

A revision of Devonian trilobites from Belgium – Part 1

The genera *Cornuproetus* and *Radiaspis*

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Abstract

Belgian Devonian trilobites have long been known, although they remain comparatively poorly documented. A revision of the obsolete nomenclature seems long overdue, and added to that, critical evaluations of listings of trilobite taxa by MAILLIEUX over sixty years ago are called for. The present note is the first part in a revision of Devonian trilobites from Belgium, and comprises data on a section near Jemelle (Luxembourg, Belgium) that yielded the new material. It briefly discusses correlations of Middle Devonian (Eifelian) successions of the Ardennes and Eifel (Germany), and describes two taxa (*Cornuproetus* (*Cornuproetus*) *cornutus cornutus* and *Radiaspis comes*) from Jemelle.

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

Résumé

La présence de trilobites dans le Dévonien belge est connue depuis longtemps, mais elles ont été relativement peu étudiées. Une révision de la nomenclature obsolète est nécessaire ainsi que l'évaluation critique des listes de MAILLIEUX qui datent d'il y a soixante ans. La présente note est la première partie d'une révision des trilobites du Dévonien belge, et contient les données nouvelles d'une localité aux environs de Jemelle (Luxembourg, Belgique). La corrélation du Dévonien Moyen (Eifélien) des Ardennes et de l' Eifel (Allemagne) est brièvement discutée et deux taxons (*Cornuproetus* (*Cornuproetus*) *cornutus cornutus* et *Radiaspis comes*) sont décrits de Jemelle.

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

Introduction

Subsequent to studies conducted in the first half of the twentieth century by the 'Institut royal des Sciences naturelles de Belgique' (IRScNB, Brussels), little work has been done on Devonian trilobites from Belgium. MAILLIEUX (1904, 1933, 1938) recorded a number of taxa, and his lists represent a fairly accurate view of current knowledge of Devonian trilobite faunas in Belgium. Research of coeval trilobites in Germany has actively continued up to the present day, thus making the hiatus

in knowledge about Belgian trilobites additionally conspicuous. In an exchange of letters with one of the authors (B.M.) in 1995 and 1996, the late W. Struve (then Senckenberg Museum, Frankfurt am Main) stressed the need for renewed studies into Ardennes trilobites, in view of the strong correlations with the Eifel region and with an aim to update work done mainly by MAILLIEUX.

Between 1999 and 2004, the authors conducted fieldwork in the Ardennes, in particular in the Dinant Synclinorium, 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 first assigned to each site combined with a number that corresponds to the sequence of visits to those sites.

VML004: Area west of the railway station of Jemelle (southern border of the Dinant Synclinorium). West of what is described by GODEFROID (in BULTYNCK *et al.*, 1991, pp. 31, 35) as "Coupe 1" and indicated on Fig. 1 below. Exposed is the Jemelle Formation of Eifelian (Middle Devonian) age.

During fieldwork in 2002, a rich trilobite fauna was discovered with representatives of the trilobite orders Corynexochida (Scutelluinae), Phacopida (Asteropyginae, Phacopinae), Proetida (Proetinae, Otarioninae, Cornuproetinae, Tropidocoryphinae) and Lichida (Trochurinae, Odontopleurinae). As far as numbers are concerned, the majority of the material collected is assignable to the Phacopinae and Proetinae, both comprising a number of taxa. Of note is the fact that most specimens collected at site VML004 represent internal moulds; the remainder of the material is of varying preservation, ranging from dissolved to some degree to more or less complete and well-preserved.

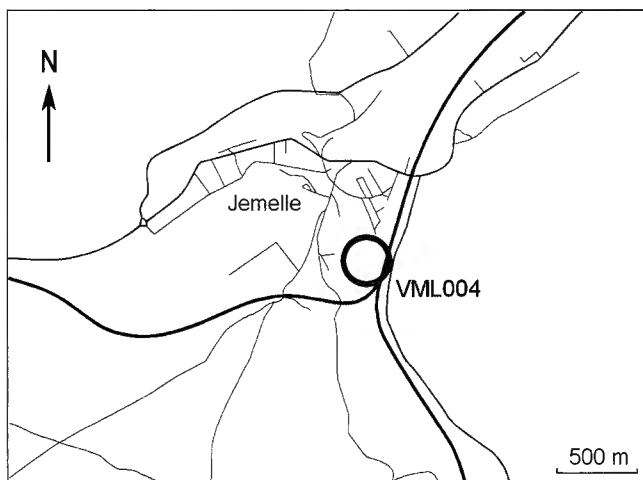


Fig. 1 — Indication of location VML004 on map.

