Poster Session III (Friday, November 4)

QUANTITATIVE INFERENCES ON MICROVERTEBRATE DEATH ASSEMBLAGES BASED ON RIGHT-LEFT DISPARITY OF SKELETAL PRESERVATION

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When there is no preservational bias against right or left skeletal elements that are mirror images, disparate numbers of right and left elements in a fossil assemblage must result from stochastic and at least partially-independent loss of right and left sides through taphonomic processes. The cumulative loss of skeletal elements can be simulated based on a simple model of stochastic exponential loss with three parameters: the number of individual organisms in the death assemblage (N0), relative time since the formation of the death assemblage (t), and the decay constant (λ), or the rate at which skeletal elements are lost after the formation of the death assemblage. An important general pattern that emerges from this simulation is that, for a given sum of right and left elements, the probability of more disparate preservation of right and left elements (i.e., deviation from the expected 1:1 ratio) increases as N0 or lambda increases. Thus, assuming that t is constant for all paired elements of the same taxon derived from the same death assemblage, it should be possible to obtain the combinations of the values of N0 and λ that maximize the fit of the model to empirical data. With this approach, the right-left disparity of skeletal preservation was evaluated for Quaternary microvertebrate assemblages from the San Francisco Bay region. The observed ratios of right and left elements are more constrained (i.e., closer to the 1:1 ratio) than expected from a wide range of values of N0 and λ, suggesting some of the assumptions of the model are violated.

Poster Session IV (Saturday, November 5)

VERTEBRATE MICROFOSSIL ANALYSIS IN THE PALAEONTOLOGICAL SITE OF 'LO HUECO' (UPPER CRETACEOUS, CUENCA, SPAIN)

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The site of 'Lo Hueco' preserves an extraordinary fossil assemblage, mainly composed of vertebrates, but also includes plants and invertebrates. The fossils are preserved in a stratigraphic succession of versicolor marly mudstone levels, partially cut by a sandy channel structure and two sulphated intervals. Most of the fossils are concentrated in only four of these lithosomes: the sandy channel structure (C), the grey marly mudstone levels (G1 and G2), and the lower part of the second red marly mudstone level (R2). The palaeontological material (0.5mm-1cm fraction) obtained from screenwashing and sorting of sediments in the G2 level has been preliminarily studied here, because this lithosome can be considered as one of the most representative of vertebrate richness, abundance and diversity at this site. The G2 level contains fossils that are rarely articulated, randomly scattered, and scarcely or not affected by erosion. The most abundant vertebrate microfossils that appear in this level correspond to fishes, mostly different morphologies of ganoid scales and numerous teeth. The ganoid scales are derived from the medium and posterior positions of the body and can be attributed to Lepisosteidae indet., as can numerous teeth and postcranial elements including an atlas. Other teeth and elements can be assigned to different fish groups, such as Pycnodontoidea, Amiidae and possibly Albulidae. Several postcranial elements, mainly diaphyses of lissamphibians, have been collected. A mandibular fragment attributed to a scincomorph, probably a Lacertidae, and cranial bones of other squamates, preliminarily assigned to iguanids, have also been identified. Crocodiles are represented by numerous teeth assigned to cf. *Musturzabalsuchus* and Crocodylia indet. Theropod remains, mainly teeth and an ungueal phalanx, are fewer but representative of Coelurosauridae indet., cf. Dromaeosauridae indet., cf. Velociraptorinae indet., cf. *Richardostesia* and cf. *Paronychodon*. This vertebrate assemblage of the G2 level is typical of an upper Campanian-lower Maastrichtian coastal shallow flooded muddy plain.

Poster Session I (Wednesday, November 2)

FEATHERING AND ESTIMATING WING LOADING FOR LITHORNITHID BIRDS FROM THE EARLY EOCENE GREEN RIVER FORMATION

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All extant palaeognath birds with the exception of tinamous are flightless. As the sister taxon to the clade including all other Aves, optimization of character states for Palaeognathae are essential to estimating those ancestral to all extant birds (crown clade Aves). New feathered specimens of the extinct taxon Lithornithidae provide key data on the diversity of feather number, wing shape and estimated wing loading in the palaeognath total group. Three specimens, recovered from the Fossil Lake Member of the Green River Formation in Wyoming, preserve the remains of primary and secondary flight feathers. The specimens preserve evidence of feather morphology, and quill knob impressions are visible along the carpometacarpus and ulna. The present study documents the preserved plumage and attempts to estimate wing loading, a metric of airfoil surface area compared to body mass often used for assessing flight ability. To estimate wing area, a composite reconstruction of a fully-extended lithornithid wing was created. Body mass was estimated using the femur and was reconstructed with reference to individuals of Tinamidae as well as other lithornithids. Lithornithid wing loading appears to be well below that of tinamous, more closely approximating pigeons. Several previous estimates of wing loading from other fossil birds appear to be unrealistic due to key methodological problems, including references used for estimating body mass and techniques for reconstructing wing shape.

