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Editor

David C. Parris

New Jersey State Museum, P. O. Box 530, 205 West State Street, Trenton, NJ 08625

Layout Editor

William J. Shankle

The Delaware Valley Paleontological Society, Inc., P.O. Box 686 Plymouth Meeting, Pennsylvania 19462-0686, wjshankle@gmail.com

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COVER ART – The cover

***Atlantochelys mortoni*: nomenclatural note on a giant sea turtle from the Cretaceous of New Jersey.**

Skye N. McDavid

Delaware Valley Paleontological Society, PO Box 686, Plymouth Meeting, PA 19462

mail@skymc david.com <https://orcid.org/0000-0003-2529-1812>

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ABSTRACT - *Atlantochelys mortoni*, from the Late Cretaceous of Monmouth County, New Jersey, is among the largest ever marine turtles. For over a century and a half, it was known only from the proximal half of a humerus, until the corresponding distal half of the same bone was discovered a decade ago. Its authorship is typically attributed to Agassiz, 1849, but as Agassiz never formally published his findings, the correct authorship is Leidy, 1865. *Protostega neptunia* Cope, 1871 is an objective junior synonym.

Keywords: *Atlantochelys*, Chelonioidea, Nomenclature, Authorship, Monmouth Brooks, Cretaceous, New Jersey.

Nomenclatural History of *Atlantochelys mortoni*

Sometime in the early nineteenth century, the proximal half of a large turtle humerus was discovered in New Jersey. This specimen eventually became part of the collections of the Academy of Natural Sciences of Philadelphia, where it is now cataloged as ANSP 9234. Morton (1834) reported ‘several bones which appear to belong to a large species of *Testudo*’ (italics added here) in the Academy’s collections, which Parris et al. (2014) interpreted as possibly including the future type specimen of *Atlantochelys* ANSP 9234. During an 1849 presentation to the Academy of Natural Sciences, Louis Agassiz presented his intention to establish the new genus and species *Atlantochelys mortoni* for ‘an immense fossil Chelonian [...] found in the green sand of New Jersey.’ (Anonymous 1848)

Under the *International Code of Zoological Nomenclature* (ICZN 1999), this is not sufficient to name a new genus and species. Although a brief record of the presentation was published in the *Proceedings of the Academy of Natural Sciences of Philadelphia* (Anonymous 1848), a widely-circulated journal, the presentation itself cannot be considered published work under Article 8.1.1, as it is neither public nor permanent. The meeting minutes (Anonymous 1848), however, are published in the sense of Article 8 as they are in a scientific journal. However, these meeting minutes are insufficient to establish a new genus and species: Article 12 of the *Code* (ICZN 1999) requires that names published before 1931 ‘must be accompanied by a description or a definition of the taxon that it denotes, or by an indication.’ No description or definition is provided beyond ‘immense fossil Chelonian’ and ‘allied to the *Colossochelys* of India’, plus the listing of New Jersey as a type

locality. There is no indication (as defined in ICZN 1999: Article 12.2), and locality is specifically noted not to constitute an indication under Article 12.3. As such, the publication containing the meeting minutes of Agassiz's presentation (Anonymous 1848) introduces "*Atlantochelys Mortoni*" only as a nomen nudum.

The capitalization of "Mortoni" by Agassiz (Anonymous 1848) and subsequent authors (e.g., Leidy 1865) is of no consequence. The current *Code* (ICZN, 1999: Article 28) clearly states that specific epithets should not be capitalized, but names originally published with a capitalized specific epithet should simply be written with a lowercase first letter.

The next mention of *Atlantochelys mortoni* in the literature would come from Leidy (1865:117, 128, pl. VIII) who included illustrations of the proximal half of the humerus in several views, and listed it as being from Burlington County, New Jersey. The provenance of the fossil being Burlington County was likely a conjecture on Leidy's part as this is a county close to Philadelphia which was known at the time for its Cretaceous fossils. Subsequent fieldwork would demonstrate the specimen originated from the Campanian (Late Cretaceous) Mount Laurel Formation in neighboring Monmouth County to the Northeast. (Parris et al. 2014)

