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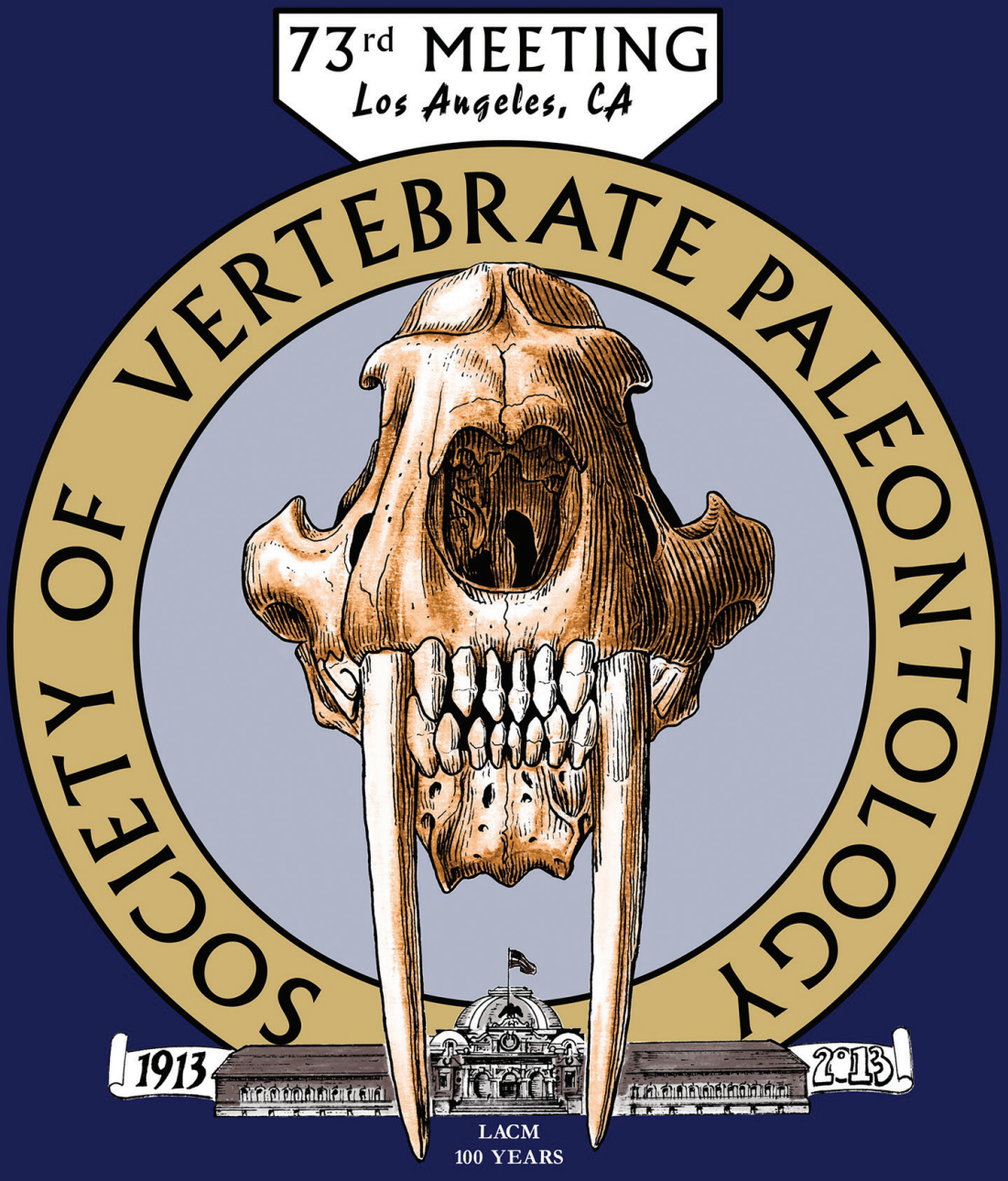
PROGRAM AND ABSTRACTS



