# THE 7TH EUROPEAN WORKSHOP OF VERTEBRATE PALEONTOLOGY

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# ABSTRACTS VOLUME AND EXCURSIONS FIELD GUIDE


- DEPARTMENT OF PALAEONTOLOGY, UNIVERSITY OF BUCHAREST
- DEPARTMENT OF GEOLOGY, BABEŞ-BOLYAI UNIVERSITY, CLUJ-NAPOCA
- "ŢĂRII CRIŞURILOR" MUSEUM, ORADEA
- UNIVERSITY "LUCIAN BLAGA" SIBIU
- THE HAŢEG DINOSAURS GEOPARK ASSOCIATION

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# Stomach contents of a Lower Triassic ichthyosaur from Spitzbergen

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The stomach content of a Lower Triassic ichthyosaur from Spitzbergen is here described. The stomach contents is now lost, and the description relies on unpublished photographs and description made in the 70's. The specimen is a juvenile that has been previously identified as *Grippia longirostris*, but the re-examination of the specimen and original literature contradicts this attribution. It is here provisionally assigned to cf. *Merriamosaurus hulkei*. Its stomach contents consists of black hooks identified as remnants of belemnoid cephalopods, and remains of annelids, which have never been described in this context. The hypothesis that these annelid remains represent the gastric contents of the preyed cephalopods is discussed. The specimen would then represent one of the rare examples of a preserved partial trophic web from Mesozoic marine environment.

# Le contenu stomacal d'un ichthyosaure du Trias inférieur du Spitsberg

Nous décrivons ici le contenu stomacal d'un ichthyosaure du Trias inférieur du Spitsberg. Ce contenu stomacal est aujourd'hui perdu, et la description est basée sur des photographies et descriptions datant des années 1970. Le spécimen est un individu juvénile, précédemment attribué à *Grippia longirostris*, mais le réexamen du spécimen et de la littérature contredisent cette identification. Il est provisoirement rapproché de *Merriamosaurus hulkei*. Son contenu stomacal est composé de crochets noirs attribués à des céphalopodes belemnoides, et des restes d'annélides, qui n'ont jamais été décrits dans ce contexte. Nous discutons l'hypothèse que ces restes d'annélides représentent le contenu stomacal des céphalopodes ingérés. Le spécimen serait alors l'un des rares exemples d'un réseau trophique marin du Mésozoïque partiellement préservé.

# New data from old finds: the dinosaurs from the Early Cretaceous Greensand ("Sables verts") of the eastern Paris Basin

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Remains of fossil reptiles (including dinosaurs) have been known from the Albian Greensand ("Sables verts") of the eastern Paris Basin since the mid-nineteenth century. At that time, in the Argonne region west of the city of Verdun, a "phosphate rush" comparable to the more or less contemporaneous "coprolite rush" of Cambridgeshire, took place, and the phosphatic nodules from the Sables verts (a shallow marine deposit of early Albian age) were intensively quarried to be turned into fertiliser. This led to the discovery of abundant fossils, including plants, invertebrates and vertebrates. Dinosaur remains were mentioned by Barrois (1875) and later described in more detail by Sauvage (1882). The following taxa were listed by Sauvage (1882):

- *Megalosaurus superbus*, a taxon known from isolated teeth and bones and a partial skeleton (which seems to have disappeared). The genus *Erectopus* was later erected by Huene (1923) for part of this material of uncertain affinities (Huene, 1926).
- *Hylaeosaurus* sp. This was based on a supposed scute. This small rather shapeless bone fragment is still kept at the Lille Natural History Museum. Its real nature is highly uncertain and it is doubtful that it really belongs to an ankylosaur.

Recently, undescribed dinosaur material from several localities in the Sables verts was rediscovered in the collections of the Nancy Zoological Museum. Although fragmentary, it provides some interesting new information about this poorly known assemblage. The available material includes:

- three teeth of a middle-sized theropod, resembling those described by Sauvage.
- the distal end of the right tibia of a large theropod. This seems to be different from the tibia (erroneously identified as a radius) referred to *Megalosaurus superbus* by Sauvage (1882).
- a left third metatarsal (lacking the proximal end) of a large, *Allosaurus*-size, theropod. This bone is remarkably slender (as was a metatarsal figured by Sauvage).
- two amphicoelous caudal vertebrae, of different sizes, belonging to fairly small sauropods. This is the first record of sauropods from the Sables verts.
- the distal end of the humerus of a nodosaurid ankylosaur. This confirms the occurrence of ankylosaurs in the Sables verts, which Sauvage's material did not really demonstrate.

One of the most remarkable elements in this assemblage thus seems to be a fairly large, but slenderly built theropod. The problem of the number of theropod taxa present in the Sables verts and of the enigmatic *Erectopus* can now be reconsidered in view of this rediscovered material.

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SAUVAGE, H.E. 1882, Mémoires de la Société géologique de France, 2, 4, 1-41.

# The first Halecomorph fish from Southeast Asia: a Sinamiidae (Amiiformes) from the Lower Cretaceous Sao Khua Formation of Thailand

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The Mesozoic sediments from the Khorat Plateau forming the Khorat Group, Northeast of Thailand, yielded abundant vertebrate assemblages. Post-Triassic deposits of that Group have long been regarded as Late Jurassic in age. However, palynological results lead to consider most of these deposits as Early Cretaceous in age. The Sao Khua Formation is probably Valanginian to Barremian in age (Buffetaut *et al*., 1997).

The vertebrate fauna of the Sao Khua Formation comprises sauropod and theropod dinosaurs, the hybodont shark *Heteroptychodus steinmanni*, turtles and crocodiles. Isolated remains of bony fishes have been recovered in different localities from the Sao Khua Formation for several years, but these have not been studied yet.

During a fieldwork conducted in February 2002 by the Thai-French group in the locality of Phu Phok, Sakon Nakhon Province, three articulated partial skulls of a sinamiid fish have been discovered. Isolated fish bones have been found in the same locality for several years. They comprise mostly pieces of jaws (premaxillaries, maxillaries, lower jaw) and vertebral centra. Some of these isolated elements show characters of sinamiids and other have their equivalent on the articulated skulls; they are assigned to the same taxon as the articulated skulls.

The sinamiids constitute a family of halecomorph fish known until now in the Late Jurassic and Early Cretaceous of China only. The presence of an unpaired median parietal allows to easily recognize the members of this family. In their extensive survey of Amiiformes fishes, Grande and Bemis (1998) regarded the Sinamiidae as the sister group of the Amiidae.

The preliminary study of the new material reveals two synapomorphies of Sinamiidae: the parietal is unpaired and the parietal and dermopterotic are about equivalent in length. However, this specimen also shows characters conflicting with the distribution of derived characters in halecomorphs proposed by Grande and Bemis (1998): the exoccipitals do not reach the posterior margin of the occiput (character of the family Amiidae) and the ornamentation of the dermal bones is strong (character of the supersubfamily Amiista).

A detailed description and an analysis of characters are now necessary to understand the phylogenetic relationships of this new form, and subsequently its paleobiogeographical implications.

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GRANDE, L. & BEMIS, W.E. 1998. *Journal of Vertebrate Paleontology*, 18, suppl. 1, Mem 4, 1-690.

# The Eocene Teleosteans from Turnu Rosu (Sibiu, Romania)

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The Eocene ichthyofauna from the geological reservation of Turnu Rosu has attracted the naturalists attention ever since the first ample systematic study was elaborated by Ludwig Johann
Neugeboren (1850-1851). He studied the fossil sharks.

Most studies refer mainly to fossil sharks and less to bony fish. Up to now, only Suraru & Suraru (1966) mentioned and described a fish species (*Scaroides gatunensis*).The present paper deals with the teleosteans remains from Turnu Rosu. The fossil material comprises mostly isolated teeth and therefore the taxa determination was rather difficult. The studied fauna belongs to the paleontological collections of the Natural History Museum from Sibiu and to personal collectings. In this study are depicted pharyngeal and splenial teeth belonging to the following genera and species: cf. suborder Labroidei, *Eotrigonodon serratus*, *Eotrigonodon cf. indicus*, *Eotrigonodon sp*. *Pycnodus toliapicus*, *Pycnodus* cf. *bowerbanki*, *Pycnodus sp*., *Progimnodus* cf. *hilgendorfi*, *Phyllodus* cf. *toliapicus*, cf. *Diodon sp*.

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# A Late Miocene mammal fauna from NW Romania and its related paleoenvironment

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The Late Miocene mammal assemblages are still extremely poorly documented in Romania: very few sites are known and the data concerning this topic are scarce. Among the Late Miocene localities, the site of Derşida (Sălaj district) is an outstanding one.

The Late Miocene vertebrate fauna from Derşida is known mainly due to some contributions published after the middle of the last century.

The most suitable succession can be observed on Peşterei Creek, located NW from the village of Derşida.

The mammal assemblage includes the following taxa: **Proboscidea** – *Deinotherium proavum* EICHWALD 1835 (=*D. gigantissimum* STEFĂNESCU, 1891), *Anancus arvernensis* CROIZET & JOBERT, 1828; **Perissodactyla** – a middle to large-sized hipparion, anteriorly assigned to *Hipparion stavropolensis* MACAROVICI, 1967 (probably a representative of the *Cremohipparion* group*)*; rhinocerotida indet. (?*„Dicerorhinus" schleiermacheri* (KAUP, 1832,1834) ); **Artiodactyla** – at least two cervids: a form probably related to (?) *Procapreolus,* beside another one, still undetermined; bovidae indet.; **Rodentia** – two beavers: a representative of *Dipoides* and a poorly documented *Castor*-size beaver; **Carnivora** – *Ictitherium pannonicum* KRETZOÏ, 1953 (a new hyena for our country).

This assemblage can be assigned to the MN13 unit, which corresponds in the intra-Carpathian realm to the Late Pontian-Early Dacian*, i.e.* the Latest Miocene.

The sedimentological data documents a distal braided-river system. Well-forested areas should have existed along the riverbanks, documented by the beavers and dinotheres. At some distance, open lands covered by grass were inhabited by hipparions.

On the Peşterii Creek succession, five arenitic „complexes" can be distinguished; each of them developed on tens of meters thickness and lateral extensions on several kilometers. Lutitic deposits separate the arenitic piles. On the lithofacies and facial associations, one can separe architectural elements comprised from SB to FF groups.

# Oligocene-Lower Miocene Ichthyofauna (Teleostei) from Romania

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The abundance of the fish assemblages in Paleogene and Lower Miocene from Tethys and Paratethys areas are well known from long ago. An important share of these fish assemblages has delivered by the Oligocene-Lower Miocene formations from Romania, both from Eastern Carpathians (the main region, with marine water fish-fauna) and Transylvania Basin (with both marine and fresh to brackish water fish-fauna)

The first remarks on the presence of the fossil fish in Romania belong to Dimitrie Cantemir, in the 18th century (Ilie, 1942) but the first scientific paper on the fossil fish from Romania is considered to belong to Cosmovici (1886), being published in Paris. A second paper was published in Romania by Cosmovici (1887), in which 2 new teleostean species (*Glyphysoma caprossoides* and *Syngnathus incompletus*) are described from Piatra Neamţ (Easter Carpathians). The first paper concerning the fossil fish from Transylvania Basin belongs to Koch, 1894

Subsequently, the list of the teleostean fish fauna mentioned from the Romania and the localities which provided it, was continuously enriched. Today, based both on the published data and on the examination of some collections from different museums or on our own recent field observations, an inventary of 65 localities with Oligocene - Lower Miocene fossil fish in the Romania and their geological background (reviewed from latest data point of view) is presented. Finally, a list of over 150 Oligocene - Lower Miocene fossil fish (teleostei) from Romania is presented. Among them, the presence of about 50 holotypes must be emphasized.

The fossil fish-fauna is generally provided by fine pelitic, bituminous shales, laminitic limestones or bituminous marls, found on different stratigraphic levels in the Oligocene - Lower Miocene formations from Eastern Carpathians and Transylvania Basin, being predominant in its lower part (Rupelian), where the fossilization conditions seemed to be the most favorable.

Even if the present paper presents the Oligocene - Lowermost Miocene teleostean fossil fish-fauna from the Romania according to latest data, we are aware that many of the mentioned species would be the object of further reviews based on Recent fish osteology mainly, to exclude any errors in the identification or in their systematic position.

The material mentioned in the present paper is hosted by the collections of the following museums: The Geological Museum of the Geological Institute of Romania, Bucharest; The Museum of Natural History, Piatra Neamţ; The Museum of Natural History, Suceava; The Museum of Natural History, Ploieşti; The Museum of Natural History "Grigore Antipa", Bucharest; the museums belonging to the Paleontological Department from the Faculties of Geology in Bucharest, Iassy and Cluj-Napoca.

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# Taxonomic and phylogenetic revision of the Blochiid fishes from the Eocene of Bolca (Italy)

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The Blochiidae are a poorly known family of fossil scombroid (mackerel-like) fishes. Its best-known representative is *Blochius longirostris*, by some believed to be the only valid species of Blochiids. However, the family, according to some authors, includes many poorly known fossil spines whose taxonomic identity is ambiguous (e.g. Schultz, 1987; Patterson, 1993). The main exponent of the Blochiids, *Blochius* (Middle Eocene, Monte Bolca, Italy) has been described in the literature a few times, but these descriptions present a poor documentation and unclear illustrations, all based on Woodward (1901). Hence, a revision of *Blochius* was carried out, starting with a thorough examination of sixty-three specimens of *Blochius longirostris* and the only known specimens of *B. macropterus* and "*Blochius" moorheadi.* These were re-described, illustrated, and compared with potential fossil and extant relatives. *B. longirostris* and *B. macropterus* are the only well-defined species of Blochiids. A cladistic analysis suggests that Blochiidae are the sister group to a clade consisting of Recent swordfish and the fossil genus *Xiphiorhynchus*. Because of lack of data and uncertainty of identity, the relationships of *Blochius* to most other supposed blochiids remain undetermined. *Aglyptorhynchus* may however still be a blochiid. Based on morphological traits, comparison with Recent taxa and the palaeoecological knowledge of its area, hypotheses of the lifestyle of *Blochius* are made. The results of our investigations on blochiids appear later this year (Fierstine & Monsch, 2002).

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# Late Cretaceous amphibians and lacertilians from Pui (Haţeg Basin, Romania)

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In 2000 and 2001, a joint team from Universitatea Babeş-Bolyai (Cluj-Napoca, Romania) and the Royal Belgian Institute of Natural Sciences (Brussels, Belgium) screen-washed 2500 kg of sediments from a new large lens found in the south of the Pui village along the Bărbat river. The sediments are attributed to the Maastrichtian Sânpetru Formation that yielded one of the richest and most diversified Late Cretaceous continental faunas in Europe. The red colored silty layer found at Pui, probably deposited in a northerly flowing braided river system under a warm and humid climate with seasonal fluctuations.

Numerous fragments of lacertilian and amphibian microfossils were found in this site. The amphibians are represented by a Discoglossidae ind. and a Lissamphibia (*Albanerpeton* cf. *inexpectatum*). It suggests that the genus *Albanerpeton* came into Europe during the Late Cretaceous, instead of the Tertiary as previously thought.

The lacertilians are represented by a Squamata ind., a new Teiidae (*Paraglyphanodon* nov. sp.) and two Paramacellodidae (*Becklesius* nov. sp. and aff. *hoffstetteri*). The stratigraphical range of the latter family is thus extended for a 70 Ma period, as this genus was previously described from Kimmeridgian deposits.

The presence of *Albanerpeton* and *Paraglyphanodon* at Pui indicates a North American influence on the East European amphibian and lacertilian faunas by Maastrichtian times.

# Franz Baron Nopcsa's slights on Albania and the dinosaurs of the Hateg Basin

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Baron Franz Nopcsa (1877-1933) was a geographer and geologist, ethnographer, soldier and spy. A researcher who paid close attention to the smallest details, yet a man of wide vision, capable of great scientific insight and synthesis. A Hungarian patriot who feared for his country and took political gambles of his own determination. A respected member of academic bodies and aristocratic circles, and at the same time a man who was equally at home among warring Albanian tribes and the Csobans of Transylvania.

From time to time he would grow his hair and disappear from sight of his friends. He travelled the mountain regions under a false identity of Peter Gorlopán. He sent back reports directly to the chief of the Monarchy's ruling elite, Franz Conrad von Hötzendorf. His character was a unique combination of a Renaissance-like openness and the romantic idealism of a Jókai novel. This adventurous existence came to a shocking end - in a double murder-suicide

The first findings of bones were made by his sister Ilona, the remains having become exposed in a hillside on the family's estate at Szentpéterfalva. Among these were a duck-billed dinosaur, an armoured reptilian, a sauropod with a long neck and tail, and several other exciting findings, including a predatory and a flying reptile (Pterosauria). These are the dinosaurs of Nopcsa: the *Magyarosaurus dacus* and others.

From the scientific point of view, the significance of these priceless relics lies in their link to the well-known dinosaurs of similar age from North America and Asia. The Transylvanian dinosaurs appear to have lived on an island – which may explain their dwarf dimensions. They were present some 67 million years ago, just prior to the complete extinction of the giant reptiles. They may even have witnessed the fatal meteorite.

The lecture focuses on the adventures, double life of the baron. The scientific result and political activity of Nopcsa is briefly discussed. Many of the original slights of the baron are used to illustrate the lecture. The photos were taken in Albania about 100 years ago, with a Kodak camera no. 1.

# Solar gliders in Mesozoic airs

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In 1989, Martill & Unwin described a fragment of a pterosaurian wing membrane from the NE Brazilian Lower Cretaceous Santana Formation showing a multilayered structure. Below a naked epidermis with an ornament of fine wrinkles there is a layer of foamy tissue of unknown nature followed by a layer of bundles of circular to oval cross-section and consisting of connective tissue fibrills, most likely representing actinofibrills. Below these bundles a layer of muscle fibres is visible intersected by strands of connective tissue. Recently, a new specimen of *Rhamphorhynchus muensteri* with an exceptionally well preserved wing membrane was discovered in the Upper Jurassic Solnhofen Plattenkalk. The specimen confirms the layers of the wing membrane described by Martill & Unwin (1989) but additionally allows the orientation of the Santana specimen and preserves a layer of blood vessels at the ventral wing surface. These two specimens in combination allow the reconstruction of some unexpected aspects of pterosaur physiology. 1) The wrinkles on the epidermis surface could have served as a cooling device similar to the ribs of air-cooled engines. 2) The foamy tissue could have been filled with air and thus serve as insulation and stabilisation device similar to a thermarest mattress. 3) The blood vessel layer on the shadow side of the wing could have been used for thermoregulation provided the blood vessels were contractile and could control the blood flow in dependence of the external temperature. The structure of the pterosaur wings explains why these animals could fly under the sun without the problem of overheating and indicates a method of thermoregulation which was hitherto unknown.

# Solarsegler am mesozoischen Himmel

Im Jahre 1989 beschrieben Martill & Unwin das Fragment einer Pterosaurier-Flughaut aus der nordostbrasilianischen Santanaformation, Unterkreide. Unter der nackten, fein gerunzelten Epidermis bwfidet sich eine schaumig aussehende Gewebelage unbekannten Typs. Diese ist unterlagert von im Querschnitt ovalen oder runden Bündeln, die aus Kollagenfasern zusammengesetzt sind und höchstwahrscheinlich Aktinofibrillen repräsentieren. Unter diesen Bündeln ist eine Muskelfaserschicht zu sehen, die von Bindegewebssträngen unterbrochen sind. Kürzlich wurde in den oberjurassischen Solnhofener Plattenkalken ein neuer Rhamphorhynchus muensteri mit ungewöhnlich guter Flughauterhaltung gefunden. Das Stück bestätigt die von Martill & Unwin (1989) beschriebenen Schichten der Flughaut, aber erlaubt darüber hinaus die Orientierung den lagigen Aufbau des Santana-Stückes. Zudem ist auf der Flügelunterseite des solnhofener Stückes eine Blutgefäßschicht überliefert. Die Kombination der beiden genannten Stücke ermöglicht die Rekonstruktion einiger unerwarteter Aspekte der Pterosaurierphysiologie. 1) Die Runzeln auf der Epidermisoberfläche könnten, ähnlich der Kühlrippen eines luftgekühlten Motors, einen Kühleffekt gehabt haben. 2) Das Schaumgwebe war möglicherweise mit Luft gefüllt und könnte eine isolierende und stabilisierende Wirkung gehabt haben, ähnlich wie eine Thermarest-Matratze. 3) Die Blutgefäßlage auf der Schattenseite des Flügels könnte zur Thermoregulation benutzt worden sein, vorausgesetzt die Gefäße waren kontraktil und konnten so den Durchfluß in Abhängigkeit von der Außentemperatur kontrollieren. Die Struktur der Pterosaurieflügel erklärt, warum diese Tiere ohne Überhitzungsprobleme unter der Sonne segeln konnten und deuten auf ein Thermoregulationssystem hin, das bislang unbekannt war.

MARTILL, D.M. & UNWIN, D.M. 1989, Nature, **340**, 138-140.

# Parataxonomic classification of eggshells from Pui in the Hateg Basin (Romania)

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Examination of forty egg fragments collected from the site of Pui (Hateg Basin) has revealed a greater ootaxonomic diversity that known from complete eggs or clutches found in the other Upper Cretaceous localities from Romania (Grigorescu 1993, Grigorescu *et al.* 1994; Codrea *et al* in press). The eggshells obtained by screen-washing, were associated with a diversified microvertebrate remains (including dinosaurs, squamates, mammals…). The egg material correspond to several parataxonomic units ( Mikhaïlov *et al.* 1996) and is referred to 5 morphotypes (discretispherulitic, prolatospherulitic, prismatic, ratite and geckonoid). The study of these ootypes provids us paleogeographical data and clues about the diversity of egg layers in the Campano-Maastrichtian from Romania.

CODREA V., SMITH T., DICA, E. P., FOLIE A., GARCIA G., GODEFROIT G. & VAN ITTERBEECK J. (in press). Dinosaur egg nests, diapsids and mammals in a new Maastrichtian site of the Hateg Basin (Romania). Comptes Rendus Palevol.

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MIKHAILOV K. E., BRAY E. & HIRSCH K. F. 1996, Journal of Vertebrate Paleontology, 16, 763-769.

# A remarkable new hollow-crested hadrosaurid dinosaur from Far Eastern Russia

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In 2000 and 2001, the complete skeleton of a new lambeosaurine (Hadrosauridae) dinosaur was excavated at Kundur, in Far Eastern Russia. This is the first time that the supracranial crest structure is preserved in a lambeosaurine specimen outside western North America. Besides this skeleton, the Kundur locality has also yielded numerous bones and teeth belonging to flat-headed hadrosaurid, ankylosaurian and theropod dinosaurs, but also to turtles, crocodiles and multituberculate mammals. Palynological data indicate that this site may be 'middle' to late Maastrichtian in age. The new lambeosaurine from Kundur is remarkable by the unusual shape of its hollow crest, by the important elongation of its neck (18 cervical vertebrae) and by an additional articulation between adjacent neural spines that rigidified the proximal third of the tail. A phylogenetic analysis shows that this new taxon forms the sister-group of *Corythosaurus* and *Hypacrosaurus*, from the late Campanian of North America. This cladogramme also clearly demonstrates that lambeosaurines originated from Asia, the most basal forms being successively *Tsintaosaurus spinorhinus*, *Jaxartosaurus aralensis* and *Amurosaurus riabinini*. Lambeosaurines migrated to North America before or at the beginning of the late Campanian. Lambeosaurine were dominant herbivorous dinosaurs in latest Cretaceous localities of Amur Region, being represented, in the current state of our knowledge, by three genera: the new taxon from Kundur locality, *Amurosaurus riabinini* in Blagoveschensk locality, and *Charonosaurus jiayinensis* in Jiayin locality, along the Chinese banks of Amur River.

# Dinosaur egg nests, mammals and other vertebrates from a new Maastrichtian site of the Haţeg Basin (Romania)

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The Toteşti-baraj site is located in the central part of the Haţeg Basin, in the northwestern part of the South Carpathians. According to the geological map of the area, the outcropping sediments belong to the Maastrichtian Sânpetru Formation. However, the general appearance in the field of the studied sediments is rather different from the sediments of the type locality of the Sânpetru Formation. The facies distribution observed at Toteşti-baraj indicates a fluvial palaeoenvironment with sandy channel infills and mainly black silty and clayey overbank deposits. At the end of spring 2001, the first Belgo-Romanian excavation campaign discovered in this locality more than forty eggs organised in 11 nests. These eggs may be referred to as the oofamily Megaloolithidae and closely resemble the eggs previously described in the Haţeg Basin and the French oospecies *Megaloolithus siruguei*. The locality was probably frequented as a nesting site during a large time span, as dinosaur nests have been found at different stratigraphic levels. Screen-washing of 1500 kilograms of sediments collected around the nests provided a particularly diversified microvertebrate fauna. Amphibians are represented by Albanerpetontidae and discoglossid Anura. Two types of sciencomorph lepidosaurians co-existed in this locality. Dinosaur teeth are particularly diversified in the sample collected at Totesti-Barraj. Besides hadrosauroid and nodosaurid ornithischians, at least five different kinds of isolated theropod teeth may be distinguished. But the most remarkable collected micro-remains are mammal teeth, representing at present the richest multituberculate collection from the Upper Cretaceous of Europe. The presence of at least two taxa of the family Kogaionidae (Multituberculata) is attested by fourteen complete teeth and several tooth fragments of mammals. Micropalaeontological analysis and study of vertebrates are in process in order to determine more precisely the age, the faunal content and the palaeoenvironment of the Totesti-Baraj locality.

