JVP
Journal of Vertebrate Paleontology
Program and Abstracts
Volume 27, Supplement to Number 3
12 September 2007

67th Annual Meeting
Society of Vertebrate Paleontology

The Jackson School of Geosciences
University of Texas
Austin, Texas USA
October 17-20, 2007

Society of Vertebrate Paleontology
ISSN 0272-4634

Technical Session XI, Friday 2:00

TOUGH NEW WORLD: DISCOVERY OF AN UNUSUAL IMMIGRANT MUSTELID WITH CRUSHING DENTITION FROM THE MIDDLE MIOCENE OF COASTAL CALIFORNIA

TSENG, Zhijie, University of Southern California, Los Angeles, CA, USA; WANG, Xiaoming, Natural History Museum of Los Angeles County, Los Angeles, CA, USA; STEWART, J.D., LACM, Los Angeles, CA, USA

The North American Pliocene mustelids *Trigonictis* and *Sminthosinis* have been interpreted as relatives of the otter-like *Mionictis* and *Lutravus*, with a common Old World origin. Here we describe a new specimen from a terrestrial facies of the Temblor Formation in California, closely related to these taxa. A combination of basal and derived dental characteristics puts the new form at an evolutionary stage intermediate between the European early Miocene *Dehmictis* and its North American relatives. A highly autapomorphic trait of this new form is its prominent P4 with hypertrophied paracone and a bulbous crown. The robust upper carnassial and very strong development of the sagittal crest both suggest capability for durophagy. Although the cusp morphology is reminiscent of otters, a suite of craniodental characteristics differentiates this taxon from the contemporaneous *Mionictis*. Cladistic analysis of craniodental characters suggests a clade including *Mionictis*, *Lutravus* and *Lutra*; the new genus has a position basal to this clade, among some other North American and European forms. The results indicate that the new form may be a Eurasian immigrant postdating an Old World divergence from lutrines. The robust cusp morphology shared between lutrines and the new mustelid indicates a more complicated, perhaps highly convergent, history of morphological evolution towards durophagy in Mustelidae.

Technical Session XI, Friday 1:30

VERY SMALL *HYAENODON* AND HYAENODONTID CREODONT FAUNA FROM THE UPPER EOCENE ERGILIN DZO FORMATION OF MONGOLIA

TSUBAMOTO, Takehisa, Hayashibara Biochemical Laboratories, Inc., Okayama, Japan; WATABE, Mahito, Hayashibara Biochemical Laboratories, Inc., Okayama, Japan; TSOGTBAATAR, Khishigjav, Mongolian Paleontological Center, Ulaanbaatar, Mongolia

We report a mandible of a very small species of *Hyaenodon* (Mammalia, Creodonta, Hyaenodontidae) from the upper Eocene Ergilin Dzo Formation at the Khoer Dzan locality of southeastern Mongolia and briefly review the hyaenodontid fauna of the formation to clarify its current status. The specimen reported here was discovered by the Hayashibara Museum of Natural Sciences and Mongolian Paleontological Center Joint Paleontological Expedition in 2004. It is assigned to *Hyaenodon chunkhtensis*, one of the smallest species of *Hyaenodon*. This is the first discovery of the smallest species of *Hyaenodon* in the formation, adding one more species to its hyaenodontid fauna. The hyaenodontid fauna of the Ergilin Dzo Formation currently consists of eight species: six species of *Hyaenodon (H. chunkhtensis, H. eminus, H. pervagus, H. incertus, H. mongoliensis,* and *H. gigas*), *Macropterodon zelenovi*, and an indeterminate proviverrine. There is a possibility that *M. zelenovi* is synonymous with *H. gigas*. If this synonymy is accepted, its hyaenodontid fauna consists of seven species. Existence of many and multiple-sized species of *Hyaenodon* in the Ergilin Dzo Formation indicates that the fauna of *Hyaenodon* from the formation is analogous to that of the North American Chadronian (late Eocene) faunas and of the lower Oligocene Hsanda Gol Formation of Mongolia.

Technical Session XIV, Saturday 9:45

A JUVENILE SKELETON OF *TARBOSAURUS* WITH A NEARLY COMPLETE SKULL AND ITS IMPLICATIONS FOR ONTOGENETIC CHANGE IN TYRANNOSAURIDS

TSUIHIJI, Takanobu, Ohio University, Athens, OH, USA; WATABE, Mahito, Hayashibara Center for Paleobiological Research, Okayama, Japan; WITMER, Lawrence, Ohio University, Athens, OH, USA; TSUBAMOTO, Takehisa, Hayashibara Center for Paleobiological Research, Okayama, Japan TSOGTBAATAR, Khishigjav, Mongolian Paleontological Center, Ulaanbaatar, Mongolia

