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Jost WIEDMANN's share in recognition of the latest Maastrichtian *Pachydiscus* from the Nasiłów section (Middle Vistula Valley, Central Poland)

ABSTRACT: The occurrence is reported of the two pachydiscid species, *Pachydiscus* (*Pachydiscus*) *gollevillensis* (D'ORBIGNY, 1850) and *Anapachydiscus* cf. *terminus* WARD & KENNEDY, 1993, from the topmost Maastrichtian siliceous chalk exposed at Nasiłów in the Middle Vistula Valley, Central Poland. The collected specimens come from a level situated about 1m below the Nasiłów hardground, and 1.3m below the residual lag marking the K/T boundary. These findings are discussed in terms of their bearing on a biostratigraphic subdivision of the Upper Maastrichtian, and an ammonoid extinction at the K/T boundary.

FOREWORD

The famous section of Nasiłów, north of Kazimierz-on-Vistula, in the Middle Vistula Valley, Central Poland, has enthusiastically focused an attention of the late Jost WIEDMANN (*see* WIEDMANN 1988, p. 118) when he visited the Nasiłów Quarry in the mid-eighties and acquainted with its faunal content. The collected material remained, however, undescribed, and only one peculiar specimen of an oyster-cast of *Hoploscaphites* has recently been described by his collaborators (LEHMANN & WIPPICH 1995; *see also* comments by RADWAŃSKI 1996, p. 119).

During the visits to the Nasiłów Quarry, of special interest for Jost WIEDMANN were the ammonites, particularly a *Pachydiscus* specimen found at that time by JELINOWSKA (1985), and another one collected subsequently. Although the section of the topmost Maastrichtian strata and the K/T boundary beds at Nasiłów have long been known to yield ubiquitous fossils (*see* RADWAŃSKI 1996, and references therein), the pachydiscid ammonites have

never been met before, and these two specimens (*see* Pls 1-2) remain the only representatives of this ammonite group collected up to date.

The discussed two pachydiscids (*see* Pls 1-2) have soon carefully been studied by Jost WIEDMANN, who determined them as:

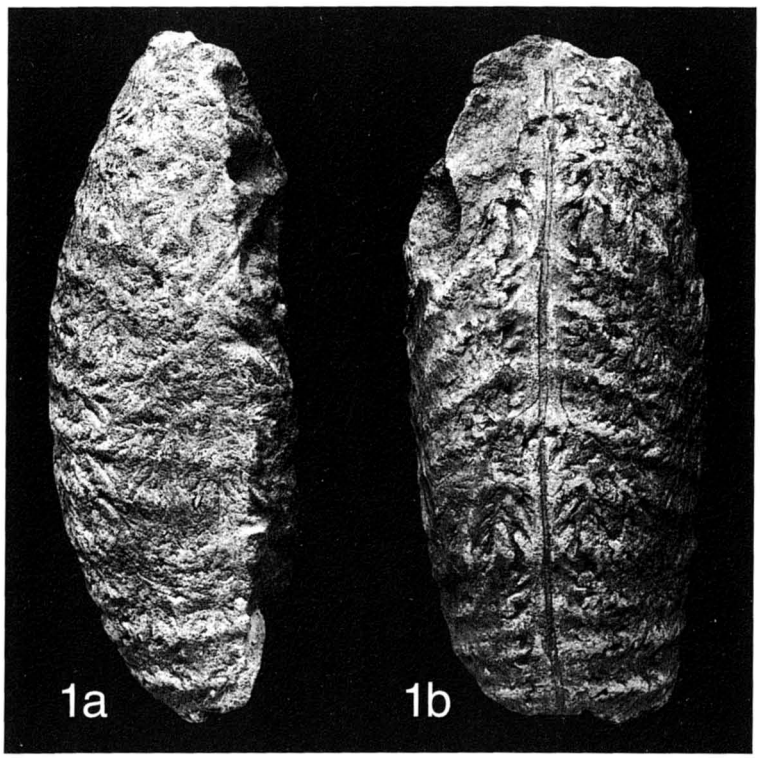
> *Pachydiscus* (*Pachydiscus*) *gollevillensis* (D' ORBIGNY, 1850),
> and *Pachydiscus* (*Pachydiscus*) cf. *epiplectus* (REDTENBACHER, 1873) [the latter, according to the recent revision by WARD & KENNEDY (1993, pp. 7 and 48-49) representing, most probably, the species *Anapachydiscus* cf. *terminus* WARD & KENNEDY, 1993].