In the Rochefort area, the Jemelle Formation (*Polygnathus partitus* – *Polygnathus ensensis* conodont Zone according to BULTYNCK *et al.* (2000, fig. 4) and BULTYNCK & DEJONGHE (2002, p. 50) is one of the main units to have yielded Eifelian trilobites. According to GODEFROID (in BULTYNCK *et al.*, 1991, pp. 31-32), the members exposed there are, in ascending order, Station, Cimetièrre and Chavées members. The lower boundary of the Jemelle Formation is defined by sandy shales in the basal portion of the Station Member, which overlie the argillaceous and crinoidal limestones of the Eau Noire Formation. The Chavées Member yields a rich macrofauna, comprising solitary corals, tabulates, brachiopods, bivalves and trilobites; this is assumed to be the main provenance of the trilobite material collected.

Jacques Godefroid (pers. comm., May 2004) helped us exclude the lower Station Member as a possible source for the trilobite material collected at site VML004, and identified the Cimetièrre and Chavées members using brachiopods that were collected there, namely *Rhenothyris rhenana* STRUVE, 1970, *Kransia parallelepipedata* (BRONN, 1837) and *Arduspirifer intermedius* (SOLLE, 1953). While the two last-named species are known to range throughout the Eifelian, *R. rhenana* is confined to the Cimetièrre and Chavées members. In the Eifel, it is

typical of the Flesten Horizon in the Ahrdorf Formation (see Table 1), where it is abundant.

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’. Treated with ammonium chloride and photographed by Werner Kraus (RWTH Aachen University) are two articulated carapaces and three pygidia (Pl. 1, Fig. 1; Pl. 2, Fig. 1-5). The remaining specimens were uncoated and photographed by one of the authors (A.v.V.).

Order Proetida FORTEY & OWENS, 1975
 Superfamily Proetoidea HAWLE & CORDA, 1847
 Family Proetidae SALTER, 1864
 Subfamily Cornuproetinae RICHTER,
 RICHTER & STRUVE, 1959

REMARK

Members of the Cornuproetinae are characterised by their less vaulted carapace in comparison to Proetinae; long, furrowed genal spines; kidney-shaped eyes; broad occipital ring; and their micropygous, smoothly outlined pygidium. Confusion arose when HARRINGTON *et al.* (in MOORE, 1959, p. O 385) named RICHTER & RICHTER, 1956 as the authors of Cornuproetinae. According to LÜTKE (1980, p. 103) this information is incorrect as RICHTER & RICHTER (1956, pp. 351-352) considered *Cornuproetus* a member of the subfamily Proetinae. We follow LÜTKE (1980) and MOORE (1959, p. O 163) in assigning the authorship of the Cornuproetinae to RICHTER, RICHTER & STRUVE, 1959.

Genus and subgenus *Cornuproetus*
 RICHTER & RICHTER, 1919

TYPE SPECIES: *Gerastos cornutus* GOLDFUSS, 1843, by original designation of RICHTER & RICHTER (1919).

Table 1 — Correlations between Devonian successions of the Eifel and Ardennes. Section from table shown by HAUSER (1999, Table 3).

Chronostratigraphy	Eifel Kalkmulden	Ardennes (Rochefort Region)
Eifelian	Ahbach Fm	Lower part of Hanonet Fm
	Freilingen Fm	?
	Junkerberg Fm	?
	Ahrdorf Fm	Jemelle Fm
	Nohn Fm	Chavées Mbr
	Lauch Fm	Cimetièrre Mbr
		Station Mbr
		Upper part of Eau Noire Fm

Cornuproetus (Cornuproetus) cornutus cornutus
(GOLDFUSS, 1843) (Pl. 1, Figs. 1-7)

MATERIAL

Internal moulds of two articulated carapaces (IRSNB a12160-12161) and of two librigenae with associated external moulds (IRSNB a12162-12163), from locality VML004, Jemelle, Jemelle Formation.

