

It is probable that the locality where the holotype of the genus was not Udan Sayr but Yagaan Khovil, and a name of the locality was mistakenly assigned. Fossils of *Avimimus* are limited in occurrence to the Nemegt Suite (Maastrichtian), and its fossils have not been found from the Djadokhta (Campanian) beds.

Student Poster Session

PNEUMATICITY, NECK LENGTH, AND BODY SIZE IN SAUROPODS

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Long necks are synapomorphic for sauropods, and additional neck elongation occurred independently in different sauropod clades. Increases to 15 or more cervical vertebrae occurred at least four times, in mamenchisaurids, diplodocids, *Euhelopus*, and *Rapetosaurus*. Necks longer than 10 meters also evolved at least four times, in mamenchisaurids, diplodocids, brachiosaurids, and giant titanosaurs like *Puertasaurus*. The longest-necked sauropod for which a rigorous estimate is possible is *Supersaurus*, which had a neck at least 14 meters long. The sauropods with the longest necks, such as *Supersaurus*, *Sauroposeidon*, and *Puertasaurus*, are also among the largest known terrestrial vertebrates.

Pneumatic vertebrae facilitated neck elongation in sauropods. The lightest sauropod vertebrae were 89% air by volume and had a specific gravity (SG) of 0.22. By comparison, cervical vertebrae of the giraffe have an SG of 1.3, and are scarcely lighter than other postcranial elements (SGs up to 1.7). The cervical column of *Brachiosaurus* is 8.5 meters long but the vertebrae would have totaled less than 600 kilograms—about the same mass as the animal's paired humeri, which are each only two meters long.

The relationships between body size, neck length, and pneumaticity can be evaluated statistically using phylogenetically independent contrasts. I used the PDAP module in Mesquite v1.06 to test the correlations among femur length (FL), trunk length (TL), absolute neck length (ANL), proportional neck length (PNL; neck length/dorsal length), cervical count (CC), and air space proportion (ASP) in 14 sauropodomorphs. ASP and the size-independent measures of neck length (PNL and CC) form a pool of mutually-correlated variables (at $p < 0.05$), as do the variables related to absolute size (FL, ANL, and DL). However, only two significant correlations link the two pools: ANL is correlated with ASP and PNL. Neck elongation in sauropods is tied to pneumaticity but largely independent from size-related variables.

Poster Session III

LATE CRETACEOUS DUCKBILL MANDIBLES AND DUCKBILL DINOSAUR CHIN SKIN SCALES: CHEEKS, CHEWING KINETICS, AND SKIN

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Duckbill dinosaur chin skin (DCS) has been discovered in direct association with the underside of a hadrosaurine mandible from the "This Side of Hell Wyoming" (TSOH) quarry in the Lance Formation. This is the first report of dinosaur chin skin associated with a mandible from Late Cretaceous Lance Formation sediments in northwestern Wyoming. Surface morphology of dinosaur chin skin found beneath the jaw of a large duckbill dinosaur is now related to an exact location on the dinosaur mandible. The DCS remains, and associated elements, are preserved within regionally laterally continuous very fine-grained sheet sandstone beds of the Upper Cretaceous, Maastrichtian Lance Formation. The quarry is located on Bureau of Land Management administrated lands. Quarry excavation has been ongoing, for 6 years to carefully observe and record taphonomic features associated with the skeletal elements. Duckbill DCS is characterized by a pavement pattern of non-overlapping, closely spaced and tightly packed polygonal scales having a morphological pattern akin to a radiating sunburst design, allowing a detailed look at the surficial appearance of this Late Cretaceous dinosaur. The mandible itself exhibits a gentle sigmoid curve along the long axis, so that jaw width narrows quickly from the predentary to the tooth row. An associated predentary preserves traces of the keratinous rhamphotheca. The rhamphotheca forms vertical ridges on the predentary. Because the thickened ridges would have worn more slowly, the rhamphotheca may have formed an even-growing serrated structure on the lower jaw that could be used to crop plants prior to oral processing by the dental batteries.

Student Poster Session

A FOSSIL HORSE SPECIMEN FROM NORTHERN OREGON (HEMPHILLIAN) WITH UNCOMMON PATHOLOGIES AND PRESERVATION OF RARE FEATURES

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The Alkali Canyon Formation of the Dalles Group, northern Oregon (Hemphillian) has produced several unique specimens, one being a nearly complete skeleton of an adult *Pseudhipparion* sp. cf. *P. gratum* with many uncommon pathologies and rare features preserved with exceptional detail. The preservation within the specimen includes fossilized sternal cartilages and a complete hyoid apparatus. The sternal cartilages are smaller in width than their corresponding ribs and are more tubular. The cartilages appear to be strongly attached, as they cover the entire distal end of the corresponding ribs. The hyoid apparatus in the specimen is composed of seven distinct bones with a weak degree of fusion at the points of articulation between the individual elements.