Poster Session IV (Saturday, November 5)

CAVIOMORPH MICROWEAR REVISITED USING HDR IMAGING

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High dynamic range (HDR) imaging methods have been shown to produce outstanding high-resolution images of enamel microwear. Based on these excellent results and the ease of application, we chose to use this method to expand our microwear dataset previously used for extant caviomorph dietary classification. Since this technique is relatively new, we performed a small consistency study to evaluate whether the microwear features analyzed in our previous study would be consistent using HDR techniques. We reexamined four caviomorph taxa in two dietary categories: *Hydrochoerus* and *Cavia* (Caviidae; grass-leaf diet) and *Dasyprocta* and *Cuniculus* (Dasyproctidae and Cuniculidae, respectively; fruit-leaf diet).

The image capture segment of the study produced exceptional images with clearly defined microwear features. Nevertheless, our new HDR generated results are not entirely consistent with our previous study. The consistency study showed an increase in features associated with "hard object" feeding in the four taxa, including large pits, large puncture pits, and small puncture pits. We suggest that the increased number of these features is due to the high quality of the HDR image. Many fewer small pits were evident in the HDR images, and this was true for all four taxa. Many fewer scratches were observed for the two grass-leaf taxa, which previously were characterized by high scratch counts (average scratch counts for *Cavia* in previous study = 29.14, this study = 9.70; *Hydrochoerus* previous study = 26.61, this study = 11.05). We believe that these discrepancies are not due to differences in microwear per se, but rather that the same features look different when using HDR imaging. Small pits, which have been characterized as "bright" and "shiny" at low magnification, are much less evident in HDR images, as are fine scratches. This highlights the need to use a consistent method when comparing counts of microwear features. As we continue to explore the utility of this new method and add to the extant caviomorph dataset, we expect that the discriminating power of small pits may decline, at least for this group of mammals.

Poster Session II (Thursday, November 3)

AN EXCEPTIONALLY LARGE JUVENILE *CAMARASAURUS* FROM THE MORRISON FORMATION (UPPER JURASSIC) OF ALBANY COUNTY, WY, USA

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During construction of the Rockies Express (REX) natural gas pipeline in 2006, Uinta Paleontological Associates, Inc. discovered a dinosaur bonebed in the Upper Jurassic Morrison Formation of Albany County, WY. Among the five dinosaurs collected from the McKinsey-REX Quarry is a juvenile *Camarasaurus* (UW-46212), represented by at least 35 caudal vertebrae, four dorsal vertebrae, and the entire sacrum. Of these vertebrae, all but the last 22 caudal vertebrae have completely open neurocentral sutures, and the sacrum is completely unfused.

As *Camarasaurus* is the most common sauropod dinosaur known from the Morrison Formation, general patterns of ontogenetic growth have been observed and can be used to group specimens of *Camarasaurus* into stages of ontogeny. For the axial skeleton, the main characteristic used to determine the ontogenetic stage is the degree of neurocentral suture fusion. Based on the lack of neurocentral suture fusion in all but the posterior caudal vertebrae, UW-46212 can be classified as a juvenile. The pattern of neurocentral suture fusion seen in this specimen supports the hypothesis that fusion in *Camarasaurus* began in the posterior part of the tail and worked its way cranially through the vertebral column.

The relatively large size of these juvenile camarasaur vertebrae prompted a preliminary comparison of these vertebrae with those of other camarasaurs. Based on published measurements of two adult camarasaurs, we determined that the preserved caudal vertebrae of UW-46212 are approximately 90% of the size of these adult *Camarasaurus* specimens. This very large size coupled with the decidedly juvenile characteristics of this specimen is very curious and prompts questions as to the identification of this dinosaur, but at present no identifying characters contradict the assignment to *Camarasaurus*. Also, a U/Pb radiometric age of 152 Ma on this site places UW-46212 as possibly one of the oldest known camarasaurs. Further work may show that UW-46212 represents a new, larger species of *Camarasaurus*.

Technical Session XVIII (Saturday, November 5, 4:00 pm)

PELVIC ANATOMY OF *ALLIGATOR MISSISSIPPIENSIS* AND ITS SIGNIFICANCE FOR INTERPRETING LIMB FUNCTION IN FOSSIL ARCHOSAURS

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Reconstructing joint anatomy and function of extinct vertebrates is critical to understanding their posture, locomotor behavior, ecology, and evolution. Major changes occurred in hip joint morphology during crurotarsan and crocodyliform evolution, reflecting a spectrum of