DIAGNOSIS

See G. ALBERTI (1969, pp. 122-123).

DESCRIPTION

One internal mould of an articulated carapace (Pl. 1, Fig. 2-3) shows extensive denudation of the right lobe, as well as of the lower right portion of the axis. In particular the glabella is in poor condition, although its contours are distinct. The slightly tilted position of the specimen in matrix has caused some lateral deformation. The other internal mould of an articulated carapace (Pl. 1, Fig. 1) is generally in good condition although its thorax and librigenae are slightly dislocated. Two internal moulds of librigenae with associated external moulds (Pl. 1, Fig. 4-7) are in good condition; both external moulds show small holes left by fine granulation that used to be present on the surface of the carapace.

COMPARISON

MAILLIEUX (1904, p. 579) reported "*Proetus*" *cornutus* (GOLDFUSS) from the Eifelian of the Couvin area and from the Eifelian of mainly the southern and eastern parts of the Dinant Synclinorium (MAILLIEUX, 1938, p. 27). We have investigated specimen IRSNB IG 9694-7 (Eifelian, Rochefort), identified as "*Proetus*" *cornutus* by MAILLIEUX in 1937 and corroborate that assignment; the specimen is a representative of *Cornuproetus (C.) c. cornutus*.

The present subspecies may be distinguished from *Cornuproetus (C.) c. pruemensis* BASSE, 2002 mainly by its having a less convex anterior rim, and from *Cornuproetus (Diademaproetus) rhenanus* BASSE, 2002 in showing a less convex anterior rim, and in having finer and more numerous granules both on the librigenae and glabella as on the thoracic rings; more ridges on cephalic rim (merely two in *Cornuproetus (D.) rhenanus*); wider librigenal fields lateral of the eyes (*tr.*).

Order Lichida MOORE, 1959

Superfamily Odontopleuroidea (sensu FORTEY, 1997)

Family Odontopleuridae BURMEISTER, 1843

Subfamily Odontopleurinae BURMEISTER, 1843

Genus *Radiaspis* RICHTER & RICHTER, 1917

TYPE SPECIES: *Arges radiatus* GOLDFUSS, 1843, by original designation of RICHTER & RICHTER (1917).

Radiaspis comes (BASSE, 1998)
(Pl. 2, Figs. 1-5)

v 1930 *Radiaspis radiata* – RICHTER & RICHTER, p. 33, fig. 2a.

? 1933 *Acidaspis radiata* – MAILLIEUX, p. 70.

? 1938 *Acidaspis radiata* GOLDF. – MAILLIEUX, p. 27.

v 1998 *Charybdaspis comes* BASSE, pl. 13, figs. 1-3.

MATERIAL

Internal moulds of a single articulated carapace (IRSNB a12614) and of three pygidia (IRSNB a12615, 12616, 12617), from locality VML004, Jemelle, Jemelle Formation.

DIAGNOSIS

See BASSE (1998, pp. 86-87).

DESCRIPTION

One internal mould of an articulated, well-preserved carapace (Pl. 2, Fig. 1-2) clearly featuring seven spines on the left half of the pygidium; most spines in this specimen are preserved only for a small part. In two internal moulds of pygidia (Pl. 2, Fig. 3-4) the spines are not preserved although their prints are preserved in the matrix. In one internal mould of a pygidium (Pl. 2, Fig. 5) the spines are partially preserved. In all three pygidia a maximum of seven spines can be detected in at least one side of the pygidium.

DISCUSSION

In describing *Radiaspis radiata*, BRUTON (1968) noted that the number of pygidial border spines differed, although he did not attach any major significance to this. BASSE (1998) distinguished two groups of *Radiaspis* (sensu RICHTER & RICHTER, 1917), namely *Radiaspis* and his new genus *Charybdaspis*, on the basis of mainly the number of pygidial border spines. *Radiaspis* has sixteen spines (2*8 axial symmetric), corresponding to the holotype of *Radiaspis radiata* (Rheinische Friedrich-Wilhelms-Universität, Bonn), while *Charybdaspis* has 14 pygidial border spines (2*7 axial symmetric). In our opinion different numbers of pygidial spines might be used to distinguish species but not genera. Therefore, we follow earlier conclusions drawn by SANTEL (2001) and JELL & ADRAIN (2003) that *Charybdaspis* is to be considered a junior subjective synonym of *Radiaspis*. The type species of *Charybdaspis*, *C. comes*, is maintained and classed under *Radiaspis*.

The present species can be distinguished from *Radiaspis radiata* mainly by the smaller number of pygidial spines. Both *Radiaspis radiata* and *Radiaspis comes* occur in the Middle Eifelian to Lower Givetian.

In the Sauerland region (Germany), both species occur in the uppermost part of the Ohle Formation (Middle Eifelian), according to BASSE (1998, pp. 84, 86). In addition, BASSE (1998, pp. 86-87) reported questionable representatives of exclusively *Radiaspis comes* in the Upper Emsian to lower Middle Eifelian.

In the Eifel region, both *Radiaspis comes* and *Radiaspis radiata* have been reported in the Ahrdorf, Junkerberg and Freilingen formations.

In the Ardennes, “*Acidaspis*” *radiata* was recorded by MAILLIEUX (1933, p. 70; 1938, p. 27) from the “Assise de Couvin” and from Eifelian strata of mainly the southern and eastern parts of the Dinant Synclinorium, respectively. We have been unable to confirm the identifications since the original specimens are unavailable at this time. Given the age of the units that MAILLIEUX (1938, Co2a = lowermost Eifelian) mentioned, the material on which he based his record is more likely to belong to *Radiaspis comes*. BRUTON (1968, pp. 37-42) refers to “ERBEN *et al.*, excursions IV, V and X” who allegedly reported *Radiaspis radiata* from the Upper Couvinian in the Couvin area; we have not been able to track down this material. Con-

sequently, there is currently no definite record of *Radiaspis radiata* from Devonian strata in Belgium.

Acknowledgments

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Explanation of Plates

PLATE 1

- Fig. 1 — Internal mould of articulated carapace of *Cornuproetus (Cornutus) cornutus cornutus* (IRSNB a12610); location VML004, Jemelle (Belgium); Jemelle Fm., Middle Eifelian; dorsal view, x 5.2.
- Fig. 2-3 — Internal mould of articulated carapace of *Cornuproetus (Cornuproetus) cornutus cornutus* (IRSNB a12611); location VML004, Jemelle (Belgium); Jemelle Fm., Middle Eifelian; 2: dorsal view on thoracopygidium, x 3.6; 3: dorsal view on cephalon, x 3.2.
- Fig. 4-5 — Internal mould of librigena of *Cornuproetus (Cornuproetus) cornutus cornutus* (IRSNB a12612a) with negative print (IRSNB a12612b); location VML004, Jemelle (Belgium); Jemelle Fm., Middle Eifelian; 4: dorsal view on internal mould, x 4.1; 5: ventral view on negative print, x 3.8.
- Fig. 6-7 — Internal mould of librigena of *Cornuproetus (Cornuproetus) cornutus cornutus* (IRSNB a 12613a) with negative print (IRSNB a2613b); location VML004, Jemelle (Belgium); Jemelle Fm., Middle Eifelian; 6: dorsal view on internal mould, x 4.0; 7: ventral view on negative print, x 3.3.

PLATE 2

- Fig. 1-2 — Internal mould of articulated carapace of *Radiaspis comes* (IRSNB a12614); location VML004, Jemelle (Belgium); Jemelle Fm., Middle Eifelian; 1: dorsal view on carapace, x 5.1; 2: oblique frontal view on carapace, x 6.0.
- Fig. 3-5 — Internal moulds of pygidia of *Radiaspis comes*; location VML004, Jemelle (Belgium); Jemelle Fm., Middle Eifelian; 3: dorsal view on pygidium (IRSNB a12615), x 3.8; 4: dorsal view on pygidium (IRSNB a12616), x 3.4; 5: dorsal view on pygidium (IRSNB a12617), x 4.7.

