time-averaged floodplain assemblage, elements of which were deposited in overbank deposits (siltstone) with subsequent deposition in an oxbow pond and/or other ephemeral body of water. These deposits were then preserved beneath a bench-forming sandstone.The Homestead Site presents a remarkable opportunity for collaboration between a private entity (LF) and diverse academic institutions, including multiple universities and museums. By leveraging resources unique to each contributor, we expect to continue collecting and documenting one of the most diverse Revueltian localities in North America. The microvertebrate assemblage of 20+ vertebrate taxa, many represented by numerous elements, is potentially the best such assemblage of Revueltian age, samples both aquatic and terrestrial environments, and includes multiple new taxa. Further description will doubtless provide greater detail on the diversification of Triassic tetrapods during the Norian.

Technical Session 3: Terrestrial Ecosystems – Early Cretaceous (Saturday, June 10, 2023, 11:00 AM)

REASSESSING THE ALPHA-TAXONOMY OF THE OOGENUS *MACROELONGATOOLITHUS* BASED ON A NEW NEST FROM THE CENOMANIAN-AGE MUSSENTUCHIT MEMBER OF THE CEDAR MOUNTAIN FORMATION (UTAH)

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The Mussentuchit Member of the Cedar Mountain Formation is a fossil-rich unit providing spectacular insight into the mid-Cretaceous faunal turnover in the Western Interior Basin. The overwhelming majority of preserved eggshell fragments are referable to Elongatoolithidae, the oofamily directly associated with the dinosaur clade Oviraptorosauria. While there is an overwhelming abundance of Elongatoolithidae eggs in the Mussentuchit Member, the holotype section for the gargantuan eggs of *Macroelongatoolithus*, it does present an ootaxonomic issue. Eggshell for this ootaxon has been known from the unit for over fifty years (Bray, 1998; Jensen, 1970; Zelenitsky et al., 2000), but partial and whole eggs had remained elusive. The discovery of a nest, NCSM 33576, by the North Carolina Museum of Natural Sciences in 2016 at the 'Deep Eddy' locality (Emery County, Utah) has yielded whole eggs within a single nest (n=13; Figure 1) for the first time.

The ootaxonomic history of *Macroelongatoolithus*, and the fossil eggshell from the Mussentuchit Member, has long been contentious. Jensen (1970) referred the first eggshells from the Cedar Mountain Formation of Utah to *Oolithes* based on the rudimentary taxonomic structure of Young (1965), erecting the first North American ootaxon, *O. carlylensis*. By 1975, Zhao had re-assigned the Utah material to *Macroolithus* within the oofamily Elongatoolithidae, under a new parataxonomic system that was not adopted globally for at least two decades. The Utah eggshell was next re-evaluated by Bray (1998), who erected *Boletuoolithus*, within the hadrosaur-affiliated oofamily Spheroolithidae. Subsequent examinations consistently refute an assignment to Spheroolithidae (Simon et al., 2019; Zelenitsky et al., 2000).

In 1995, Li et al. described a clutch of enormous eggs from Henan Province, China that they erected a new ootaxon for, *Macroelongatoolithus xixiaensis*, within a new oofamily of Macroelongatoolithidae, based on their remarkable size. The use of this oofamily in the literature is irregular. Zelenitsky et al. (2000) reassigned the Utah eggshell fragments to *Macroelongatoolithus*, creating a new combination, *M. carlylei*, and reinstating the oogenus to Elongatoolithidae based on comparisons to new discoveries made of comparable whole eggs and nests from Asia. Asian specimens of giant, elongate eggs and nests were reported early in the 21st Century, including two more species of *Macroelongatoolithus*: *M. zhangi* (Fang et al., 2000) and *M. goseongensis* (Kim et al., 2011). Most recently, Simon et al. (2019) revised the diagnosis to incorporate the discovery of two partial eggs from the Wayan Formation of Idaho – a penecontemporenous unit to the Mussentuchit Member – and the first complete specimens of Elongatoolithidae from North America. They synonymized all hitherto described *Macroelongatoolithus* specimens, as well as two of the other massive oogenera from Asia, *Megafusoolithus qiaoxianensis* and *Longiteresoolithus xixiaensis*, under the single oospecies *M. carlylei*. The ootaxon thus currently includes five junior synonyms. The current diagnosis, following Simon et al. (2019), characterizes *M. carlylei* as elongate eggs ranging from 34-61cm in length; laid in pairs as part of a ring-shaped configuration within a nest 2-3 m in diameter; eggshell thickness between 1.38-4.75mm; variable but often prominent ornamentation types; and two eggshell layers separated by an undulating boundary.

NCSM 33576 adds the first non-fragmentary material to the hypodigm for *M. carlylei*, and shows significant differences in gross dimensions to other specimens. It is undoubtedly within Elongatoolithidae, but is somewhat smaller: the eggs in the nest range in length from 265-304mm, and width from 82-102mm, with a resultant elongation index of

2.98-3.23. One half of the nest is preserved, showing up to thirteen partial to whole eggs, with the likelihood that the complete nest contained between 20 and 30 eggs and was at least 130 cm across. In terms of nest architecture, the eggs are arranged in pairs, concentrically, and in at least two rings, where the blunt end points inwards to a central space akin to that seen for other nests for larger oviraptorosaur nests (Tanaka et al., 2018). The external surfaces of the eggs exhibit highly variable ornamentation from lineartuberculate to dispersituberculate. Quantitative analysis of this ornamentation using the r package 'molaR' reveals high values for Dirichlet Normal Energy (=complexity) and Slope (=relief), more like those of large caenagnathid eggs from China than smaller oviraptorid eggs from Mongolia. Radial thin sections of nest-associated fragments reveal eggshell thickness ranging from 1.87-2.7 mm, with an undulating boundary between the eggshell layers.

Given the potential ambiguity of assigning ootaxa based solely on eggshell fragments, the nest from Deep Eddy is ideally placed for the erection of a neotype for the oogenus *Macroelongatoolithus*, as proposed by Zelenitsky et al., (2000). However, these eggs fall outside the currently recognized size diagnosis for the ootaxon, which can range to significantly greater lengths (the eggs from Henan Province have a reported intra-nest variation of 340-610mm). Incorporating the new egg lengths into this would take the total range for *M. carlylei* from 265-610mm, a difference well-exceeding 200%. As such, the alphataxonomic status of all eggs currently assigned to *M. carlylei* must be taken under consideration once again. Based on our preliminary observations and data collection, it is likely there will be a future formal re-diagnosis of all eggs currently assigned to *M. carlylei*, with likely some division into multiple oospecies or potentially oogenera, reflecting the major size variation that is a key diagnostic differentiator within Elongatoolithidae.

Figure 1. NCSM 33576, the nest of elongatoolithid eggs from the Deep Eddy locality. Eggs are paired, highly ornamented, and laid in a concentric architecture constructed of multiple overlaid rings (at least two are present here).

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Theme Session: Greening of the Upper Jurassic Morrison Formation, USA: Huge advances in paleobotany with implications for dinosaur herbivory ecosystem reconstruction (Friday, June 9, 2023, 4:00 PM)

DECIDUOUS OR EVERGREEN? A CASE STUDY ON A NEW SPECIES OF UPPER JURASSIC WOOD FROM THE MORRISON FORMATION OF MONTANA, USA

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