while temnospondyls and lungfish appear to be absent, the vertebrate fauna is largely dominated by actinopterygian fish (cf. *Lepidotes*), hybodontid sharks, as well as thalattosuchian crocodiles, the latter represented by partly associated skull material, isolated teeth, osteoderms, vertebrae, ribs, and limb elements. In contrast to previous assertions, the faunal composition indicates that the Adigrat Formation is, in part, of marine character, particularly in its middle and upper sections. This interpretation is also supported by sedimentological data such as tidal bundles, large-scale symmetrical wave ripples, dolomite horizons overlying intensely bioturbated interlaminated fine-grained sandstones, and siltstones and claystones indicative of a lagoonal setting; furthermore, our findings suggest that at least the younger sediments of the formation are Early Jurassic in age. The results have implications not only for the distribution of epicontinental vertebrates in the Early Mesozoic of southern Pangaea, but also for the paleogeography of the Gondwanan shoreline of the western Tethyan realm.

Technical Session IV, Wednesday 3:30

DIRECT EVIDENCE OF PREDATOR-PREY-RESOURCE INTERACTIONS IN A PERMIAN AQUATIC ECOSYSTEM

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Predation is a behaviour that is normally not preserved for extinct organisms, and trophic levels in the fossil record generally are derived from indirect observations such as tooth morphologies, tooth marks, or coprolites. Here, we present the first direct evidence of a three-level trophic-chain in a fossil aquatic ecosystems as exemplified by the xenacanthid shark *Triodus sessilis* from the Lower Permian Lake Humberg of the Saar-Nahe Basin in Germany with two different ingested larval temnospondyls. More importantly, one of the amphibians bears the remains of an acanthodian fish in its digestive tract, providing unambiguous evidence of its last meal. A shark with preserved amphibian prey items is exceptional because no other extinct or extant shark is known to feed on amphibians. *Triodus* is considered to represent a tertiary consumer, and we hypothesize that the two larval temnospondyls, which are secondary consumers, were attacked and swallowed completely by *Triodus* during their pursuit of juvenile acanthodians, which constitute the prey of larval temnospondyls in the lake. Juvenile acanthodians were primary consumers feeding on ostracods and plankton. The attempt to reconstruct the food web of Lake Humberg shows that it is predator heavy and highly biased towards piscivores and batrachophagous taxa indicating that predator-prey interactions may be more important than planktivore-controlled structures. Absence of herbivores and only few planktivores are indicative for those ecosytems, but it displays trophic complexities very distinct to those found today in fluvio-lacustrine settings. During the Palaeozoic, top predators in piscivore-dominated, fluvio-lacustrine ecosystems, were represented by large xenacanth sharks and adult aquatic temnospondyls. In post-Triassic ecosystems, xenacanth sharks and temnospondyls were ecologically replaced by aquatic amniotes, hybodont sharks, and bony fishes. In the Late Cretaceous and Cenozoic, teleosts, birds and mammals successively filled the positions of top predators in lacustrine ecosystems. Batrachophagous sharks are seemingly absent from post-Triassic ecosystems, and amphibians do not play an important role in post-Triassic lacustrine food webs anymore.

Technical Session XIII, Friday 2:30

LARGEST COLLECTION OF FEATHERS FROM MESOZOIC STRATA OF NORTH AMERICA, INGERSOLL SHALE, EUTAW FORMATION, EASTERN ALABAMA.

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The Ingersoll shale is a thin (<1 m), laterally restricted, olive-black, carbonaceous, clay lens within the Upper Cretaceous (Santonian) Eutaw Formation, Russell County, eastern Alabama. The clay lens represents abandoned tidal creek fill within the bayhead delta of an estuary. Excavation of this marginal marine conservation deposit produced the largest collection of fossil feathers from Mesozoic strata of North America. These fossil feathers are possibly the only Mesozoic feathers from North America preserved in a non-amber host. The fourteen collected contour feathers range in length from 0.43 to 16.50 cm and 0.35 to 3.10 cm in width. Twelve of the feathers are body contour feathers: one appears to be a rectrix (tail feather), and the other is likely a remix (wing feather). Some fossil feathers are exceptionally well preserved, and one even shows the fine detail of barbicel structures (hooklets) on the distal barbules. Scanning electron microscopy (SEM) of two of the fossil feathers indicated replacement by mats of small, rod-shaped structures that compare favorably to bacilliform bacteria; other SEM work is in progress. These rod-shaped structures are preserved in three dimensions and are ~1 µm in length. Energy dispersive spectroscopy (EDS) of the bacilliform mats indicated no mineral replacement, but the analysis showed that a carbon component remains. The carbon spike indicated by EDS is possibly a result of original carbon from the bacteria. This type of preservation is seen in feathers from the Crato Formation, Brazil, where the original organic remains of bacterial cell walls are preserved. The Ingersoll shale fossils add considerably to the sparse record of feathers from Mesozoic strata worldwide, especially from the Late Cretaceous. In addition, the Ingersoll shale is only the third confirmed site worldwide to preserve feathers from an estuarine setting. We suggest tidal channel fills within estuarine depositional settings should be a focus for future prospecting of theropod feathers.

