

avian remains from the Lance and Hell Creek Formations in Wyoming and Montana indicate that those fossils were deposited during magnetochron 29R and are from the last ~333 ka of the Cretaceous. Additionally, some of the specimens have been found within meters (or less) of the K-P Boundary. These North American specimens appear to be the youngest Mesozoic avian remains in the world. In addition, the Hell Creek and Ft. Union (Tullock Member) Formations contain the only records of fossil bird bones from the earliest Paleocene. The fossil specimen data indicate that the well-known clades of Enantiornithes, Hesperornithiformes, and Neornithes are all present in the latest part of the Maastrichtian. Only remains of Neornithes have been found in definitive earliest Paleocene sediments (including at least one species that was present in the Cretaceous). Non-neornithine taxa are present in mixed age assemblages near the K-P Boundary suggesting the possibility (but not certainty) that other avian clades survived the mass extinction. The diversity of non-neornithine birds prior to the extinction is low, possibly as few as 3 species.

Edwin H. and Margaret M. Colbert Poster Competition (Thursday)
A FUNCTIONAL ANALYSIS OF THE FORELIMB IN THE MACROPODIDAE
STIEGLER, Josef, Montana State University, Bozeman, MT, USA

Functional morphological differences on the spectrum from terrestrial to arboreal are poorly understood as climbing has received relatively little attention compared to the biomechanics of other locomotor modes. Therefore, it is difficult to assess with certainty the locomotor habits of fossil taxa that are hypothesized climbers. Of particular interest are dromaeosaurs, which some have attributed arboreal capabilities while others maintain that they were strictly terrestrial. Without quantitative data on known bipedal climbers, neither hypothesis can be rejected. The crown group Macro podidae exhibit a diversity of locomotor niches and forelimb morphologies despite sharing a common ancestor that was likely a terrestrial saltator with reduced forelimbs. The macro podid forelimbs have been completely freed from an obligate locomotor role, but are commonly employed in scansorial, arboreal, and "pentapedal" locomotion. In this respect macro pods are the best extant example for examining a transition from obligate terrestrial bipedality to fully arboreal locomotion. I present preliminary results from an osteological study of the forelimb in crown group macro pods designed to: (1) quantify variation in element length, robusticity, and range of motion; (2) test for correlation of the variation with locomotor strategy; and, (3) assess the functional and phylogenetic importance of the observed metrics.

Technical Session XVI, Saturday 9:45
A REINTERPRETATION OF PHYTOSAURIAN DIVERSITY IN THE SONSELA MEMBER (CHINLE FORMATION) OF PETRIFIED FOREST NATIONAL PARK AND ITS INFLUENCES ON THE EVOLUTION OF AND PHYLOGENETIC RELATIONSHIPS WITHIN PHYTOSAURIA
STOCKER, Michelle, University of Iowa, Iowa City, IA, USA

Though phytosaurs have long been recognized as monophyletic, phytosaur ingroup relationships and taxonomy have been poorly understood. Recent taxonomic and phylogenetic work within Phytosauria has been limited to Pseudopalatinae. The relationships of all other phytosaurs, including *Leptosuchus*, are therefore still in need of revision. *Leptosuchus* is a common, if poorly understood, phytosaur taxon from the Late Triassic of the American Southwest. Currently there are two recognized taxa of *Leptosuchus*, though as many as seven taxa have been named. The lack of phylogenetic analyses, descriptions without comparisons, and an overlap in the morphology of many specimens have confounded the taxonomy of the clade. Here, I present three new specimens from the Devils Playground area of Petrified Forest National Park, Arizona. These three specimens represent the same species-level taxon and were previously referred to *Leptosuchus* outside a phylogenetic framework. Here, I test the taxonomic affinities of the new specimens in a rigorous cladistic analysis. Though they share several characters with *Leptosuchus*, the Devils Playground specimens are recovered as the sister taxon to Pseudopalatinae. In addition, the phylogenetic relationships of *Leptosuchus* are tested for the first time in twenty years, and *Leptosuchus* is found as a non-monophyletic taxon. These new phylogenetic data on the relationships of all phytosaurs have several implications. The documentation of the morphological diversity present within Phytosauria, and specifically within "*Leptosuchus*", illuminates the origins of character states already examined in Pseudopalatinae by placing them into a phylogenetic context. Further, specific identification of specimens can no longer be made by isolated elements, such as the squamosal, because many characters are homoplastic. The identification of paraphyly in both "*Paleorhinus*" and "*Leptosuchus*" recognizes the lack of analyses used for past taxonomic assignment, and emphasizes the need for continued clarification of the taxonomy and phylogenetic relationships within Phytosauria.

Poster Session I (Wednesday)
NEW INSIGHTS INTO THE ANATOMY AND FUNCTION OF DUNKLEOSTEUS TERRELLI (NEWBERRY), A GIANT ARTHRODIRE FROM THE FAMENNIAN CLEVELAND SHALE OF OHIO
STORRS, Glenn, Cincinnati Museum Center, Cincinnati, OH, USA; KAMPOURIS, George, Cincinnati Museum Center, Cincinnati, OH, USA; CARR, Robert, Ohio University, Athens, OH, USA