Leidy (1865: pl. VIII) does include several illustrations of the proximal humerus. However, he did not regard *Atlantochelys mortoni* as taxonomically valid. Leidy (1865:117) regarded *Atlantochelys mortoni* as a mosasaurid squamate, specifically a synonym of the species *Mosasaurus mitchilli*. This species has recently been treated as a synonym of *Mosasaurus hoffmannii* (e.g. Harrell & Martin 2014), but as

its type specimen consists solely of a tooth and jaw fragment (De Kay 1830) it should be treated as a nomen dubium (sensu Mones 1989) and its type specimen assigned to *Mosasaurus* sp. Additionally, ANSP 9234 bears very little resemblance to genuine mosasaurid humeri (e.g. IRSNB R 26; Street & Caldwell 2016) though it does resemble various turtle humeri (such as those examined by the author at NJSM) in its overall morphology. Leidy's publication fulfills the requirements of Article 12 of the *Code* (ICZN 1999) as it includes illustrations of ANSP 9234. (Leidy 1865: pl. VIII) Article 11.6 of the *Code* (ICZN 1999) states that names originally published as synonyms are not available, with an exception for names originally published as synonyms that were subsequently treated as available prior to 1961. Several authors writing after 1865 and before 1961 regarded *Atlantochelys mortoni* as an available name, retroactively making *Atlantochelys* and *Atlantochelys mortoni* valid as of 1865. (See Appendix 1 for a non-exhaustive list of publications between 1865 and 1961 that treat *Atlantochelys mortoni* as available.) Article 50.7 of the *Code* (ICZN 1999) clarifies that the authorship belongs to the person who first published it as a synonym. The correct authorship for *Atlantochelys* and *Atlantochelys mortoni* is therefore Leidy, 1865.

Cope (1871) correctly identified *Atlantochelys* as being a turtle, and correctly noted that since Agassiz had never published a description, then his name was 'useless to science' (or, in the terms of the *Code*, unavailable.) He erected for it the species *Protostega neptunia*, placing it in his own genus *Protostega*, citing Leidy's (1865) illustration and description. (Cope 1871) The designation of the species by name with a bibliographic reference to an illustration of the type specimen makes *Protostega neptunia* an

available name under the *Code*. (ICZN 1999: Art. 12) However, as both species have the same holotype, *Protostega neptunia* is an objective junior synonym of *Atlantochelys mortoni*.

Hay (1898) correctly noted that *Atlantochelys* should be attributed to Leidy, and that Cope's *Protostega neptunia* was a junior synonym. However, his conclusion was largely ignored and *Atlantochelys* continued to be attributed to Agassiz. Even the influential *Nomenclator Zoologicus* (Neave 1939:347) which correctly cites some often incorrectly cited authorships (e.g., McDavid & Perkins 2023) lists the authorship of *Atlantochelys* as Agassiz. Recent authors (e.g., Parris et al. 2014) have also attributed the authorship to Agassiz.

In summary, even though Agassiz (in Anonymous 1848) was the first to use the names *Atlantochelys* and *Atlantochelys mortoni*, the correct authorship is Leidy, 1865.

Systematics

Testudines Batsch 1788

Cryptodira Cope 1868

?**Chelonioidea** (Cope 1868)

Genus ***Atlantochelys*** Leidy 1865

Type species: *Atlantochelys mortoni* Leidy 1865

Species ***Atlantochelys mortoni*** Leidy 1865

Synonymy

'a large species of *Testudo*' Morton 1834

"*Atlantochelys Mortoni*" Agassiz in Anonymous (1848) (nomen nudum)

Mosasaurus Mitchelli Leidy 1865 (lapsus spelling of '*mitchilli*')

Protostega neptunia Cope 1871

Atlantochelys Baur 1889

Atlantochelys mortoni Hay 1898

Holotype: ANSP 9234 (proximal half of right humerus), NJSM GP 23363 (distal half of same humerus)

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Appendix 1

Publications dated between 1865 and 1961 treating *Atlantochelys* as available.

Baur, G. (1889). Die systematische Stellung von *Dermochelys* Blainv. *Biologisches Centralblatt*, 9, 149–191.

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<https://doi.org/10.2475/ajs.s4-14.80.95>

Appendix 2

Institutional Abbreviations

ANSP - Academy of Natural Sciences of Drexel University (formerly Academy of Natural Sciences of Philadelphia), Philadelphia

IRSNB - Institut Royal des Sciences Naturelles de Belgique, Bruxelles

NJSM - New Jersey State Museum, Trenton