# Fossil fish scales from the Tertiary of the West Carpathians

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Fossil fish scales represent the significant part of the taphocoenosis in the Tertiary (Oligocene) sediments of the Carpathians flysh. They have the taxonomic importance above all when the whole skeletons are absent. They are part of the complete osteological analysis of the fossil fish. In some groups (e.g. representatives of the family Myctophidae) the scales bear the light organs. Therefore they have a paleoecological significance. The scales of the representatives of the families Myctophidae, Gadidae, Ostraciidae, Serranidae, Clupeidae and other Teleostei gen. indet. are present in the Carpathians Flysh.

# Vertebrate Paleontology in Romania - a brief account

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Information on fossil vertebrates in Romania might be found in several travel descriptions from the 17th up to the 19th centuries. These regard especially Late Tertiary and Quaternary large mammals whose remains were found exposed on the ground.

But the first vertebrate palaeontology studies date only from the second part of the 19th century, starting with L.J. Neugeboren's paper from 1850 on a large collection of fossil sharks from the Eocene limestones of southern Transylvania. Till the end of the 19th century and the first decades of the 20th fossil vertebrates were reported from all the three major regions of Romania: Valachia, Moldavia and Transylvania. Among these studies are especially noteworthy A. Koch's papers on the Perissodactyl mammals from Transylvania, including the description of a primitive rhinocerothid: *Prohyracodon orientale* from the Upper Eocene (1897), G. Ştefănescu's studies on the complete skeleton of the proboscidean *Deinotherium gigantissimum* from the Upper Miocene (Meotian) of Southern Moldavia, S.Athanasiu's works on the mammals from the Argeş and Covurlui counties (1905, 1915) and S. Ştefănescu's papers on the systematics and phylogeny of the mastodons and elephants (1913 - 1924).

The Tertiary and Quaternary mammals remained since now a principal subject in the Romanian Paleontology, reflecting the stratigraphical structure of the country in which the corresponding deposits are largely exposed. I. Simionescu, the greatest vertebrate paleontologist of Romania, cas contributed numerous important studies on this subject, starting from 1898 till 1942. Apart from the large mammals, the micromammals that are very useful for biostratigraphic purposes in continental deposits were also intensively searched after 1960, both in outcrops and in cave deposits. The main promoters of these studies are C. Rădulescu, P. Samson and E. Terzea. The cave deposits, widely represented in the Carpathian sectors and Dobrogea, have also provided important Quaternary herpeto- and avifaunas, the systematic studies of which being undertaken by researchers from Cluj and Oradea.

Other major subjects in Romanian Vertebrate Paleontology are the Oligocene and Lower Miocene marine teleost fishes found in Eastern and Southern Carpathians and in Transylvania, and the Cretaceous dinosaurs discovered in terrestrial deposits from the extremities of the period, namely in the Lowermost Cretaceous (Wealden) bauxite from Western Carpathians, and respectively, in the Uppermost Cretaceous (Maastrichtian) terrigenous deposits from the Haţeg Basin and other regions of Southern and Western Transylvania. The studies on teleost fishes were constantly developed by M.Pauca, from 1932 till the early '70s, while F. Nopcsa is the best known researcher on the systematics and paleobiological studies on the dinosaurs and other contemporaneous reptiles from Haţeg, to which he devoted several papers elaborated between 1898 and 1934. T. Jurcsák has devoted the last twelve years of his life to the preparation and systematic studies of the Early Cretaceous dinosaur remains from the hard bauxite matrix.

Other fossil vertebrates in Romania, even more rarely found in comparison with the groups mentioned above, include ganoid fishes from the Late Carboniferous and Early Permian lacustrine deposits, Triassic marine reptiles (ichthyosaurs, nothosaurs), Tertiary marine and peri-marine mammals (cetaceans, sirenians and pinnipeds) and birds.

# New results in the study of the Middle Miocene vertebrate faunas of the Carpathian Basin

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During the las five years four new important microvertebrate faunas were collected from the Miocene non-marine sediments of Northern Hungary and a fifth one was excavated in the western part of Romania by Dr. Marton Venczel. Besides the vertebrates rich mollusk materials were also produced by all these localities. The new discoveries represent important connection points between the terrestrial and the marine stratigraphy of the Paratethys.

1. Sámsonháza (N. Hungary). The bones were found in a diatomaceus clay layer at the limit of the Sámsonháza and the Sajó Valley Formations. The mollusk fauna allows its referral to the Middle Badenian. The rodent fauna is characteristic for the MN 6 zone, including *Spermophilinus bredai, Muscardinus sansaniensis, Microdyromys complicatus, Miodyromys aegercii, Miodyromys aff. aegercii, Megacricetodon minor, Democricetodon sp., Cricetodon cf. hungaricus, Eumyarion medius.*

2. Mátraszölös 1-2. (N. Hungary). The finds were excavated from the green clay and the diatomaceous clay layers of a lacustrine series referred to the Sajó Valley Formation. The mollusk fauna is Late Badenian in age. The rodents indicate the MN 7 zone, with *Eurolagus fontannessi, Spermophilinus bredai, Muscardinus aff. sansaniensis, Eliomys truci, Bransatoglis sp., Eomyops oppligeri, Keramidomys mohleri, Democricetodon mutilus, D. cf. freisingensis, Megacricetodon minor, Cricetodon cf. hungaricus, Eumyarion latior, Anomalomys gaudryi.*

3. Felsőtárkány 1. (N. Hungary). The bone bearing green clay was classified as a part of the Sajó Valley Formation. The mollusk fauna is characteristic for the Late Sarmatian. The mammal assemblage possibly suggests the presence of the MN8 zone: *Glirulus sp., Myoglis meini, Eomyops oppligeri, Keramidomys cf. mohleri, Megacricetodon sp., Anomalomys gaudryi*.

4. Felsőtárkány 3/2. The material was collected from a grey clay layer paced immediately above the Galga Valley Rhyolite Tuff. The mollusk fauna is Late Sarmatian. The rich microvertebrate material is refereable to the MN 8 zone: *Spermophilinus bredai, Hylopetes sp., Blackia miocaenica, Muscardinus aff. sansaniensis, Microdyromys complicatus, Myoglis meini, Eomyops oppligeri, Keramidomys mohleri, Megacricetodon minutus, Eumyarion medius, Collimys n. sp., Anomalomys gaudryi.*

5. Tăşad (Romania). In the section the fossiliferous green clay is underlain by limestones (Tinnye Formation). The rich mollusk material ppoints to the presence of the Volchynian substage of the Sarmatian. The stratigraphical position of the microvertebrate material is MN 7: *Spermophilinus bredai, Muscardinus aff. sansaniensis, Eliomys sp., Democricetodon brevis, Megacricetodon cf. minor, Eumyarion medius, Cricetodon sp*.

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# Biogeography of the Late Pleistocene-Holocene faunal interchange: small mammals in Central Europe

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The long distance migration and extinction events are traditionally looked upon as the major way in which the various taxa respond to the climatic and environmental fluctuations of the Quaternary period. Under such a range dynamic (called ORD recently) the major characteristic of the faunal development is a periodic alternation of two chorologic units, glacial and interglacial assemblages, which differ almost completely: in their core species, energetic structure and even in the satellite species contributing them. In full, it holds for the mid-European Late Pleistocene and the present cycle (Vistulian and Holocene) in particular.

Nevertheless, the extensive fossil record now available from Central Europe revealed even for that period numerous cases which do not fit to the above model, e.g. those suggesting that the local extinctions were not complete either in some of the interglacial elements during the glacial period and vice versa. In the present cycle, this typically concerns e.g. *Microtus agrestis, Sicista* spp., *Microtus oeconomus, Arvicola terrestris, Cricetus cricetus*, i.e. just those species which are capable to switch between the rarity dynamics when surviving in the mutually isolated micropopulations and breaks of local expansion responding the bouts of ecological release. Maximum spread of these species has been associated with the transitional stages between glacials and interglacials, while their average distribution during most time of the cycle was rather discontinuous. Their distributional dynamics is thus characterized with a variegated, fine-patched and greatly fluctuating vicariance patterns, which contrasts to rather countinuous distribution and the large scale migration/extinction dynamics characteristic for the core elements such as *Microtus gregalis, M.arvalis, Dicrostonyx* sp., *Sylvaemus* spp. or *Clethrionomys glareolus*.

Anyhow, the situation in the early Pleistocene was apparently different. Both the glacial and interglacial assemblages were rather uniform not only in their species composition but also in core elements and the overall dominance pattern. It seems, hence, that the Early Pleistocene faunal dynamic was not modulated essentially with the large scale migration/exctintion events but with the local fine grained variation in the vicariance pattern of individual taxa. The transition between the two types faunal dynamics was relatively sharp, and for the small rodents it can be correlated with FAD *Arvicola* and beginning of the glacial cycle G.