Dunkleosteus (Dinichthys) terrelli is the iconic arthrodire of the Upper Devonian (Famennian) Cleveland Shale fauna. Multiple specimens have been collected since the first discoveries in the 19th century, and numerous casts are exhibited in museums worldwide due to the 3-dimensional reconstructions of Peter Bungart. Much of our anatomical knowledge of this taxon

results from detailed study by Anatol Heinz in the early 20th century. Traditional preparation techniques available to early workers, however, were not able to recover the full range of anatomical detail preserved by the *Konservat-Lagerstätte* conditions of the anoxic Cleveland Shale. New specimens of *Dunkleosteus* have been subjected to a range of recently developed advanced preparation techniques, revealing the presence, along with the resilient dermal bone plates, of soft tissues and perichondral ossifications. Organic films reveal the limits of pectoral fin shape, permitting an estimate of the fin's, previously unknown, aspect ratio. The new data allow interpretation suggesting that the fin outline was comparable to that of Cleveland Shale chondrichthyans. Significantly, both basal and radial elements are seen. In the oral region, the oropharyngeal mucosa is also seemingly present. Of interest is the lack of a denticulate mucosa. The position of the basibranchials/interlaterals is confirmed and relevant to any discussion of feeding function. The posterior wall of the gill chamber is denticulate. Naturally articulated inferognathals and mentomandibular indicate an elastic mandibular symphyseal joint. Our understanding of the neurocranium, previously limited to the olfactory capsules and isolated ethmoid ossifications, is also enhanced by the new material. The braincase is expanded posteriorly to cover the gills and is situated farther posterior relative to sharks. The otic capsule is preserved with indications that other neurocranial (e.g., ethmoidal), visceral arch and postcranial structures are present, potentially adding greatly to our knowledge of arthrodire comparative neuroanatomy and axial structures.

Poster Session IV (Saturday)
FOSSILS FROM THE EAGLE POINT QUARRY PROVIDE INSIGHT INTO A PIOCENE MARINE FISHES FAUNA FROM SOUTH CAROLINA
STRINGER, Gary, University of Louisiana at Monroe, Monroe, LA, USA; CICIMURRI, David, Bob Campbell Geology Museum, Clemson University, Clemson, SC, USA; KNIGHT, James, South Carolina State Museum, Columbia, SC, USA; CAMPBELL, Lyle, University of South Carolina Upstate, Spartanburg, SC, USA; KING, Lorin, Consultant geologist/paleontologist, Lafayette, LA, USA

Prior to this study, information on Pliocene marine fishes from South Carolina was quite limited and incomplete. This is partly related to the sporadic exposure of Pliocene marine sediments in the state, as well as to factors such as leaching and erosion. Chondrichthyan and actinopterygian remains from the Eagle Point Quarry, located in Darlington County, South Carolina, have provided important insight into a Pliocene marine vertebrate assemblage. Vertebrate remains appear to be from the Raysor Marl (3.2 to 3.8 Ma). Isotope studies have indicated two minor transgressions during this period, and the marine sediments at the site may correspond to this interval. Vertebrate material obtained through screen washing bulk matrix from the site includes six elasmobranchs and as many as 24 bony fishes. Shark teeth represent *Mustelus* sp. (smoothhound shark), *Rhizoprionodon* sp. (sharpnose shark), *Carcharhinus* cf. *C. obscurus* (dusky shark), *Carcharias* sp. (sand tiger shark), *Notorhynchus* cf. *N. cepedianus* (broadnose sevengill shark), and *Parotodus benedeni* (extinct lamnid). Skeletal remains of bony fish indicated only a few taxa, but over 175 fish otoliths allowed for identification of at least 21 taxa of actinopterygians. The Eagle Point otoliths revealed a fish assemblage that is dominated numerically and taxonomically by ophiidiids (cusk-eels). Otoliths also indicate the presence of conger eels, anchovies, phycid hakes, midshipman, sea basses, cardinalfishes, drums, jawfishes, butterfishes, sand flounders, and tonguefishes. The cartilaginous and bony fishes, especially fish otoliths, point toward a middle shelf-depth paleoenvironment (20-100 m) of normal salinity and a soft substrate. Vertebrate remains from the Eagle Point Quarry are considered highly significant considering our restricted knowledge of Pliocene marine fishes from South Carolina. Furthermore, the assemblage allows for comparison to other Pliocene marine ichthyological faunas, especially those from North Carolina and Florida, and also assists in determining changes in fish faunas of South Carolina since the Pliocene.

Early hominid evolutionary tempo and mode between 3 Ma and 4.5 Ma, Friday 9:45
THE LAETOLI PALEOENVIRONMENT: RECONSIDERATIONS AND IMPLICATIONS FOR HOMININ EVOLUTION
SU, Denise, University of California, Berkeley, Berkeley, CA, USA; HARRISON, Terry, New York University, New York, NY, USA

The Pliocene hominin-bearing site of Laetoli in northern Tanzania has yielded a large and diverse fauna associated with a unique depositional environment. The paleoenvironment of the Upper Laetoli Beds (~3.5-3.8 Ma) has previously been reconstructed as an arid to semi-arid grassland with scattered bush and tree cover, and possibly patches of acacia woodland. The site is unusual in that there is no evidence of permanent or large seasonal bodies of water. This contrasts with most contemporary East African hominin sites, which are generally inferred to be more heavily wooded and associated with riverine or lake-margin settings. New evidence from the fauna and flora from the Upper Laetoli Beds allows a reinterpretation of the paleoenvironment, and it indicates a mosaic of different vegetation types, with greater representations of bushland and woodland. However, some elements of the fauna do indicate the presence of dry grasslands. The totality of the data supports the inference that while grassland habitats (including bushed- and wooded-grassland) were an important and significant part of the habitat mosaic at Laetoli, there was greater representation of bushland and woodland habitats than previously reconstructed. This implies that the early hominin *Australopithecus afarensis* had access to a wide variety of potential habitats. While no hominins have been recovered from the Lower Laetoli Beds (~3.8-4.3 Ma), its paleoenvironment may have been similar to that of the Upper Laetoli Beds, although there is evidence of permanent sources of water.