

a nearly exclusive C_4 diet, with low seasonal variation (1 per mil). $\delta^{13}C$ values change inversely with $\delta^{18}O$ values over the annual cycle for all individuals sampled. Decreasing carbon isotopic composition of tooth enamel could indicate a shift in dietary content from the wet to the dry season or a seasonal shift in $\delta^{13}C$ values of the C_4 vegetation itself. Stable isotope studies on modern species provide fundamental insights for reconstructing the ecology of extinct mammals and discovering the influence of seasonal changes on Cenozoic mammalian lineages and faunas.

Poster Session I (Wednesday, October 17, 4:15 - 6:15 pm)

A NEW RHOMALEOSAURID Pliosaur FROM THE SINEMURIAN (LOWER JURASSIC) OF LYME REGIS, ENGLAND

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An excellently preserved partial skeleton of a rhomaleosaurid pliosaur (Sauropterygia: Plesiosauria) from the Sinemurian (Lower Jurassic) of Lyme Regis, England, consists of a complete cranium, mandible, and articulated cervical vertebral column. The material is taxonomically distinct and its occurrence is noteworthy because pliosauroids are rare from this stratigraphic horizon. The new taxon is diagnosed by a single autapomorphy: a pronounced pit on the posterior margin of the dorsal ramus of the squamosal. It also possesses the following unique combination of characters: premaxillary rostrum short (length and width subequal), five teeth in the premaxilla, premaxilla-maxilla sutures parallel anterior to the external nares, frontals contact on the midline, prefrontal-frontal suture convex and gently curved medially, mandibular symphyseal region spatulate and short (length and width subequal), robust rod-like axis neural spine with a circular transverse cross section, and cervical neural spines with a laterally expanded apex. The taxon shares some characters with older (Hettangian) rhomaleosaurids (e.g. *Rhomaleosaurus megalcephalus*), and other characters with younger (Toarcian) rhomaleosaurids (e.g. *Rhomaleosaurus sensu stricto* and *Meyerasaurus*), and it is therefore morphologically and proportionally intermediate between these two groups.

Poster Session III (Friday, October 19, 4:15 - 6:15 pm)

A RECONSIDERATION OF THE STATUS OF THE UPPER JURASSIC PTERODACTYLOID PTEROSAUR *MESADACTYLUS ORNITHOSPHYOS* FROM THE MORRISON FORMATION OF COLORADO

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Pterosaurian fossils from the Upper Jurassic Morrison Formation remain fragmentary and poorly known. In the 1980s, a small synsacrum from Dry Mesa Dinosaur Quarry, Mesa County, Colorado, was proposed as the holotype for the new pterodactyloid pterosaur species *Mesadactylus ornithosphyos*. A number of disarticulated cranial and postcranial elements subsequently have been referred to the same taxon.

Although the referred postcranial material is certainly pterodactyloid, the synsacrum would constitute an extremely unusual element for a pterosaur. It consists of a series of fused sacral vertebrae with prominent, distally fused neural spines that dramatically decrease in height posteriorly. The vertebrae also become minute posteriorly, indicating that this animal could not have had an extensive or large tail. Micro-CT scans failed to recover any evidence of internal structure or pneumaticity.

The holotype synsacrum has been extensively figured, a detailed description is lacking. It was initially identified as avian; it has also been informally suggested to be derived from a bird, a small dromaeosaurid theropod, or an anurognathid or dsungaripteroid pterosaur. We provide a detailed description of the synsacrum and discuss the various hypotheses concerning its affinity. Finally, phylogenetic analysis including *Mesadactylus* is undertaken, making use of the available material and assuming that it is all derived from the same taxon.

Poster Session II (Thursday, October 18, 4:15 - 6:15 pm)

DENTAL WEAR AND LAMELLAR FREQUENCY ANALYSIS TO CONSTRAIN THE IDENTITY OF THE NORTH AMERICAN MAMMOTH SPECIES

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A mammoth skeleton found at the Newton Site, a kettle lake 15 km southeast of Towanda, Pennsylvania, has been referred to *M. columbi* on the basis of its high, narrow skull. However, the specimen's thin enamel (1.5 mm) and moderately high lamellar frequency (9 plates/decimeter) resemble some specimens of *M. primigenius*, as well. Maps from the Neotoma database show that a Columbian mammoth inhabiting the Towanda area would be a significant outlier from the general geographic range (western US and Gulf Coast area from Florida to Texas) for this species. This record would suggest that *M. columbi* inhabited a broader range of environments than previously presumed. However, if the specimen was in reality *M. primigenius*, its location, 50 km north of the Olean drift border, would align well with the Woolly mammoth's range.

To better ascertain the Newton mammoth's identification, we examine herein the effects of dental wear on the morphology of mammoth teeth, especially enamel thickness and lamellar frequency. Sagittal sections of mammoth teeth reveal the tendency for enamel lophs to become more broadly spaced and enamel ridges to thicken towards the base of the crown.

