Programme and Abstracts

Edited by Stig Walsh, Nick Fraser, Stephen Brusatte, Jeff Liston and Vicen Carrió

61st Symposium on Vertebrate Palaeontology and Comparative Anatomy

22nd Symposium on Palaeontological Preparation and Conservation

Geological Curators' Group

27th–30th August 2013

Edinburgh 2013

Birds present an important variability in their type of flight depending on their behaviour and ecology. These differences involve important modifications in modes of environmental perception, and hence in the structures that integrate such information. The brain has the main role of integrating information from the environment and translating it into behaviour. While the brain is not fossilised along with other remains, the morphological similarities between the brain and the endocranial cavity in birds allow neurocranial studies of extinct taxa and give us crucial information about the evolution of flight in birds, from the Jurassic to present. Modelling endocasts may help to define organisational patterns in extant species with the aim of deducing the behaviour of fossil birds and to assess additional ecological and ethological information (flying, feeding behaviour). The results so far tend to show a relation between endocast shape and flying behaviour in birds. The morphological analysis of an Enantiornithes endocast highlighted a well-developed optic tectum together with a reduced cerebellum. The phylogenetic analysis confirmed a relationship between endocast shape and behaviour but surprisingly the absence of a clear phylogenetic signal. The generated tree displayed a marked locomotor distinction between flying and non-flying birds and within different types of flight (occasional or regular aerial or subaquatic flights). These results, together with recent anatomical studies, lead to the conclusion that Enantiornithes had evolved the neurological prerequisites for flight, in an intermediate position between occasional and regularly flying birds.

Cranial roof bone names and homologizations between fishes and tetrapods. An old controversy revisited

Ulf J Borgen
Bergshamra, Sweden.

In the mid-nineteen thirties Stanley Westoll changed the names of the cranial roof bones of osteolepiform fishes. This was based on a new interpretation of the homologies of these bones between osteolepiform fishes and tetrapods. His interpretation has gradually become dominating and is today followed by most palaeoichthyologists. It has influenced also the names used on the cranial roof bones in actinopterygians. This interpretation, which at that time was bold, innovative and seemingly logical, can now be seen as probably incorrect. Present knowledge reveals that Westoll's main arguments were wrong. Supporters of Westoll's interpretation have disregarded the prolonged snout of many of the early tetrapods and the results of this on cranial roof bones. Besides, they have disregarded the posteriad change in position of the so called pineal opening in the clade within osteolepiform fishes leading to tetrapods. Comparisons in bone and sensory canal patterns between osteolepiform fishes and tetrapods show that the so-called orthodox bone terminology, which was used by palaeoichthyologists previously to Westoll's suggestions, probably is correct.

Terrestrial vertebrates from the Late Triassic of Portugal: new records of temnospondyls and archosauriforms from a Pangaean rift sequence

Stephen L. Brusatte[1], Richard J. Butler[2,3], Octávio Mateus[4,5], J. Sébastien Steyer[6] & Jessica H. