

J. S. H. COLLINS & ANDRZEJ RADWAŃSKI

Scalpellid cirripedes from the Upper Cretaceous chalk of Mielnik (eastern Poland)

ABSTRACT: The scalpellid cirripedes from the richly fossiliferous Upper Cretaceous chalk deposits (?Lower Campanian through the lowermost Maestrichtian), exposed at Mielnik on the Bug river, eastern Poland, belong to the species *Arcoscalpellum maximum* (J. de C. Sowerby, 1829) and *A. fossula* (Darwin, 1851). The description of these species is supplemented by some remarks on the previous reports of *Arcoscalpellum maximum* (J. de C. Sowerby) from Poland.

INTRODUCTION

The present paper gives a successive contribution to the knowledge of the abundant fossils contained in the Upper Cretaceous chalk deposits exposed at Mielnik on the Bug river, eastern Poland. The section, which is accessible in a series of open pits, as well as within the natural exposures along the Bug river valley, and in a larger quarry, comprises a sequence of the white chalk (ca 10 m thick) displaying a few bands of flints, and overlain by the greyish chalk (ca 5 m thick) with a sandy or silty admixture and phosphatic nodules at the bottom; the hard-ground horizon separates these two chalk units (cf. Bitner & Pisera 1979, Text-fig. 1). The whole section yields a remarkable amount of diverse fossils, the systematic studies of which have been promoted by the second author (A. Radwański). Besides numerous belemnites, ostreids *Pycnodonta vesicularis* (Lamarck), alectryonids and other bivalves, some echinoids, and ubiquitous epibionts (see Radwański 1972, and Bitner & Pisera 1979, for review of previous investigations), the organic assemblages comprise an outstanding material of the octocorals, bryozoans, and cirripedes, associated with calcareous sponges *Porosphaera globularis* (Phillips), free-living serpulids, asteroid ossicles, shark teeth, and other organic remains. The microflora and -fauna and diverse trace fossils complete the list of the hitherto recognized groups.

The systematic studies of the fossils collected from the chalk deposits at Mielnik have resulted in the description of diversified brachiopods, the assemblage of which (23 species) is dominated by small sized forms attaching to hard substrates (Bitner & Pisera 1979), and in the analysis of the calcareous nannoplankton and index foraminifers (Gaździcka 1981). Other groups still remain under investigation, as does their ecology and taphonomy which has an obvious bearing upon the recognition of general environmental conditions under which all these diversified communities lived (cf. Radwański 1972).

As to the stratigraphy, the section exposed at Mielnik was formerly placed at the Campanian/Maestrichtian boundary, the course of which was regarded as identical with the hardground horizon (Pozaryski 1960). The brachiopods studied by Bitner & Pisera (1979) contain the index forms of the brachiopod zones 2 and 3 distinguished by Surlyk in the Danish chalk, and which in Denmark correspond to the lowermost part of the Lower Maestrichtian. The balemmites determined by Professor D. P. Naidin, University of Moscow, viz. *Goniot euthis gracilis* (Stolley), *Belemnellocamax mammillatus* (Nilsson), and *Belemnitella mucronata mucronata* (Link), show an uppermost part of the Lower Campanian for the white chalk (see Gaździcka 1981, p. 77), while the nannoplankton and foraminifers studied by Gaździcka herself indicate Lower Campanian age for the bottom, and Lower Maestrichtian age for the top of the section. Consequently, it seems that the sedimentary conditions responsible for the development of the hardground horizon, possibly associated with the preceding processes of non-deposition (? or even reworking), have supposedly disturbed the continuity of sedimentation and blurred its exact stratigraphical documentation.

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THE MIELNIK CIRRIPEDES

The cirripede material collected in the Mielnik chalk contains numerous isolated plates (both compartmental and opercular) of verrucids, and single valves of scalpellids. The verrucids, comparable to those from the Isle of Rügen (see Withers 1923) are still under research, while the obtained scalpellids are the subject of this contribution.

The collected scalpellid valves belong to the genus *Arcoscapellum* Hoek, 1907, and represent the two commonly known species, *Arcoscapellum maximum* (J. de C. Sowerby, 1829) and *A. fossula* (Darwin, 1851); both are discussed at some length by Withers (1935), who should

also be consulted for intermediate synonymies. The second of these species has not hitherto been recorded from Poland, whereas the first one, under the name of *Scalpellum maximum*, has been reported by a few authors since over a century. All these reports, however, have either been subjected to a revision previously, or need such treatment now.

Roemer (1870, p. 322 and Pl. 37, Figs 13—15) presented, under the name "*Scalpellum maximum* Darwin?", two carinae and one tergum from the Upper Turonian marls of Opole (German: Oppeln) in Lower Silesia, southern Poland. Two of these specimens (a carina and a tergum; Roemer 1870, Pl. 37, Figs 13 and 15) were subsequently assigned by Withers (1923, p. 11) to *Scalpellum* (*Cretiscalpellum*) *glabrum* (F. A. Roemer, 1841)*. The second carina (Roemer 1870, Pl. 37, Fig. 14) was retained by Withers (1923, pp. 20—21) in *Scalpellum* (*Arcoscalpellum*) *maximum* (J. de C. Sowerby), but the illustration of the latter specimen is so imperfect that it can hardly be recognized as depicting any scalpellid at all; a repeated drawing of that specimen (Leonhard 1897, Pl. 6, Figs 12a—b) does also not offer a sufficient insight into its nature.

