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BALLERSTEDTIA BUECKEBERGENSIS, A NEW TURTLE FROM THE EARLY CRETACEOUS WEALDEN FACIES OF GERMANY (TESTUDINES: PLEUROSTERNIDAE)

/Ballerstedtia bueckebergensis*, nueva tortuga del Cretácico Inferior (facies Weal) de Alemania (Testudines: Pleurosternidae)]*

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ABSTRACT: The turtle "*Pleurosternon*" ["*Glyptops*"] *typocardium* (Seeley, 1869) from the Early Cretaceous (Berriasian) Purbeck Limestone Group of England is selected as type species of *Ballerstedtia* n. gen. The new genus is characterized by a deep nuchal notch and an estimated carapace length of only 0.3 m, what is in representatives of contrary to the large genera *Pleurosternon* and *Hylaeochelys*. Furthermore, *Ballerstedtia bueckebergensis* n. sp. from the Wealden Facies of northwestern Germany (Berriasian) is described and included in this new genus. The relationships of these two nearly contemporaneous species are also analyzed.

Key words: Early Cretaceous, Wealden, Purbeck Limestone Group, Berriasian, *Ballerstedtia bueckebergensis* n. sp., *Ballerstedtia typocardia* (Seeley, 1869) n. comb., cryptodire, turtle, taxonomy.

RESUMEN: La tortuga "*Pleurosternon*" ["*Glyptops*"] *typocardium* (Seeley, 1869) del Cretácico Inferior (Berriasiense) (Purbeck Limestone Group) de Inglaterra ha sido aquí seleccionada como especie-tipo de *Ballerstedtia* nov. gen. El nuevo género se caracteriza por una profunda muesca nucal y una longitud estimada de sólo 0,3 m en contra de los grandes géneros *Pleurosternon* e *Hylaeochelys*. Por otra parte, se incluye en el nuevo género a *Ballerstedtia bueckebergensis* nov. sp., de la facies Wealdense (Berriasiense) del noroeste de Alemania. Se analizan las relaciones entre esta especie y *Ballerstedtia typocardia* (Seeley), ambas casi contemporáneas.

Palabras clave: Cretácico Inferior, Wealdense, Purbeck Limestone Group, Berriasiense, *Ballerstedtia bueckebergensis* nov. sp., *Ballerstedtia typocardia* (Seeley) nov. comb., tortuga, criptodira, taxonomía.

INTRODUCTION

Turtles from the Late Jurassic and Early Cretaceous of northern Germany are reviewed in detail by KARL *et al.* (2007). The species *Pleurosternon bullocki* Owen, 1842, *Hylaeochelys menkei* (Roemer, 1836) and *Peltochelys duchastelli* Dollo, 1884/85 are known from the German Berriasian (lowermost Early Cretaceous). Additionally, four carapace remains with typical characters of *Salasemys pulcherrima* Fuentes Vidarte, Meijide Calvo & Meijide Fuentes, 2003 has been recently discovered in the material collected by Heinrich Friedrich Wilhelm GRABBE in the early 1880s deposited in the collections of the Geoscience Centre of the University of Göttingen. PEITZ (1998) gave a first overview of the the turtles within so called "Ballerstedt collection" which was previously housed in the college grammar the School "Gymnasium Adolfinum" in Bückeburg (KARL & TICHY, 2004; HORNUNG & REICH, 2007).

Several individuals of another, yet undescribed taxon are recently found in the Ballerstedt collection. Similar material from the Early Cretaceous Purbeck Limestone Group (Berriasian) in England was previously discussed under the genus '*Glyptops*' (MILNER, 2004).

