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Pass show diagnostic features of *Amphisauropus* including: manus and pes pentadactyl and broad with rounded digit tips, trackway pattern of inward-directed manus and forward-directed pes. *Varanopus*, a protorothyridid-captorhinid track known from the European Rotliegend and from the Lower Permian Choza Formation of Texas, also occurs for the first time in the Abo Formation at this site. Tracks show a moderate increasing length between pes digits I to IV, pes digit V is outwardly directed slightly, and the angle between the axis of pes digits I and IV is greater than 90 degrees. Based on the proportion and position of the pes digits, we assign these tracks to *Varanopus*.

EARLY CRETACEOUS VERTEBRATE LOCALITY SHESTAKOVO, WESTERN SIBERIA, RUSSIA: A REFUGIUM FOR JURASSIC RELICTS?

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Early Cretaceous vertebrates at Shestakovo were known since 1953, when 2 partial *Psittacosaurus* skeletons were found. Intensive excavations and screen-washing at Shestakovo 1 and 3 localities, carried out since 1995 by a Tomsk University team, with participation of specialists from Moscow and St. Petersburg, revealed diverse fauna of micro- and macrovertebrates, which consists of two distinct blocks. One block contains elements of Jurassic affinities: the lizard *Paramacellodus*, crocodyliforms *Tagarosuchus* (Protosuchia) and *Kyasuchus* (Shartegosuchidae), tritylodontid *Xenocretosuchus*, a docodont close to *Simpsonodon*, the amphilestid *Gobiconodon*, and a eupantotherian. This block is analogous to the Bathonian fauna of England. The other block contains elements of Cretaceous affinities: a salamander, the "macrobaenid" turtle *Kirgizemys*, lizards from the family Xenosauridae, dinosaurs including Titanosauria, Velociraptorinae, Troodontidae, ?Tyrannosauridae, *Psittacosaurus sibiricus*, and a bird.

One possible explanation of such drastic heterogeneity of the Shestakovo fauna is by peculiar palaeoenvironmental conditions: the locality was formed near or within a large water reservoir under arid to extra-arid climate. This harsh abiotic environment prevents dispersal in the area of some derived small-sized vertebrates, like placental mammals, but together with quite favorable biotic environment (abundance of plants and insects near reservoir coastline), favor conservation of Jurassic relicts. Larger-sized vertebrates, like dinosaurs, are less dependent on unfavorable local abiotic conditions, more geographically widespread, and thus more important for assessing of geological age for locality. Particularly important is that *Psittacosaurus sibiricus* is the largest and one of the most derived species of the genus. This allows us to determine the age of Shestakovo fauna as Aptian-Albian, possibly early Albian.

QUALITATIVE CRANIAL AGE VARIATION AMONG RECENT AND FOSSIL POPULATIONS OF *KERODON RUPESTRIS* WIED, 1820, (MAMMALIA, RODENTIA, CAVIIDA), IN BRAZIL

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Kerodon rupestris is a caviid that can be diagnosed by an outstanding forward produced orofacial region of the skull. This species is distributed from Pleistocene to Recent, inhabiting exposed granitic islands in the semi-arid region of northeastern Brazil, from the state of Piauí to the north of the state of Minas Gerais.

Age variation in cranial characters has been investigated on a sample of 153 recent individuals from Campos Sales (Ceara), as well as on 16 specimens found in association to Pleistocene fauna in limestone caves in Bahia State. The recent specimens are deposited in the mammal collection of the Museu Nacional—UFRJ, and the fossil specimens are in the Paleontology collection of the Museu de Ciências Naturais PUC/Minas Gerais.

Patterns of suture fusion and the development of processes and foramina allow the determination of five age classes. Age class one (juvenile) can be diagnosed by the absence of ossification in most cranial sutures and by the presence of the interparietal bone. In age class two the fusion among skull bones is incipient, but the contact between sutures is still visible. Age class three (juvenile-adult) display fused sutures and an expansion of the paraoccipital process, which contacts the ventral limit of the tympanic bulla. In adults (class 4) the cranial sutures are completely ossified. The paraoccipital process is ventrally expanded, reaching the posterior limit of the tympanic bulla. The interparietal disappears completely. In old adult (class 5) most of the cranial sutures are not discernible. The paraoccipital process surpasses the posterior limit of tympanic bulla and shifts downwards.

The age criterion, developed for recent specimens, was applied to estimate relative ages of 16 fossil individuals. Two age classes of adults were revealed, despite differences in geographic and stratigraphic origins. The greater resistance of adults specimens to taphonomic processes may explain the preservation of more advanced age classes in the fossil record.

IMPLICATIONS OF INTERSPECIFIC VARIATION IN THE POSTCRANIAL SKELETON OF *HOMOTHERIUM* (FELIDAE, MACHAIRODONTINAE)

LEWIS, Margaret E., NAMS, R. Stockton Coll. of NJ, Pomona, NJ 08240.