The situation described above for the present glacial cycle in Central Europe is, however, not entirely valid for the regions more distant from the actual periglacial area. For instance, the available fossil record from the SE-Europe and Asia Minor, shows only minute faunal changes during the Vistulian/Holocene period what rather reminds the pattern characteristic of the mid-European Early Pleistocene than the recent cycle. No wonder that the average level of the Recent faunal provincialism is much higher in the SE-Europe and Asia Minor than in Central Europe where it achieved its maximum during the Boreal time.

In conclusion, the local vicariance dynamic is a plesiochoric pattern of the European rodent faunal development. When looking for historical scenarios in biogeographic and phylogenetic studies, it is just that what is the first to be taken in account, especially in the southern Europe.

# Fossil snake assemblages from the French Middle Miocene localities at La Grive (France)

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Localities at La Grive are situated about 35 km east of Lyon, in the department Isère. It is a case of karstic fissures which are developed in the Bajocian limestone which forms the topographically and geologically high blocks that are locally called "islands", like L'îsle d'Abeau (Freudenthal & Mein 1989). Material from two classical fissures have recently been investigated - La Grive L7 and La Grive M. Both localities represent the unique European palaeoherpetological Middle Miocene (MN 7+8) sites. Localities show somewhat different fossilisation each other and also different snake diversity.

Representatives reported from La Grive L7 (MN 7+8 sensu de Bruijn et al. 1992) are as follow: Typhlopidae: *Typhlops* cf. *grivensis*; Colubridae: *Coluber* sp. 1, *Coluber* sp. 2, *Texasophis meini*, *Natrix* sp. 1, *Natrix* sp. 2; Elapidae: *Naja romani*, *Naja* sp. 1, *Micrurus* sp. (probably *M. gallicus*); Viperidae: *Vipera* sp. 1 ('Oriental vipers'), *Vipera* sp. 2 ('*aspis*' complex).

The snake assemblage reported from La Grive M (MN 7+8 sensu de Bruijn et al. 1992; Steininger et al. 1996) is much more diversified: Typhlopidae: *Typhlops* cf. *grivensis*; Boidae: Boidae gen. et sp. indet., Erycinae gen. et sp. indet.; Colubridae: *Coluber* cf. *dolnicensis*, *Coluber* sp. 1, *Coluber* sp. 2, *Coluber* sp. 3, *Elaphe* sp. 1, *Elaphe* sp. 2, *Paleoheterodon* sp. (probably *P. arcuatus*), *Texasophis meini*, Colubrinae A, B & C, *Neonatrix* sp., *Natrix* cf. *sansaniensis*, *Natrix* sp. 1, *Natrix* sp. 2, *Natrix* sp. 3, Natricinae gen. et sp. indet.; Elapidae: *Naja* cf. *romani*, *Micrurus gallicus*, Elapidae gen. et sp. indet. 1 [which is closely similar to small elapids from Merkur-North (Ivanov – in press)], Elapidae gen. et sp. indet. 2 (large form); Viperidae: *Vipera* sp. 1 ('Oriental vipers'), *Vipera* sp. 2, *Vipera* sp. 3. Several morphotypes may represent new species.

As results from the comparison with some other Miocene ophidian localities in Europe (Sansan, MN 6, Devínska Nová Ves, MN 6, Gritsev, MN 9a, Kohfidisch, MN 11) (Rage & Augé 2000; Ivanov 1997, 1998; Bachmayer & Szyndlar 1985, 1987) snake assemblages at La Grive L7 and La Grive M show a rapid evolution of colubrid snakes in Europe. North American extinct taxa show their last European occurrences (*Texasophis*, *Paleoheterodon*, *Neonatrix*), representatives of extant genera are prevailing. It seems probable that almost all morphotypes represent exclusively extinct species.

As regards representatives of *Natrix* sp. 2, which were partially (La Grive L7) affiliated to *Natrix* aff. *longivertebrata* in older publications (Rage & Szyndlar 1986; Szyndlar 1991), preserved cranial elements really do not differ from that of *Natrix longivertebrara* reported first (Szyndlar 1984) from the Polish Late Pliocene locality of Rębielice Królewskie 1A (MN 16). However, vertebral morphology of the Polish type material is different from *Natrix* sp. 2 with much more shorter vertebral centra in the material from La Grive. Vertebrae of *Natrix* sp. 2 are much more massive than it is in remaining extinct and living representatives of the genus *Natrix*. However, the general structure of vertebrae is very similar to the posterior precaudal vertebrae of some living specimens of *Natrix natrix*. Snake assemblages from La Grive L7 and La Grive M give the evidence of rapid adaptive radiation of colubroid snakes in European Neogene but the distinct direct ancestors of recent European species are known to a large extent since the Late Miocene.

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# Vertebrates remains of the Middle Eocene Csordakút basin, Hungary

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Three well-preserved land mammal teeth were found in the Middle Eocene marine marl, at Gerecse, in the abandoned bauxit pit Csordakút II (Gerecse Hills, Hungary). The teeth are molaris (M1-3) of a left maxilla of a juvenile specimen and were described as *Hyrachyus* cf. *stehlini*. This is only the fourth Eocene land mammal fossil, which was reported from Hungary.

*Hyrachyus* is the oldest known rhinocerotoids. They were widespread in North America during Eocene and the oldest and the richest remains occur there. They migrated from America to Europe about 55 My ago. About 48 My ago this route was disconnected and Europe became isolated from America and rest of the world in the late Eocene. Thus the European Eocene fauna was dominated by several endemic perissodactyls. The Csordakút area lay on an island of the Adriatic microplate of the Tethys during the Eocene. These fossils suggest the possibility of a temporary land connection with the European continent. According to the mammalian fossils the beds can be correlated to the Rhenanian or Geiseltalian mammalian unit.

*Hyrachyus* lived in tropical and subtropical marsh and mangrove on alluvial plains or seashore. This kind of biotope was recognized in the Middle Eocene of Transdanubia.

Beside the mammalian remains, lots of shark teeth, among them *Nebrius thalensis*, *Galeocerdo latidens*, *Carcharias hopei*, *Striatolamia macrota*; **rays teeth** – *Aetobatis irregularis*; *Myliobatis sp*., *Dasyatis sp*., *Rhinobatos sp.* and Osteichthyes, turtles, crocodiles and Sirenia were also found.

# Locomotion of Ichthyosaurs

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Before discussing the locomotion of ichthyosaurs, the flexibility of their vertebral column should be determined. One possible way is to look for the intervertebral spaces. For such a purpose numerous ichthyosaurs form the Holzmaden oil shale are available where the total length of the vertebral column and the length of each vertebra can be determined to high precision. Based on these measurements the intervertebral space can then be calculated. The next step would be to develop a three-dimensional model of the intervertebral substance, and then test the movability of the vertebrae against each other, for example with finite element analysis (see for example Zander *et al*. 2002). However, for any analysis concerning the mobility of the ichthyosaur vertebral column the knowledge of the nature of the intervertebral substance is crucial. The problem is that ichthyosaur vertebrae are enigmatic in being extremely amphicoelous. A new and exceptionally well prepared ichthyosaur skeleton (SMNS 81960) for the first time preserves the attachment area for an annulus fibrosus. According to the fossil evidence, this annulus fibrosus could only have been a few millimeters thick. It is likely that tough connective tissue wrapped the intervertebral gap and formed a ring-like junction between two adjacent vertebrae. Such a type of annulus fibrosus makes it likely that the ichthyosaurian intervertebral joints represent liquid-filled synovial joints, constructionally similar to those of crocodilians (SALISBURY & FREY 2000). According to these, the ichthyosaur vertebral column would have been much more flexible as has been assumed on the basis of mammalian intervertebral discs (Zander *et al*. 2000).

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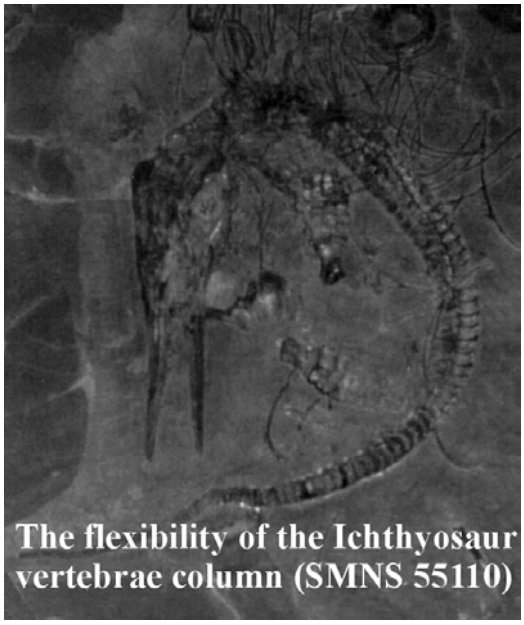

# A new hypothesis for the phylogenetic position of long-snouted eurhinodelphinids (Mammalia, Cetacea) from the Miocene of Anvers, Belgium

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The building of fortifications around the city of Anvers (North of Belgium) during the second part of the XIXth century has yielded huge quantities of cetacean fossils from the Neogene, and particularly several taxa of long-snouted dolphins from the Antwerpen Sands (late Early Miocene – Middle Miocene). These species have been first described by du Bus (1867 and 1872) and more deeply investigated by Abel (1901 and 1902), gathering them in a family Eurhinodelphinidae. Members of this extinct group have since been found in numerous Miocene (and maybe Oligocene) localities of the world and 5 genera are now described: *Eurhinodelphis*, *Ziphiodelphis*, *Argyrodelphis*, *Schizodelphis* and *Macrodelphinus*, with a main synapomorphy : the lenghtening of the maxilla-free portion of the premaxillae on the rostrum, associated with a much shorter mandible (Muizon, 1990).

