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Desmemys bertelsmanni (Wegner 1911) (Testudines: Pleurosternidae) - a valid taxon of a mesozoic river turtle based on the rediscovery of type material from the Wealden fazies of North Rhine-Westphalia

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Abstract: Remains of both femora, rigth tibia and fibula from the type materials of *Desmemys bertelsmanni*, described and figured by Wegner (1911), are rediscovered, described and figured as lectotype. This type sample is discussed and elucidated on geographically and stratigraphically comparable material.

Keywords: Lower Cretaceous, Berriasian, Wealden facies, taxonomy, Pleurosternidae, Desmemydinae, Bückeberg Group, Ontogenetic variability.

Kurzfassung: *Desmemys bertelsmanni* (Wegner 1911) ist ein valides Taxon einer mesozoischen Flußschildkröte aus der Wealden-Fazies Nordrhein-Westfalens, begründet auf wieder aufgefundenem Typusmaterial. Die Überreste beider Femora und der rechten Tibia mit Fibula aus dem Typusmaterial zu *Desmemys bertelsmanni*, welche schon in der Originalbeschreibung von Wegner (1911) beschrieben und abgebildet wurden, werden als Lectotypus festgelegt. Dieses Typusmaterial wird mit geographisch und stratigraphisch vergleichbarem Material diskutiert.

Schlüsselwörter: Unterkreide, Berriasium, Wealden-Fazies, Taxonomie, Pleurosternidae, Desmemydinae, Bückeberg Gruppe, ontogenetische Variabilität.

Introduction

The holotype of *Desmemys bertelsmanni* is one of the most historically famous and anatomically nearly complete Early Cretaceous turtle fossils. It derived from the Gerdemann & Co. brickworks clay pit near Gronau (Westfalen) in North Rhine-Westphalia, northwestern Germany. Stratigraphically this locality formed part of the classic European Wealden facies, but is now more formally attributed to the uppermost strata of the Bückeberg Group (upper Berriasian). Since its initial description in 1911, the type skeleton of *D. bertelsmanni* has suffered damage both during, and after World War II. Sadly, these mishaps have resulted in the loss of substantial information, in particular many structures of the shell and limb girdles, which are a long time only evidenced from published text and illustrations. This non-confirmable data has, however, proven crucial for determining the relationships of *D. bertelsmanni* within Pleurosternidae. Therefore affiliation of the described neotype to the holotype by Karl et al. (2012) was indisputable.

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Geological Setting

For lithostratigraphical setting, palaeogeography, palaeoenvironment and taphonomy see also Sachs et al. (2016). According Karl et al. (2012) the inoperative and today flooded clay mining pit "Ziegeleitongrube Gerdeman" (Gerdemann's clay mining pit) in Gronau (Westf.) (UTM 7°01'20.69"E, 52°12'43.70"N) is situated in the western limnic to brackish marginal facies of the Lower Saxony Wealden Basin close to the German and Netherland border (figure 1). Exposed layers reach from the brackish upper Berriasian (Osterwald-Member of the highest Bückeburg-Formation) to the fully marine developed ammonite leading lower Valanginian. The Osterwald-Member consists of interbedded strata of mudstones and thin lumashells. This succession is the origin of the specimen described herein. Detailed profiles and further information on the geology and paleontology of the former Gerdemann´s clay pit are given in Bessin (1928), Hosius (1893), Kemper (1961a,b, 1963, 1976, 1992) and Wegner (1926).

