

## The Youngest (Uppermost Maastrichtian) Ammonites in the Middle Vistula Valley, Central Poland

by

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**Summary.** First ammonites, belonging to the species *Hoploscaphites constrictus* (Sowerby), are reported from the uppermost Maastrichtian/Danian Greensand cropping out at Nasiłów quarry near Kazimierz-on-Vistula. These are the youngest ammonite findings in the mid-to Upper Cretaceous sequence exposed along the Middle Vistula Valley. The scarcity of ammonites within Greensand layer is interpreted as a result of some biological (ecological and/or evolutionary) factors.

The strata exposed along the Middle Vistula Valley are regarded as the most complete profile of the Upper Cretaceous of Europe [1, 4, 8, 12, 13]. The scope of the present contribution is to announce the finding of the youngest ammonites in the Middle Vistula Valley section and to discuss briefly their significance. For the detailed stratigraphical and sedimentological background the reader is referred to the authors' previous paper ([10] see also [1]).

**Geologic setting.** The uppermost Maastrichtian part of the Cretaceous sedimentary sequence in the Middle Vistula Valley is formed by deposits exposed in the environs of Kazimierz-on-Vistula in Nasiłów and Bochoznica quarries (see [1] for detailed data).

The considered part of the sequence (Fig. 1) starts with some tens of meters thick siliceous limestones (so-called opokas) of uppermost Maastrichtian (*Belemnella kazimiroviensis* Zone) age [4, 5]. The limestones are topped by a hardground. Higher on, there lies 0.5 m thick Greensand layer overcrowded in its upper part with phosphatic nodules and Maastrichtian and Danian fossils. The Cretaceous-Tertiary boundary is drawn just below the layer with numerous phosphates [10]. Upwards, the Greensand passes into gaizes and limestones of the Danian age [7, 10, 14].

**The finding.** Two fragmentary specimens determined as *Hoploscaphites constrictus* (Sowerby) were found in the Greensand at Nasiłów. One of them is an

imprint of a small fragment of a shell, probably devived from its aperture region (Fig. 2A), whereas the other one (Fig. 2B) is an imprint of the juvenile part of a shell (compare 6, Pl. 4). These specimens are the first and so far the only ammonite findings in the Greensand layer (Fig. 1). They were found in the phosphatic nodules occurring abundantly in the upper part of the unit.

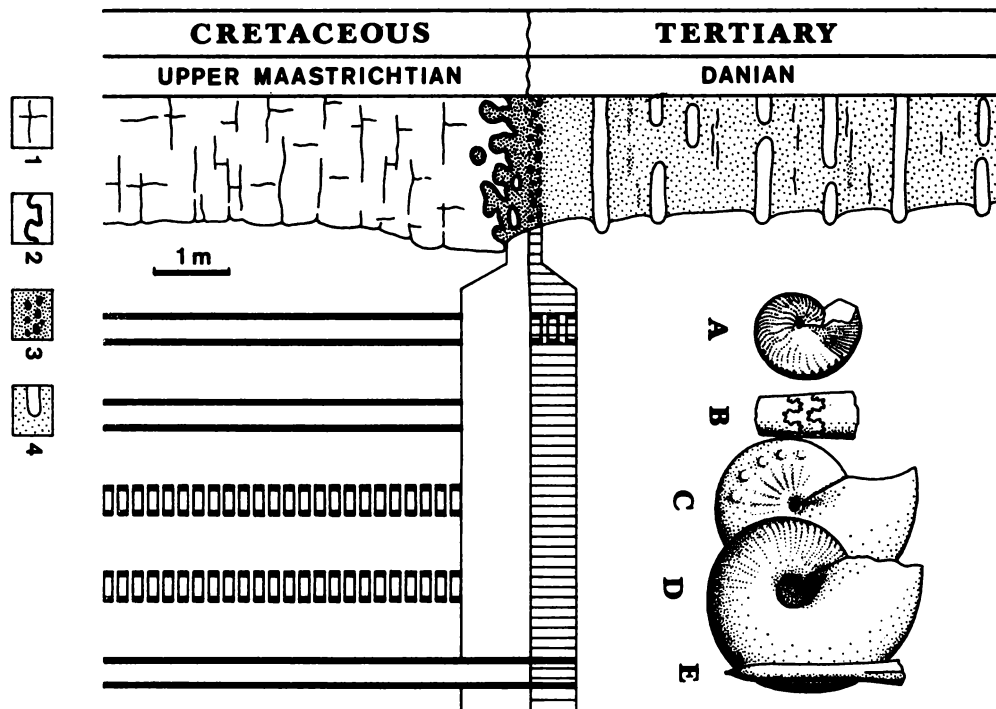


Fig. 1. Stratigraphy and lithology of the Cretaceous-Tertiary boundary deposits in the Nasilów quarry, Middle Vistula Valley, Central Poland and vertical distribution of ammonites and *Belemnella kazimiroviensis* (Skoloźdrówna) in these deposits (based on literature and the authors own data)

Explanations: 1 — siliceous limestones, 2 — hardground, 3 — Greensand, 4 — gaizes with limestone intercalatios; Ammonites: A — *Hoploscaphites constrictus* (Sowerby), B — *Basulites* spp., C — *Sphenodiscus binkhorsti* Böhm, D — *Pachydiscus sersensis* Atabekyan et Akapyan, belemnite: E — *Belemnella kazimiroviensis* (Skoloźdrówna)

Continuous lines reflect very abundant to frequent occurrence of fossils, interrupted lines — fossils very rare to rare. An occurrence of uppermost Maastrichtian fossils in redeposited nodules at the base of Danian is marked on vertically hatched area

**Discussion.** The nodules which yield the ammonites studied constitute a residuum after the uppermost Maastrichtian carbonate unit that originally overlaid the Greensand and subsequently was destroyed during the Lower Danian by erosion [10]. The nodules occur at the base of the Danian sequence (Fig. 1).

The ammonite fauna of the siliceous limestones underlying the Greensand is represented by mas-occurring *Hoploscaphites constrictus* (Sowerby) and *Baculites* spp., accompanied by rare specimens of *Pachydiscus sersensis* Atabekyan et Akapyan and *Sphenodiscus binkhorsti* Böhm [4, 9, 11, 14]. The question arises, whether the scarcity of ammonites within the overlying Greensand results from taphonomical or biological factors?

The first possibility can be excluded by analysis of the phosphatized assemblage contained in phosphatic nodules. This assemblage is represented by remains of calcitic belemnites, brachiopods, oysters, scallops and echinoids as well as by velics of aragonitic bivalves and gastropods [1, 10]. Fossils are generally small-sized but larger forms (e. g. pleurotomariid gastropods) are

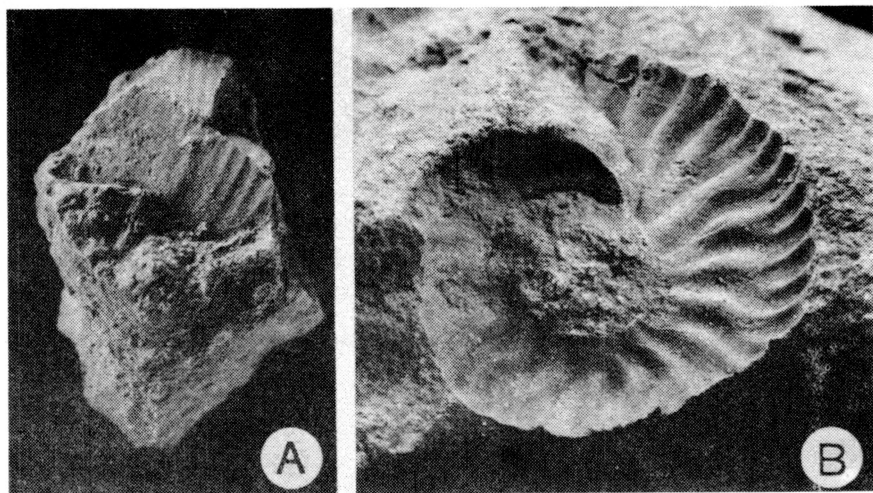


Fig. 2. First findings of *Hoploscaphites constrictus* (Sowerby) from the uppermost Maastrichtian nodules from the Nasilów quarry