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ABSTRACTS OF PAPERS
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dependent on the quality of the data in the database. There is always the potential that published identifications of species of fossils were not solely based on morphology, but rather were made by using geography the restrict the number of species that were considered when the identifications were made. If geography was used to aid in the identification of species, then any studies using those identifications to examine range shifts during the Quaternary will be biased. It is therefore necessary to determine which identifications may be biased in this way. In a novel use of GIS (geographic information systems), I analyzed the FAUNMAP II database for potential geographic bias in the identification of Quaternary fossils. I queried the FAUNMAP II database for shrews, (Soricidae) deer (*Odocoileus* spp.), pocket mice and kangaroo rats (Heteromyidae), and spotted skunks (*Spilogale* spp.). These taxa were selected because they are difficult to identify to species from isolated skeletal material, and there are significant differences in the geographic ranges of the species within a genus. To capture the shape of the geographic distribution of the species from the FAUNMAP II database, I generated a standard deviational ellipse for each species. A standard deviational ellipse encloses one standard deviation, or 68% of the features. The ellipses were then compared between species of the same genus and to the modern ranges of the taxa. My analysis found that there was a significant geographic influence in the identification of species of Soricidae, Heteromyidae, *Odocoileus*, and *Spilogale*. The strength of this technique is that it rapidly recognizes those taxa where the identification potentially was based on geographic assumptions. In those cases, a re-examination of the identification is warranted to determine what role geography may have played. Of special concern are taxa like *Notiosorex* and *Blarina*, for which there was only a single species recognized for all or most of the twentieth century. Due to the historical bias towards the first named species, the identification of those fossils should be treated as generic identifications until they are reevaluated against the full diversity of species from the broadest geographic sample possible.

Preparators' Session (Thursday, October 31, 2013, 11:15 AM)

MOVING COLLECTIONS INTO THE NEW NATURAL HISTORY MUSEUM OF UTAH

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In November 2011, the new Natural History Museum of Utah opened to the public in our new facility at the Rio Tinto Center. For those of us in the paleontology collections, however, the job of moving into the building had just begun. From October 2011 through April 2012, we transferred all of the NHMU paleontology collections, including approximately 26,000 vertebrate, 6,000 invertebrate, and 4000 paleobotanical specimens into our new collections facility. This proved to be a very intense process which required repairing, rehousing and stabilizing a large diversity of specimens, including significant Mesozoic and Cenozoic faunas from Utah and the surrounding area. Most vertebrate specimens were rehoused into new drawers and fully stabilized with ethafoam prior to being moved into the new building, where they were sorted into cabinets mounted on compactable carriages. Oversized specimens were palletized and stabilized prior to moving. All of the large broken material was repaired and many of the largest and most delicate specimens were rehoused into large open faced or clam-shell styled support jackets, constructed of fiberglass and gypsum cement and lined with felt or ethafoam. Throughout the move specimens were organized into hierarchical order based on a combination of stratigraphic , systematic and anatomical properties. A small crew of three full time staff, three part time interns and 10–15 volunteers worked six days a week for six months to complete the move. Four days per week were spent rehousing and stabilizing specimens in the old building, which were moved into the new facility on two move days per week with the assistance of professional movers. The movers also provided assistance and expertise on moving large specimens out from difficult places in the old collections as well as moving select furniture and cabinets which were transferred from the old building into the new museum. While the move was complete by April 2012, reorganization and inventory of the collections in the new facility will continue for at least another year.

Poster Session IV (Saturday, November 2, 2013, 4:15 - 6:15 PM)

TESTING CLIMATE CHANGE AND OVERKILL EXTINCTION HYPOTHESES FOR PLEISTOCENE EQUIDS WITH DENTAL MESOWEAR

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The late Pleistocene equid (*Equus ferus*) underwent rapid body size decline in Alaska preceding its extinction c.a. 12.5 radiocarbon KYBP. This size shift, thought to be caused by a climate/vegetational shift, has been used to argue against human overkill. The disarticulated condition of fossils from this region renders it difficult to examine paleoecological trends because the skulls, jaws, and dentitions are disassociated from the ^{14C} dated metacarpals. Nevertheless, if changes in paleodiet are associated with body size decline, then correlations between body size and paleodiet should exist. We examined trends in paleodiet using a recently developed semilandmark-based mesowear technique with 245 fossil equid molars (174 lower m2s and 71 upper M2s). We also analyzed several species of extant wild equids to establish a relationship between the mesowear of upper and lower molars. Using photographs taken at a standardized angle, 70 evenly spread semilandmarks were distributed on the paracones of the uppers and in the corresponding occlusal valleys between the paraconid and metaconid on the lowers.

Among modern equids, the first principal component scores of the upper and lower landmark data are significantly correlated, suggesting that both uppers and lowers provide similar paleodietary information.

