

minimum of 11 pygal vertebrae. Future descriptive work on the Goldfuss specimen can now confidently refer the specimen to *Mosasaurus missouriensis*, and then accurately characterise other locally and globally distributed mosasaurines against the features of both the Bonn (RFWUIP 1327) and Paris specimens (MNHN 9587).

Friday 3:00

#### THE EXTINCT CALIFORNIA TURKEY, *MELEAGRIS CALIFORNICA*, FROM RANCHO LA BREA

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An extensive study of the comparative osteology of turkeys (Aves: Meleagridae) confirms the validity of the extinct California Turkey, *Meleagris californica*. The study included all major and many minor skeletal elements of adult specimens of *M. californica*, best known from the asphalt deposits at Rancho La Brea, California, and both modern turkeys: *M. gallopavo* and *M. ocellata*. The study also revealed that *M. californica* is more closely related to *M. gallopavo* than it is to *M. ocellata*. A review of turkey remains from localities other than Rancho La Brea confirmed the presence of *M. californica* in California within a relatively small range extending from Orange County in the south, through Los Angeles County, to Santa Barbara County in the north. Other, unconfirmed, records of fossil turkeys in the western United States suggest that the species might have been more widespread. The close osteological similarity between *M. californica* and *M. gallopavo* suggests that the ancestors of *M. californica* became isolated in California only after nearing the *M. gallopavo* grade, but certain osteological features suggest different adaptations in the two species following divergence of their respective lineages. The high incidence of entrapment in the La Brea asphalt seeps is linked to the species' social behavior. The end Pleistocene extinction of *M. californica* might have resulted from the coincidental occurrence of two factors: a dramatic, long term drop in precipitation to well below modern precipitation levels beginning about 11,500 yr BP, which would have concentrated local populations of turkeys around limited water supplies and roost sites, and the arrival of paleoindians in California, who could easily have hunted the concentrated birds to extinction.

Friday 9:15

#### THE PATTERN OF DUROPHAGY AMONG THE LATE DEVONIAN ARTHRODIRES (PLACODERMI)

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Durophagous feeding has been inferred within several Late Devonian arthrodire (Placodermi) groups: the Mylostomatidae, Selenosteidae, Pholidosteidae, Leptosteidae, Bungartiidae, and a number of Australian taxa of uncertain affinity. This estimate of feeding strategy is based on the form of the gnathal elements; however, the nature of durophagy among arthrodires has not been critically reviewed. Comparison of North American and Moroccan durophagous arthrodires demonstrates distinct forms and orientations for the gnathal elements.

Arthrodires possess anterior (ASG) and posterior (PSG) superognathals (paired upper elements). The two elements are aligned longitudinally in occlusion with the inferognathal (IG, paired "lower jaw"). There are five distinct patterns of durophagy: a plesiomorphic orientation with 1, crushing ASG (*Tafialalichthys*); 2, fused crushing ASG (*Bungartius*); 3, crushing ASG and PSG (plesiomorphic form, *Paramylostoma*); 4, crushing ASG and PSG (derived form, *Dinomylostoma*); and a compacted derived orientation, 5, crushing ASG (fused and shifted posteriorly) and PSG (*Mylostoma*). Changes, such as, shortening of the out-force moment arm or expansion of the adductor mandibulae attachment site suggesting improved in-force, are not commonly seen in arthrodire gnathal elements. Compaction is only seen in *Mylostoma*; however, the IG retains the same length proportion to the head as in other arthrodires (suggesting both increased in-force and shortened out-force moment arm). Fusion of the ASG occurs twice, once in *Mylostoma* where a derived crushing platform develops beneath a broad head (the plesiomorphic pattern for the head) and in *Bungartius* where fusion may be related to lateral compression of the head (a derived condition).

Systematic studies suggest a minimum of eight originations of durophagy in Late Devonian arthrodires (including European and Australian forms). This adaptive radiation parallels the "middle Paleozoic predatory radiation" where durophagy evolved numerous times among chondrichthyans, teleostomes, arthropods, cephalopods, and gastropods and suggests a greater role for Late Devonian arthrodires among the Paleozoic durophages.

Thursday 2:15

#### A REAPPRAISAL OF TYRANNOSAUROIDS FROM IREN DABASU, INNER MONGOLIA, PEOPLE'S REPUBLIC OF CHINA

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The hindlimb of the lectotype of *Alectrosaurus olseni* (AMNH 6554) is strikingly different from that of all other tyrannosaurids. However, an undescribed, but shattered, tyrannosaurid skull (AMNH 6556) from the same general area—Iren Dabasu—is not especially distinctive. A field crew from the American Museum of Natural History collected both specimens in late April 1923. They were found five days apart and in different locations; there is no evidence they are from the same individual.