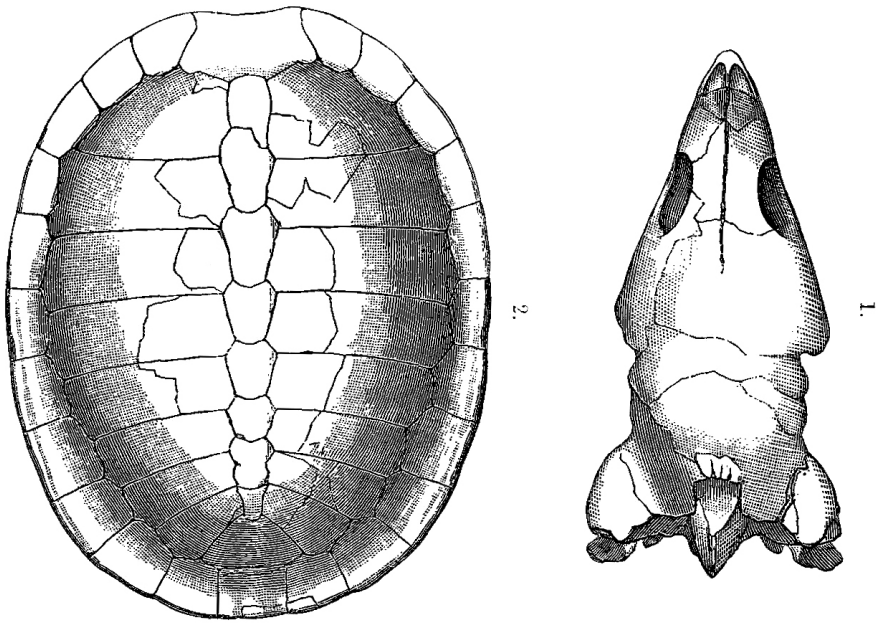

Figure 1. MARSH's (1890) explanations of plate VII, figure 1: skull of Glyptops ornatus*, top view, natural size and figure 2: carapace of same species, top view, without indicated scale.*

GENERAL REMARKS ON THE GENUS *GLYPTOPS* MARSH, 1890

MARSH (1890) established his new genus *Glyptops* to include *Compsemys plicatulus* Cope, 1877 from the Late Jurassic Morrison Formation in Colorado (USA) as well as *Glyptops ornatus* Marsh, 1890 from the Late Jurassic in Wyoming (USA). The latter was established on a skull (MARSH, 1890: Plate VII, fig. 1) and a carapace (MARSH, 1890: Plate VII, fig. 2). Type species of *Glyptops* is *Compsemys plicatulus* which was confirmed by several subsequent authors, as for example GAFFNEY, 1975a, b, 1979, 1984; GAFFNEY *et al.*, 1987; GAFFNEY & MEYLAN, 1988; GAFFNEY & WYSS, 1991, and LAPPARENT DE BROIN, 2001.

HAY (1908) already listed four species of the genus: *Glyptops plicatulus* (Cope), *Glyptops? belviderensis* (Craigin) and his new species *Glyptops caelatus* and *Glyptops pervicax*. LUCAS *et al.* (2006) allocated five species to this genus: *Glyptops caelatus* Hay, 1908, *Glyptops ornatus* Marsh, 1890, *Glyptops plicatulus* (Cope, 1877), *Glyptops pervicax* Hay, 1908, and *Glyptops utahensis* Gilmore, 1916.

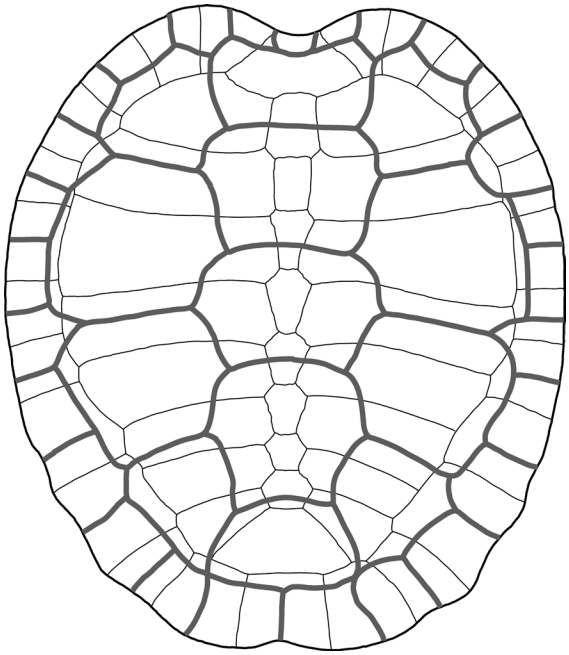

Figure 2. Schematic reconstruction of the carapace of Ballerstedtia typocardia *n. comb. 1*: *carapace based on CAMSM J5329 and BMNH 40676, redrawn from MILNER (2004). Heike Künzel, TLDA.*

According to MILNER (2004: 1452) the genus *Glyptops* only certainly applies to its type species *G. plicatulus* and is critically diagnosed on cranial features.

A previous analysis of skull and shell characters was published by GAFFNEY (1979) who confirmed the independent generic position of '*Compsemys*' *plicatulus* as *Glyptops plicatulus*. It was assigned to Glyptopsidae by MARSH (1890) and CARROLL (1988), but to Pleurosternidae by LUCAS *et al.* (2006). According to the last authors, *Chengyuchelys* Young & Chow, 1953; *Helochelys* H.v. Meyer, 1854 and *Pleurosternon* Owen, 1853 are sister genera of *Glyptops*. For the problems concerning *Helochelys* see LAPPARENT DE BROIN (2001).

