Poster Session III

NEW PRIMATES (MAMMALIA) FROM GANDHERA QUARRY, EARLY EOCENE, BALOCHISTAN PROVINCE, PAKISTAN

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Fieldwork conducted in Balochistan, western Pakistan, led to the discovery of Gandhera Quarry in the upper part of the Ghazij Formation. Sequence stratigraphy indicates that the Ghazij Formation spans the early Eocene (Ypresian). Gandhera Quarry dates to approximately 50 Ma with the lower Ghazij stretching to approximately 54.5 Ma. Thousands of vertebrate specimens have been recovered from Gandhera, thirty of which represent euprimates, including at least two new adapiforms and one omomyiform. The best represented adapiform is a new species of the primitive cercamoniine *Panobius*. *Panobius* differs from all other cercamoniines except European *Donrussellia* in retaining paraconids on lower molars—differs from *Donrussellia* in lacking distinct paraconid and metaconid on p4, m1-2 with higher paraconids, higher para- and protocristids, and straight cristid obliquae, and m1 with trigonid more open lingually. Another adapiform most closely resembles Eocene *Anchomomys* from Europe and Oligocene *Bugtilemur* from Dera Bugti, Pakistan. It differs from *Anchomomys* in being smaller, having a complete paracristid closing off the trigonid, a stronger preprotostylid, higher and shorter entocristid and a relatively shorter and broader talonid. It differs from *Bugtilemur* in being smaller, having a more lingually angled cristid obliqua, a preprotostylid, and a weaker protocristid and hypoconulid. *Bugtilemur* is a purported lemuriform, however its similarities to this new Gandhera taxon indicate that it may have had an adapiform ancestry, traceable to the early Eocene The Gandhera omomyiform is smaller than other known omomyiforms with the exception of enigmatic *Altanius.* It differs from *Altanius* in having upper molars with broader and deeper trigon basins, more robust, bulbous, and marginally placed conules, having poorly developed pre-, postpara- and metaconule cristae, protocones more anteriorly placed and lingually extended, lacking a postprotocingulum, and having a small but distinct cingular hypocone. This taxon is primitive in lacking an upper molar postprotocingulum but does not share much in common with other omomyids that lack this feature.

Poster Session I

THE CETACEANS FROM BAHÍA INGLESA FORMATION (ATACAMA, CHILE): TAPHONOMIC APPROACH AND PALEOGEOGRAPHICAL IMPLICATIONS

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The cetacean fossils are abundant and diverse at the bonebed of Bahía Inglesa Formation (Northern Chile), a sequence of phosphatic beds belonging to upper Miocene. The cetaceans taxa include very fragmentary baleen whales (Mysticeti indet.) and toothed whales (Physeteridae indet., Phocoenidae indet., Pontoporriidae: *Pliopontos* sp., *Brachydelphis mazeasi*, cf. *Brachydelphis* n. form, *Pontistes* sp.).

The most productive site is called "Mina Fosforita" where the bonebed is well exposed. The sequence of this deposit is part of a major transgressive-regressive cycle, in this site marked by the presence of coquina intercalated with sandstones culminating in the bonebed (different types of phosphatic conglomerates). Field observations revealed that the fossils are generally disarticulated and the long bones are all broken with a smooth and uniform surface. These taphonomic and lithologic features together with the presence of the bonebed layers, composed by a great abundance of fossils including approximately 70 taxa of vertebrates, indicate a reworking of the fossils, probably from a more ancient stratum. All the Neogene Pontoporiidae genera known and some new forms are recorded for the first time to the same site indicating major diversity for the clade. The Miocene record for *Pliopontos*, a *Pontistes* record to the Pacific coast and *Brachydelphis* recognized in two forms (short and long rostrum) extends in time, diversity and distribution the range of Pontoporiidae.

The broader distribution for all taxa mentioned above, most described only for tropical waters attributed to Pisco Fm. (Peru) could indicate independence of this aquatic mammals from currents and temperature barriers between Peru and Chile coasts as indicate from Neogene mollusk faunas. This genera appearing together in upper Miocene Pacific strata suggest a broader distribution to this group, considering reinterpretations and new findings of Pontoporiidae, from North Atlantic.

Wednesday 4:15

STRUCTURAL CHARACTERS OF THE LIMBS OF RAPTORIAL BIRDS CAN PREDICT CHARACTERISTICS OF LOCOMOTION AND PREDATORY BEHAVIOR

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Raptorial birds (Falconiformes and Strigiformes) demonstrate a wide range of locomotor behavior, associated with a range of feeding strategies. Despite the fact that owls and true raptors are well-studied and charismatic groups, little detailed attention has been given to the relationships between the quantitative structural characteristics of their limbs and locomotor behavior. Such structural characteristics hold the possibility of being able to yield new information about locomotion diversity in raptorial birds, and may further allow for better estimates of hunting behavior (and thus dietary preferences) in fossil taxa.

