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ABSTRACTS OF PAPERS

SIXTY-SEVENTH ANNUAL MEETING
SOCIETY OF VERTEBRATE PALEONTOLOGY
THE JACKSON SCHOOL OF GEOSCIENCES AT
THE UNIVERSITY OF TEXAS, AUSTIN
HILTON AUSTIN
AUSTIN, TEXAS
OCTOBER 17–20, 2007

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Carnivora: Phylogeny, Form and Function Symposium, Saturday 9:15
WHAT'S THE DIFFERENCE: A MULTIPHASIC ALLOMETRIC ANALYSIS OF FOSSIL AND LIVING LIONS
BENOIT, Matthew, Yale University, New Haven, CT, USA
The modern-day range of lions (Panthera leo) is restricted to Africa and a small section of Asia. In historic times, they were known through the Mediterranean. However, in the fossil record, paleontologists have found lion remains from Europe, Asia, and the Americas. Such a widespread distribution results in inter-populational differences, and, with fossil specimens, leads to discussion and argument about the species' status of different groups. The American Lion (referred to as Panthera atrox or Panthera leo atrox) has been the subject of such discussion and argument for the better part of a century. P. atrox lived in the Americas until roughly 10Kya. While all researchers seem to agree that P. atrox was larger than the modern lion, several authors have claimed that different cranial characteristics also distinguish the American Lion. To examine these claims, I performed multivariate allometric analyses to determine if the change in these cranial characteristics was simply a by-product of the increased size of P. atrox. I examined nine cranial measurements from 93 modern lions and compared them with those same measurements from 45 specimens of P. atrox. Using F-distribution analyses, I tested the significance of the differences between the allometric slopes for the two groups. When multivariate allometric relationships were considered, none of the proposed cranial characters was found to be significantly different (P > 0.05) between the two groups, indicating that the cranial features examined are no different than expected from the change in size. However, one feature did show a difference in y-intercept while maintaining the same allometric slope. The site of the auditory bulla was substantially smaller in the American Lion than in the modern Lion. This may be the result of different social structures or communicative behaviors in the American Lion. While this analysis does not prove that the American lion and the modern African lion were undoubtedly the same species, it does allow us to discuss the differences in their various features independently of the difference in their overall sizes.

Poster Session IV (Saturday)
A NEW JURASSIC TYRANNOSAUROID FROM THE TITHONIAN (LATE JURASSIC) OF DORSET, UK; REPRESENTING A LARGE-BODIED SPECIES OF THE AMERICAN GENUS STYGOSAURUS
BENSON, Roger, University of Cambridge, Cambridge, United Kingdom
A partial postcranium skeleton from the Late Jurassic (Tithonian) of Dorset, England represents a new species of the theropod dinosaur genus Stygosaursaurus. The specimen provides additional anatomical evidence in support of the tyrannosauroid affinities of Stygosaursaurus. A distinct median vertical ridge on the lateral surface of the ilium, a concave anterior outline of the pubic peduncle of the ilium in lateral view, a distinct shelf medial to the precaetabular notch, an ischium that is short and slender compared to the pubis and a pronounced ischial tubercle. It is one of only two Jurassic tyrannosauroids known from more than isolated elements and, with estimated mass of 350kg, is substantially larger than other known Jurassic tyrannosauroids, providing evidence for a basal radiation of small to medium-sized tyrannosauroids in Asia, North America and Europe during the Late Jurassic. The occurrence of Stygosaursaurus in the UK supports the hypothesis of a paleobiogeographic link between North America and Europe during the Late Jurassic.