Thus, an older *M. primigenius* with extensively worn molars might display thicker enamel and a lower lamellar frequency, and might therefore appear to be a Columbian mammoth on the basis of dental morphology alone. Here, we conduct an analysis of numerous *M. columbi* and *M. primigenius* molars at various stages of dental wear to determine if this phenomenon has played a role in determining the species identification of the Newton mammoth.

Poster Session II (Thursday, October 18, 4:15 - 6:15 pm)

PROBLEMATIC IDENTIFICATION OF PROBOSCIDEANS AT THE MIDDLE PLEISTOCENE PALEONTOLOGICAL/ARCHAEOLOGICAL LOCALITY OF ELANDSFONTEIN (WESTERN CAPE PROVINCE, SOUTH AFRICA)

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Three proboscidean species inhabited Africa in the middle Pleistocene: *Loxodonta atlantica*, *Loxodonta africana*, and *Elephas recki*. *L. africana* can easily be distinguished from *L. atlantica* and *E. recki* by the broad, lozenge-shaped wear surfaces of its molars. *L. atlantica* and *E. recki* are more difficult to distinguish on the basis of molar characteristics. These two species rarely co-occur in the African fossil record, with *L. atlantica* in northern and southern Africa and *E. recki* in eastern equatorial Africa. Consequently, taxonomic assignment of isolated molars from these species may have been based, in some cases, on geography rather than morphology. Elandsfontein (EFT), a middle Pleistocene locality on the west coast of South Africa, has produced hundreds of skeletal elements referred to *L. atlantica*. Among these are 15 complete or nearly complete permanent molars, one of which is newly recovered and has not yet been referred to a species. The last taxonomic revision of EFT proboscidean material was done in the 1970s, and additional material has been recovered since then, so an updated assessment could yield new insights into the biogeography and evolutionary history of middle Pleistocene African elephants. With this goal in mind, standard molar characteristics (crown height, width, length, enamel thickness, lamellar frequency, number of enamel plates, and hypsodonty index) were recorded for EFT molars, and characteristics of M3s (n=5) were evaluated against diagnostic characteristics for *L. atlantica* and *E. recki*. EFT molars were in general more similar to *L. atlantica* than to *E. recki*, but they exhibited features of both species and could not definitively be assigned to one. Principal components analysis (PCA) was conducted to compare EFT M3s to those of *E. recki* and *L. atlantica* described in the literature. Variables used in the PCA were those not substantially affected by tooth incompleteness: height, width, enamel thickness, and average lamellar thickness (a measurable reflection of lamellar frequency). The first principal component sorted individuals by species and showed that the newly recovered M3 was more similar to *L. atlantica* than to *E. recki*, but species assessment based on PCA was unreliable because the distinction between species was unclear on the first or any axis. Qualitative criteria may be more useful for identifying species based on molars; for example, *E. recki* exhibits irregular enamel folding, usually not present on *L. atlantica* and not present on EFT molars. Overall, there is little reason to revise taxonomic assignment of EFT specimens or to refer the new molar to *E. recki*. However, if not for geographic differences and based on molar criteria, *E. recki* and *L. atlantica* might be described as members of the same genus.

Poster Session III (Friday, October 19, 4:15 - 6:15 pm)

REGIONAL PATTERNS OF MODERN SYMPATRY IN NORTH AMERICAN QUATERNARY MAMMAL FAUNAS

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The temporal and regional responses of past faunas to Quaternary climate cycles provide important insights for how biotas respond to changing climates and environments. We used cluster analyses, digital range data for modern mammals, and digital climate data to determine whether faunal similarity from 27 Quaternary sites in North America was affected by site age, past climate, or biogeographic region.

Cluster analysis using the Raup-Crick index was used to categorize sites based on the similarity of their mammalian faunas. Areas of maximum modern sympatry for the extant species at each site were quantitatively identified using the modern geographic. Areas of sympatry were found by counting the number of modern species shared at each 50 km grid point in North America. The climate associated with the areas of maximum sympatry were located using the digital climate data for North America (1960-1990 average). Rectilinear climate envelopes were constructed for the points with maximum sympatry using the minimum and maximum values for MAT and total annual precipitation from those points.

Faunas clustered into four groups, which separate first on regional basis and secondarily on a climatic basis. The first cluster contained sites whose extant species were largely sympatric in the area of the site, the second cluster contained sites whose extant species are today sympatric in the northeast Appalachians or north of the Great Lakes, the third cluster with a mixture of species that are today sympatric in the great plains or greater midwest, and the fourth with species that are today sympatric in the inter-montane west. The extant component of the faunas were highly predictive of this pattern despite the wide variety of ages, paleoclimates, and proportions of extinct fauna at the sites. Local climate and/or other geographical range controllers were mixed in these continental scale patterns indicating a need for understanding faunal dynamics on a regional scale.