The *Glyptops*-like material from Purbeck, Dorset, South England, as discussed by MILNER (2004) has been regularly treated as a glyptopid and was already referred to *Glyptops* by WATSON (1910a). Due to the absence of a skull, MILNER (2004) retained it as '*Glyptops*' and did not assign it to a new independent genus. If the skull of *Dorsetochelys* Evans & Kemp, 1976 really proved to belong with this Purbeck material as MILNER (2004: 1464) tentatively presumed, *Glyptops* would become the senior generic name. But the skull of *Dorsetochelys* does not share a *Glyptops*-like morphology; thus a possible resulting new genus must then be removed from the Pleurosternidae

(= Glyptopidae). On the other hand, there is one species included in the materials of the Purbeck Limestone Group which is closely related to remains from the northwestern German Berriasian (Obernkirchen Sandstone, Wealden Facies in the German terminology), that is '*Glyptops*' *typocardium* (Seeley) as combined by MILNER (2004: Text-figs. 5B, 8A, 9).

As pointed out in detail by MILNER (2004: 1455), (1) the misinterpretation of one of the Manchester Museum specimens (MANCH L7020) by WATSON (1910a) as *Glyptops ruetimeyeri* and (2) the double use of the catalogue number BMNH 40676 in LYDEKKER (1889) for both, the holotype carapace of "*Thalassemys*" *ruetimeyeri* Lydekker, 1889 (p. 149) and for a *Pleurosternon* carapace (p. 209) led to serious nomenclatural confusion between "*Pleurosternon*" *typocardium* (Seeley, 1869), "*Thalassemys*" *ruetimeyeri* and *Pleurosternon bullocki* (Owen, 1842). This was neglected by several subsequent authors until MILNER reidentified the holotype carapace of *ruetimeyeri* in 1997. In the shiny shell surface '*Glyptops*' *typocardium* is most similar to *P. bullocki* but differs from the latter in its coarser pitting. Complete carapaces of both species are clearly distinct.

Comparison between the English '*Glyptops*' *typocardium* from the Purbeck Limestone Group and Berriasian materials from the Wealden Facies in northwestern Germany shows that both are closely related and cannot be included in the genus '*Glyptops*' sensu MILNER (2004). They represent a separate genus which is here introduced as *Ballerstedtia* n. gen. It includes *B. typocardium* as type species and *B. bueckebergensis* n. sp.

SYSTEMATIC PALAEONTOLOGY

Order Testudines Linnaeus, 1758

Infraorder Cryptodira Cope, 1868

Capaxorder Selmacryptodira Gaffney, Hutchinson, Jenkins and Meeker, 1987

Superfamily Pleurosternoidea Cope, 1868

Family Pleurosternidae Cope, 1868

[syn. Glyptopsidae Marsh, 1890]

Included genera: *Pleurosternon* (= *Mesochelys*), *Glyptops*, *Compsemys*, *Dinochelys*, *Desmemys*, *Ballerstedtia* n. gen.

Diagnosis for skull characters after GAFFNEY & MEYLAN (1988) and MILNER (2004): Primitive cryptodires sharing one synapomorphy, namely pterygoids separated by anteriorly elongate basisphenoid. Diagnosis for shell characters according KARL *et al.* (2007: 46): Mesoplastra present and inguinal buttress inserting in pleural V or VI; three submarginals present.

Plate 1. Imprint of Ballerstedtia bueckebergensis *n. gen. n. sp. GZG.BA.533. 1: dorsal imprint of carapace GZG.BA.533a; 2: ventral imprint of plastron GZG.BA.545b; 3: Steinkern with visceral imprint of carapace; 4: visceral imprint of plastron (both GZG.BA.533c). Scale bar = 5 cm. Design Heike Künzel, TLDA.*