Technical Session II, Wednesday 12:15
MASS EXTINCTION OF TETRAPODS AT THE PERMO-TRIASSIC BOUNDARY IN RUSSIA
BENTON, Michael, University of Bristol, Bristol, United Kingdom; RUTA, Marcello, University of Bristol, Bristol, United Kingdom; TWITCHETT, Richard, University of Plymouth, Plymouth, United Kingdom; VALENTIN, Tverdokhlebov, Saratov Geological Institute, Saratov, Russia; SURKOV, Mikhail, Saratov State University, Saratov, Russia
The Permo-Triassic (PT) mass extinction had as profound an effect on tetrapod diversity as on life in the sea. Studies on the PT sequences in South Africa and Russia have revealed some detail of the magnitude and pattern of ecosystem destruction and recovery, but these studies are plagued with major problems, including, but not limited to, the current geological time scales, the Russian Tatarian, formerly the terminal stage of the Permian, has been moved down to the Middle Permian (Guadalupian, Capitanian). If this is true, the Vyatskian (upper Tatarian) fauna of Russia, comprising temnospondyls, procoelopodids, therapsid, dicynodonts, parasaurolophus, and gorgonopods, and the equivalent DYknodon Assemblage Zone of the Karoo must lie well below the PT boundary. Our fieldwork in Russia in 2006 included studies of palaeomagnetism and stables isotope (carbon and oxygen) fingerprints through the entire PT succession, and these more or less confirm the classic view. Quantitative studies of the Russian faunas shows the catastrophic collapse of tetrapod ecosystems at the PT boundary, and that they had not recovered to a fully stable condition 20 Myr later at the end of the Middle Triassic. In such studies of recovery after mass extinctions, overall diversity may appear to bounce back rather rapidly, but some major sectors of the ecosystem, such as large herbivores and carnivores, did not reappear until much later. Sedimentological studies of the Russian sections confirm major climate and environmental changes at the PT boundary; global warming, removal of plants and soils, change in fluval regime from meandering to braided streams, and a negative carbon isotope shift. These confirm the generally accepted model of extinction following a concatenation of processes triggered by repeated eruption of the Siberian traps.

Poster Session IV (Saturday)
UNDERSTANDING PALEONTOLOGICAL RESOURCE MANAGEMENT ISSUES AND PARTNERSHIPS WITH LOCAL INDIAN TRIBES: A CASE STUDY AT BADLANDS NATIONAL PARK
BENTON, Rachel, Badlands National Park, Interior, SD, USA; BAKER, Paige, Badlands National Park, Interior, SD, USA
The South Unit at Badlands National Park is located on 133,300 acres of the Pine Ridge Indian Reservation. Since 1976, this parcel of land has been managed under the guidelines outlined in a Memorandum of Agreement between the National Park Service (NPS) and the Pine Ridge Indian Reservation. The South Unit contains some of the most spectacular geologic and paleontological deposits within the White River Badlands and has been an important center for paleontological research. Over the years, limited attempts have been made to manage this area for paleontological resources through surveys, research permits and a proposed research quarry. During this time, the NPS involved the Tribe peripherally through the government to government consultation process required by legislation and NPS policy, but did not include tribal members in these projects. Portions of the South Unit where the surveys took place are considered sacred by the Tribe. The procedures used by the NPS were regarded by the tribal members as intrusive and invasive. In 2002 many of these programs were stopped because of opposition by the Tribe. The management issues of the South Unit are steeped in the history, culture and social issues of the original ownership of the land now within the South Unit. To understand these management issues is to understand the complexities facing the Oglala. Some of these tenents include an understanding of what treaties are with the United States government, colonialism and dependency theory (mercantilism). These underpinning form the essence, the theoretical framework, the starting point from which to begin to frame the partnership and management issues surrounding paleontological resources in the South Unit. The NPS now recognizes the need to include the Tribe directly in the planning and carrying out of all activities in the South Unit. At present, a team comprising National Park Service staff and Oglala Sioux Tribe members is developing a General Management Plan, which will guide the management of the South Unit for the next 15-20 years. The General Management Plan is scheduled for completion in the next two years.