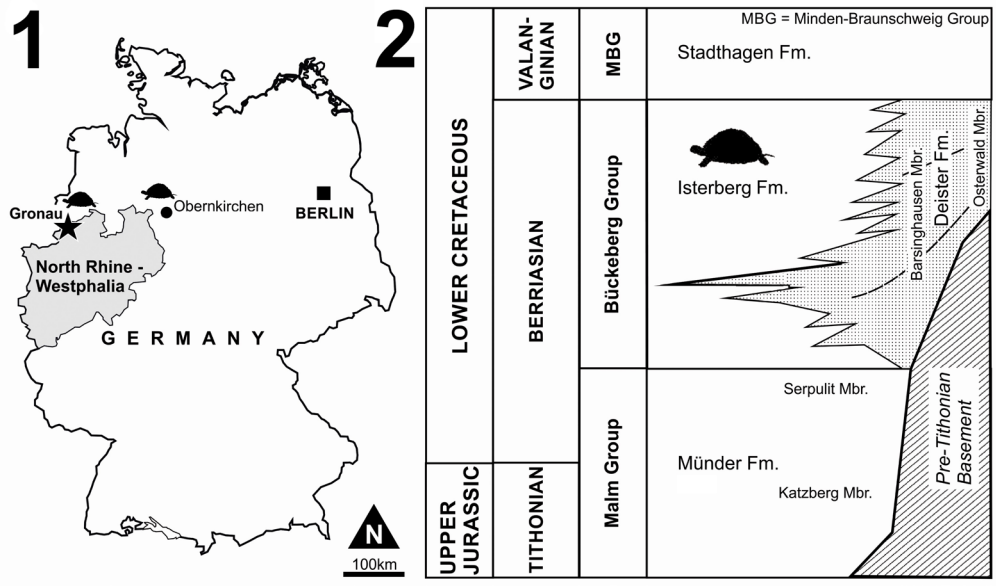

Figure 1: (1) Map of the type locality for *Desmemys bertelsmanni* at Gronau (Westfalen), Germany (asterisk), together with neighbore pertinent sources of fossil turtle material. **(2)** Lithostratigraphy of the lowermost Cretaceous in the central and southeastern Lower Saxony Basin (northwestern Germany) with the position of *D. bertelsmanni* in the upper Berriasian Bückeberg Group (after Mutterlose, 1997, Sachse et al., 2016, modified).

Materials andMethods

We redescribe the rediscovered type material of *Desmemys bertelsmanni* (GPMM without number) and further referrable material, housed in the the Geomuseum der Universität Münster (GPMM) in Münster in Westfalen, Germany. Additional referrable and comparable specimens were studied in the collections of the Driland Museum (DLM) in Gronau (Westfalen) and Geoscience Center of Georg-August-University Göttingen (GZG). Further information to the Göttingen Wealden collection see Böhme et al. (2012). The cited material was studied and documented first-hand in conjunction with appropriate comparative literature where relevant. All studied material is stored in public collections and was accessed with formal permission from the responsible curating personel. The turtle material was collected 1910 by professor Theodor Wegner of the geologic institute of the Westphalian Wilhelm's university in Münster in the clay-pit of the Gerdemann brickyard, called shale hollow (Schieferkuhle, figure 2-1). The clay production was begin up in 1883 in the Glanerfeld (Gronau) and was finished during the First World War in 1917 with the end of brick production, and the pit filled quite quickly with water (plate 1, figure 2).

General structure of the hitherto unknown samples: Eigth samples of historical museums material of fossil reptile bone remains are recovered in the Geomuseum Münster (plate 2, 4). Three original

labels are present with informations to the frame of this study:
1) Label at box for sample 7 and 8: Enclosed shoulder girdle of *Desmemys bertelsmanni* Wegner care! (plate 1, up right)
2) Label to sample 7: Vertebrae and head remains of *Desmemys bertelsmanni* Wegner (plate 4, up).
3) Label to sample 5: Gronau to the hands of Gerdemann Wealden, mostly layers ?. Kuhlmann 1914 (plate 4, below).
Samples 1 to 6 contain strongly fragmented vertebrae and extremities remains of indeterminate plesiosaurids. Sample 7 contains only fragments of clay-shale and the turtle fragments at plate 4, fig. 1-6. Sample 8 contains 6 glass sample tubes with cork stopper from before 7, with very fine indetermined osseous splinters which unopen.

Results

Systematic Palaeontology

Pleurosternidae Cope, 1868 PaleoDB taxon number: 37762
Desmemydinae Nopsca, 1928 PaleoDB taxon number: 357873
Desmemys Wegner, 1911 PaleoDB taxon number: 37697 (https://paleobiodb.org/data1.2/taxa/list.csv?datainfo&rowcount&base_name=Desmemys)

Type species: *Desmemys berlelsmanni* Wegner, 1914
Diagnosis: As for the type and only species.
Stratigraphical and geographical range: Gigas-layer, Kimmeridgian, Upper Jurassic to Bückeberg Group, upper Berriasian; Lower Saxony Basin, northwestern Germany.

Desmemys berlelsmanni Wegner, 1914

The roles for the present synonyms list follows the recommended protocols used by Sachs et al. (2016). v* marks studies on original type material:

v* 1914 *Desmemys bertelsmanni* n. gen n. sp. Wegner: 108ff., 125, Figs. 1-2, pl. VIII-IX.
v 1964 *Desmemys bertelsmanni* Wegner - Sukhanov: 384, Fig. 374.
v 1964 *Desmemys bertelsmanni* Wegner - Kuhn: 17.
v 1976 *Desmemys bertelsmanni* Wegner - Młynarski: 37-38, Fig. 33-2.
v 2000 *Desmemys bertelsmanni* Wegner - Brinkmann et al.: 269-274.
v 2001 *Desmemys bertelsmanni* Wegner - Lapparent de Broin: 172.
v 2007 *Desmemys bertelsmanni* Wegner - Karl et al.: 49-50, Fig. 12.
v* 2012 *Desmemys bertelsmanni* Wegner - Karl et al.: 31-46, Pl. 1-4.
v 2019 *Desmemys bertelsmanni* Wegner - Karl et al.: 49-50, Fig. 12.
v 2019 *Desmemys bertelsmanni* Wegner nomen dubium - Joyce & Anquetin: 145.
v* 2019 *Desmemys bertelsmanni* Wegner - Karl & Safi in this study based on real type material.