An articulated juvenile skeleton of the tyrannosaurid *Tarbosaurus bataar* was found from the Nemegt Svita of the Bugin Tsav locality in South Gobi, Mongolia, by a field party of the Hayashibara Museum of Natural Sciences - Mongolian Paleontological Center Joint Expedition. It is nearly complete and even has such elements as articulated gastralia preserved in situ, lacking only the neck, anterior one third of the dorsal series, and posterior two-thirds of the tail. With a femoral length of 300 mm, it is the smallest articulated specimen ever reported that is confidently referable to *Tarbosaurus*, significantly extending the known size range and providing new ontogenetic information in this large-bodied taxon. Observed postcranial ontogenetic changes include: the first metacarpal is shorter than the third metacarpal in this juvenile whereas the opposite has been considered diagnostic of *Tarbosaurus*; distal limb elements (epipodials and metapodials) of both the fore- and hindlimbs are proportionally longer relative to propodials than in adults (e.g., the length of the third metatarsal is about 83% of femoral length in this juvenile); the first metatarsal articulates with the second metatarsal on its medial side, rather than on the posterior/ventral side as in adults. Most remarkably, a skull of about 290 mm in length is preserved in superb condition. Not surprisingly, it shows various characteristics common to juvenile tyrannosaurids, such as the anterior margin of the maxillary fenestra not reaching that of the antorbital fossa and a smooth dorsal surface of the lacrimal (no cornual process present). However, the right and left nasals, which bear a small lacrimal process unlike in adults, are already coossified. Tooth-position counts in the maxilla (13) and dentary (14 and15) are the same as those for adults, suggesting that they do not change ontogenetically. CT scanning reveals new details about the ontogeny of the cephalic pneumatic system, brain cavity, and inner ear.

Technical Session II, Wednesday 9:45

MIDDLE EAR EVOLUTION AND IMPEDANCE-MATCHING HEARING IN PARAREPTILIA

TSUJI, Linda, Humboldt-Universität zu Berlin, Museum für Naturkunde, Berlin, Germany; MUELLER, Johannes, Humboldt-Universität zu Berlin, Museum für Naturkunde, Berlin, Germany

The origin and evolution of the impedance-matching (tympanic) middle ear in amniotes was considered a key innovation of basal tetrapods, which was only later modified during amniote diversification. More recent investigations, however, have shown that the otic region of the earliest known amniotes lacks any indication of impedance matching, indicating that the tympanic middle ear seen in modern taxa must have evolved independently in multiple amniote lineages, most notably Synapsida and Eureptilia, in the Mesozoic. In order to explicitly infer the presence of an impedance matching middle ear in fossil amniotes, several functional requirements must be reflected in the anatomy, including: a modified temporal region indicating the presence of a tympanum; firm contact between the skull roof and paroccipital process freeing the stapes from a strictly bracing function; a slender stapes, an indication of the mediation of airborne sounds via vibrations from the tympanum to the inner ear; and differentiation of the posterolateral braincase wall into oval and pressure-relief windows, along with ossification of the medial wall to separate the inner ear from the other part of the braincase. Until recently a true tympanic middle ear had not been positively identified in the third major amniote lineage, the Parareptilia. However, we present here evidence that within derived parareptiles, a poorly known group found primarily in the Middle Permian of Russia possesses all the above characteristics typical of an impedance-matching middle ear. This study also undertook the first phylogenetic analysis to include each of *Macroleter*, *Tokosaurus*, *Emeroleter*, *Bashkyroleter* and *Nycteroleter*, and confirmed the monophyly of the group, which was also demonstrated to be sister-taxon to pareiasaurs. The discovery of a tympanic ear in this little researched clade represents the first true unequivocal evidence of this feature in parareptiles, and the earliest yet found in amniotes.

Student Poster Session (Thursday)

TAPHONOMIC INFLUENCES ON SHARK FAUNAL ASSEMBLAGES FROM THE JUDITH RIVER FORMATION (CAMPANIAN) OF MONTANA

TULU, Yasemin, Michigan State University, East Lansing, MI, USA

Two Judith River Formation (JRF) sites in north-central Montana, the Woodhawk bonebed (WH) and the Power Plant Ferry bonebed (PPF), have been the focus of recent research on Campanian chondrichthyan faunas. The two localities are approximately 3 km apart and from the same stratigraphic horizon in shoreface deposits, and they preserve comparable fossil assemblages. The matrix at each site consists of very well-sorted, moderately rounded, medium to fine-grained, yellow-tan quartz sandstone, with an assortment of fossils including shark and ray teeth, dermal denticles, and centra, chimaerid fragments, teleost teeth, and archosaur material. When examined on a finer scale, these sites reveal subtle differences relating to the mode of formation of their respective fossil assemblages, which differ in abundance, diversity, and preservation. The WH has ca. 16 identifiable species (collected directly from the weathered sediment). The PPF fauna, which consists of material collected both *in situ* and from weathered sediments, is currently composed of ca. eight identifiable species, with far fewer identifiable specimens but many bone fragments. The chondrichthyan fauna from WH displays a wide range of preservation, from near pristine to worn and broken teeth, whereas teeth in the PPF fauna are largely pristine (with teeth still sharp to the touch), with relatively few broken and worn teeth. The disparity in abundance and diversity of the fossils between the sites, and the range in preservation, indicates the likelihood of local paleoenvironmental variation. The WH site is north and west of PPF, and appears to represent a higher energy environment that brought in material from farther offshore and mixed it with local material, abrading them to a greater degree than the specimens preserved at PPF, where the material reflects a more autochthonous origin.