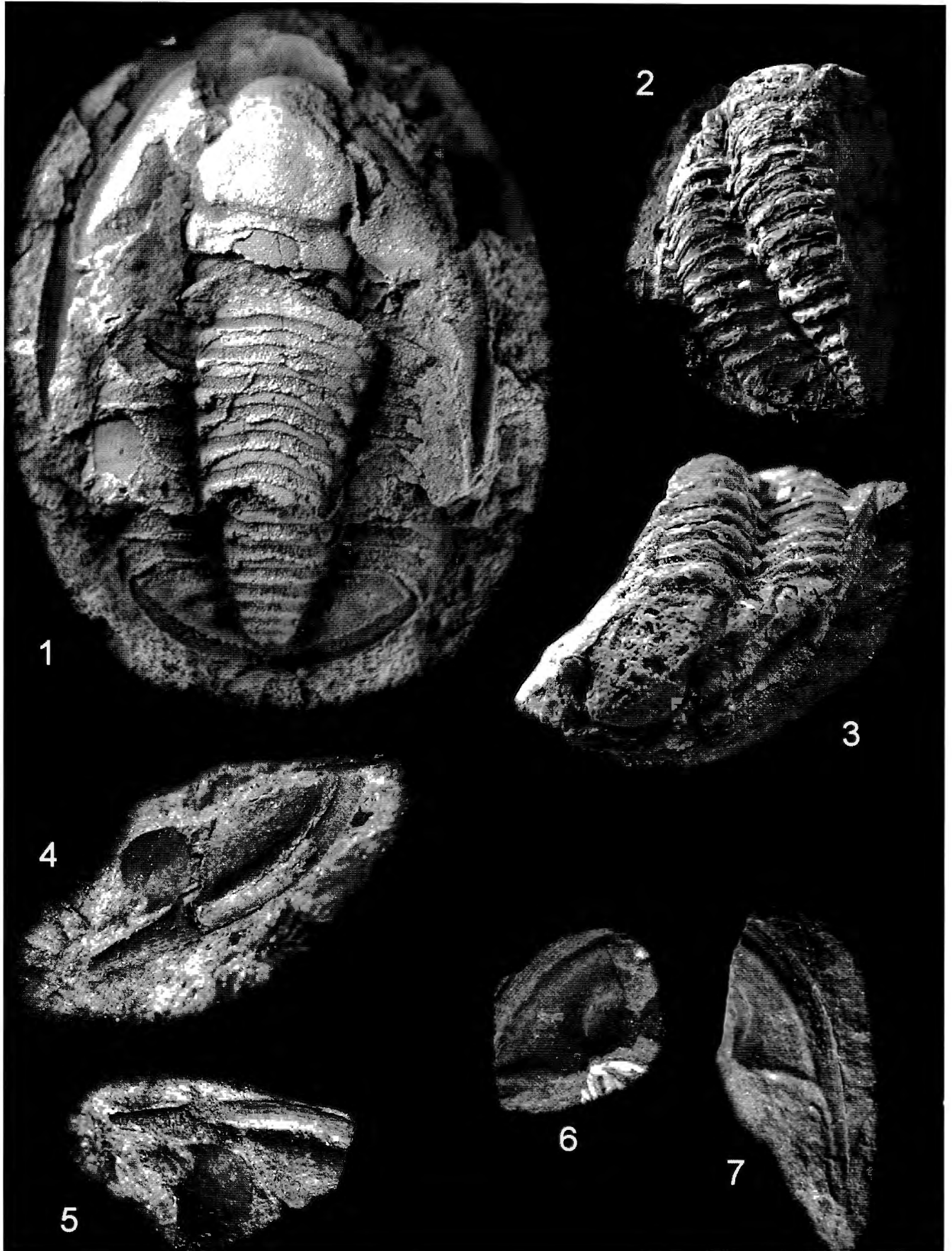


PLATE 1