Diagnosis: River turtles with strong shell. Peripheral fontanelles of carapace deeply. Well developed mesoplastra at plastron. Medial and lateral plastral fontanelles present. Acromial process of scapula elongated. Skull unknown. The carapace is slightly domed, with a strong keel at pygal area, peripheral edge massive. Peripheral carapace fontanels present. Nine neurals extended, usually hexagonal. Two large broad metaneurals. Plastron thick, with rounded medial fontanels. Epiplastra developed, hyoplastra with strong axillar butresses. Xiphiplastra not fused. Characteristic surface sculpture, centrals very broad.
Type locality: Gerdemann's clay mining pit in Gronau, North Rhine-Westphalia, Germany.
Type horizon: Osterwald-Member; Berriasian, Wealden facies (western Lower Saxony Cretaceous basin), Lower Cretaceous.

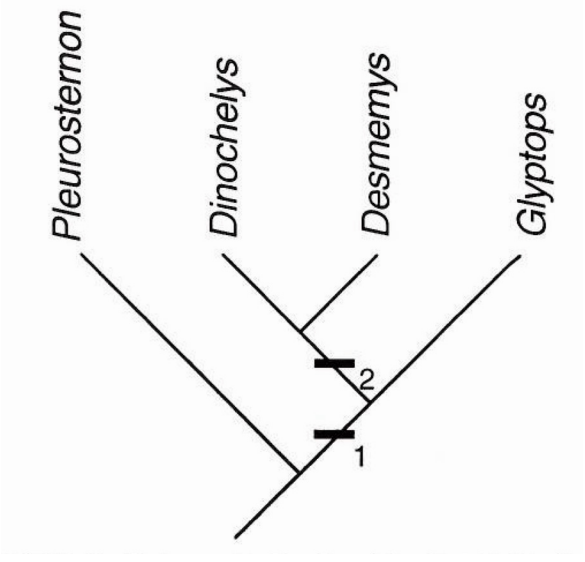

Figure 2: Cladogramm according Brinkman et al. (2000: fig. 5) showing the relationships of Desmemys and Dinochelys. Characters supporting their cladogramm are: 1 - juvenile shells with plications on vertebral scutes extending anteriorly from posterior edge of scute, hooked beak on premaxilla and dentary; and 2 - vertebral scutes wide, ossification of the carapace delayed.

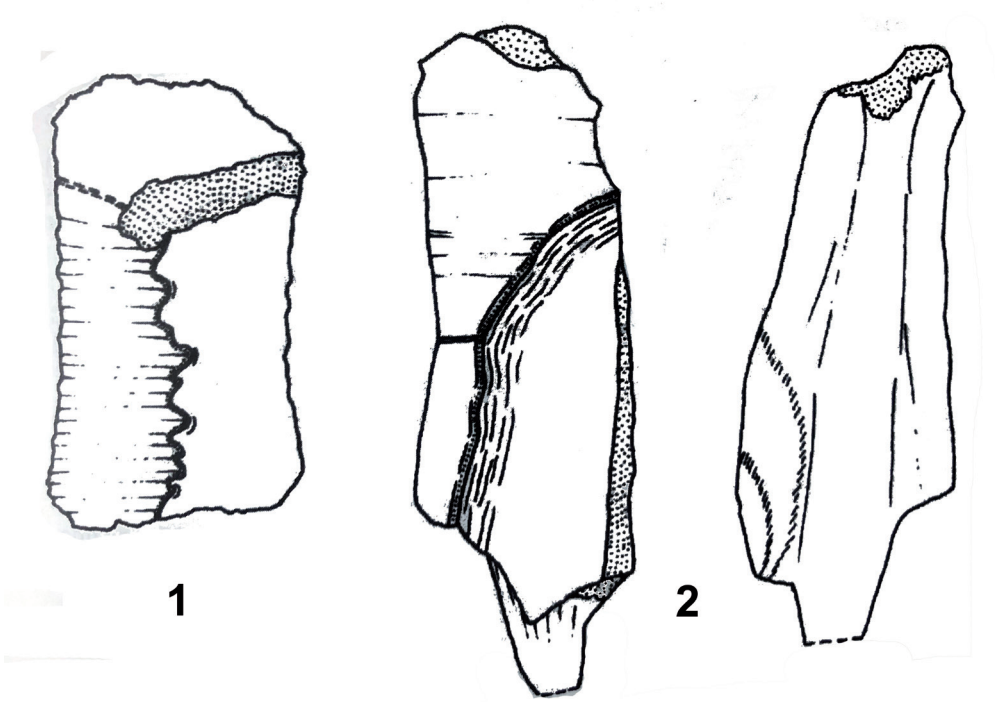

Figure 3: DFMM 853 from layer 73 (middle Kimmeridgian) of Langenberg near Oker according Karl et al. (2007: fig. 10).

Ontogenetic variability: Measurements according Wegner (1911) carapace lenght 180 millimeters (mm) or 7.08661 inches (in), width 149 millimeters (mm) or 5,86614 inches (in), probably juvenile (Młynarski, 1976, Karl et al., 2012). The adult morphotype of *Desmemys* is unknown, but two by KARL et al (2007: 46, fig. 10) described and figured pleurals point by plications caused sinuose sulci and „imbricate" horny-scute growth zones, which growth occurs from posterior to anterior (figure 3). The reconstructable carapace length may relate to other European Mesozoic turtles like *Plesiochelys*, *Craspedochelys* and Pleurosternon.

Skull remains not preserved according Wegner (1911): „der größte Teil des Kopfes stark verdrückt und die aus der Schale vorstehenden Extremitätenteile sowie der Schwanz in der nicht mehr vorhandenen Gegenplatte stecken geblieben sind (p. 107) ... Füße und Kopf unbekannt. (p. 120)" [„the most part of the head strongly impressed and the extremity parts projecting from the shell as well as the tail have got stuck in the not more available counterplate (p. 107)... Feet and head unknown. (p. 120)"]

Referred specimens: GPMM without number: lectotype of *Desmemys bertelsmanni*: hind limb elements: both femora, rigth tibia and rigth fibula from the type material described and figured by Wegner (1911: p. 118, fig. 2); DLMG (Driland-Museum Gronau) no. 536 (neotype of *Desmemys bertelsmanni*): almost complete right hyoplastron of a juvenile turtle (Karl et al. 2012: plate 2, fig. 1-2); GZG (Geoscience Centre of the University of Göttingen, Museum) no. GZG.V.10005: right hyoplastron (KARL et al. 2012: plate 2, fig. 3-4) from Waltersberg near Holzen at Ith, Lower Saxony, Germany; "Gigas-layer" Kimmeridgian, former Tithonian or "Portland", Upper Jurassic; DFMM (Dinosaurier-Freilichtmuseum Münchehagen) no. 853: shell, skull and extremity remains, carapace has a length in the current state of 75 mm and a width of 60 mm, from Florian von Pupka´s quarry at Langenberg near Oker, Lower Saxony, Kimmeridgian, Upper Jurassic; (Karl et al., 2006, 2007, 2008, 2012: plate 3); Testudines gen. et spec. indet., leg. et coll. Thomas Hemker, Ahaus-Alstätte; Hagemeister´s clay pit, April 2007, Ahaus-Alstätte, North Rhine-Westphalia, Lower Aptian, Lower Cretaceous; description see Karl et al. (2012: plate 4). Joyce & Anquetin (2019) considerred *Desmemys bertelsmanni* for a nomen dubium, because the holotype, a nearly complete shell and associated limb and girdle remains which were described and figured in detail by Wegner (1911). The specimen is otherwise characterized by being relatively small (carapace length approximately 18 cm), by having well-developed fontanelles in the carapace and plastron, and by having radiating scute patterns.

It therefore seems all but certain that this is a juvenile individual. Gaffney (1979) noted that *Desmemys bertelsmanni* is similar to *Dinochelys whitei* by possessing these radiating scute patterns, but we do not believe this to be particularly meaningful, as *Dinochelys whitei* is mostly known from juvenile material as well. *Desmemys bertelsmanni* is therefore a valid Taxon, even if the type specimens is from a juvenilen individual.

Plesiosauria indet.

Referred material: Remains of disarticulated vertebrae and ribs. Numerous isolated propodials, ribs and vertebrae from the Gerdemann & Co. clay-pit are housed in the collections of the GPMM and are morphologically indistinguishable from the corresponding elements of aff. *Brancasaurus brancai* compared to SACHS et al. (2016) and the material in the Driland Museum Gronau (see KARL et al. 2012: fig. 1).

Phylogenetic Systematics

Desmemys was assigned by Bergounioux (1955) and von Huene (1956) as a representative of the family Thalassemydidae (Zittel 1889). Von Nopsca (1928) erected the subfamily Desmemydinae Nopsca, 1928, Romer (1956) and Pritchard (1975) follow this classification. Młynarski (1976) considerd the "Subfamilia Desmemydinae Williams 1955, emend. Sukhanov 1964" to be a member of the superfamily Chelonioidea Baur, 1893. Lapparant de Broin (2001) listed the genus within ?Pleurosternidae (incertae sedis). Recently Karl et al. (2007, 2012) published an updated reconstruction and assigned *Desmemys* to the family Pleurosternidae Cope, 1868, according Pérez-García et al. (2014) to the family Baenoidea Williams, 1950 sensu Lyson & Joyce 2011.

The relatively large fontanelles of this semi-adult specimen were previously interpreted as a characterictic feature of a sea turtle. This affilation is excluded because of the presence of mesoplastra. Today *Desmemys* is seen in relation to the Upper Jurassic genus *Dinochelys* (Brinkman et al., 2000). Both share a pronounced radial structure of centrals, so called pattern of plications, which originally is affiliated to *Desmemys*. The related material from Langenberg near Oker and Waltersberg near Holzen described by Karl et al. (2012) extends the stratigraphic distribution of the genus *Desmemys* below the Jurassic-Cretaceous boundary. The sample location of *Desmemys bertelsmanni* DFMM 853 (figure 3) in layer 73 (middle Kimmeridgian) is substantially younger than the other so far proven turtles from layer 51 (lower Kimmeridgian), as *Plesiochelys* or *Craspedochelys*. All so far discovered fossil turtle remains from Langenberg have an aquatic background (Karl et al. 2007, 2012), Jansen & Klein (2010) follow this approval. The phylogenetic reconstruction according Brinkman et al. (2000) shows figure 3. Parent taxon is Pleurosternidae according to Brinkman et al. (2000), sister taxa are *Ballerstedtia*, *Desmemydinae*, *Dinochelys*, *Dorsetochelys*, *Glyptops*, *Pleurosternon*, *Riodevemys*, *Selenemys*, *Toremys* according to (Carroll 1988, Karl et al. 2012, Kuhn 1966, Milner 2004 and Nopcsa 1928).