Scupin (1912—1913, p. 92 and Pl. 3, Fig. 6) presented, under the name "*Scalpellum maximum* Sow.", a carina from the Upper Turonian through Lower Conacian marly sandstones exposed at Skala (German: Hohlstein) near Lwówek (German: Löwenberg) in western Lower Silesia. The illustrated specimen, being a putty-cast of an external imprint, cannot be classified within a definite scalpellid species. Another material from that region (Andert 1934, p. 408) remained not illustrated.

Barczyk (1956, pp. 15—16) reported "*Scalpellum maximum* Sow." in faunal lists of the Lower Campanian marls exposed at Bonarka on the southern outskirts of the city of Cracow. These specimens have never been illustrated, and the material collected by Professor W. Barczyk at this locality, and deposited at the Museum of the Faculty of Geology, University of Warsaw, contains both *Arcoscalpellum maximum* (J. de C. Sowerby) and *A. fossula* (Darwin).

The above review shows that Bonarka in Cracow is the only locality outside Mielnik, where these two scalpellid species are known to occur in the Upper Cretaceous deposits of Poland.

SYSTEMATIC DESCRIPTION

Class Cirripedia Burmeister, 1834

Order Thoracica Darwin, 1854

Suborder Lepadomorpha Pilsbry, 1916

Family Scalpellidae Pilsbry, 1916

Genus ARCOSCALPELLUM Hoek, 1907

Type species: *A. mitchelottianum* (Seguenza, 1876) = *A. velutinum* (Hoek, 1883), by original designation.

Range: Aptian (Lower Greensand) to Recent.

* In the meantime, one of these specimens, viz. the carina (Roemer 1870, Pl. 37, Fig. 13) was called "*Scalpellum oppolense* nov. nom." by Leonhard (1897, p. 63), whereas the tergum (Roemer 1870, Pl. 37, Fig. 15) was correctly assigned by Leonhard to the species *glabrum*.

Arcoscalpellum maximum (J. de C. Sowerby, 1829)
(Pl. 1, Figs 1—2)

Range: Lower Santonian *Micraster coranguinum* Zone to Upper Maestrichtian.

Material: 4 carinae and 1 tergum.

Remarks. — The carinae, although largely fragmentary (see Pl. 1, Figs 1a—1b), are in all respects similar to those from the *B. mucronata* chalk of Norwich. Weak ridges separating the moderately arched tectum from the parietes differentiate them from carinae of *A. fossula* (Darwin), in which the parietal ridges, particularly of the Upper Santonian forms, become much thickened and raised above the general level of the flattened tectum.

The fragmentary tergum (see Pl. 1, Fig. 2) is much thickened and similar to that figured by Withers (1935, Pl. 30, Fig. 27) from Norfolk.

Arcoscalpellum fossula (Darwin, 1851)
(Pl. 1, Fig. 3)

Range: Middle Santonian *Uintacrinus socialis* Zone to Upper Maestrichtian.

Material: 5 terga and 1 scutum.

Remarks. — The terga (see Pl. 1, Fig. 3) fall well within the degree of variation displayed by valves of more or less similar age from Norfolk, and the somewhat higher chalk of the Isle of Rügen (cf. Withers 1923). In all cases the occludent margin is moderately thickened and more closely resembles valves from the *B. mucronata* Zone of Norwich and that of Rügen than they do the valves from the Phosphatic Chalk (Maestrichtian) of Ciply, Belgium (cf. Withers 1935, p. 214). The presence of a thickened ridge extending from the apex to about the middle of the scutal margin, together with short growth lines pending from the inner occludent and upper carinal edges distinguishes these valves from those of *A. maximum* (J. de C. Sowerby).

The scutum, although close to those of *A. maximum* (J. de C. Sowerby), is distinguished by a shallow depression almost parallel with the occludent margin and a furrow bordering the tergal margin.