A an imprint of adaperthual shell fragment. B an imprint of a juvenile part of the shell.

preserved as fragments. It is thus reasonable to suppose that the very poor representation of ammonites in the phosphatized nodules does not reflect changes during the fossilization process (e. g. aragonite dissolution or size-sorting). Until now, however, the lack of ammonites within the Greensand was explained as a result of taphonomical bias [3].

The present authors suggest that the scarcity of ammonites within the Greensand reflects their extremely rare occurrence in the original latest Maastrichtian community living during the sedimentation of the carbonate unit. One is, however, unable to say definitely whether this situation is a result of some local ecological conditons unfavourable to the ammonites, or whether it reflects phenomena of a wider extent (compare recent discussion on Zumaya profile in Spain in [2, 15, 16], though the high dispersal and migration potential of cephalopods may suggest the second possibility.

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## REFERENCES

- [1] G. I. Abdel-Gawad, *Acta Geol. Polon.*, **36** (1986), 69–224.  
 [2] W. Alvarez, E. G. Kauffmann, F. Surlyk, L. W. Alvarez, F. Asaro, H. V. Michel, *Science*, **223** (1984), 1135–1141.  
 [3] A. Błaszczewicz, *Kwart. Geol.*, **10** (1966), 1060–1071.  
 [4] A. Błaszczewicz, *Prace Inst. Geol.*, **92** (1980), 1–63.  
 [5] E. Gaździcka, *Acta Geol. Polonica*, **28** (1978), 335–375.  
 [6] W. J. Kennedy, M. Bilotte, B. Lepicard, F. Segura, *Ecolgae geol. Helv.*, **79** (3) (1986), 1001–1037.  
 [7] R. Kongiel, *Prace T-wa Przyj. Nauk w Wilnie*, **9** (1935), 1–59.  
 [8] R. Kongiel, *Prace Muz. Ziemi*, **5** (1962), 1–148.  
 [9] C. Łopuski, *Spraw. Tow. Nauk. Warsz.*, **4** (1911), 104–140.  
 [10] M. Machalski, I. Walaszczyk, *Acta Geol. Polon.*, **37** (1987), 75–91.  
 [11] K. Pożaryska, *Acta Geol. Polon.*, **3** (1953), 137–145.  
 [12] K. Pożaryska, *Palaeont. Poion.*, **14** (1965), 1–156.  
 [13] W. Pożaryski, *Biul. Państw. Inst. Geol.*, **6** (1938), 1–64.  
 [14] A. Radwański, *Cretaceous*, in: *Field-guide of the geological excursion to Poland*, University of Warsaw, 1985, 71–78.  
 [15] S. Stanley, *Sci. American*, **250** (1984), 64–72.  
 [16] P. Ward, J. Widmann, in: *Cretaceous stage boundaries*, Abstracts, University of Copenhagen, 1983, 205–207.

**М. Махальски, И. Валящик, Находка самых молодых верхнемаастрихтских аммонитов в долине Вислы, Центральная Польша**

В глауконитовых песчаниках верхнемаастрихтского и датского возраста, которые открываются в Насилове вблизи Казимежа на реке Висле, впервые были найдены остатки аммонитов, определенные как *Hoplосcaphites constrictus* (Совербы). Это самые молодые аммониты в разрезе верхнего мела в долине Вислы. По мнению авторов малое количество аммонитов в глауконитовых песчаниках является результатом эволюционных или экологических процессов, отбрасывая возможность, что причиной этого могут быть тафономические факторы.