Updated Classification of the pleurosternid turtles for Paleobiology Database:

Suborder Cryptodira Cope 1868 – PaleoDB taxon number: 37622
Family Pleurosternidae Cope 1868 – PaleoDB taxon number: 37762
Genus *Ballerstedtia* Karl et al. 2012 – PaleoDB taxon number: 254315
Ballerstedtia bueckebergensis Karl et al. 2012 – PaleoDB taxon number: 254324
Ballerstedtia typocardia Seeley 1869 – PaleoDB taxon number: 254325
Subgenus Desmemydinae Nopsca, 1928 – PaleoDB taxon number: 357873
Genus *Desmemys* Wegner 1911 – PaleoDB taxon number: 37697
Desmemys bertelsmanni Wegner 1911 – no PaleoDB taxon number.
Genus *Dinochelys* Gaffney 1979 – PaleoDB taxon number: 37751
Dinochelys whitei Gaffney 1979 – PaleoDB taxon number: 253384
Genus *Dorsetochelys* Evans and Kemp 1976 – PaleoDB taxon number: 37630
Dorsetochelys buzzops Bakker 1998 – PaleoDB taxon number: 66832
Dorsetochelys typocardium Pérez-García 2014 – PaleoDB taxon number: 290854
Genus *Glyptops* Marsh 1890 – PaleoDB taxon number: 37625
Glyptops plicatulus Cope 1877 – PaleoDB taxon number: 65858
Genus *Pleurosternon* Owen 1853 – PaleoDB taxon number: 37765
Pleurosternon bullockii Owen 1842 – PaleoDB taxon number: 234884
Pleurosternum portlandicum Lydekker 1889 [synonyms *Digerrhum* Cope 1870, *Mesochelys* Evans and Kemp 1975] – PaleoDB taxon number: 235541
Genus *Riodevemys* Pérez-García et al. 2015 – PaleoDB ta-

xon number: 296182
Riodevemys inumbragigas Pérez-García et al. 2015 – PaleoDB taxon number: 296183
Genus *Selenemys* Pérez-García and Ortega 2011 – PaleoDB taxon number: 184479
Selenemys lusitanica Pérez-García and Ortega 2011 – PaleoDB taxon number: 184480
Genus *Toremys* Pérez-García et al. 2015 – PaleoDB taxon number: 316766
Toremys cassiopeia Pérez-García et al. 2015 – PaleoDB taxon number: 316768

Discussion

Gerdemann's clay mining pit ("Ziegeleitongrube Gerdemann") has been a classical outcrop for German Wealden fossils (Berriasian; lowermost Cretaceous; Bückeberg-Formation) since the first part of the 20th century. It is well known for the discovery of a 3.26-meter-long skeleton of the elasmosaurid *Brancasaurus brancai* (Wegner, 1914). Even a fragment of an armoured dinosaur has been described (Sachs, 1997, Sachs et al. 2016).
End of the first decade of the 20th Century one almost complete specimen of a turtle has been discovered in the clay mining pit. This specimen included most parts of the shell, the complete pectoral girdle and femura. The owners of the clay pit, Mr. Gerdemann and Mr. Bertelsmann donated this stunning finding to the Mineralogical and Geological Museum of the University of Muenster. There it has been described by Th. Wegner in 1911 as *Desmemys bertelsmanni*. During World War II this specimen got nearly destroyed. A complete hypoplastron from the type sample of *Desmemys bertelsmanni* (Wegner 1911) was described and figured as neotype by Karl et al. (2012). This type sample was discussed and elucidated on geographically and stratigraphically comparable material. In contrast to all previous authors, we here consider *Desmemys bertelsmanni* as lectotype, a valid taxon, by identification from the authentic type of material. The specimen can confidentially be interpreted as a juvenile of paracryptodire, as it possesses well-developed mesoplastra, the specimen is characterized by being relatively small (carapace length approximately 18 cm), most bones are poorly ossified, and most scute sulci are not preserved, making it impossible to rigorously compare this taxon with roughly coeval paracryptodires such as *Dorsetochelys typocardium*, *Pleurosternon bullockii*, and *Riodevemys inumbragigas*.

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References

Bergounioux, F. M. 1955. Chelonia. – In: Piveteau, J. (ed.): Traité de Paléontologie, 5 : 487-544, Paris.