Neither further visits to the Nasiłów Quarry, nor an intended report could be realized by Jost WIEDMANN, who has left this subject unfinished, solely with the specific determination of the Nasiłów specimens and their photographic documentation. Personal discussions with Jost WIEDMANN in his last years at Tübingen have virtually helped the Authors to complete the content of the herein presented report.

THE NASIŁÓW *versus* ZUMAYA PACHYDISCIDS

The **Nasiłów sequence**, recently discussed by the co-Author (RADWAŃSKI 1996), contains the siliceous chalk ("Opoka" facies), topped with a limestone layer truncated by a hardground, and covered by a greensand that yields a phosphatized residual lag, about 30cm above the hardground surface. With the K/T boundary placed at this very lag (*see* MACHALSKI & WALASZCZYK 1987, *see also* HANSEN & *al.* 1989), the occurrence site of the two pachydiscids is about 1m below the hardground, that is about 1.3m below the K/T boundary.

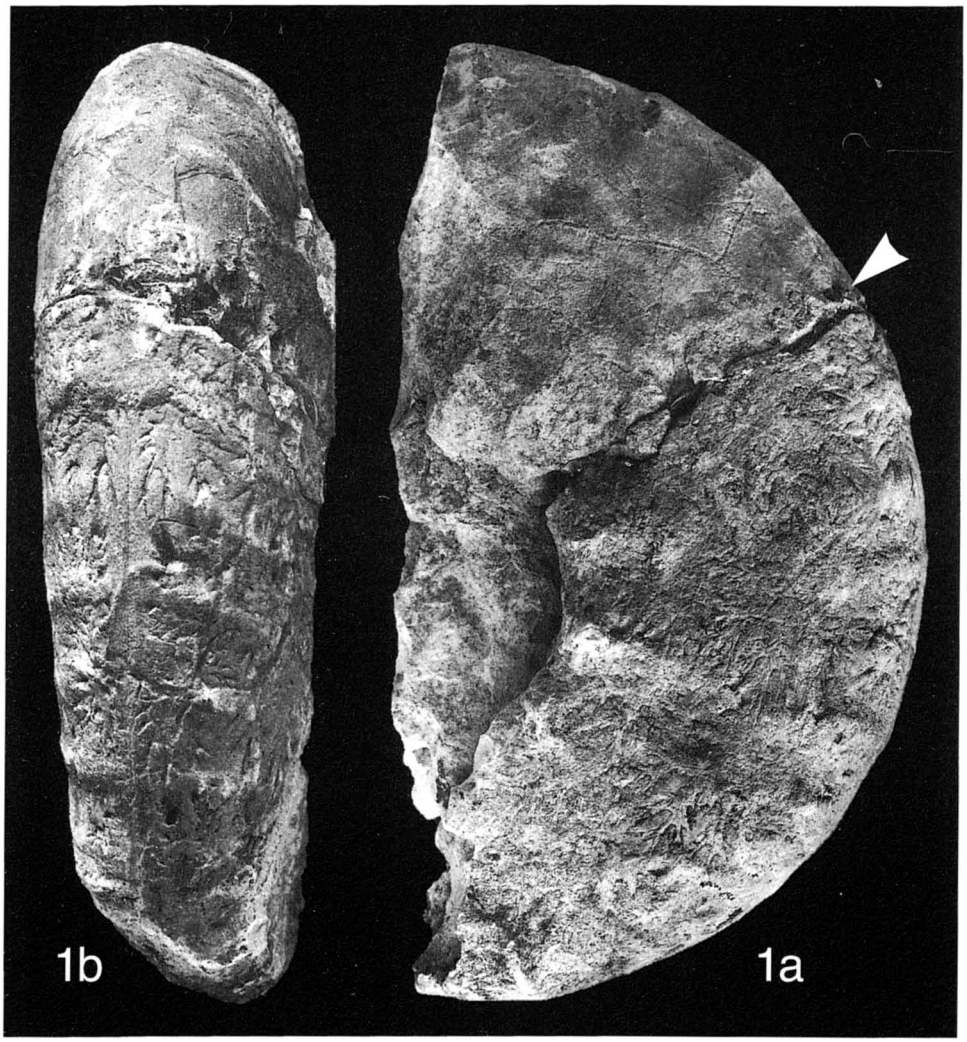
As apparent from paleomagnetic studies by HANSEN & *al.* (1989), and comparison with the Stevens Klint sequence in Denmark, only some decimeters of chalk have been removed by dissolution from the Nasiłów hardground (*see* HANSEN & *al.* 1989, p. 11). With an estimation of the time duration of the magneto-chrone 29R, to which the last *c.* 7 meters of the siliceous chalk belongs, as either 600 or 869 Ky (*see* HANSEN & *al.* 1993, p. 175), an average sedimentation rate of one meter of the siliceous chalk can be calculated as ranging between 60 and 80-82Ky. This results from the data that about 2/3 of the magneto-chrone 29R lies beneath the K/T boundary, and the sedimentation rate was more or less stable during deposition of the siliceous chalk, what is evidenced by the global rhythms of the magnetic susceptibility (*see* HANSEN & *al.* 1993, pp. 175-176, 178-179 and Fig. 1). These smaller-scale rhythms, numbering 3, and lasting about 20Ky each (*see* HANSEN & *al.* 1993, Fig. 1), give a similar age value for the last meter of the Nasiłów chalk. When comparing with other sections where the magneto-stratigraphy and the magnetic susceptibility are recognized (*see* HANSEN & *al.* 1993), one or two such smaller-scale rhythms before the K/T boundary are missing in the Nasiłów sequence. This may be interpreted as corresponding to a very limited dissolution at the hardground surface, and to a similar sedimentation rate for the overlying greensand. On the other hand, if one takes the figure of two smaller-scale rhythms, plus a sedimentation rate for one meter of the



