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THE FIRST SHELL REMAINS OF *RHINOCHELYS PULCHRICEPS* (OWEN, 1851) FROM THE UPPER CRETACEOUS OF NW-GERMANY (TESTUDINES: PROTOSTEGIDAE)

[Primeros restos de caparazón de* Rhinochelys pulchriceps *del Cretácico Superior del noroeste de Alemania (Testudines: Protostegidae)]

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ABSTRACT: The first fossil remains of a protostegid turtle from the upper Cretaceous of northwestern Germany are described and discussed. The material includes a carapace and a plastron which belong to the best preserved material of this species discovered to date.

Key words: Upper Cretaceous, Westphalia, *Rhinochelys pulchriceps* (Owen, 1851), protostegid turtle.

RESUMEN: Se describen y discuten los primeros restos de una tortuga protostegínida del Cretácico Superior del noroeste de Alemania. El material consiste

en un peto y espaldar, los mejores preservados de esta especie descubiertos hasta la fecha.

Palabras clave: Cretácico Superior, Westphalia, *Rhinochelys pulchriceps* (Owen, 1851), tortuga protostegínida.

INTRODUCTION

In 1988 Mr. P. Lepper (Everswinkel) devised the partial skeleton of a turtle, which is embedded in a light gray limestone to the Museum of Natural History of the Landesverband Westfalen-Lippe in Muenster (Germany). The specimen was found in the nowadays inoperative and flooded Hollekamp quarry in Ahaus-Wüllen (figure 1) (TK25 Ottenstein), which is well known for its rich echinoid fauna (ERNST *et al.*, 1998) and a representative of the family Cheloniidae (Testudines) described by Diedrich & Hirayama (2003).

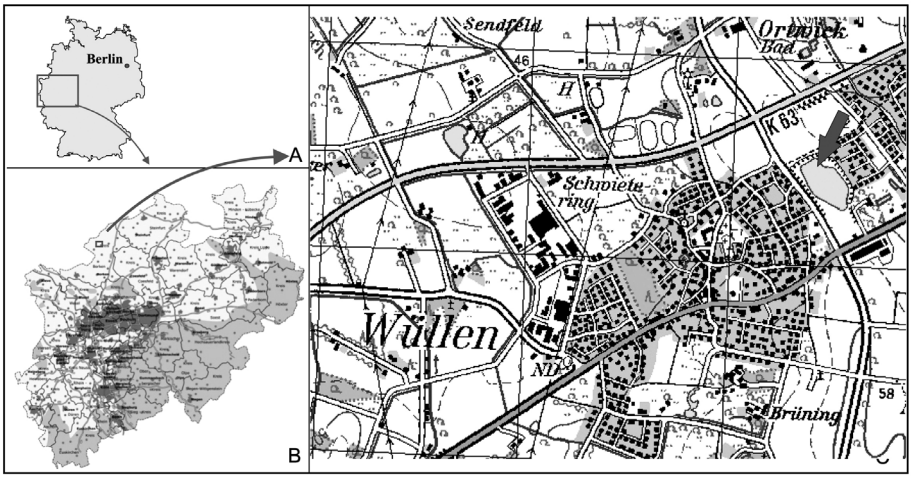

Figure 1. Geographical position of Ahaus-Wüllen, North Rhine-Westphalia, Germany.

In Central European Upper Cretaceous deposits, fossilized turtles are very rare faunal elements. The herein studied specimen is the first evidence of the genus *Rhinochelys* for the Upper Cretaceous of Westphalia.

The fossil is housed in the Museum of Natural History in Muenster (collection number P12-877).

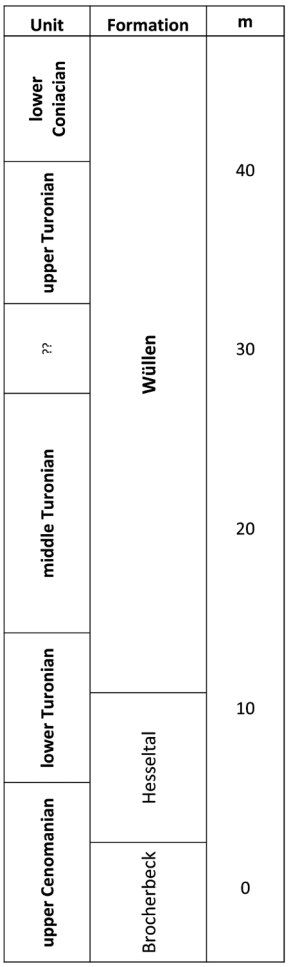

Figure 2. Stratigraphy within the former Hollekamp quarry in Ahaus-Wüllen, North Rhine-Westphalia, Germany, modified after ERNST et al., *1998.*