Bessin, B. (1928): Das Wealdenbecken und seine Überlagerung durch die marine Untere Kreide in Norddeutschland. – 21. Jahresbericht des Niedersächsischen Geologischen Vereins zu Hannover.

Billon-Bruyat, J-P., Lécuyer,Ch., Martineau, F. & Mazin, J-M. 2005. Oxygen isotope compositions of Late Jurassic vertebrate remains from lithographic limestones of western Europe: implications for the ecology of fish, turtles and crocodilians. – Palaeogeography, Palaeoclimatology, Palaeoecology, 216: 359-375, figs. 1-6; Amsterdam (Elsevier).

Böhme, A., Reich, M., Hornung, J.J. & Karl, H.-V. 2012. Northern `German Wealden' the collection of the Göttingen University. – In: Richter, A, Reich, M., (eds.): Dinosaur tracks 2011. An international symposium, Obernkirchen, April 14 17, 2011. Abstract Volume and Field Guide to Excursions, Göttingen: Universitätsverlag Göttingen, 151 168.

Brinkman, D. B., Stadtman, K. & Smith, D. 2000. New material of Dinochelys whitei Gaffney, 1979, from the Dry Mesa Quarry (Morrison Formation, Jurassic) of Colorado. – Journal of Vertebrate Paleontology 20(2):269-274.

Carroll, R. L. 1988. Vertebrate Paleontology and Evolution. – p. 1-698.

Frerichs, U. 2005. Knochen eines Landtieres im Untercampan von Höver (?). – Arbeitskreis Paläontologie Hannover 33: 1 ff.

Gaffney, E. S. 1979. The Jurassic turtles of North America. – Bulletin of the American Museum of Natural History 162(3): 95-135.

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.

Huene, F. v. 1956. Paläontologie und Phylogenie der niederen Tetrapoden. – 716 pp; Fischer, Jena.

Jansen, M. & Klein, N. 2010. Eine kleine Schildkröte

(Reptilia: Testudines) aus dem oberen Jura Niedersachsens (Norddeutschland) und ihre Referenz für aquatische Anpassung und Ontogenie. – Zitteliana B 29: 54. (Paläontologie im Blickpunkt. 80th Annual Meeting of the Paleontological Society in Munich, 5th-8th October 2010, abstracts, Munich.)

Joyce, W.G. & Anquetin, J. 2019. A review of the fossil record of non-baenid turtles of the clade Paracryptodira. – Bulletin of the Peabody Museum of Natural History, in press.

Karl, H.-V. 2002. Übersicht über die fossilen marinen Schildkrötenfamilien Zentraleuropas (Reptilia, Testudines). – Mauritiana (Altenburg), 18 (2): 171- 202.

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.; Hannover.

Karl, H.-V., Nyhuis, C.J. & Schleicher, L. 2012. Redescription of Desmemys bertelsmanni (Wegner, 1911) from the Upper Jurassic and Lower Cretaceous of Germany (Testudines: Pleurosternidae). – Studia Palaeocheloniologica 4: pp. 31-46.

Kemper, E. 1961a. Mikrofauna und Faziesfossilien im unteren Mittelvalendis Nordwestdeutschlands. – Neues Jahrbuch für Geologie und Paläontologie Monatshefte, 2: 87-94.

Kemper, E. 1961b. Die Ammonitengattung Platylenticeras (=Garnieria). Mit einem Beitrag zur Stratigraphie und Bionomie ihrer Schichten (Untere Kreide, mittleres Valendis). – Beihefte Geologisches. Jahrbuch. 47: 195.

Kemper, E. 1963. Die Aufschlüsse der Unterkreide im Raum Rheine-Ahaus. – Geologisches. Jahrbuch. 80: 447-494.

Kemper, E. 1976. Geologischer Führer durch die Grafschaft Bentheim und die angrenzenden Gebiete mit einem Abriss der emsländischen Unterkreide. – 5. ed.. 206 pp., Nordhorn, Bentheim (Heimatverein Grafschaft Bentheim).

Kemper, E. 1992. Die tiefe Unterkreide im Vechte-Dinkel-Gebiet. – 95 pp., Losser (Stichting Het Staringmonument te Losser).

Kuhn, O. 1964. Testudines. – In: F. Westphal (Ed.): Fossilium Catalogus, I: Animalia, Pars 107; 299 S.; Gravenhage.

Kuhn, O. W. M. 1966. Die Reptilien. System und Stammesgeschichte [The Reptiles. Systematics and Phylogeny.] – 1-154.

Lapparent de Broin, F. De 2001. The European turtle fauna from the Triassic to the Present. – Dumerilia, 4 (3): 155-217.

Lyson, T. R. & Joyce, W. G. 2011. Cranial anatomy and phylogenetic placement of the enigmatic turtle Compsemys victa Leidy, 1856. – Journal of Paleontology 85: 789 801.

Milner, A. R. 2004. The turtles of the Purbeck Limestone Group of Dorset, southern England. – Palaeontology 47(6):1441-1467.

Nopsca, F. v. 1928. The genera of reptiles. – Palaeobiologica, 1: 161-188.