Homotherium has long been described as a scimitar-toothed cat with distally elongate limbs. The latter feature has led to general interpretations of cursoriality for this genus. Nevertheless, while craniodental differences have been noted among the various species of *Homotherium*, postcranial differences have not yet been adequately addressed. Instead, most postcranial comparisons have been with dirk-toothed genera from the same region (*Megantereon* or *Smilodon*).

This study evaluates hypotheses about the locomotion and posture of *Homotherium* by examining postcranial material assigned to this genus from a variety of Plio-Pleistocene localities. The significance of interspecific differences in morphology and inferred behavior in *Homotherium* is considered in light of the larger carnivore taxa found with each species. The possibility of sexual dimorphism is also explored.

The present study confirms the general impression of *Homotherium* as cursorial, although not in the manner of cheetahs. Previous studies have suggested spotted hyena-like proportions or posture. This study suggests that locomotion in *Homotherium* was also somewhat similar to that of spotted hyenas. Supinatory abilities (and presumably prey grappling abilities) were reduced, particularly in the younger species. The shortened pes and muscle leverages in the hind limb seen in all species do not indicate leaping, a behavior suggested by a previous study. Overall body size and limb morphology indicate little to no scansorial ability.

In sum, the general trend in *Homotherium* is towards small increases in load-bearing ability and cursoriality through time. Postcranial characters seen in later African species and North American *H. serum* may have evolved in parallel as they are found to a lesser degree in the European *H. crenatidens* and early African forms. Other features, such as the short, wide astragalus, the non-retractile claws, and characters associated with reduced supinatory abilities may be synapomorphies of the genus.

ANAGENETIC EVOLUTION OF *TETRACLAENODON*, A PALEOCENE "CONDYLARTH" FROM THE SAN JUAN BASIN, NEW MEXICO

LIBED, Shirley A., Dept Earth & Planet. Sci., UNM, Albuquerque, NM, 87131; LUCAS, Spencer G., New Mexico Museum of Natural History and Science, 1801 Mountain Road, Albuquerque, NM 87104; KONDRASHOV, Peter, Paleont. Inst., Moscow, RUSSIA

The earliest known phenacodontid, the Paleocene "condylarth" genus *Tetraclaenodon*, appeared at the beginning of the Torrejonian (~63.8 Ma) and was broadly distributed in the Western Interior, and especially abundant in the San Juan Basin of New Mexico, where stratigraphically and temporally closely spaced samples present evidence of anagenetic gradualism in a Paleogene mammal lineage. Due to high variation and lack of stratigraphic control, more than 11 taxa have been proposed, but most workers reduced them to a single species, *Tetraclaenodon puercensis*. The largest fossil sample of *T. puercensis* is from the San Juan Basin, where recent New Mexico Museum of Natural History (NMMNH) field studies have allowed precise stratigraphic organization of fossil localities. Re-examination of the more than 600 NMMNH specimens, from six temporally successive faunal zones, permit evaluation of evolutionary pattern of *T. puercensis*. The two earliest Torrejonian populations are significantly smaller in overall size than the four successive larger-sized populations, which present a gradual and unidirectional increase in size while displaying more subtle progressive trends in cheek tooth morphology. The species *T. septentrionalis*, is invalid because it falls within the range of variability of the upper *T. puercensis* assemblages. Therefore, despite high variability, our new analysis identifies *Tetraclaenodon* as a single evolving lineage with continuous morphological overlap during its minimum 2.9 my generic duration. This corroborates other studies that indicate anagenesis was a common mode in mammalian evolution.

FIELD MAPPING MADE EASY

LIEN, Daniel B, 413 East Idaho Street, Rapid City, SD 57701

To date over five thousand bones have been removed from the Conata Picnic Ground excavation site. Windy condition at this site has always made field mapping a difficult if not impossible at times. It is at locations such as this that new methods of mapping present themselves. The use of a laser pointer and a sliding arm grid system has cut mapping time and improved over accuracy.

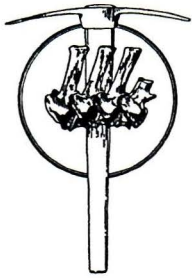
The mapping grid poster session will present this new application of technology being adapted to further paleontologic science.

BIRD TRACKS FROM NEAR THE JURASSIC-CRETACEOUS BOUNDARY, LIAONING PROVINCE, CHINA

LOCKLEY, Martin, Geology Dept., University of Colorado at Denver, Colorado, 80217-3364; MATSUKAWA, Masaki, Science Education Dept., Tokyo Gakugei University, Tokyo, 184-8501, Japan; WRIGHT, Joanna, WHITE, Diane, Geology Dept., University of Colorado at Denver, Colorado, 80217-3364; LI Jianjun, Beijing Natural History Museum, 126 Tian Qiao, South Street, Beijing, 100050, China

Tracks of waterbirds from the upper part of the Tu Cheng Zi Formation, Beipiao area, Liaoning Province, may be the oldest evidence of birds from China. The Tu Cheng Zi Formation, previously considered as Middle to Late Jurassic, lies stratigraphically below the famous Yixian Formation which has produced feathered dinosaurs such as *Sinosauropteryx*,

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ABSTRACTS OF PAPERS

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MUSEUM OF THE ROCKIES
MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA

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