GEOLOGICAL SETTING

The former Hollekamp quarry near Ahaus-Wüllen (UTM 6°58'59.92"E, 52°04'18.41"N) is located on the northwestern margin of the Münsterland Cretaceous Basin. During the inversion of the northern located Lower Saxony basin the Münsterland Cretaceous Basin sank (BOIGK, 1968; Geological Society of America, 1995; HISS, 1993) and up to 1,500 m sediments of the Upper Cretaceous were deposited. Outcropping lithology within this basin ranges from the Cenomanian to the Campanian.

Sediments of the Hollekamp quarry near Wüllen are associated to the second meagsequenz, which is characterized by transgressional conditions. Due to the transgression, extensive uniform sediments, such as the Plänerkalk-group were deposited. The accumulation area, which was previously highly fragmented, turned after basin fill into an epicontinental shelf which was arranged parallel to the coastal fazies-belts (NIEBUHR *et al.*, 2007). Exposed layers include the upper part of the Brochterbeck-Formation, the Hesseltal-Formation and the Wüllen-Formation (HISS *et al.*, 2007) and thus range from the Lower Cenomanian to the Lower Coniacian (figure 2).

The Genus *Rhinochelys* Lydekker, 1889 in Central Europe

According COLLINS (1970) three species of the genus *Rhinochelys* are regarded as valid. The skull and the shells of *Chelone benstedti* and *Rhinochelys* are conspecific. Since the first description of fossil remains from Bohemian Cretaceous turtles by REUSS (1855) as *Chelone benstedti* (plate 1) only a few unidentifiable fossil turtle remains of two other related taxa have been described (see table below). The shell remains entered the historical literature only nomenclaturaly, like the material from Patek of REUSS (1855) and FRITSCH (1878) which also includes material from the area of Michelob (LAUBE, 1896). Even some skull remains were described by an internal mold of the skull which also includes fragmentary jawbones from the Cenomanian-Turonian transgression from Svitavy at the White Mountain near Prague (KARL, 2002).

Furthermore a Carapax remain of about 75 mm in length from Patek between Laun and Libochowitz, Czech Republic (Weissenberger Fischpläner, Turonian, Cretaceous) is known. These carapace plates just show the visceral surfaces.

The original material of *Pygmaeochelys* from the "Weissenberger Grobkalken" (Cretaceous of Michelob, Czech Republic) also shows only the visceral surfaces. The fragment has a length of 46 mm.

KARL (2002) listed synonyms of the Bohemian *Rhinochelys*, such as *Chelone benstedti* Owen, 1851 according REUSS, 1855; FRITSCH, 1878; LAUBE, 1896; *Euclastes (Chelone) benstedti* OW. sp. according FRITSCH, 1905; *Cimochelys benstedti* Mantell, 1841; Thalassemydidae according KUHN, 1964; *Pygmaeocheys michelobana* Laube, 1896 according FRITSCH, 1905 and KUHN, 1964.

Plate 1. Rhinochelys pulchriceps *(Owen, 1851) from Patek in Bohmia after REUSS (1855).*

According COLLINS (1970) and MŁYNARSKI (1976) *Rhinochelys* is characterized by a short and domed skull with an elongated nose portion. The squamosal is separated from the parietal, the praefrontals and nasals are clearly marked. The snout is blunt. A secondary palatine is not developed. Significant broad scale-seams are present. Detailed information on the nomenclature, palaeogeography and synonymy of the older central European *Rhinochelys* fossils are given in MOODY (1993) and KARL (2002). COLLINS (1971) places *Rhinochelys* within the protostegid subfamilia Chelospharginae Zangerl, 1953. Discussions on the ongoing systematics are found in GAFFNEY & MEYLAN (1988), HIRAYAMA (1995) and LAPPARENT DE BROIN (2001). Another species of that genus out of Europe, *Rhinochelys nammourensis*, is described on the basis of beautifully preserved complete and articulated skeletons from the Nammoura locality, a Cenomanian (Late Cretaceous) Lagerstätte in Lebanon (TONG *et al.*, 2006). According KARL (2002) the following material of *Rhinochelys* is so far known from Central Europe. It is synonymous with *Rhinochelys cantabrigiensis* and most related with the new material presented within this study:

MATERIAL	COLLECTION	LOCALITY	HORIZON	ORIGINAL NAME	AUTHOR
Humerus, original to GEINITZ, 1875	Staatliches Museum für Geologie und Mineralogie Dresden	Dresden-Strehlen	Chalk, old name "Pläner", Middel-Upper Turonian border, Upper Cretaceous	*Chelone Carusiana* Geinitz, 1875	Fritsch, 1878, Geinitz, 1875, Karl, 1991, 2002, Kuhn, 1964, Laube, 1896, Owen, 1851, Reuss, 1855
Shell remains, skeletal remains of a juvenile individual	Prague coll.	Michelob, Czech Republic	Weissenberger Grobkalke, Upper Cretaceous	*Pygmaeochelys michelbana* Laube, 1896	Laube, 1896, Karl, 1991, 2002, Kuhn, 1964
Shell remains	Prague coll.	Patek between Laun and Libochowitz, Czech Republic	Weissenberger Fischpläner, Turonian, Upper Cretaceous	*Chelone Benstedi* Owen, 1851	Reuss, 1855, Karl, 1991, 2002, Kuhn, 1964
Internal mold with brain imprint and jaw remains	Institute of Geology and Palaeontology of University Prague, n.º 1513	Svitavy, Bohemian Switzerland, Czech Republic	Upper Cretaceous (Zélna Krida)		Karl, 2002

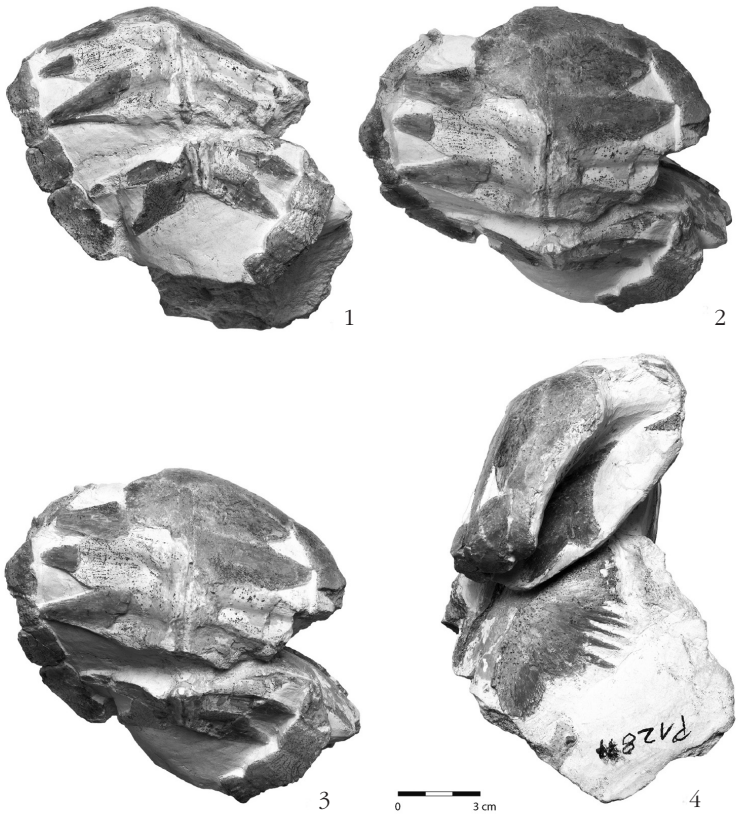

Plate 2. Rhinochelys pulchriceps *(Owen, 1851) from the former Hollekamp quarry in Abaus-Wüllen, North Rhine-Westphalia, Germany. Scale bar = 5 cm. Photo Brigitte Stefan, TLDA. 1: carapace in posterodorsal view, 2: carapace in anterodorsal view, 3: carapace in posterolateral view, 4: carapace in frontal view with plastral elements in situ.*

SYSTEMATIC PALAEONTOLOGY

Order Testudines Linnaeus, 1758

Infraorder Cryptodira Cope, 1868

Superfamily Chelonioidea Agassiz, 1857

Family Protostegidae Cope, 1889

Subfamily Chelospharginae Zangerl, 1953

Genus *Rhinochelys* Seeley, 1869

Rhinochelys pulchriceps (Owen, 1851)

Material: LWL- Museum of Natural History Muenster, number P12 877 (plate 2).

