A basal neoornithischian known from two bonebeds in the Kulinda locality in Siberia preserves various integumentary structures, and suggests both simple monofilaments and feathery compounds were widespread among dinosaurs. Besides these filamentary structures, Godefroid et al. describe large, overlapping scales stiffening the tail in dorsoventral direction, and scaly covering of the distal hindlimb, akin to the analogous, secondarily appearing scales of birds. The fossil demonstrates great diversity in the types of integument in single specimens and of the dinosaurian clade as a whole.

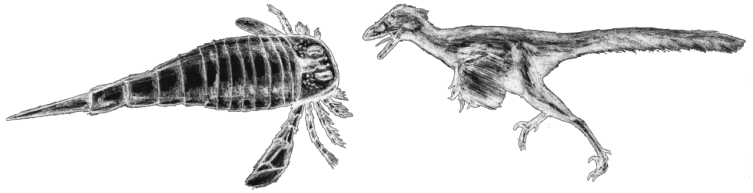
A study by Snively and Fahlke examined the jaw apparatus of the Eocene Cetacean *Basilosaurus isis*, using finite element analysis and the so called dry-skull-method, suggesting a force of 1.6-2t delivered at the third upper premolar and a relatively greater anterior bite force than in crocodilians. Jaw biomechanics are consistent with a use of the conical, recurved anterior teeth in gripping and the jagged molars and premolars in crushing, as can be observed in bite marks attributed to predation by *Basilosaurus* on fossils of *Dorudon*.

Upcoming research by Pimiento and Balk examines chronological size patterns in the giant neogene lamniform *Carcharocles megalodon* throughout its period of existence.
According to preliminary data, the elasmobranch's size varies considerably depending on the geological age and follows no marked trend, with peaks of its reported maximum size 4, 10 and 12 miya and peak median sizes 13 (~22t), 9 and 8 (both ~18t) miya (the divergence between median and maximum may be attributable to sampling bias in the preliminary data). The overall size range in the sample is approximately 10-55t. According to the researchers, *C. megalodon* generally became larger, however both populations from older and younger strata often display comparable median and/or maximum sizes.
Paradoxically, there is no strong correlation between the predator's size evolution and that of its contemporary cetaceans, the lamniform's probable prey.

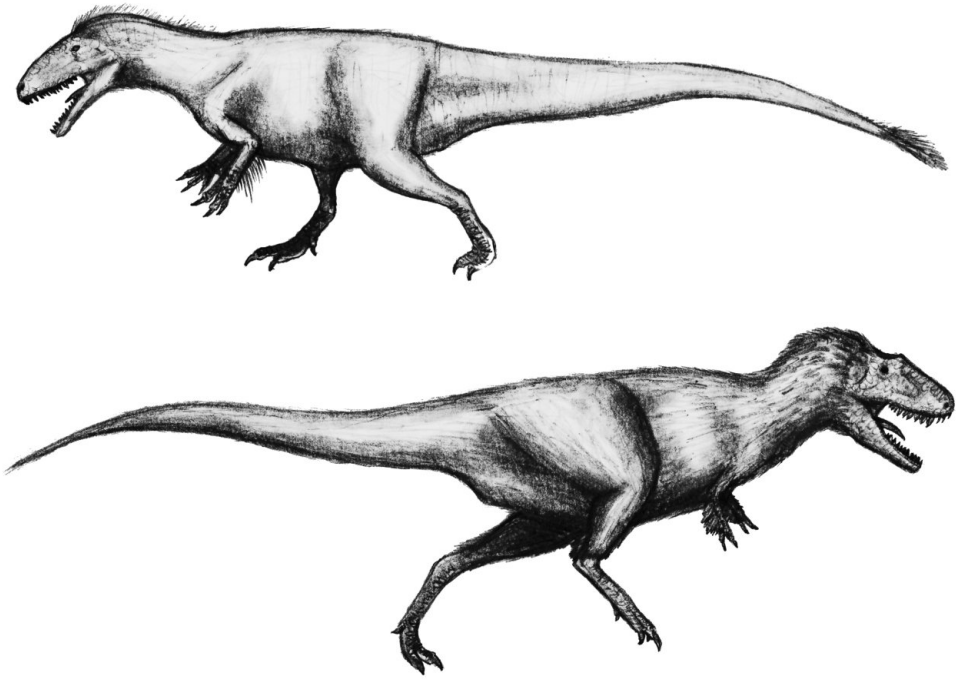
Material of giant *Apatosaurus* specimens from Oklahoma, described by Wedel and Taylor (SVP abstract and SVPOW), suggests sizes greatly exceeding the commonly reported size range and placing it as one of the largest known sauropods. giant (111-130% the linear size of 23m long CM 3018, the holotype of *Apatosaurus louisae*) specimens display unfused neurocentral sutures and cervical ribs, the latter a feature that in *Diplodocus* and *Giraffatitan* only individuals ≤80% of adult dimensions retain.
Weight estimates (Mazetta et al. 2004) suggest that these specimens massed between 28 and 45t (rivalling *Supersaurus vivianae* and perhaps even large macronarians), despite their young age (note that full ontogenic maturity is a relatively rare occurrence in dinosaurs, Myhrvold 2013).
Another specimen (OMNH 1331), presumably representing an adult, is known from only an incomplete vertebral centrum that is 34-63% (depending on the assignment of the centrum) larger than aforementioned *A. louisae*, implying a weight of 50-89t and a lenght of 30-37m.