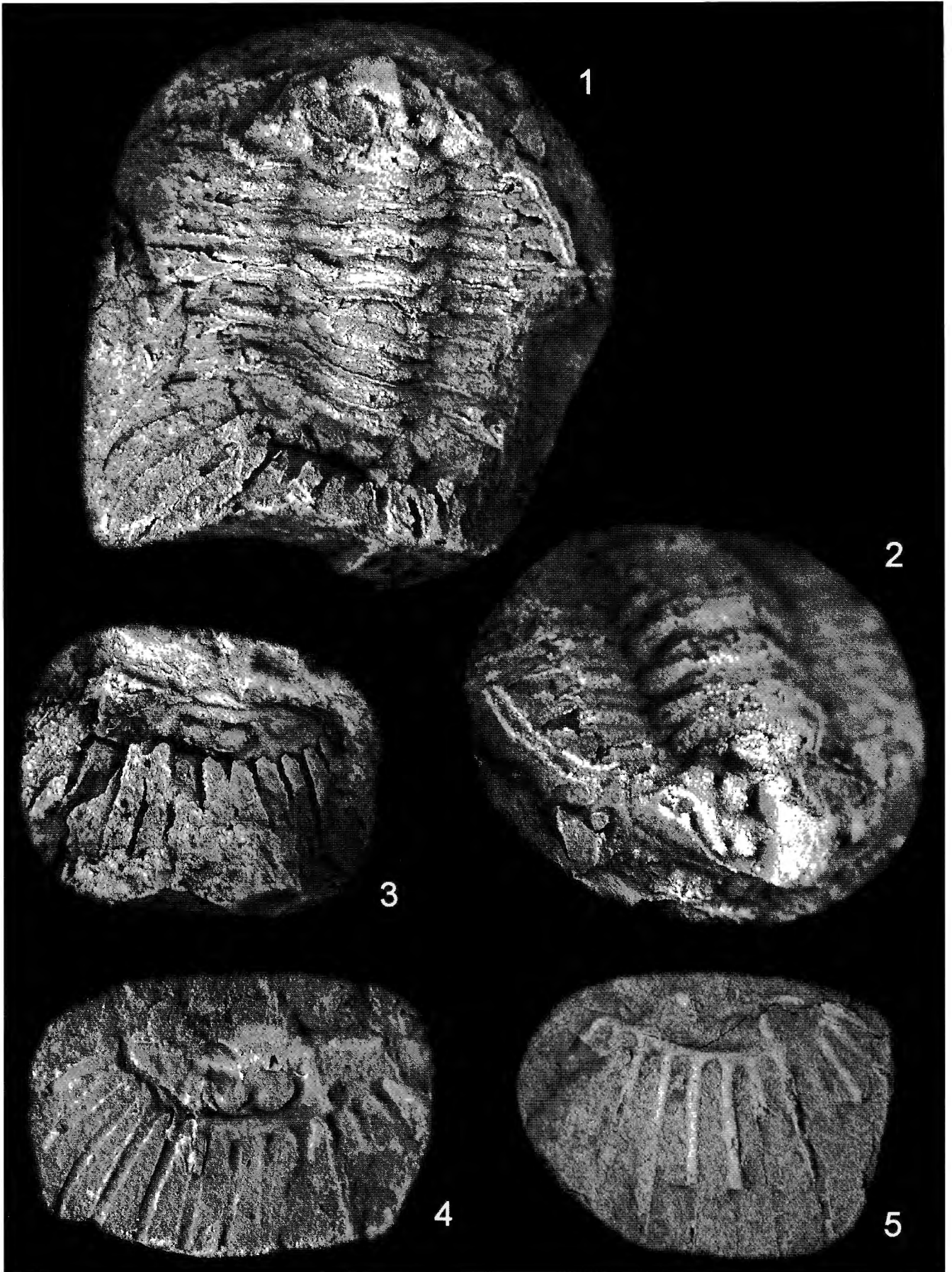


PLATE 2