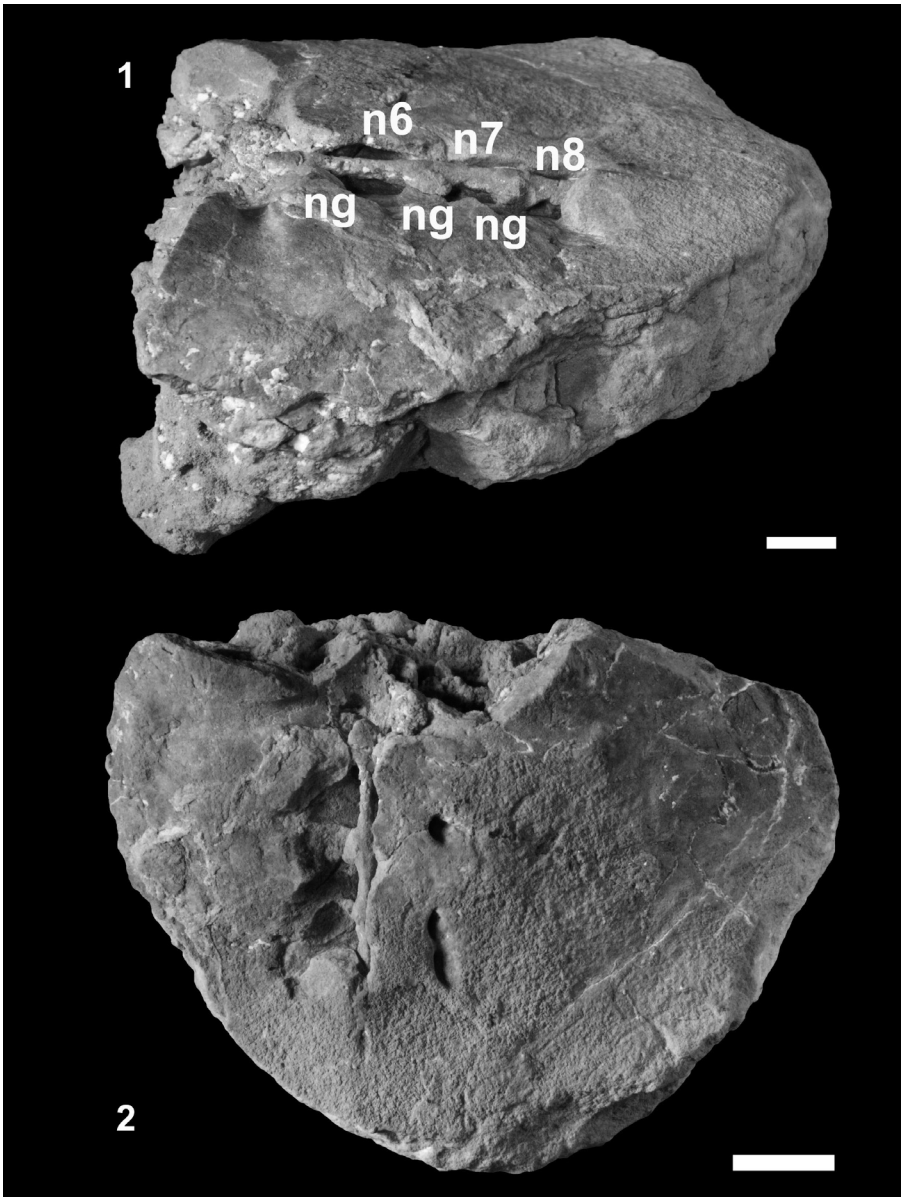

Plate 2. Posterior part of steinkern of Ballerstedtia bueckebergensis *n. gen. n. sp. GZG.BA.837, with incrusted lumbal part of the spinal cord (pars lumbalis). n6-n8 = position of the neurals 6 to 8, ng = ganglia of the lumbar nerves. Original. Scale bar = 1 cm. Photo Dirk Urban, Museum Erfurt.*

Genus *Ballerstedtia* n. gen.

Derivatio nominis: *Ballerstedtia* - in honour to Maximilian Magnus Wilhelm Carl Ballerstedt (* June 20th, 1857, Bückeburg, † December 7th, 1945, Bückeburg), most important collector of Wealden fossils in Germany.

Type species: *Pleurosternon typocardium* Seeley 1869.

Diagnosis: 8 neurals present, anterior neurals 6P/ 4/ 6A; deep nuchal notch present; carapace growing to an estimated length of at least 0.3 m (BMNH 40676 and CAMSM J5329; see MILNER (2004).

***Ballerstedtia typocardia* n. comb.**

Synonyms:

- 1869 *Pleurosternon typocardium* SEELEY, p. 87.
- 1887 *Eurysternum* sp. LYDEKKER & BOULENGER, p. 274.
- 1889 *Thalassemys ruetimeyeri* LYDEKKER, p. 149, fig. 36.
- 1910a *Glyptops ruetimeyeri* (Lydekker); WATSON, p. 311, figs. 1-2.
- 1910b *Glyptops ruetimeyeri* (Lydekker); WATSON, p. 381.
- 1958 *Glyptops ruetimeyeri* (Lydekker); DELAIR, p. 51.
- 1979 '*Glyptops*' *ruetimeyeri* (Lydekker); GAFFNEY, p. 108.
- 1999 '*Thalassemys*' *ruetimeyeri* (Lydekker); LAPPARENT DE BROIN & MURELAGA, p. 192.
- 2004 '*Glyptops*' *typocardium* (Seeley) comb. nov.; MILNER, p. 1452, figs. 8A, 9.