For inquiry about references or general questions or suggestions, please mail to **dariusnau@gmx.at** or visit **www.paleo.square7.ch**

Prehistoric Nature



2013: A Year of Discoveries



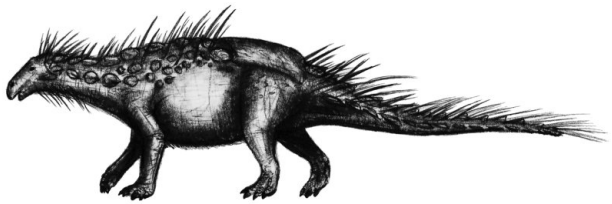
SIATS MEEKERORUM, A GIANT NORTH AMERICAN NEOVENATORID

Described on the basis of a fragmentary vertebral column, pedal phalanges and a partial ilium, ischium and fibula (holotype: FMNH PR 2716, referred specimen: FMNH PR 3059), *Siats meekerorum* (cover, I) is the first neovenatorid carcharodontosaur and the stratigraphically youngest carnosaur known from North America (Zanno & Makovicky 2013). Collected from the Mussentuchit member of the Cedar Mountain Formation, dated to be 98 miy. old, the fossils (along with the discovery of *Lythronax argestes* [this issue]) significantly constrain the geological duration and age of the northern-hemispheric Cretaceous faunal turnover.

At an estimated 11.7-11.9m in total lenght for the subadult holotype (basing on comparisons of pelvic [835mm ilial fragment, ~130-135%] and appendicular [461mm fibular fragment, ~93%] elements to those of *Aerosteon* and *Mapusaurus* [MCF-PVPH-108.202] respectively*), Siats* is among the largest known theropods, and further expands the reign of allosauroid apex predators in North America, up to at least the Cenomanian. This is consistent with the geological age of the related Asian taxa *Shaochilong maortuensis* and *Chilantaisaurus tashikouensis*, dating back to as late as the Turonian, and suggests that the replacement of allosauroid predators by tyrannosauridae took place during the Coniacian or even later.

Phylogenetic analysis found *Siats* to be a derived Neovenatorid, forming a polytomy with the clades *Megaraptor*+*Aerosteon* and *Australovenator*+*Fukuiraptor*.