63, Oakhurst Grove,
East Dulwich,
London, S. E. 22
England

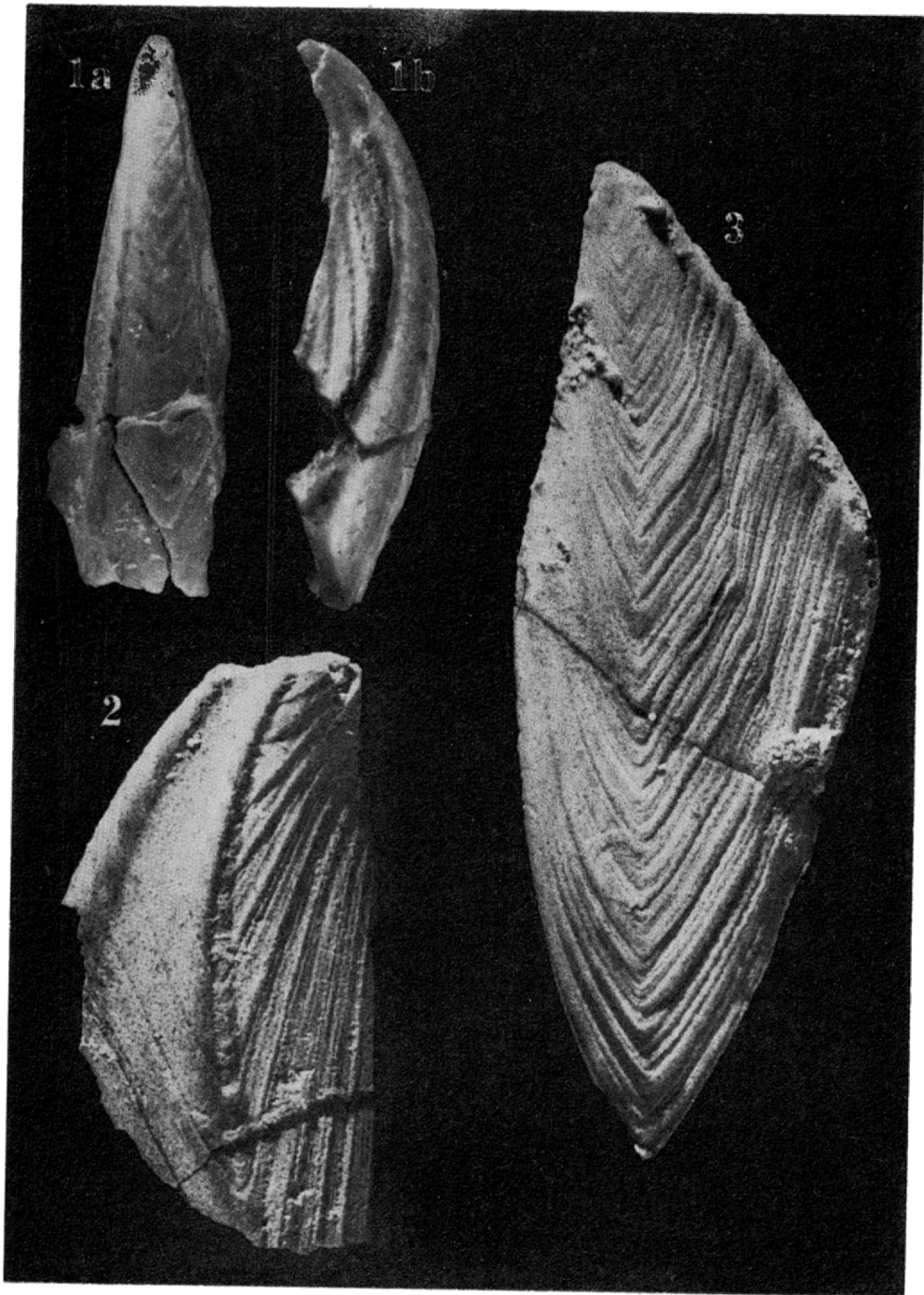
(J. S. H. Collins)

Institute of Geology
of the Warsaw University,
Al. Zwirki i Wigury 93,
02-089 Warszawa, Poland

(A. Radwański)

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- 1 — *Arcoscalpellum maximum* J. de C. Sowerby; carina in front (1a) and side (1b) views
 2 — *Arcoscalpellum maximum* (J. de C. Sowerby); right tergum, slightly damaged
 3 — *Arcoscalpellum fossula* (Darwin); left tergum

All photos X5; taken by B. Drozd, M. Sc.

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J. S. H. COLLINS i A. RADWAŃSKI

**WĄSONOGI SCALPELLIDAE Z KREDY PISZĄCEJ
MIELNIKA NAD BUGIEM**

(Streszczenie)

Przedmiotem pracy jest opis szczątków wąsonogów z rodziny Scalpellidae znalezionych w profilu kredy piszącej Mielnika nad Bugiem. Zebrany w obrębie obfitych zespołów rozmaitych skamieniałości (patrz Radwański 1972, Bitner & Pi-sera 1979, Gaździcka 1981) materiał składa się z izolowanych płytek, wśród których znajdują się kareny, terga i skuta (patrz pl. 1, fig. 1—3) reprezentujące dwa gatunki: *Arcoscalpellum maximum* (J. de C. Sowerby) oraz *A. fossula* (Darwin). W pracy przedstawiono także uwagi rewizyjne w sprawie dawniejszych danych o występowaniu gatunku *Arcoscalpellum maximum* w Polsce (patrz Roemer 1870; Leonhard 1897; Scupin 1912—1913; Withers 1923, 1935; Andert 1934; Barczyk 1956).
