

rischians, compared to mammals, illustrates there are different ways to build fibrolamellar bone and hence grow fast. Both groups have high appositional growth rates, but saurischians have generally smaller osteocyte lacunae than mammals, and hence require higher osteoblast proliferation rates for similar bone apposition rates. Low OLD of poikilotherms is not compensated significantly by lacuna size, and rather reflects low bone apposition and growth rates. Moreover, high lacuna densities in saurischian dinosaurs compared with low lacuna densities in ectothermic poikilotherms provides additional strong evidence for sustained high metabolic activity in saurischian dinosaurs. These results demonstrate the potential of OLD quantification for life history and bone physiology studies of extinct and extant vertebrate clades.

Poster Session III (Friday, November 4)

ECOLOGICAL PROFILE FOR SOUTH AFRICA AND EAST AFRICAN EARLY HOMININ FOSSIL SITES USING STABLE CARBON ISOTOPES FROM FOSSIL BOVID DENTITION

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The conventionally held view of a uniform global trend of open grasslands after ca. 2.0 Ma for South Africa and East Africa is questioned with new isotopic data. Isotopic analyses of bovid dentition from these two regions indicate more complex palaeoecological settings. The new isotopic data suggest differential timing of grass expansion between East African and South Africa, with a C4-dominated ecosystem occurring in East Africa prior to South Africa. Early hominin assemblages from South Africa encompass a mosaic ecosystem that was more C3-dominated than contemporaneous East African sites.

Poster Session IV (Saturday, November 5)

FAUNAL COMPOSITION OF THE LATE OLIGOCENE SONGWE MEMBER OF THE NSUNGWE FORMATION, TANZANIA

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The Songwe Member of the Nsungwe Formation, exposed in southwestern Tanzania, is a 200+ m thick succession characterized by a myriad of micro-depositional environments. It represents a shallow wetland system that developed in a semi-arid climate approximately 25-24 Ma, early in the development of the modern East African Rift System. The presence of aquatic and semi-aquatic taxa (e.g., fish, frogs, crustaceans and aquatic molluscs) in many of the localities suggests perennial availability of water with periodic or seasonal climatic fluctuation. Differential preservation of fossils at the ten localities presents rich potential for detailed taphonomic and paleoecological investigations. Sedimentological data suggest that fossil-bearing localities represent a range of depositional environments from fluvial to lacustrine to shoreline and deltaic deposits, each represented by different taphonomic modes of preservation. This study compares faunal composition and size sorting among the Nsungwe Formation localities. An analysis of 1409 identified specimens from ten localities indicates the following taxonomic breakdown: mammals comprise ~31% of the total fauna, with invertebrates and fish each just over 20%, anurans ~13%, crocodylians and turtles each < 5%, and squamates and aves together accounting for ~2%. The composition is highly variable across localities, with for example mammals ranging from 11% of the recovered specimens at one site to over 57% from a different but nearby locality. Maximum length was recorded for all prepared specimens (n=675; min < 1 mm, max 132mm), with the majority of specimens from well-sampled localities measuring between 2 and 5 mm in length. Recently discovered localities near the base of the Songwe Member represent wetland/lacustrine environments that preserve freshwater ostracods and a greater size diversity of vertebrates, from micromammals to megaherbivores, the latter likely transported by periodic discharge from local river systems. Notably absent from those localities, however, are some of the most common micromammal and invertebrate taxa of the Nsungwe fauna.

Poster Session I (Wednesday, November 2)

A NEW METOPOSAURID (TEMNOSPONDYL) BONEBED FROM THE LATE TRIASSIC OF PORTUGAL

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The end-Triassic extinction event (ETE), considered one of the 'Big Five' mass extinctions, marks a dividing line between early Mesozoic vertebrate assemblages, typically including abundant temnospondyls, basal synapsids and basal archosaurs, and 'typical' Mesozoic faunas dominated by dinosaurs, pterosaurs, crocodylomorphs, turtles and mammaliaforms. Recent geochemical work has provided strong evidence that the ETE is synchronous with, and likely caused by, the emplacement of the Central Atlantic magmatic province (CAMP). However, stratigraphic sections containing both terrestrial vertebrates and CAMP basalts are scarce, complicating attempts to examine terrestrial faunal changes during this extinction event. The Triassic-Jurassic Algarve Basin, southern Portugal, is an extensional rift basin formed during Pangaea breakup. The infill of this basin consists of a series of terrestrial-