Pachydiscus (*Pachydiscus*) *gollevillensis* (D'ORBIGNY, 1850)

Fragment of the phragmocone (sculptured steinkern = sculptured internal mold) from the topmost Maastrichtian siliceous chalk ("Opoka" facies) of the Nasiłów Quarry (*horizon x/y* of RADWAŃSKI 1996, Pl. 1*B*)

1a — Left lateral, **1b** — ventral view; both of nat. size



Anapachydiscus cf. *terminus* WARD & KENNEDY, 1993

Fragment of the last whorl (sculptured steinkern = sculptured internal mold) – the end of the phragmocone (*arrowed*) and the beginning of the body chamber – from the topmost Maastrichtian siliceous chalk ("Opoka" facies) of the Nasiłów Quarry (*horizon x/y* of RADWAŃSKI 1996, Pl. 1*B*)

1a — Right lateral, **1b** — ventral view; both of nat. size

siliceous chalk that covered the pachydiscid remains, a value ranging from about 100 to about 120Ky before the K/T boundary may be calculated for the final burial of the Nasiłów pachydiscids.

Nevertheless, the occurrence of the discussed pachydiscids (*see* Pls 1-2) is not the last for the ammonites in the Nasiłów sequence, where a specimen of *Sphenodiscus binkhorsti* (BÖHM, 1898) was reported from the hardground (POŻARYSKA 1953; *cf. also* KENNEDY 1986, pp. 177-178), and *Hoploscaphites constrictus* (J. SOWERBY) from the hardground top (RADWAŃSKI 1996, Fig. 1 and Pl. 1), and even from the residual lag above (MACHALSKI & WALASZCZYK 1988). None of these ammonites display any malformations, abberancy, or stunting. On the contrary, *Hoploscaphites constrictus* (J. SOWERBY) from the hardground top is supposedly the largest of the ever found specimens of that species. Consequently, the Nasiłów sequence does not demonstrate a gradual disappearance (extinction) of particular ammonite species, or their biologic abnormalities. Paradoxically, the ammonite species diversity does increase upwardly in the sequence, the terminal hardground including. This phenomenon coincides with an increase of the other faunal contents, and of the number of specimens and their frequency, *e.g.* of nautiloids that form locally mass accumulations (? stranding the shells ashore).

The **Zumaya sequence** in northern Spain (*see* WIEDMANN 1988) comprises the latest Maastrichtian deposits with extremely rare ammonites (Unit *12* of WIEDMANN 1988, pp. 128, 136, Figs 2 and 6; *cf. also* WARD & KENNEDY 1993 p. 9 and Fig. 5).

A correlation of the topmost Maastrichtian strata of Zumaya with those of Nasiłów is far from precision at the moment. As counted by Jost WIEDMANN, with an average sedimentation rate of 106m/My for the whole Maastrichtian sequence of Zumaya (*see* WIEDMANN 1988, p. 128), an age duration for the poorly fossiliferous Unit *12* (13m thick) may be estimated as about 122Ky. As the last ammonite-bearing level with pachydiscids is noted about one meter beneath the K/T boundary (WARD & KENNEDY 1993, p. 9 and Fig. 5), the final disappearance of the pachydiscids may be calculated to had happened a little less than 10Ky before the K/T boundary. The above calculation seems to suggest that in the Nasiłów section the last pachydiscids disappear much earlier than in the Zumaya section (*see* discussion above). It is also supported by the relatively high species diversity in the highest assemblages from the opokas of the Vistula section which, in the Zumaya section (*see* WARD & KENNEDY 1993), is recorded remarkably beneath the K/T boundary.

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