The Dissorophoidea - Early Amphibian Radiation Symposium, Friday 9:15
A NEW, LATE PENNSYLVANIAN TREMATOPID (TEMNOSPONDYLLID: DISSOROPHOIDAE) FROM WESTERN PENNSYLVANIA
BERMAN, David, Carnegie Museum of Natural History, Pittsburgh, PA, USA; HENCRI, Amy, Carnegie Museum of Natural History, Pittsburgh, PA, USA
In March, 2004, Adam Striegel, a senior at the University of Pittsburgh, while on a field trip in an introductory geology class, discovered a superbly preserved skull of a new species of Late Pennsylvanian (early Virgilian) trematopid amphibian about 15 mi northwest of Pittsburgh. The skull was found at the base of a large, recently excavated road cut that exposes a significant part (ca. 115 m) of the Casselman Formation. Commonly an Early Pennsylvanian group, this is only the third record of a Pennsylvanian species of trematopid. The skull exhibits numerous autapomorphies that distinguish it easily from all other dissorophoids, whereas placement well within the Trematopidae is verified by several synapomorphies. Most importantly, the skull of the new Pennsylvanian trematopid possesses several characters previously viewed as unique to dissorophoids. Prompted mainly by the latter characters a preliminary cladistic analysis of the dissorophoids was conducted that is based exclusively on cranial characters and focuses on the relationships of the trematopids (5 taxa, including the new species) and dissorophids (3 taxa). Also included in the analysis was the problematical Eosoma cutleri, which has been argued to be either a trematopid or dissorophid. The cladogram, though weakly supported by the CI and Bremer Support, yielded interesting but not totally unexpected results: 1) the Trematopidae and Dissorophidae form monophyletic sister clades; 2) the new, undescribed trematopid falls within the Trematopidae; 3) Eosoma and Dissorophus form the terminal dichotomy of the Dissorophidae.

Poster Session 1 (Wednesday)
NEW FOSSILISER SITES WITH FISH FAUNA FROM THE BASQUE-CANTABRIAN AND CAMEROS BASINS, EARLY CRETACEOUS OF SPAIN
BERMÚDEZ-ROCHAS, David, Museo Geominero (IGME), Madrid, Spain; PoyaTO-ARIZA, Francisco, Universidad Autónoma de Madrid, Madrid, Spain
Recent field works have provided fish remains from new fossiliferous sites from the Early Cretaceous of the Basque-Cantabrian Basin (Cantabric Range) and Cameros Basin (Northwest of Iberian Range) in Spain, from the Berriasian-Aptian interval.

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which was poorly documented in this area in the past. The fish remains consist mostly of ganoid scales, teeth, and dentitions, and represent taxa that are typical from Mesozoic continental environments. They mainly include: 1) euselachian chondrichthyes assessed to the order Hybodontiformes, and 2) neopterygian actinopteri-
gians assessed to three orders: Semionotiformes, Pycnodontiformes and Amiiformes. More than two thirds of the specimens are ganoid scales assessed to the Semionotiformes. Among these, pycnodonts and Hybodontiformes teeth are the most abundant. No telarchic remains have been identified so far, but this is probably due to an ecomorphologic and taxonomic bias rather than to real absence in the original communities. Most taxa collected are identified for the first time in these basins. There are remarkable differences between both basins in the number of Bietsia-Aptian localities that have provided fish remains. In the Basque-Cantabrian Basin they have been found, to date, in a single outcrop, located at the Viviparus Bed Member of the Vega de Pas Formation (Taugerrian-Barremian). In the Cameros Basin, remains have been identified from fifteen different strata within the Oncillas Group (Tithonian-
Bietsiaian), Urbanio Group (uppermost Bietsia-Aptian) and Enciso Group (Aptian). These fish assemblages show general similarities with the ichthyofaunas from the Purbeck and Weald of England. The Cameros Basin faunas are the most similar to those previously known from the Early Cretaceous of Spain: Galve (Teruel, Maestruogo Basin), La Hoyas (Cuencia, Iberian Basin), and Montec (Lérida, South Pyrenean Zone), although all these localities present a high percentage of endemic taxa, at least at specific level. In addition to the overall faunistic similarities, the new ichthyofaunas from both basins show evidence of endemism as well, involving several new taxa cur-
cently under study.