Holotype: CAMSM J5329 (SEELEY N.º 4; MILNER 2004: Text-fig. 8A), complete carapace in dorsal aspect, mentioned as a glyptopid by WATSON (1910b).

Locality and horizon: Purbeck, South England; Purbeck Limestone Group, Early Cretaceous.

Further material listed by MILNER (2004): BMNH 40676, the holotype specimen of '*Glyptops*' *ruetimeyeri* (MILNER 2004: Text-fig. 9), carapace in dorsal aspect lacking most marginals, figured by LYDEKKER (1889: fig. 36); BMNH R1522, large highly emarginate nuchal in ventral aspect listed by LYDEKKER (1889: 189) as a specimen of *Hylaeochelys emarginata*; MANCH L7017, carapace lacking marginals from the Middle Purbeck Cap/Feather Bed at Swanage, Dorset, South England, figured by WATSON (1910a: 1); MANCH L11347, a fragment of a small carapace (according to MILNER 2004).

Ballerstedtia bueckebergensis n. sp.

Holotype: Complete shell impression with steinkern, GZG.BA.533a-c (plate 1).

Type locality: Harrl Hill at the western slope of the Bückeberg area, S Bückeburg, Weser-Bergland, Lower Saxony.

Stratum typicum: Bückeberg Formation, late Berriasian, Wealden facies (as used in the northern German stratigraphy), Early Cretaceous.

Derivatio nominis: *bueckebergensis* = the specimens have been collected in the Bückeberg area near Bückeburg and Obernkirchen, Lower Saxony, northwestern Germany.

Diagnosis: First two ribs parallel and fused, without bridge; anterior neurals 4/ 6A/ 6A; anterior plastral lobe smooth and well rounded; anal notch present; large mesoplastra present, contacting at midline; entoplastron wider than long, cut from intergular and the gularia, but not from the humeropectoral sulcus.

Description of holotype specimen: Carapace depressed with a median hump, basically oval in shape but with very distinct nuchal emargination and deep nuchal notch. Peripheral posterolateral bones usually not or only moderately emarginated. Pleural 1 is an irregular rhomboid, slightly less than twice as long as wide. Outline of discus heart-shaped, narrowing posteriorly in contrast to general oval carapace outline. Small rectangular cervical scute separates first marginal scutes over anterior half of nuchal bone. Width of vertebral scutes of about one-quarter width of carapace, with vertebral 1 almost as large as vertebral 2. Pleural scutes overlapping peripheral bones and covering about a quarter of their area. External surface of carapace smooth and mostly covered by weak to coarse pitting. Dorsal carapace length = 0.27 m; width = 0.24 m. A cervical scute is not visible (GZG.BA.533a). Steinkern of the visceral surface shows smaller neural and entoplastral borders as at the external surface (GZG.BA.533c). Anal notch clearly present in an additional specimen (GZG.BA.544b); Bridge is short (bridge index 3.3) like that in *Pleurosternon*, but larger in *Hylaeochelys* =2.3. The sculpture of both carapace and plastron is slightly granular.

Character coding: The following characters are used in the analysis: [1] mesoplastron present-0, absent-1; [2] cocervicals present-0, absent-1; [3] cervical present-0, absent-1; [4] nuchal notch absent-0, present-1; [5] marginals 1 cross the nuchal yes-0, no-1, [6] metaneural fused no-0, yes-1; [7] caudal sulcus at pygal-0 or metaneural-1; [8] first neurals 6P/4/6A-0 or 4/6A/6A-1.

Datamatrix: *Plesiochelys etalloni* 10010010, *Craspedochelys picteti* 10010000, *Tropidemys langii* 10000000, *Hylaeochelys latiscutatus* 11010110, *Glyptops ornatus* 010111?1, *Pleurosternon bullocki* 0110010, *Ballerstedtia typocardia* 01010100, *Ballerstedtia bueckebergensis* 01?10111.