Locality: Hollekamp quarry in Ahaus-Wüllen (TK25 Ottenstein).

Horizon: Unknown, see discussion.

Description of LWL-MNH n.º P12-877: Large parts of carapace and plastron are preserved but stretched and shifted. On the basis of the nuchal and right peripherals I-II the front carapace area can be reconstructed. The nuchal region is absent in all the English specimens of *Chelone benstedti* which were available to OWEN (1851). In LWL-MNH n.º P12-877 it is preserved and thus can be described. The completion of the previous reconstruction of the carapace is possible now (figure 3). Only the pleurals VIII, mesoplastron and pygal are missing. The arrowhead-shaped horny shield sulcus of central 2 is flattened and not terminated sharply. This is a feature for imbricate scale type, like the recent Hawksbill turtle *Eretmochelys* (KARL, 2002). Preserved parts from the carapace include bony material and imprints of: nuchal, neurals I-VII, pleurals I-VII and peripherals I-X (figure 3-1). Preserved plastron parts include a right hyoplastron and a right hypoplastron (figure 3-2).

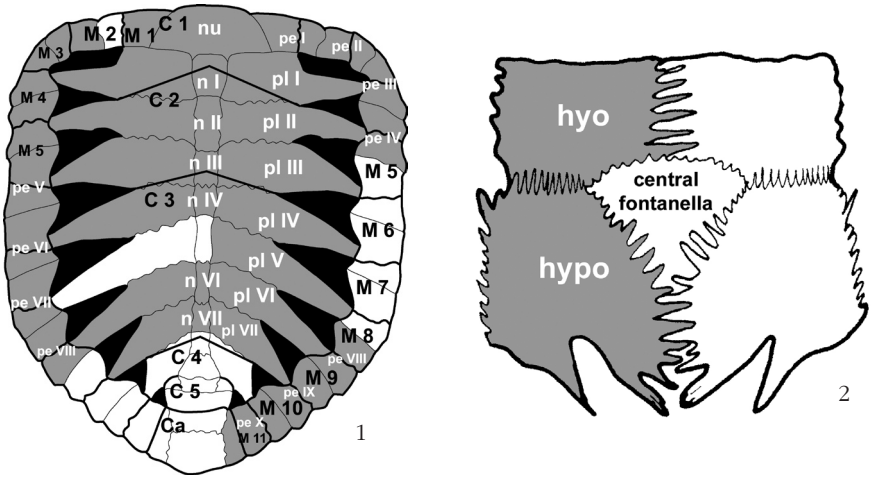

Figure 3. Schematic carapace and plastron reconstruction of Rhinochelys pulchriceps *(Owen, 1851); 1: carapace; 2: plastron. Preserved parts of the specimen LWL-MNH n.º P12-877 von Ahaus-Wüllen are shaded in gray, by H.-V. Karl and Heike Künzel, TLDA based on the partial reconstruction by COLLINS (1970) and the herein described new material. White: bony elements (thin lines): nu = nuchal, nI-VII = neurals, pl I-VIII = pleurals, pe I-X = peripherals, metaneurals and pygal lost, hyo = hyoplastron, hypo = hypoplastron; black: horny scutes (thick lines): C 1-5 = centrals, M 1-11 = marginals, Ca = caudal scute.*

DISCUSSION

The described *Rhinochelys pulchriceps* (Owen, 1851), is the first evidence of a representative of the family Protostegidae Cope, 1889 from the Wüllen-Formation. Due to the well preserved material an updated reconstruction of the carapace of that genus is possible now.

Ahaus includes the districts Alstätte and Wüllen which are located south to Gronau (Westphalia). Both cities belong to the county of Borken. Fossil turtles from Alstätte and Gronau are recently known only from the Lower Cretaceous (KARL, NYHUIS & SCHLEICHER, this volume).

Unfortunately exact strata of the sample cannot be given doubtless. The fossil is embedded in a light grey carbonate. These carbonates only occur in the Brochterbeck-Formation and in the Wüllen-Formation (figure 2). Due to lithology Hesseltal-Formation can be excluded. In any case this work is the first report of a protostegid turtle from the Upper Cretaceous in this region.

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