Romer Prize Session, Thursday 10:30

VARIATION, VARIABILITY, AND PROBABILITY IN ASSESSING THE EVO-
LUTIONARY HISTORY OF VERTEBRATE FOSSILS BASED ON DISCRETE
SKELetal CHARACTERISTICS

BEVER, Gabe, American Museum of Natural History, New York, NY, USA

Although the geological record provides us the only direct window into the evolutionary story of life, it often does not supply us with the specimens necessary to recog-
nize the full complexity of the morphological transformations that it preserves. Developmental biology combined with phylogenetic systematics is broadening our per-
spectives on the role of intraspecific variation in the evolution of morphology and its applications to the fossil record. These perspectives include conceptualizing variability as a reflection of the evolutionary history of underlying developmental pathways rather than solely the result of population-level phenomena working largely independent of phylogenetic history. This view provides a theoretical context for studying variability as synapomorphy, which in turn provides not only the means to objectively evaluate variability in extinct lineages but also the emphasis to do so. Unfortunately, our current understanding of variation in the skeleton of extant vertebrates and its distribution through space and time is largely inadequate to support meaningful conclusions with regards to what degree the evolution of variability affects our perception of evolution-
ary history based on the fossil record. I undertook a series of studies, using cryptodire turtles as a model, which examined variation in discrete skeletal characters to determine how that variation is distributed across a range of hierarchical levels. Results indicate that variation data are not randomly distributed through space and time and therefore informative patterns do exist. These patterns, not surprisingly, are often complex and closely related to postnatal trajectories of growth and skeletal remodeling. The presence of phylogenetic information in variation data supports the notion that meaningful phy-
genetic brackets can be used to infer variability in extinct lineages and to assess confi-
dence in the phylogenetic position of a fossil specimen. Such confidence also is applica-
to the inference of all secondary biological properties dependent on tree topology and therefore can be used to strengthen the contribution of palentological data to broader biological questions.

Technical Session V, Wednesday 3:15

THE ENIGMATIC FOSSILS EXOSTINUS AND RESTES: RESOLVING THE
STEM AND THE CROWN OF XENOSARUS, THE KNOB-SCALED
LIZARDS

BHULLAR, Bhart-Anjan, The University of Texas at Austin, Austin, TX, USA

Two lizard clades, Xenosaurusidae (Pan-Xenosaurus) and Shinisauridae, both with exten-
sive fossil records and relict extant distributions, are important in reconstructing rela-
tionships within Eumeces in eumecinomorphs, an ancient clade whose composition and internal rela-
tionships remain controversial. Xenosaurusidae and Shinisauridae preserve plesiomorphic characters within Angimorpha that are lost in the highly derived Anguidae and Varanoidea. In the course of my work on Anguidae (Xenosaurusidae + Anguidae), and with the aid of CT scans, I examined the anatomy of all extinct and most extant Xenosaurusidae in an attempt to produce the first phylogeny of the clade. These taxa included the extinct Exostinus lamensis (Cretaceous), Exostinus sericus (Oligocene), and Restes from the Tertiary. The latter two known from substantially better described cranial material, and eight species within the crown clade Xenosaurus. Phylogenetic resolution of the clade is complicated by the derived nature of putative outgroups. Nevertheless, my results suggest that R. rigidae is sister to the others, resolv-
ing a polytomy with other Angimorpha recovered by previous work. Its anterior skull roof osteoderms are primitively platy, but its posterior osteoderms filled apomorphic "knob-scales," demonstrating the early appearance of this characteristic feature. E. lam-
sensis is problematic in that referred specimens may represent distinct taxa. One of these appears to be sister to E. sericus + Xenosaurus, making Exostitus paraphyletic. Exostinus sericus emerges as sister to Xenosaurus; however, it is apomorphomorph in its shortened rostrum and narial elongation. Finally, Xenoaraux comprises flattened, crevice-dwelling microhabitat-defining species that follows the great mountain ranges of north-
ern North America. For parts of a group until recently thought to include but three species, the eight examined species are remarkably distinct. A northern clade comprises X. neumayeri and X. playcei; the remaining taxa are united as a southern clade. North-south shifts within Xenosaurusidae mirror those of other lizard clades and may be the legacy of the equatorial contraction of early Tertiary tropical forests.