to-marginal marine red beds (the 'Grés de Silves' Group) interbedded with CAMP basalts. New expeditions in this basin have identified a rich, paucispecific, temnospondyl-dominated bonebed from the interval 'AB1' of the Grés de Silves. Preliminary excavations yielded at least nine well-preserved temnospondyl individuals represented by partial to nearly complete skulls and disarticulated postcranial elements of juvenile to adult ages. Nearly all material appears to represent a single species of metoposaurid referable to the genus *Metoposaurus*, well known from the late Carnian-early Norian of Germany and Poland. A number of characters of the occiput and mandible suggest that the Algarve material may represent a new species. This new material provides new data on the diversity and paleogeographical distribution of the metoposaurids, a highly autapomorphic and peculiar group composed of large aquatic carnivores with a unique elongated but brevirostral skull. This taxon also provides the best current age constraints for the bonebed, suggesting that at least part of the "AB1" Horizon may be within or close to the late Carnian-early Norian. Additional bone-bearing horizons within the 'Grés de Silves' provide a rare opportunity to examine terrestrial faunal change in the lead-up to the ETE.

Poster Session I (Wednesday, November 2)

PHYLOGENETIC INFORMATION FROM THE QUADRATE OF DIATRYMA (NEORNITHES)

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The galloanserine quadrate exhibits a suite of characters unique among birds. That morphology is present in the Cretaceous and occurs in a wide range of bird body sizes from quail to the large-bodied *Diatryma*. Examination of the quadrate of *Diatryma* documents the presence of this typical set of derived galloanserine characters, anseriform characters, and potentially autapomorphic states. For example, *Diatryma* has two mandibular condyles and a subcapitular tubercle as in other galloanserines. In addition, *Diatryma*'s quadrate has a basi-orbital foramen that is likely primitive for galloanserines (and absent in many anseriforms). The presence of that foramen appears to be correlated with the presence of a pneumatic foramen on the pterygoid, and *Diatryma* likely also has a pneumatic pterygoid. In combination with the similarly primitive morphology of the quadrate in *Presbyornis*, the homologous structures in *Diatryma* support its placement within crown galloanserines, but not within crown anseriforms (possibly along the anseriform stem). *Diatryma* shares the derived morphology of the mandibular condyles (two condyles meeting with interdigitated beveled tips) with *Presbyornis*, the Lance galloanserine, and extant anseriforms. Some of the characters that may diagnose a clade composed of *Diatryma* and other extinct close relatives include the extremely dorsoventrally tall orbital process (over 50% of quadrate height), massive subcapitular tubercle, shallow dorsolaterally facing quadratojugal cotyla, and extremely mediolaterally elongate squamosal condyle. However, *Diatryma*'s quadrate appears to retain the primitive proportions of the neornithine ancestor since it is more similar to paleognath and neoavian proportions than it is to that in galloanserines. The non-crown anseriform placement of *Diatryma* is suggestive that its evolutionary lineage and quadrate morphology diverged from other galloanserines in the Cretaceous.

Poster Session III (Friday, November 4)

DETECTING AND ACCOUNTING FOR DEPOSITIONAL BIAS IN THE LATE MIOCENE MCKAY RESERVOIR FAUNA

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Fossil assemblages have the potential to tell us about the ecology of a specific time and place in geologic history. What we can glean about ancient ecologies can tell us something about the consequences of past environmental changes and gives us clues as to how human and habitat change will affect modern faunas. However, taphonomic biases complicate paleoecological inference. A collection of fossils is rarely, if ever, preserved in the same proportions in which the animals lived. We are looking at ways to measure the taphonomic bias in terrestrial mammal assemblages to the original fauna. Our focus is the McKay Reservoir, a locality in north-central Oregon, where fossils were deposited by fluvial transport in the late Hemphillian. We are using two main approaches to determining the taphonomic history of McKay, the Voorhies method and Rank-Order Analysis. The Voorhies method classifies fossils by element in a sedimentary deposit. Voorhies diagrams use the element to determine the degree of sorting in an ancient river system. Surface Index is another different method to measure fluvial transport. Rank-Order analysis involves sorting by mass, size, shape and degree of weathering. Past analyses have simply looked at these data qualitatively; we re-analyze them in a more rigorous statistical framework to generate numerical descriptors of the degree of hydraulic sorting. Results from these two approaches are consistent with deposition by a flooding event. The bones rolled a medium distance at high velocity and were buried relatively quickly. The weathering and abrasion suggest the specimens came from nearby, perhaps as close as a mile from the site of deposition to the site of final burial. Therefore, this assemblage should be a good indicator of ancient local species abundances.