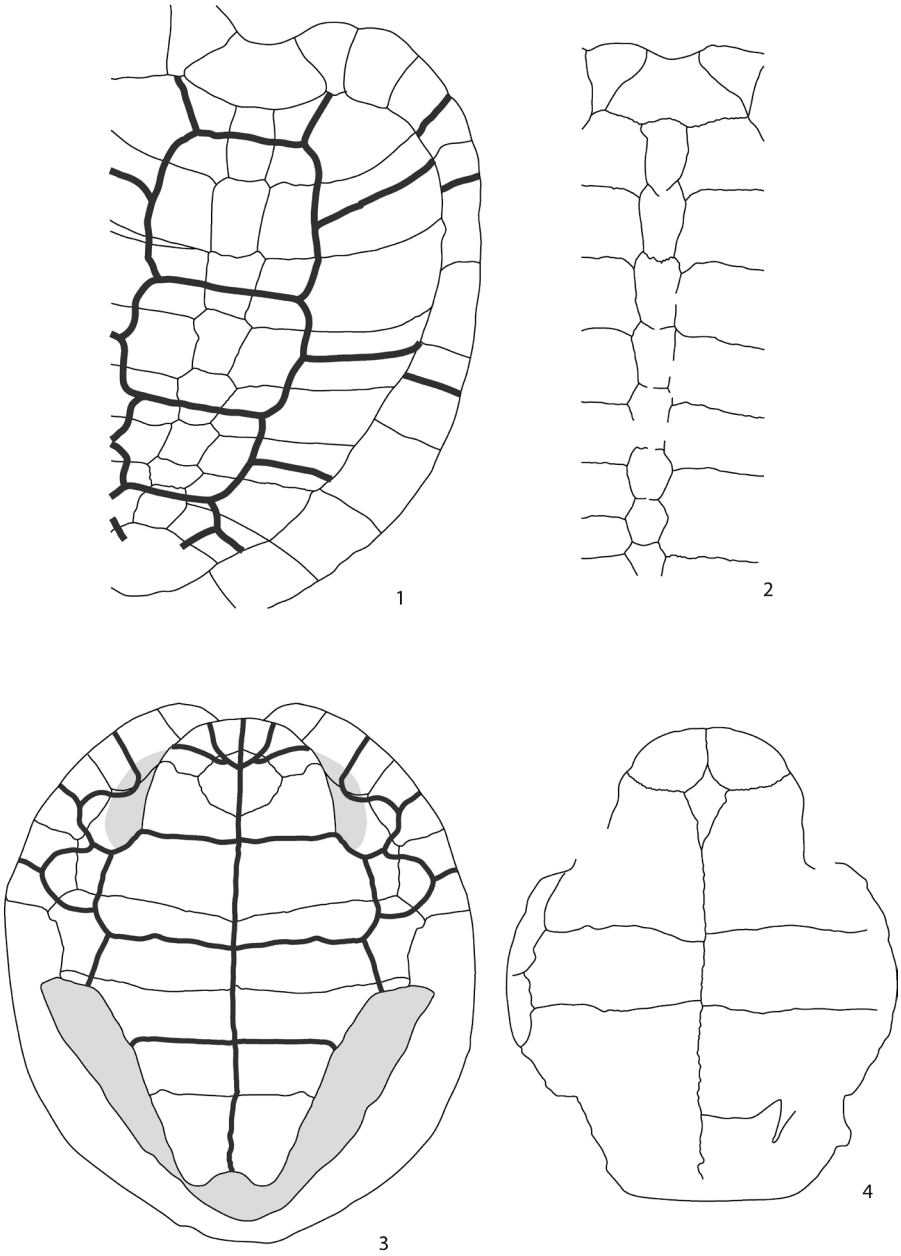

Figure 3. Schematic reconstruction of the carapace and plastron of Ballerstedtia bueckebergensis *n. gen. n. sp. 1-2: carapace; 3-4: plastron based on GZG.BA.533a-c. and GZG.BA. Heike Künzel, TLDA.*

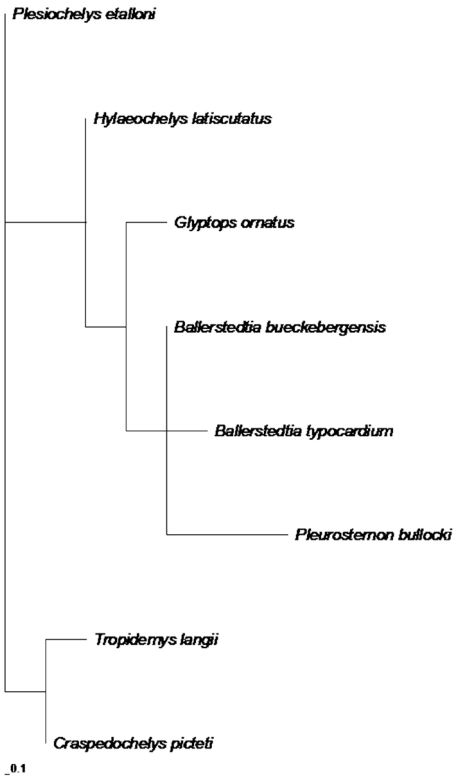

Figure 4. Outtree by PARS made with TreeView (©RODERIC PAGE).