The phylogenetic relationships of the family Eurhinodelphinidae have long been debated. Autors like Abel (1901, 1902), Dal Piaz (1977) and Pilleri (1985) have noticed similarities between eurhinodelphinids and the family Ziphiidae (beaked-whales). However, recent phylogenetic studies (Muizon, 1990 ; Fordyce, 1994) suggest sister-group relationships between the ziphiids and the physeterids (sperm-whales), bringing the eurhinodelphinids closer to the Delphinida.

With the description of a recently discovered skull of the species *Eurhinodelphis cocheteuxi* from the Antwerpen Sands, associated with its ear bones, never described for this species (a periotic, two tympanics, a malleus and a stapes), a cladistic analysis (Paup, version 4.0 beta 10) has been undertaken using 73 characters for 8 extinct and 8 extant odontocetes taxa. The most parsimonious tree obtained shows a sister-group relationship between *E. cocheteuxi* and the ziphiids. These are not closely related to the physeterids, a result consistent with the morphological study on extant odontocetes of Heyning (1989) and the molecular analyses of Cassens *et al.* (2000), Hamilton *et al.* (2001) and Nikaido *et al.* (2001). An other point that should be more deeply investigated is the possible non-monophyletism of the family Eurhinodelphinidae, *Schizodelphis* being here more basal than the *E. cocheteuxi* – ziphiids clade.

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# Glasgow's *Leedsichthys* - Red Herring or Rosetta Stone?

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The extinct Callovian Actinopterygian fish *Leedsichthys problematicus* represents a fossil enigma of some 115 years standing. As with other members of the Pachycormidae (Lambers, 1992), the vertebral column does not ossify and is not preserved. In his formal description of the taxon, the renowned palaeoichthyologist Arthur Smith Woodward tentatively identified eight different bone morphologies (Woodward, 1889), some of which he later radically revised (Woodward, 1895). The generally crushed and fragmentary skull bones, with their large size and extreme fragility, have posed considerable barriers to workers wishing to continue Woodward's work of identification, and reconstruct this remarkable animal.

A recent review of all material held in UK museums, in conjunction with archival research, has revealed significant 'lost' topotype specimens, including one (in the vertebrate collections of the Hunterian Museum, University of Glasgow) that is considerably more complete than any specimen previously described (Liston, 1999).

This work has shed considerable light on the identity and structure of the bones of *Leedsichthys*, and in turn has had a considerable impact on the published estimates of the full adult length (up to 27 metres) (Martill, 1985) of this animal.

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# Middle Jurassic dinosaur tracks from Morocco – Facts and fiction

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Dinosaur fooprints from the Central Atlas Mountains of Morocco have long been known (Plateau et al., 1937) but not been study until 1980 by Dutuit & Ouazzou. The latter formerly described a large sauropod trackway as a new ichnospecies *Breviparopus taghbaloutensis*, the tridactyl footprints from the Demnat site were only briefly mentioned. Ishigaki (1985) attributed a trackway with manus prints from the same site to swimming sauropods.

The Middle Jurassic dinosaur footprints from Guettioua Formation in the Iouaridene Basin (Demnat, High Atlas, Morocco) are reviewed. Several tracklevels have been detected that were left in overbank deposits with abundant mud cracks. The large sauropod tracks (*Breviparopus taghbaloutensis*) have been reexamined . Neither manus nor pes imprints show traces of claws (as figured in Ishigaki, 1985 and Dutuit & Ouazzou, 1980), most of the manus imprints are deformed by the pushing action of the pes. The manus only trackways (swimming sauropods of Ishigaki) could not be found, all of the observed trackways consist of manus and pes sets. The presence of oscillation ripple marks on the tracklevels indicating a waterdepth of no more than 50 cm serioulsy questions Ishigaki's interpretation of swimming sauropods.

The trackway assemblage consists of small and large sauropods as well as three different morphotypes of theropods. The smallest form is attributed to the ichnogenus *Carmelopodus*, whereas the largest footprints belong to a hitherto unknown ichnogenus. One tracklevel shows six parallel trackways of medium-sized sauropods.

Another site in the vicinity of Isseksi (Syncline of Taguelft) has yielded a large slab with at least seven trackways of a small theropod assigned to *Carmelopodus*. They are situated at the base of the Guettioua Formation and therefore coeval with the trackbeds in the Demnat area. The sandstones and red bed sediments have been formed in a fluvial environment with channels and overbank deposits, the latter containing abundant bones of sauropods. Close to the village Bin el Ouidane, lacustrine intercalations in the Tillouguitte Formation show ten parallel trackways of small sauropods.

The Demnat and Bin El Ouidane sites with several parallel trackways of subadult dinosaurs demonstrate for the first time social behaviour in sauropods as early as the Middle Jurassic.

The presence of *Carmelopodus* in the Demnat and Isseksi area, as well as in the USA and England (Lockley & Meyer, 2000) confirms the age assignement of the contintental sediments (Bathonian) in Morocco (Jenny et al. 1981) .

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# A new Nodosaurid (Ankylosauria) from the Upper Cretaceous (Santonian) Csehbánya Formation, Bakony Mts, Hungary

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Two partial skeletons were discovered from the Upper Cretaceous Csehbánya Formation in the Bakony Mts, Western Hungary. Based on the palynological examinations the age of the find is Santonian. The first one consists of one cervical vertebra, one cervical rib, six dorsal ribs and five dermal plates.

The second skeleton is more complete and disarticulated when found including skull elements, two cervical, four dorsal and three caudal vertebrae, several cervical and dorsal ribs, right scapula, preacetabular part of the left ilium, left ischium, left(?) fibula with four metatarsals, three chevrons and more than hundred dermal plates and spikes.

Skull elements are the premaxilla, the prevomer(?), the right postorbitale and jugale, the right quadrate, the pterygoid, the occipital condyle and nine isoleted teeth. The posterior part of premaxilla bears teeth. The quadrate is wide mediolaterally, the quadrate condyl is rhomboidal, more robust than that of *Struthiosaurus*. In contrast to that in *Sruthiosaurus* the suture between quadrate and quadratojugale is not visible. The pterygoid has an interpterygoid vacuity like *Pawpawsaurus campbelli.* The jugale and postorbitale have dermal plates and the jugale is wider dorso-ventrally than the jugale of *Struthiosaurus transsilvanicus.*

The centrum of the cervical vertebrae are wider than long. The caudal cervical vertebra is strongly opistocoelous, the cranial face is higher than the caudal face. Neural arches of the dorsal vertebrae are not so high and have no deep cavity towards the centrum as in *Struthiosaurus transsilvanicus.*

Caudal vertebae are similar to those of *Struthiosaurus*. The dorsal ribs are T-shaped in cross-section. The pseudoacromial process lies posteriorly than on the scapula of *Struthiosaurus*. The preacetabular part of the left ilium is developed similar to that of *Struthiosaurus austriacus*. Body of the left ischium is long, laterally compressed and has a slight curvature, concave cranially, but the distinct flexion of ischia, characteristic to Nodosaurids, is not visible. The fibula is straight, in lateral and anterior views. At the distal end of that, as originally found, there were four metatarsals. Proximal and distal ends of the metatarsals are strongly divergent.

The condition and measurements of the bones indicate a mature individual of about 3 to 4 metres length. On the basis of the features of the skull elements, the wider than long cervical vertebrae and the strongly opistocoelous, caudal cervical vertebra suggest a more primitiv Nodosaurid than *Struthiosaurus* and represent a new taxon of the European Ankylosaurs.

# Mammalian Ecosystem dynamics in the Carpathian Basin during the last 27,000 years

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The Quaternary mammalian fauna of the Carpathian Basin is well described by ecological variables of the ecosystem, such as the number of species, equitability, diversity index as well as trophic and body size structures. On the basis of these ecological variables six ecomorphological zones could be established (zones A-F). The cluster analysis made on species composition and number of specimen of the small mammalian fauna, supported the conclusions of the ecological variables.