Pritchard, P. C. H. 1975. Directory of turtle genera. – Chelonia, 2 (5): 1029.

Pérez-García, A., Royo-Torres, R. & Cobos, A. 2014. A new European Late Jurassic pleurosternid (Testudines, Paracryptodira) and a new hypothesis of paracryptodiran phylogeny. – Journal of Systematic Palaeontology 13(4):351-369.

Romer, A. S. 1956. Vertebrate paleontology. – 687 pp., 1st ed. 1945; Chicago.

Młynarski, M. 1976. Testudines. – In: O. Kuhn (Ed.): Encyclopedia of Paleoherpetology; Part 7: 130 pp.

Sachs, S. 1997. Erster Nachweis eines gepanzerten Dinosauriers (Reptilia, Ornithischia, Thyreophora) aus der Unterkreide (Berrias) von Gronau in Westfalen. – Neues Jahrbuch für Geologie und Paläontologie Monatshefte, 1:56-64.

Sachs S., Hornung J.J. & Kear B.P. 2016. Reappraisal of Europe's most complete Early Cretaceous plesiosaurian: Brancasaurus brancai Wegner, 1914 from the "Wealden facies" of Germany. – PeerJ 4:e2813 https://doi.org/10.7717/peerj.2813

Sukhanov, V. B. 1964. Testudinata. – In: Orlov, I. A. (ed.): Osnovy Paleontologii, part Amphibia, Reptilia, Aves, pp. 354-438; Moskva.

Wegner, T. 1911. Desmemys Bertelsmanni n. g. n. sp. Ein Beitrag zur Kenntnis der Thalassemydidae Rütimeyer. – Palaeontographica, LVIII: 105- 132.

Wegner, T. 1914. Brancasaurus brancai n. g. n. sp., ein Elasmosauride aus dem Wealden Westfalens. – In: Branca-Festschrift 9: 235–302; Borntraeger, Leipzig.

Wegner, T. 1926. Geologie Westfalens und der angrenzenden Gebiete. – 2. Auflage., 500 pp; Paderborn (Schöningh).

PLATE 1-5

PLATE 1

Fig. 1: Photograph during the clay production at the turn 19. - 20th century in the Gerdemann's clay mining pit (Gronau); archive Dr. L. Schleicher†.

Fig. 2: The pit during a field excursion in August 18 2010; photo by the author (HVK).

PLATE 1

PLATE 2

Fig. 1: Plesiosauridae indet./ Testudines indet.: Hitherto unknown samples in the Geomuseum Münster, remarks in text.

PLATE 2


Inventar-Nr. 1
Inventar-Nr. 2
Inventar-Nr. 3
Inventar-Nr. 4
Dr. Hans-Volker Karl
Paläontologe
Inventar-Nr. 8
Dr. Hans-Volker Karl
Paläontologe
Inventar-Nr. 5
Inventar-Nr. 6
Inventar-Nr. 7
1 2 3 4

PLATE 3

Lost or destroyed holotypus of *Desmemys bertelsmanni* Wegner, 1911 from Gronau (Westf.).

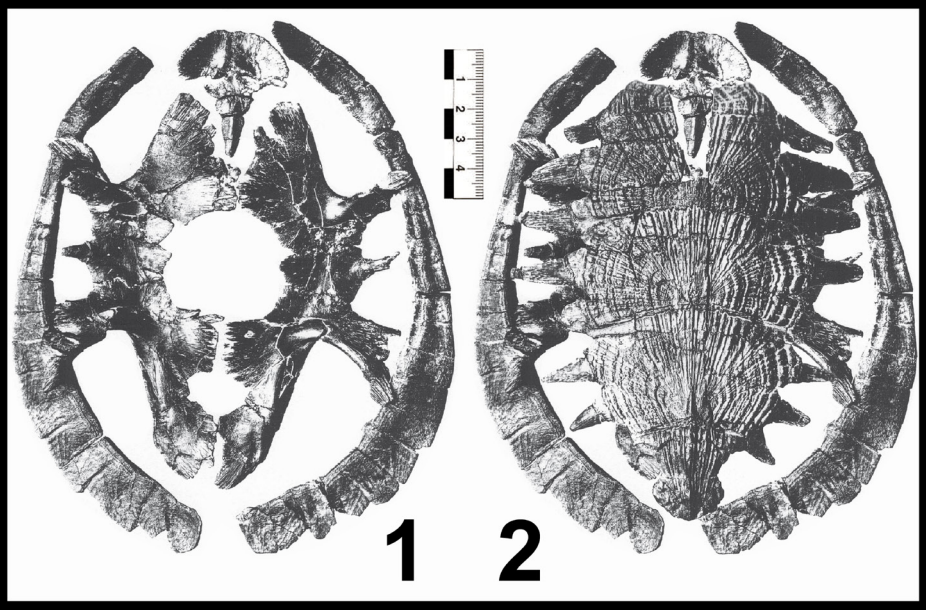
Fig. 1: peripherals and plastron viszeral view according Karl et al. (2012: pl. 1, fig. 3);

Fig. 2: carapace and plastron in new combination according Karl et al. (2012: pl. 1fig. 4);

Fig. 3: shoulder girdle and figure;

Fig. 4: pelvic girdle from Wegner (1911). Without scale.

