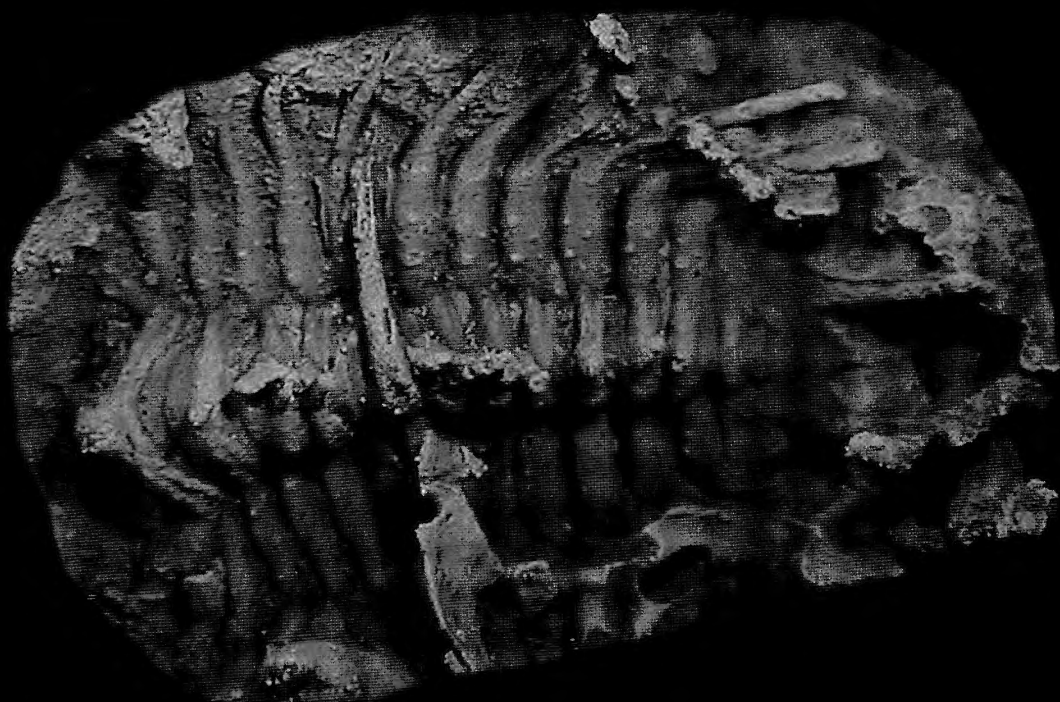
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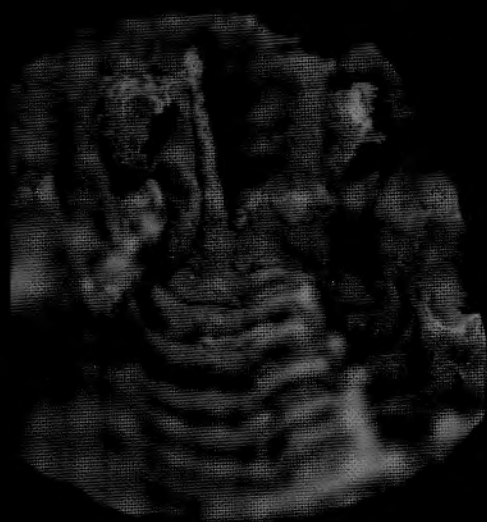
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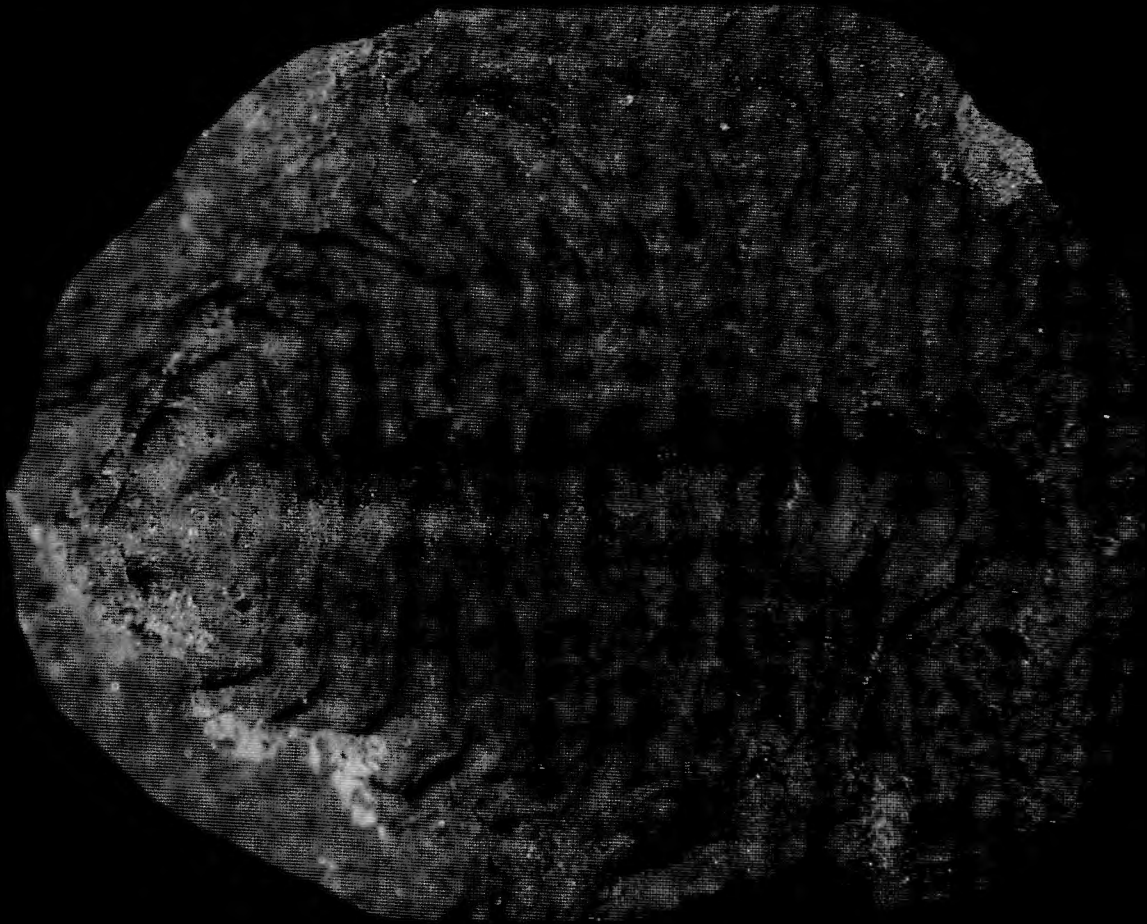
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3



4



1



2



3



1



2