Technical Session XII, Friday 1:45

RECONSTRUCTION OF PALEOECOLOGIES AND PALEOCALIMATES
OF CENOZOIC MAMMALS FROM NORTHEAST CHINA BASED ON STABLE
ISOTOPEs

BIASATTI, Dana, Florida State University, Tallahassee, FL, USA; WANG, Yang, Florida State University, Tallahassee, FL, USA; DENG, Tao, Institute of Vertebrate Paleontology and Paleoanthropology, Beijing, China

The Linxia Basin is located in Gansu Province, China, on the NE margin of the Tibetan Plateau and the present-day climate is strongly influenced by the East Asian monsoon system. The uplift of the Tibetan Plateau during the Cenozoic is considered to be the driving force in the development of the East Asian monsoon, and the timing of this development is important to the understanding of mammalian evolution in China. The sedimentary sequences in the Linxia Basin span almost continuously from the L. Oligocene to the Holocene and contain abundant and well-preserved mammalian fossils. Bulk carbon and oxygen isotope analyses of teeth from 160 mammalian individu-
als, including boids, horses, rhinos, cervids, giraffids, pigs, and elephants, and serial analyses of tooth enamel from 36 of those individuals ranging in age from 25 Ma to the present, have allowed reconstruction of the paleoecologies of those taxa and season-
ality in the region throughout the late Cenozoic. Bulk and serial δ13C values for sam-
oples older than 2.5 Ma indicate a pure C3 diet for all individuals. A positive shift in bulk δ13C values after 2.5 Ma, indicating a change to a mixed C3/C4 diet, suggests that C4 grasses may have not spread into the basin until after 2.5 Ma, which is much later than the proposed global C4 expansion during the Late Miocene. It was hypothe-
sized that the late C4 expansion into the Linxia Basin was driven by the strengthening of the East Asian Summer Monsoon after ~2.3 Ma, as C4 plants require summer pre-
cipitation. The serial δ13C values show greater ranges after 2.5 Ma, indicating a season-
al shift in diet from a C4-based or mixed C3/C4 diet during summer months to a C3-
based diet in winter months. The seasonal patterns from individuals younger than 2.5 Ma are consistent with the seasonal isotopic patterns in modern precipitation in the summer monsoon region of East Asia, whereas the seasonal patterns from individuals older than 2.5 Ma correspond to modern precipitation records outside the summer monsoon region. This change in seasonal isotopic patterns recorded in individual teeth provides strong evidence indicating a strengthening of the East Asian summer mon-
soon after ~2.3 Ma.

Technical Session XII, Friday 1:30

DIETARY NICHES PARTITIONING AMONG FOSSILS IN LATE MIOCENE C.
HABITATS; CONSEQUENCE OF FUNCTIONAL
MORPHOLOGY AND STABLE ISOTOPE ANAlysis

BIBI, Fiyadu, Yale University, New Haven, CT, USA

Teeth of late Miocene Bovini (bovid clade including living oxen, buffaloes, and bison) possess morphology-larger size, higher crowns, increased enamel surface area that is reflective of feeding on a rougher diet, probably graze. In contrast, teeth of fossil "Boselaphini" bear simpler, more plesiomorphic dental morphology indicative of a diet with a greater reliance on softer food items such as browse. A palaeoecological implica-
tion of the comparative dental morphology is that late Miocene bovines inhabited drier, more open habitats than did boselephines. In order to test this hypothesis, I ana-
lyzed the stable carbon isotopes from fossil teeth from well-dated localities between 7.9 and 8.3 Ma in age from the Siwalik deposits, Pakistan. All δ13C values (PDB) lie between -9.5‰ and -12.9‰, indicating that both bovines and boselephines at this time had pure C4 diets. The mean δ13C for bovine teeth (-10.4‰) is more positive than that for boselephines (-10.9‰), and the differences between these two series is statistically significant. Fossil bovine and boselephine δ13C values for the most part do not overlap, separating at -10.7‰. Stable isotope analysis results support the hypothe-
sis developed on the basis of dental functional morphology that early bovines evolved inhabiting more open habitats than did contemporaneous boselepines. The scenario whereby the bovine clade owes its origins to a boselephine lineage that adapted to drier, more open habitats is supported by the general context of climatic and faunal change.