PARS - Discrete character parsimony algorithm, version 3.6a3 (©JOSEPH FELSENSTEIN, 1986) requires a total of 11.000:

BETWEEN	AND	LENGTH
1	3	2.00
3	4	1.00
4	5	1.00
5	*Ballerstedtia bueckebergensis*	0.00
5	*Ballerstedtia typocardia*	1.00
5	*Pleurosternon bullocki*	3.00
4	*Glyptops ornatus*	1.00
3	*Hylaeochelys latiscutatus*	0.00
1	2	1.00
2	*Tropidemys langii*	1.00
2	*Craspedochelys picteti*	0.00
1	*Plesiochelys etalloni*	0.00

Preservation of lumbar nerves: GZG.BA.837, a posterior remain of asteinkern of *Ballerstedtia bueckebergensis* n. gen. n. sp. shows the incrusted lumbar part of the spinal cord (pars lumbalis) including the position of neurals 6 to 8, and the corresponding ganglia of the lumbar nerves (plate 2).

DISCUSSION

According to MILNER (2004) the carapace of '*Glyptops*' *typocardium* "is depressed with a midline 'hump', basically oval in shape but with very pronounced nuchal emargination, the nuchal element itself being highly concave. Posterolateral peripheral bones normally not emarginated (emargination in one specimen may represent healed damage). Eight neurals and two suprapygals, the first suprapygal a wide rhomboid, twice as wide as long and with posterior width over twice the anterior width. Costal 1 is an irregular rhomboid, slightly less than twice as long as wide. Outer costal outline heart-shaped, narrowing posteriorly in contrast to oval carapace outline. Small rectangular cervical scute separates first marginal scutes over anterior half of nuchal bone. Vertebral scutes about one-quarter width of carapace with vertebral 1 almost as large as vertebral 2. Pleural scutes overlapping peripheral bones and covering about a quarter of their area. Carapace outer surface is smooth and mostly covered in poorly defined or coarse pitting. Growing to at least an estimated carapace length of 0.3 m (BMNH 40676 and CAMSM J5329)".

MARSH (1890) gave the following diagnosis of his *Glyptops ornatus*: "The carapace, represented in Plate VII, figure 2 (= fig. 1 in the present article), was not found with the skull, and may possibly represent a distinct form. It resembles the corresponding part in *Dermatemys*, but the costals do not meet on the median line. It has the complete number of eight neurals, and in this and some other characters resembles *Melochelys* von Meyer, from the Cretaceous Greensand of Germany, and *Pleurosternon*, of OWEN, from the English Purbeck. The plastron of a third individual had mesoplastral bones, an intergular plate, and inframarginals, as in the above genera. The pelvis was not co-ossified with the carapace or plastron. The sculpture of both carapace and plastron is similar to that of the skull".

The present mesoplastra are a distinct character of *Ballerstedtia* n. gen. and the Pleurosternidae. The neural formula in *Ballerstedtia typocardia* n. comb. of the first three is 6P/ 4/ 6A like in *Pleurosternon*, on the other hand in 4/ 6A/ 6A like in *Ballerstedtia bueckebergensis* n. sp., *Glyptops*, Plesiochelyidae or Hylaeochelyidae.

According to our character analysis the Purbeckian *Ballerstedtia typocardia* is placed between the Berriasian *Ballerstedtia bueckebergensis* and *Pleurosternon bullocki*. *Glyptops ornatus* is here regarded as the adelphotaxon of the Pleurosternidae whereas *Hylaeochelys latiscutatus* (Hylaeochelyidae) is the adelphotaxon of the

complex (*Glyptops ornatus* + (*Ballerstedtia bueckebergensis* + *B. typocardia* + *Pleurosternon bullocki*)). This whole group has evidently derived from an ancestral level which includes the Plesiochelyidae (with *Plesiochelys etalloni*) on one side, and *Tropidemys langii* and *Craspedochelys picteti* on the other side.

BIBLIOGRAPHY

CARROLL, R. L. (1988): *Vertebrate Paleontology and Evolution*. W. H. Freeman and Company, New York, pp. 1-698.

DELAIR, J. B. (1958): The Mesozoic reptiles of Dorset. Part 1. *Proceedings of the Dorset Natural History and Archaeological Society*, **79**: 47-72.

FELSENSTEIN, J. (1986): PHYLIP/PARS-Discrete character parsimony © Copyright 1986-2000 by the University of Washington. Written by Joseph Felsenstein.

GAFFNEY, E. S. (1975a): A phylogeny and classification of the higher categories of turtles. *Bulletin of the American Museum of Natural History*, **155**: 387-436.

GAFFNEY, E. S. (1975b): A taxonomic revision of the Jurassic turtles *Portlandemys* and *Plesiochelys*. *American Museum Novitates*, **2574**, 19 pp.