For the Alaskan equid, tooth shape, defined by the Procrustes coordinates, was compared to a body size proxy (molar length + width) using multivariate regression. Lower dental mesowear is significantly related to size, with smaller (and presumably younger) specimens having a shallower lingual occlusal valley, suggesting a shift towards more highly abrasive diets as body size declined. We found no relationship of mesowear and size among upper molars, although the smaller sample size of upper molars may explain the insignificant result. Thus far, the results are most consistent with ecological change towards the end of the Pleistocene, although intraspecific variation in body size renders it difficult to establish a true relationship with time. Directly dating the cranio-dental material would enable a more direct analysis of ecological change through time.

Poster Session IV (Saturday, November 2, 2013, 4:15 - 6:15 PM)

FIRST REPORT OF JURASSIC PTEROSAUR TRACKS FROM AFRICA

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Although pterosaur tracks are now quite well known from North America, Western Europe and Asia, they are still almost unknown from Africa and South America, and are completely unknown from Australia and Antarctica. Here we report a Jurassic assemblage found by Piotr Menducki from Mibladen, Morocco in 2009, which is likely the oldest known occurrence of pterosaur tracks and possibly the first from Africa. The specimen consists of a slab with more than a dozen *Pteraichnus* tracks and trackway segments from a known stratigraphic horizon of red sandstones, which also yield theropod and sauropod tracks. The pterosaur tracks are very well-preserved and medium sized (manus and pes length about 10 cm). Moreover, replicas of the tracks are preserved in the JuraPark and University of Colorado collections (J389 and UCM 185.17 respectively). Although the tracks occur in the Mibladen region which is very famous for mineral mines, tracks in this area have not previously been reported or dated accurately. According to the published geological maps the strata are Lower Jurassic in age. The dinosaur tracks confirm a Jurassic age, but are suggestive of a Middle to Upper Jurassic assemblage (with *Parabrontopdus, Therangospodus*, and cf. *Jialingpus*). Given that no pterosaur track assemblages have yet been dated as earlier than Late Jurassic, the Mibladen pterosaur tracks are at least as old if not older than any previously reported.

Enigmatic tracks of possible reptilian (lacertilian) affinity were reported from the Upper Cretaceous (Maastrichtian) of the Agadir region of Morocco in 1954 and named *Agadirichnus*. These were later re-interpreted as "possible" pterosaur tracks, although this conjecture is not proven, as the type material is not available for study. Thus, the Mibladen assemblage is the only pterosaur tracksite from Africa for which actual specimens (and GPS coordinates) are available.

Technical Sesssion XII (Friday, November 1, 2013, 3:15 PM)

INFERENCES ON THE FEEDING BIOMECHANICS OF THE BIZARRE PUG-NOSED CROCODYLIFORM *SIMOSUCHUS CLARKI*

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Living crocodylians and their ancestors are commonly thought of as predators that manage, simultaneously, to be large and stealthy, and these seem to be consistent factors in their evolutionary success. Several recently discovered crocodylian ancestors (i.e., notosuchians), however, have demonstrated that the evolutionary narrative of crocodile-line archosaurs is far more diverse than previously realized. Among these divergent fossil forms is *Simosuchus clarki* from the Late Cretaceous of Madagascar, a relatively small, heavily armored, and blunt-snouted relative of modern alligators and crocodiles. Multiple analyses of tooth and jaw morphology indicate that this taxon represents an herbivorous radiation within Notosuchia. Here we examine the diet and feeding biomechanics of *Simosuchus* to address how this fossil mesoeucrocodylian evolved into its highly divergent feeding niche. Relying largely on gross dissections and iodine-enhanced X-ray μCT scanning, we use modern crocodylian cranial soft-tissue anatomy, along with the exquisitely preserved hard-tissue anatomy of *Simosuchus*, as foundations for reconstructing a functional anatomical model of the jaw adductor system in this taxon. We integrate investigations of gross cranial morphology, estimates of bite-force capacity, and inferences of transverse jaw motion with examinations of dental form and tooth pressures to address the anatomical and functional characteristics of *Simosuchus* herbivory. These findings are compared to the feeding biomechanics of the closest living relatives of *Simosuchus*, modern crocodylians, as well as to a sample of herbivorous reptiles. Our results indicate numerous specializations for processing plant matter in several cranial systems (e.g., skull structure, dentition, adductor musculature) that are convergent with those of other living and fossil reptilian herbivores. In sum, these findings provide an example of how the crocodylian cranial bauplan can be co-opted to facilitate a major transformation in feeding ecology that seems to have influenced even the post-cranial anatomy of this taxon (resulting in expansion of body armor and semi-erect posture, among other features).