The pathologies in this *Pseudhipparion* specimen include a distinct injury to the right

dentary, associated disease and malocclusion of the dentary, as well as what appears to be a broken rib. CT scans of the dentary indicate that a continuous sub-vertical fracture bisects the ramus just posterior to the p2. This malocclusion produced a significant offset of the p3 leading to abnormal wear of the p3 and the corresponding P2 and P3. As a result of the fracture, the normal growth was altered and a disease may have resulted. Evidence from the CT scans include noticeable alterations of the roots in the area surrounding the fracture, most likely caused from the trauma and possibly by disease.

Wednesday 2:30

EVOLUTION OF SYNDACTYLY IN THE MARSUPIAL FOOT: A MORPHOMETRIC AND DEVELOPMENTAL REASSESSMENT

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Syndactyly (fusion of digits II and III) in the foot of marsupials has long been recognized as a highly significant character in marsupial phylogeny. It has attracted much attention regarding its precise character, origin, and functional implications, on which no consensus has yet been reached. The aim of this study was to revise available information on syndactyly from the literature and supplement it with developmental and morphometric data from a broad range of syndactylous species. Visual examination of museum specimens, clear staining of feet of pouch young specimens, and morphometric measurements of length and width of metatarsals, proximal and intermediate digits in 29 syndactylous species were conducted. Analysis of covariance and correlation matrices showed that measurements of syndactylous digits are more correlated than either is to digits IV and V, or digits IV and V with each other. This suggests integration between digits II and III. Developmental data support this, showing that syndactyly manifests itself in the earliest stages of digital chondrification. Diversity of relative size and development in syndactylous digits is high across the marsupials tested, ranging from extremely thin and nearly fused (e.g. in kangaroos) to sturdy and well developed (e.g. in wombats), suggesting that syndactyly has not constrained pedal proportions. However, there is a convergent emphasis of digit V among the hopping/bounding kangaroos and Peramelemorpha (Bandicoots), which is unique within Mammalia. The convergent concurrence of reduced syndactylous toes and a hopping/bounding locomotion in these two clades suggests that syndactyly may facilitate the evolution of hopping. The possible presence of syndactyly in some South American marsupials suggests a deep origin of syndactyly within marsupials, or alternatively a general tendency towards it. It is therefore possible that contrary to the traditional view, syndactyly of Peramelemorpha and Diprotodontia is a plesiomorphic character for a larger grouping of marsupials.

Saturday 1:45

ENDOSTEALLY DERIVED TISSUES IN DINOSAURS AND THE EVOLUTION OF MEDULLARY BONE

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Medullary bone is an endosteally derived tissue found naturally only in extant birds, where it acts as a labile calcium reserve for eggshell production. This tissue was described recently in *Tyrannosaurus rex*, and it was proposed that medullary bone evolved early in the theropod lineage. Here we report two new observations of this tissue in other dinosaurian taxa, the theropod *Allosaurus fragilis* (UVP 5300; Late Jurassic, North America) and the ornithomimid *Tenontosaurus tilletti* (OMNH 34784; Early Cretaceous, North America). Both specimens exhibit endosteal tissues that are morphologically homologous to the medullary bone described in *T. rex* and extant ratites, with rapidly-deposited cancellous bone internal to endosteal lamellae. Although the tissues are morphologically homologous, the functional homology of medullary bone in extant taxa and similar tissues in any fossil taxon is untestable. As expected, some differences in morphology also exist among the three known examples of dinosaurian medullary bone, including the organization of cancellous tissue and evidence of remodeling, but these are most likely the result of phylogenetic disparity among the taxa. These new specimens offer insight into the process of medullary bone tissue deposition in dinosaurs, and suggest that the ability to produce medullary bone evolved at least as early as the Saurischian-Ornithischian divergence in basal Dinosauria.

Wednesday 9:15

UNUSUAL FOSSIL RODENT FAUNAS FROM SOUTH CENTRAL CHILE

WERTHEIM, Jill, HERRIOTT, Trystan, Univ. of California, Santa Barbara, Santa Barbara, CA; CROFT, Darin, Case Western Reserve Univ., Cleveland, OH; FLYNN, John, American Museum of Natural History, New York, NY; GANS, Phillip, Univ. of California, Santa Barbara, Santa Barbara, CA

Laguna del Laja, Chile (LdL) is one of few places that preserves stratigraphically superposed fossil mammal faunas in South America; taxa that occur elsewhere in at least four South American Land Mammal Ages (SALMAs) are represented. The volcanogenic nature of the strata at LdL permits high-precision $^{40}\text{Ar}/^{39}\text{Ar}$ analysis; 17 dates (~20-9 Ma) are distributed throughout most of the ~1.8 km thick section, significantly improving age control particularly for the early to middle Miocene segment of the SALMA sequence.

All twenty rodent taxa from LdL (37.5°S 71.2°W) represent new species, but temporal ranges for relevant genera elsewhere span much of the early late Miocene. The lowest levels of the Cura-Mallin Fm. exposed at LdL produce taxa differing modestly from Patagonian contemporaries. *?Neotomomys* n. sp. from LdL resembles the rare *?Colhuehupian Neotomomys* sp. from El Pajarito, Chubut, while Santacrucian *Protacaremys*