EUROPELTA CARBONENDIS, NODOSAURID FROM SPAIN



Europelta carbonendis (Kirkland et al. 2013) is a new mid-sized (~5m and 1t) nodosaurid from the lower Albian Escucha Formation in Spain. The animal, represented by two partial specimens (holotype; AR-1/10, paratype; AR-1-3466/31), is the most completely known European ankylosaur, with large parts of skull and vertebral collumn, almost the entire ribcage, hip and hindlimb and partial pectoral girdle and forelimb along with a well-preserved set of osteoderms recovered by the research team. The skull, as reconstructed, is about 40cm long (minimum lenght of 37cm) and almost 30cm wide in each dimension's greatest measurement. It lacks the distinct post-temporal notch and complex naris of other nodosaurids and polacanthids. An estimated 22-25 leaf-shaped teeth, increasing in size posteriorly, were present. The robust femur measures 50.3cm and the tibia 45.9cm in lenght. *E. carbonendis* is the oldest ankylosaur for which a straight ischiumis known.

Large spikes were likely present in the pectoral region, and a plate formed by sutured osteoderms protected the sacrum. The rest of the animal's dorsal side and tail was protected by several types of osteoderms, coming in various shapes and sizes.

A phylogenetic analysis, conducted by the describers, found *Europelta* to be a basal nodosaurid, based on the morphology of its skull and armour plating, and the proportions of its limbs and vertebrae.

LYTHRONAX ARGESTES, AN EARLY AND CLOSE RELATIVE OF TYRANNOSAURUS

Lythronax argestes (cover, II) is a new tyrannosaurid from the lower middlemember of the Wahweap Formation of western North America, dated to be approximately 80miy old. The species, described on the basis of a partial cranium, a rib, hemal arch, pubis and a partial hindlimb (holotype: UMNH VP 20200), is the oldest known tyrannosaurid, but nevertheless a derived member of the clade, indicating a tyrannosaurid radiation to have occured during the Coniacian, Santonian and/or earliest Campanian (Loewen et al. 2013), fitting the suspected age of extinction inferred from the northern hemisphere's youngest reported carnosaurs.

The demise of this clade in Asia and North America probably allowed for a drastic diversification, size increase and subsequent rise in the trophic web among tyrannosauroids, which until then had, with few exceptions, remained small (<5m), secondary predators.

Lythronax appears to have been a mid-sized theropod, measuring ~7m in lenght and massing about 1.3-1.4t, but it displays many traits reminiscent of later, giant Tyrannosaurines, such as long, robust teeth and a wide, relatively brevirostrine skull with marked posterior expansion (and, consequently, anteriorly facing orbits), the latter a feature more marked than in any other tyrannosaur except late Maastrichtian *Tyrannosaurus rex*.

THE PAST YEAR'S SVP ABSTRACTS AND OTHER NEWS-THE HIGHLIGHTS!

Barsbold et al. report of new specimens of the enigmatic giant theropod *Deinocheirus mirificus* from Mongolia. These new fossils render the taxon's osteology almost completely known, and allow insights into its morphology and ecology.

The larger of the two specimens includes a forelimb with a humerus measuring 993mm long, approximately 6% larger than the holotype (Osmólska & Roniewicz 1970). The smaller is a subadult individual, aproximately 72% the former's size.

More than 1100 gastroliths found in its abdomen suggest that the animal, classified as a basal member of ornithomimosauria, was a herbivore, and the built of the pelvis suggests a more graviportal, slow moving creature as opposed to *Deinocheirus*' smaller, fleet-footed relatives. Most surprisingly, the animal's back bears hypertrophied and extensively pneumatised neural spines, fused to a huge plate in the sacral region, and the ribs imply a deep, narrow body.

Sertich et al. describe a new abelisaurid, known from several specimens, from the latest Cretaceous of Kenya. Along with being part of the first reported diagnostic terrestrial vertebrate fauna of terminal-Cretaceous Africa, the new taxon is by far the largest abelisaur reported so far, at an estimated total lenght of 11-12m or more. Referred cranial material shows typical abelisaurid features, such as a deep, rugose premaxilla and a prominent parietal-supraoccipital process. The skull is firmly sutured.