PLATE 3



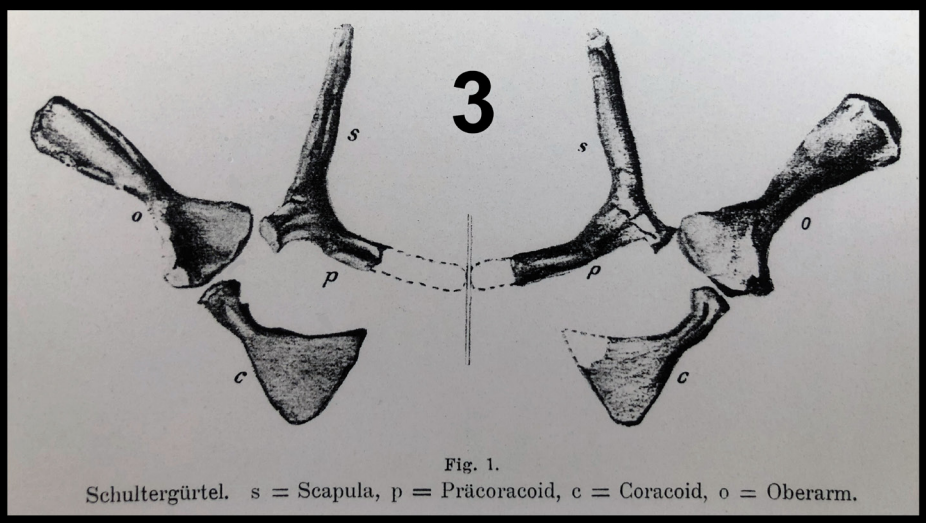


Fig. 1.
Schultergürtel. s = Scapula, p = Präcoracoid, c = Coracoid, o = Oberarm.

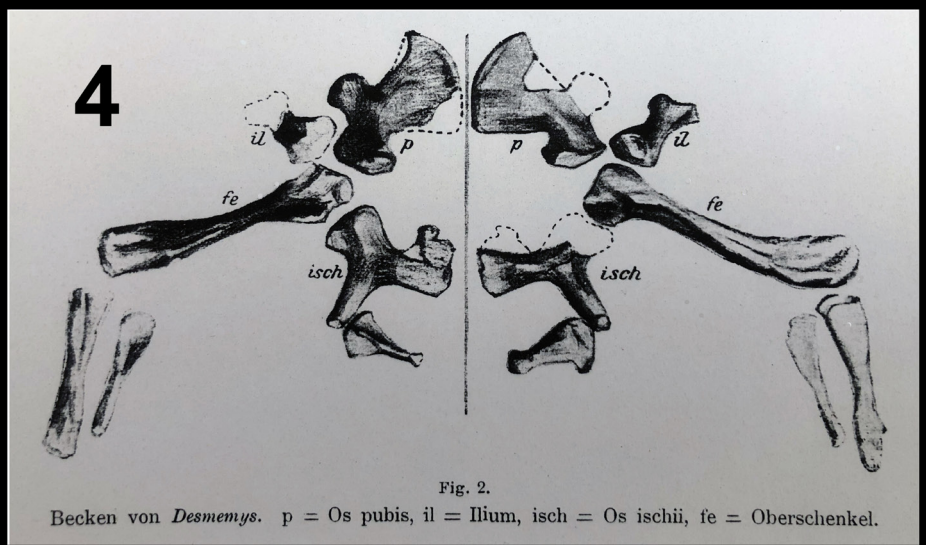


Fig. 2.
Becken von *Desmemys*. p = Os pubis, il = Ilium, isch = Os ischii, fe = Oberschenkel.

PLATE 4

Desmemys bertelsmanni **Wegner, 1911 from Gronau (Westf.), original, lectotype (Lectotypus).**

Fig. 1: left femur, (a) dorsal view, (b) ventral view;

Fig. 2: rigth femur, (a) dorsal view, (b) ventral view;

Fig. 3a-b: rigth fibula remain proximal in compare with Wegner´s original illustration (1911: fig. 2).

PLATE 4


1
2
3
4
a
a
a
a
b
b
b
b
1
2
3
4
il
p
fe
isch
Fig. 2.
Becken von *Desmemys*. p = Os pubis, il = Ilium, isch = Os ischii, fe = Oberschenkel.

PLATE 5

***Desmemys bertelsmanni* Wegner, 1911 from Gronau (Westf.), hitherto unknown original material from samples 7 and 8.**

Fig. 1-3: trunk vertebrae;

Fig. 4: ?pelvis remain;

Fig. 5: fibula remains;

Fig. 6: enamel fragment indet. (no turtle!);

Fig. 7: cervikal vertebrae remain;

Fig. 8: praezygapophysis of 7;

Fig. 9: vertebrae fragment of 7.

PLATE 5