Previously, it was demonstrated that avian locomotor guilds can be differentiated on the basis of forelimb to hindlimb ratios of bone strength, and also that these structural ratios are more informative than length ratios for determining behavior and locomotion. Here I present a focused study on the structural characteristics of the limbs in falconiform and strigiform birds, as well as members of distantly related groups convergent with raptors.

This study demonstrates that measures of bending and torsional strength in the forelimb and hindlimb (and the ratios between them) carry signals related to hunting behavior. These structural ratios predict behavior more accurately than ratios of bone lengths, and do so using only a single pair of proximal limb bones per animal. This approach is highly applicable to fossil taxa. I include several fossil species in my analysis, such as a giant tytonid owl from Haiti (*Tyto ostologa*), and I compare these fossil taxa to their extant relatives.

By examining species that are not closely related to each other, but are behaviorally similar, I am able to quantify the differing degrees to which phylogeny and functional traits determine several aspects of osteological structure. In addition, I have found that, in some cases, a difference in hindlimb bone strength may exist between raptors and owls of similar size, possibly related to differences in talon force.

Saturday 4:15

ARE RARE SPECIES DOOMED? A PALEONTOLOGICAL PERSPECTIVE ON EXTINCTION

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Rare species are commonly viewed as the species most likely to become extinct. Explanations for this include population fragmentation, decreased connectivity between populations, and reduction of genetic diversity due to population bottlenecks. In order to investigate the properties of commonness and rarity at various taxonomic scales, data from fossil assemblages of mammalian communities across almost 1,000,000 years and 3,500 km in North America were assembled. These data demonstrate a remarkable similarity of community composition across these vast scales of space and time. The use of Hubbell's neutral theory demonstrates that empirical communities show greater inertia than neutrally modeled communities, in large part due to the persistence of 'rare' taxa. Rare species maintain their abundance in mammalian communities much longer than the neutral model predicts. These species are always rare, but are found throughout 1,000,000 years and across 3500 km, while other species remain common at these scales of space and time. These results demonstrate that individual species and their roles in communities are persistent, yet distinct. Thus, although species are threatened by population size reduction due to the myriad of human-induced global impacts, the property of rarity itself may not necessarily lead to extinction. This distinction is a critical consideration as scientists try to predict the effects of climate change on biotic communities.

Wednesday 11:45

BOVINAE (ARTIODACTYLA: BOVIDAE) FROM MIO-PLIOCENE DEPOSITS OF THE MIDDLE AWASH, ETHIOPIA

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Newly recovered fossils from Mio-Pliocene deposits of the Middle Awash, Ethiopia, comprise a diverse terrestrial vertebrate fauna that includes a significant proportion of bovids. This faunal assemblage derives from the Kuseralee Member of the Sagantole Formation (~5.2 Ma), and the Asa Koma Member of the Adu-Asa Formation (~5.5—5.8 Ma) and represents one of the most complete and best-dated assemblages of its age from the African continent.

Among the Bovinae, two bovines (Bovini) are present, a species of *Simatherium* from the Kuseralee Member, and a very primitve *Ugandax*-like species from the Asa Koma Member. A single, new, tragelaphine (Tragelaphini) species is also present in both the Kuseralee and Asa Koma Members. Known primarily from horn core material, this species exhibits a large range of variation but is generally intermediate in morphology between tragelaphines previously described from older (e.g. Lukeino) and younger (e.g. Apak Member, Lothagam) deposits. Boselaphines (Boselaphini) are also present, represented by more than one species, recording one of their latest African appearances in the younger Kuseralee Member. A new *Tragoportax* species is described which bears affinities to other contemporaneous African species of this genus as well as to older species from the Siwaliks of Pakistan.

The Middle Awash material provides new specimens crucial to the reconstruction of bovid evolution in Africa during the late Miocene and early Pliocene. The Middle Awash fossils provide insight into the polarity of characters traditionally used to differentiate the different bovid tribes, particularly in the case of the bovine and tragelaphine material. Additionally, the evolutionary dynamics of Bovinae in Eurasia and Africa are further elaborated. Evolutionary trends within Bovidae are analyzed in terms of large-scale global environmental changes, including the expansion of C4 grasslands, that took place in the late Miocene.

Saturday 9:45

A NEW SPECIES OF *THURSIUS* (SARCOPTERYGII; OSTEOLEPIFORMES) AND ITS IMPLICATIONS ON MIDDLE DEVONIAN OSTEOLEPIDID RELATIONSHIPS

HALL, Patricia, ELLIOTT, David, Northern Arizona Univ., Flagstaff, AZ

A new species of the osteolepid *Thursius* is represented by completely articulated individuals from the Water Canyon Formation of northern Utah. This discovery is the first report