Technical Session IX, Friday 9:15

THE GROWTH TRAJECTORY AND ADULT SIZE OF *LESOTHOSAURUS DIAGNOSTICUS* (DINOSAURIA: ORNITHISCHIA): TAXONOMIC IMPLICATIONS

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Questions about the taxonomic status, diversity, and pace of evolution of basal ornithischian dinosaurs persist in part because some historically important taxa have been based on incomplete material of uncertain ontogenetic status. We analyzed the bone tissues of small (~1 m length) specimens of *Lesothosaurus* and determined that they represent young individuals that were rapidly growing. In contrast, a larger (~2 m length) individual that has been referred alternatively to *Lesothosaurus* and to "cf. *Stormbergia* & *Lesothosaurus*" shows the onset of adult histological features. We infer that these and other specimens referred to the two taxa are most reasonably interpreted as representing ontogenetic stages of a single taxon that reached maturity in approximately four years. Of the two character states that are supposed to distinguish the two taxa, one is probably best ascribed to teratological and preservational differences, and the other to ontogenetic change; there seems, therefore, no compelling reason to separate *Stormbergia* from the senior taxon *Lesothosaurus*. Diagnoses of taxa that are based on supposedly unique combinations of character states can be problematic: they often cannot account for possible polarity errors that result from comparing individuals that differ in ontogenetic stage but may belong to the same taxon. For this reason it is important to base taxonomic diagnoses on specimens with well-defined ontogenetic stages, preferably adults. This is one of a very few examples so far where bone histology has been used to determine taxonomic questions.

Poster Session IV (Saturday)

ORNITHOMIMIDS (THEROPODA: DINOSAURIA) FROM THE NEMEGT FORMATION (MAASTRICHTIAN) OF MONGOLIA

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The Nemegt Formation of Mongolia is well known for the abundance of dinosaur fossils, and two definitive ornithomimids *(Gallimimus bullatus* and *Anserimimus planinychus)* have been reported so far. Since their original descriptions, the diagnoses of *Gallimimus* and *Anserimimus* have been poorly understood, resulting many of ornithomimids from the Nemegt Formation have been simply assigned to these two genera. Re-evaluations of the diagnoses of Nemegt ornithomimids allow us to understand the diversity of ornithomimids of the formation. *Gallimimus bullatus* is one of the best-known ornithomimids, but its diagnoses have been argued previously. It is characterized by having a short manus, as suggested by most of previous studies, and the manus/humerus ratio is 0.61, which is the smallest value in ornithomimosaurs (>0.8 in others). *Anserimimus planinychus* is a unique ornithomimosaur in having strong deltopectoral crest of the humerus, dorsoventrally flat (proximal end is wider than high) and nearly straight manual unguals, and long forelimbs. ZPAL MgD65 is a partial skeleton, collected during the Polish-Mongolian Expedition from the Nemegt Formation in 1964, could be a third taxon and has nearly straight but not flat (proximal end is higher than wide) manual unguals, differing from *Gallimimus* and *Anserimimus*. A partial skeleton of an ornithomimid with similar manual unguals was discovered from the same formation by a recent fieldwork by the Korean International Dinosaur Expedition in the summer 2006. Preliminary phylogenetic analyses for an enigmatic ornithomimid, *Deinocheirus mirificus*, are tested in this study based on three large data matrices of Theropoda from previous studies. Two data matrices resulted in that *Deinocheirus mirificus* is a possible ornithomimosaur because it has some ornithomimosaur-like features (e.g., subequal metacarpals and weak deltopectoral crest of humerus), but the phylognetic status of Deinocheirus mirificus as a member of ornithomimosaurs is not confirmed because the other matrix placed outside of the clade Ornithomimosauria.