The analysis was made on mammalian faunas of 63 strata of 15 localities in the Carpathian Basin from the last 27,000 years, which were suitable for the selection criteria.

Two principal cycles and, within these, secondary cycles were found by the ecotype analysis. The first cycle (27,000-10,000 B.P.) was characterized by a low diversity index, equitability and number of species, while the second cycle (10,000-0 B.P.) was characterized by high values. The first cycle was dominated by rodents and browser/grazers, while the second cycle was characterized by rodents, insectivores and carnivores.

The first cycle can be divided into two secondary cycles (27,000-14,000 B.P.; 14,000-10,000 B.P.) and smaller stages. The first stage was characterized by a low number of species, equitability and diversity index, while being dominated by small mammals, especially rodents (zone A). The mammalian fauna of the next stage (21,000-18,000 B.P.) was characterized by small- and medium-sized species, rodents and browser/grazers (zone B). The most interesting stage of this period was between 18,000 B.P. and 15,500 B.P. This stage was characterized by a low number of species but high equitability and diversity index. The proportion of the medium-sized species was higher than the ratio of the small mammals, and the proportion of the large mammals was significant as well. The trophic structure was dominated by browser/grazers, rodents and omnivores (zone C). Zone B appeared again between 15,500 and 14,000 B.P. A new ecomorphological zone (zone D), which remained constant until the end of the Pleistocene, appeared in the Carpathian Basin 14,000 years B.P. Besides a low number of species, equitability and diversity index, this zone was characterized by the significant proportion of small-, medium- and large-sized mammals and it was dominated by rodents and browser/grazers.

At the beginning of the Holocene the character of the ecomorphological zone changed, the number of species, the equitability and the diversity index increased, and the small mammals became dominant. Within the small mammalian group the rodents, the insectivores, the browser/grazers and the carnivores played a significant role (zone E). The present ecomorphological zone of the Carpathian Basin (zone F) appeared 7.500 years ago. This mammalian fauna is characterized by a high number of species, equitability and diversity index, and small- and medium-sized species, rodents, insectivores and carnivores are dominant.

# Preliminary report on the revision of the ornithopod collection from the Lower Cretaceous bauxite deposit, Cornet-Romania

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The Lower Cretaceous bauxite deposit from Cornet, Romania has produced thousands of bones predominantly from ornithopod dinosaurs. The sequence of sediments consisting mainly of red-brownish boehmitic bauxite alternating with small beds of arenitic or arenitic-ruditic units, terminating with kaolinitic clay, is not clearly dated. It's Late Berriasian - Earliest Barremian according to Patrulius et al. (1983), Late Berriasian-Early Valanginian according to Dragastan et al., (1988).

The dominance of ornithopod dinosaurs in the Cornet fauna is obvious, but rare theropods, pterosaurs and birds were reported as well. The Cornet material is disarticulated and incomplete, vertebral centra, metapodials and phalanges are over-represented in the collection, therefore taxonomic interpretations generically and specifically are difficult.

Jurcsák and Kessler (1991) reported six dinosaurian taxa among which four ornithopods: *Hypsilophodon* sp., *Valdosaurus canaliculatus*, *Iguanodon* cf. *mantelli* and *Vectisaurus valdensis*. The purpose of this paper is to revise these determinations.

The presence of *Hypsilophodon* can not be attested. *Valdosaurus* is attested in the collection by two distal femur fragments, vertebrae and metapodials. This is a poorly known genus, the type and referred material consists of several femora, an ilium, a proximal part of ischium and an incomplete dentary (Galton and Taquet, 1982). Jurcsák and Kessler (1991) referred a neurocranial fragment to *Valdosaurus canaliculatus*, which formerly was figured as *Dryosaurus* sp. (Jurcsák and Popa, 1983), without giving any diagnostic description. This specimen differs from *Dryosaurus* in having a posteroventral orientation of the basipterigoid processes of the basisphenoid, instead of being ventrally oriented and the trigeminal foramen is not entirely enclosed by the prootic as it is in *Dryosaurus*. The exoccipitals do not separate the foramen magnum from the basioccipital and supraoccipital as in *Iguanodon*. This specimen belongs to a species of Camptosauridae, resembling *Camptosaurus* in the pattern of foramina for cranial nerves (Gilmore, 1909).

*Iguanodon* cf. *mantelli* has been referred to *Iguanodon atherfieldensis* (Norman, 1986). The referred material ( Jurcsák and Kessler, 1991) is based on a left humerus, partial radius, metatarsals and vertebrae, but lack diagnostic description. This might belong to a small iguanodontid or to the same camptosaurid as the neurocranium.

*Vectisaurus* is a junior subjective synonym of *Iguanodon atherfieldensis* (Norman, 1990), it was identified on the base of an astragalus (Jurcsák, 1983) and a phalanx (Jurcsák and Kessler, 1991), which lacks diagnostic characters on generic level.

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# New finds of placoderms from the late Devonian of Morocco

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Devonian placoderms from southern Morocco were first described by LEHMAN (1956). Further on LELIÈVRE reprepared these and other specimens with acid and redescribed the material from the Tafilalt, Maider and the Drâa Valley (LELIÈVRE et al. 1993), focusing on finds from Emsian, Eifelian, Givetian and Fammenian sediments. Placoderms from Frasnian rocks were only known in a few fragments from the Tafilalt and Maider (LEHMAN 1976, 1977, LELIÈVRE et al. 1993).

During the last years two new localities in the late Devonian were examined.

In the Famennian *annulata* Zone of the Tafilalt a *Dunkleosteus* skull together with its dermal shoulder girdle was excavated that represents hitherto one of the best preserved dunkleosteids. The extraordinary three dimensional preservation is the result of a quick deposition in carbonate mud followed by a rapid sedimentation of mass-flows, that covered the specimen nearly entirely. This material yields new osteological data of *Dunkleosteus*, especially of the internasal and ethmoidal region. It indicates further on the taxonomical interpretation of *Dunkleosteus marsaisi* as synonym for *Dunkleosteus terrelli*. This taxonomical interpretation argues for a close association of northern America and northern Africa during the Famennian, which led to a global distribution and dominance of these giant predators.

New material from the Frasnian Kellwasser facies of southern Morocco at the Muséum d'Histoire naturelle in Paris gave the hint to a new upper Frasnian locality of the Tafilalt, that was prospected in February 2002. The specimens found there are preliminary reported, they fill a gap in the fossil record of placoderms from southern Morocco (LELIÈVRE 1993).

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# Osteological investigations on skeleton material of rhinoceroses from the early Middle Pleistocene Locality of Mauer near Heidelberg (SW-Germany)

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The early Middle Pleistocene locality of Mauer near Heidelberg has yielded a rich and diverse faunal assemblage of fossil mammals. About a quarter of disarticulated finds are material of rhinoceroses. Generaly, complete and articulate skeleton of European Pleistocene rhinoceroses are rare. In that context, the fossil remains of the nearly 20 m thick fluvial deposits of Mauer locality gives the opportunity to work on a relatively great number of fossil remains of rhinoceroses, which represents a relatively short geological time span.

By using morphological and metric characters of the skull, dentition and postcranial bones it is possible to assign the fossil remains from Mauer mainly to *Stephanorhinus hundsheimensis* (TOULA, 1902). The variability of characters in comparision to other European Pleistocene rhinoceroses is also analysed. Additionally, it is possible to indentify – in the case of some specimens of radius, II metacarpal, astragalus and III metatarsal – the species *S. kirchbergensis* (JÄGER, 1839) in Mauer.

The present paper contains a selection of important examples (cranium, upper check teeth, radius, II metacarpal, astragalus, III metatarsal).

# Approach to the bracing system of dyrosaurid crocodilians

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Dyrosaurs are long-snouted crocodilians that inhabited the Tethys region from the Upper Cretaceous to the Upper Eocene. Osteologically, dyrosaurid crocodilians are distinguished from all other crocodilians mainly by the morphology of the vertebral column. The height of the neural spines differs between the neck, the trunk and the tail. Further osteological characters comprise large hypapophyses, long thoracal ribs, a large scapula with an expanded and lateromedially flattened dorsal extension, a coracoid half as high as the scapula, and dorsal osteoderms lacking external keels. Reconstructions show that in dyrosaurid crocodilians the cross-section of the trunk is high-oval. The epaxial muscle masses of the trunk are concentrated close to the *processus spinosi*. The *M. iliocostalis* mass is oriented vertically. A stronger interlacing of the epaxial muscles in the trunk and a transmission of power directly to the *processus spinosus* similar to a mammalian is probable. It appears that the medial systems of the epaxial muscles are cross-braced in a way as it is found in some ornithischian dinosaurs like *Iguanodon* and *Ouranosaurus* whereas the lateral systems form long fascicles like it is visible in mammals.

A bracing of the trunk and tail base, as it was postulated for Recent and many fossil crocodilians by FREY 1988 and SALISBURY & FREY 2001 in the way of a longitudinally cross-braced, hydraulically stabilised, segmented I-beam carrier is not possible for dyrosaurs. Dyrosaurid crocodilians have two maxima of extremely high neural spines in the vertebral column that indicates that they are braced in a different, hitherto unknown way.

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# An earliest Cretaceous (Purbeckian) vertebrate fauna from Southern Dobrogea (southeastern Romania)

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In Romania, the Jurassic-Cretaceous boundary sequences are restricted mostly to different areas of the Carpathian orogenic arc; here they are represented by dominantly marine (either shallow-water or deep-water) sediments. However, sediments formed around the Jurassic-Cretaceous boundary are also known in the sub-surface of the principal platform units of Romania, including the Moesian Platform (southern Romania). A small outcrop of these deposits were exposed for a short time during the excavations of the Danube-Black Sea Channel, showing that these sediments are developed in a typical Purbeckian, regressive facies with evaporites (Băncilă, 1973); drillings made in nearby areas showed that the depositional area of these deposits is represented by an east-west oriented narrow belt, marking the trend of the Latest Jurassic – Earliest Cretaceous coastline of the basin covering the largest part of the platform. The analysis of samples coming from different boreholes drilled in these deposits revealed the presence of a relatively diverse vertebrate fauna.

The "Purbeckian" marine-brackish-freshwater deposits are underlain by the dolomites and dolomitic limestones of the Rasova Formation (Oxfordian-Tithonian) and overlain by the shallow marin calcareous sequences (limestones, marly limestones and oolitic limestones) of the Cernavoda Formation (Upper Berriasian-Hauterivian) (Dragastan et al., 1998); the age of both lithostratigraphic units is well-constrained by microfossils (forams, algae). Welded between these two marine units, the evaporitic Amara Formation, made up by massive gypsum beds with marly limestone intercalation in the lower part and an alternance of marly limestones and soft reddish claystones in the upper part, represents a short-lived regressive depositional episod spanning the Jurassic-Cretaceous boundary. Micropaleontological analysis of the ostracod assemblages (Stoica, 1998) identified the *Cypridea dunkeri* and *C. granulosa* biozones of the English Purbeckian, also suggesting a latest Tithonian – earliest Berriasian age for these deposits.

Ongoing systematic research of the micropaleontological content of the borehole samples from the Amara Formation led to the recovery of a diverse vertebrate assemblage, represented by isolated teeth and rare, fragmentary skeletal parts. The most common elements of the assemblage are fishes, represented especially by semionotids (*Lepidotes sp*.) and pycnodontids (Pycnodontidae indet.); other taxa might include *Caturus sp*. and *Apateodus sp*. The tetrapods are represented mainly by crocodilians (atoposaurids – ?*Theriosuchus sp.*, bernissartids – *Bernissartia sp*.); other terrestrial elements include amphibians, possibly squamates and mammals.

The vertebrate assemblage from southern Dobrogea share many taxa with the western European Purbeckian deposits (England, Spain, France, Germany), extending the geographical range of this paleocommunity eastward.

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# Turtles from the Late Cretaceous of Nammoura, Lebanon

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The Nammoura locality consists of limestone quarries situated about 25 km northeast of Beirut, Lebanon. The succession of fossiliferous beds is dated as Cenomanian on the basis of the fauna of rudists, oysters and foraminifera. Well-preserved vertebrate fossils are occasionally found by quarrymen, including fishes, reptiles and birds (Bannikov & Bacchia, 2000).

Turtles from Nammoura include beautifully preserved complete and partial skeletons in connection, as well as isolated elements. These turtle remains can be attributed to the family Protostegidae because of the large star-shaped hyo-hypoplasta, the T-shaped, wider than long entoplastron, the short and curved xiphiplastra, a plastral index over 100, and a radius which is bent anteriorly (Hirayama, 1998). They seem to be closely related to *Rhinochelys*, a primitive protostegid known from the Albian to the Turonian in western Europe (Collins, 1970; Hirayama, 1997), in having a large nasal bone nearly as large as the prefrontal, and an antorbital area slightly broader anteriorly. For the first time, the complete flipper of primitive protostegids is available for study. The flipper of the Nammoura turtles is more derived than that of *Santanachelys* from the Santana Formation (Late Aptian or Early Albian) of Brazil (Hirayama, 1998) in having immobile metacarpals, digits one to five without movable articulation, and a larger and more elongated ulnare bone, as in more advanced protostegids (*Archelon* and *Protostega*) (Wieland, 1906, 1909; Zangerl, 1953).

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# Mesozoic and Neozoic anurans (Amphibia: Anura) from the Carpathian Basin

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The Maastrichtian deposits of Haţeg Basin, Romania has yielded dissociated skeletal remains of discoglossid frogs, assigned to *Eodiscoglossus* sp. (Grigorescu et al. 1999). Based on a more abundant new material there are at least two distinct discoglossid frogs: a still unnamed new bombinatorine discoglossid frog and a still unnamed new discoglossine discoglossid frog (work in progress). The sympatric occurrence of these, primarily Laurasian frogs suggests that the cladogenetic events leading to these distinct lineages within discoglossids may have taken place earlier than previously estimated.

From the Oligocene deposits of Cetăţuia Cluj remains of large discoglossids (*Latonia*) have been recorded.

The Neogene localities of Hasznos, Szentendre, Sámsonháza 3, Mátraszőlős 1 & 2, Felsőtárkány 1 & 2, Tardosbánya 3, Polgárdi 4 & 5 (Hungary) yielded at least seven anuran taxa: *Latonia gigantea*, *Discoglossus* sp., *Palaeobatrachus* sp., *Pelobates* sp., *Bufo* cf. *viridis*, *Hyla* cf. *arborea*, and *Rana esculenta* synklepton (Hír et al. 1998, Gál et al. 1999, 2000, Venczel 1999). The remains of *Palaeobatrachus* and *Pelobates* from the Middle Miocene of Sámsonháza 3 and Mátraszőlős 1 & 2 belong to new, still unnamed species displaying clear affinities with those known from the Oligo-Miocene of Europe (work in progress), while those of *Bufo*, *Hyla* and *Rana* morphologically are close to recent species. The genera *Latonia* and *Pelobates* are present in all the studied localities, but they never reach high frequency. *Palaeobatrachus* is relatively frequent in the Middle Miocene of the Carpathian Basin, becoming rare during Late Miocene times. *Discoglossus* was recorded from the Mátraszőlős 1 & 2 localities only. The genus *Bufo* is extremely rare in the Middle Miocene localities, but became more abundant in younger localities (e.g. in the Middle Pliocene of Csarnóta 2, Hungary). The remains of *Hyla* are rare to due its small size and fragility. The genus *Rana* was recorded in all the Neogene localities.

The Quaternary frog remains morfologically are undistinguishable from those of living species. *Pliobatrachus langhae* is the only extinct form, recorded from the Lower Pleistocene of Betfia and Subpiatră (Romania).

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# Fishes from the family Trichiuridae (Perciformes) from menilite beds of Polish Carpathians

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Tertiary fishes from the family Trichiuridae (order Perciformes) are known from middle Eocene to Pliocene. Remains of them were discovered in Mediterranean region (North Africa - Oran, South Spain, Italy, Sicilia, Crete) in Swiss Alps (Glarus), France (Froidefontaine), Carpathians and Caucasus. At the present day, presence of two genera of Trichiuridae was confirmed from the fossil record: *Anenchelum* and *Lepidopus*. The genus *Anenchelum* is known from middle Eocene to lower Miocene. However, fishes from the genus *Lepidopus* appear in upper Oligocene and live till now (validity of the genus *Anenchelum* was restored by Bannikov, Parin, 1995). In Polish Carpathians, trichiurid fishes occur in menilite beds. Both of genera mentioned above were found there. The collection of Department of Paleozoology, University of Wrocław contains over 700 specimens of Trichiuridae collected in 20 localities. The geological age of them is from lower to upper Oligocene. The genus *Anenchelum* occurs in whole profile of menilite beds. In lower part of the profile the species *Anenchelum glarisianum* was found (described as *Lepidopus glarisianus* by Jerzmańska, 1968). The genus *Lepidopus* occurs in upper part of the profile of Bachów locality (Jerzmańska, Kotlarczyk, 1975). These remains are (together with specimens from Važany nad Litavou (Moravia) the oldest known fossils of *Lepidopus*. They show a group of features which differs them from fossils of the genus known from other Tertiary localities.

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