GAFFNEY, E. S. (1979): The Jurassic turtles of North America. *Bulletin of the American Museum of Natural History*, **161**: 91-136.

GAFFNEY, E. S. (1984): Historical analysis of theories of chelonian relationship. *Systematic Zoology*, **33**: 383-401.

GAFFNEY, E. S.; HUTCHINSON, J. H.; JENKINS, F. A. & MEEKER, L. J. (1987): Modern turtle origins: the oldest known cryptodire. *Science*, **237**: 289-291.

GAFFNEY, E. S. & MEYLAN, P. A. (1988): A phylogeny of turtles. 103-156. *In*: BENTON, M. J. (Ed.): *The phylogeny and classification of tetrapods*. Volume 1. *Amphibians, Reptiles, Birds*. *Systematics Association*. Special Volume 35A. Oxford University Press, Oxford, 377 pp.

GAFFNEY, E. S. & WYSS, A. R. (1991): A computer assisted analysis of the relationships of the higher categories of turtles. *Cladistics*, **7**: 313-335.

GRABBE, H. F. (1883): *Die Schaumburg-Lippe'sche Wealden-Mulde*. Dissertation Göttingen, 61 pp.

HAY, O. P. (1908): Fossil Turtles of North America. *Carnegie Institution of Washington*, **75**: IV + 568 pp., 113 pls.

HORNUNG, J. J. & REICH, M. (2007): Krokodile, Schildkröten & Dinosaurier: Die "Wealden". *Sammlung der Universitat Göttingen. Fossilien*, **24 (1)**: 32-36.

KARL, H.-V.; STAESCHE, U.; TICHY, G.; LEHMANN, J. & PEITZ, S. (2007): Systematik der Schildkröten (Anapsida: Chelonii) aus Oberjura und Unterkreide von Nordwestdeutschland. *Geologisches Jahrbuch*, B **98**: 5-89.

KARL, H.-V. & TICHY, G. (2004): Zur frühen Geschichte der Paläocheloniologie von Schaumburg-Lippe. *Berichte zur Wissenschaftsgeschichte, Weinheim*, **27**: 285-296.

LAPPARENT DE BROIN, F. de (2001): The European turtle fauna from the Triassic to the Present. *Dumerilia*, **4 (3)**: 155-217.

LAPPARENT DE BROIN, F. de & MURELAGA, X. (1999): Turtles from the Upper Cretaceous of Laño (Iberian peninsula). *Estudios del Museo de Ciencias Naturales de Álava*, **14** (Número Especial 1): 135-211.

LUCAS, S. G.; RINEHART, L. F. & HECKERT, A. B. (2006): *Glyptops* (Testudines, Pleurosternidae) from the Upper Jurassic Morrison Formation, New Mexico. *In*: FOSTER, J. R. & LUCAS, S. G. (Eds.): Paleontology and Geology of the Upper Jurassic Morrison Formation. *New Mexico Museum of Natural History and Science Bulletin*, **36**: 97-99.

LYDEKKER, R. (1889): *Catalogue of the fossil Reptilia and Amphibia in the British Museum (Natural History)* Part III. *The Order Chelonia*. British Museum (Natural History), London, 239 pp.

LYDEKKER, R. & BOULENGER, G. A. (1887): Notes on Chelonia from the Purbeck, Wealden and London Clay. *Geological Magazine*, **3** (4): 270-275.

MARSH, O. C. (1890): Notice of some extinct Testudinata. *The American Journal of Science and Arts*, Series 3, **40**: 177-179.

MILNER, A. R. (2004): The turtles of the Purbeck limestone group of Dorset, Southern England. *Palaeontology*, **47 (6)**: 1441-1467.

PEITZ, S. (1998): Schildkröten der deutschen Wealden-Fazies. Ein Einblick in die Ballerstedtsche Sammlung. *Terra nostra, Schriften der Alfred-Wegener-Stiftung*, 7/98, Berlin (2. Treffen deutschspr. Paläoherpetologen), **1**: 18 pp.

SEELEY, H. G. (1869): *Index to the fossil remains of Aves, Ornithosauria and Reptilia, from the Secondary system of strata arranged in the Woodwardian Museum of the University of Cambridge*. Deighton, Bell and Co., Cambridge, 143 pp.

WATSON, D. M. S. (1910a): *Glyptops ruetimeyeri* (Lyd.), a chelonian from the Purbeck of Swanage. *Geological Magazine*, **5 (7)**: 311-314.

WATSON, D. M. S. (1910b): A chelonian from the Purbeck of Swanage, Dorset. *Geological Magazine*, **5 (7)**: 381.