The shattered skull is from a small animal and has never been described; it includes premaxillary and lateral teeth, an incomplete left lacrimal, the maxillary process of the left jugal, most of the right quadratojugal, the jugal process of the right ectopterygoid, and the quadrate ramus of the right pterygoid. The presence of a secondary fossa in the antorbital fossa of the jugal indicates the specimen is referable to Tyrannosauridae. The cornual process of the lacrimal is similar to some juvenile tyrannosaurids in that it is a low, laterally extending ridge. The lateral teeth are as finely denticulate as tyrannosaurid teeth of the same basal crown length from the Turonian of Uzbekistan.

AMNH 6554 includes a right hind limb, a partial left pes, and partial pubis. The hind limb and foot displays many diagnostic characters. Most notable of these is the hypertrophied condition of the joint surfaces of most of the metatarsals and phalanges, in contrast to other tyrannosaurids, a condition that readily would permit identification of isolated *Alectrosaurus* pedal bones in the field. A similar pediculate condition of the joint surfaces among extant birds is present in raptorial and large cursorial species, an occurrence consistent with the presumed fleet and predatory habits of tyrannosaurids. However, it is presently unclear if this enhanced condition in *Alectrosaurus* served one purpose more effectively than the other.

Friday 1:30

#### THE DINOSAUR FOSSIL RECORD

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Although macroevolutionary studies on dinosaurs have focused on such diverse topics as biogeography, coevolution, and faunal turnover, pervasive sampling weaknesses allow the fossil record to support conflicting hypotheses, or at least render them difficult to test. The incompleteness of the dinosaur record has been frequently noted but not quantified, and no consensus exists regarding the specific biases at work. Many studies simply ignore record quality altogether, treating missing data as simple unknowns whose absences can have no effect on hypotheses. Current summaries of this record are insufficiently resolved to permit determination or correction of biases, or to generate sampling-based estimates of lineage longevity, first and last appearances, and diversity.

An ongoing project is currently accumulating all published dinosaur occurrences in the fossil record. As a subset of the Paleobiology Database, it records detailed taxonomic, taphonomic, geologic, stratigraphic, and geographic information for each known dinosaur occurrence in a standardized, electronic format. When completed, the PBDB will allow any researcher to digitally access the entire published occurrence record of dinosaurs, download datasets, or generate temporally accurate distributional maps.

These data already demonstrate several important biases in the dinosaur record. Much of our current perspective on dinosaur evolution is driven by the North American record, which constitutes 47% of all collections though comprising only about 15% of land area. By contrast, all Gondwana (nearly 50% of land area) is represented by just 23% of collections. 43% of all collections are Campano-Maastrichtian, but only 4% derive from the entire Middle Jurassic. More generally, sampling is markedly but complexly correlated with country area, historical onset of study, and economic productivity. These are underlain by the same depositional and tectonic filters affecting many other fossil groups. Sampling density variations indicate that first appearances cannot be reliably determined simply by applying minimum divergence times to dinosaur phylogenies.

Poster Session A

#### MIOCENE-PLIOCENE PALEO LAKES WITHIN THE CENTRAL SECTOR OF THE MEXICAN VOLCANIC BELT

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At the central sector of the Mexican Volcanic Belt between 19° and 23° north latitude, there are widespread basins filled with thick volcanoclastic and fluviallacustrine deposits that contain volcanic rocks and index fossils that date back to the middle Miocene, and in few cases to the Eocene-Oligocene. The basins were originated by graben formation and/or by drainage obstruction by volcanic structures. The former process was related to both the Basin and Range and the Mexican Volcanic Belt (MVB) intra-arc normal extensional episodes. Examples of these basins are Zacualtipan, Tula-Tepeji del Rio and Santa Ma. Amajac (Hidalgo State); abundant material of *Ictiobus* and *Goodeoides* fishes are reported.

In the state of Tlaxcala, in the Panotla locality the fishes *Ictalurus* and *Ictiobus* are described, in addition, Blancan fossil horses and *Rhynchotherium* are known. In the Acambay Basin (State of Michoacan) has been reported a radiometric age of 1.9 Ma and abundant *Equus* and camel material. In the Cuitzeo basin, where the Rancho la Goleta lies, there are fish vertebrae and the cormorant *Phalacrocorax*, associated with horses, rodents and *Rhynchotherium*.

In the state of Jalisco, in the Chapala lake, the latest Blancan fishes *Ictalurus dugesi* and *Salmus australis* are associated with the aves *Pliolymbus*, *Phalacrocorax* and *Phoenicopterus*. The Tecolotlan basin sequence is interrupted by lake layers which contain evidences of fishes and *Crocodylus* material. In the San Miguel Allende Basin lake evidence is present in different localities, the most representative is the Arroyo Tepalcates, where a late Hemphillian assemblage is known.

At the Huanusco-Juchipila and Colotlan-Tlaltenango basins in the states of Jalisco-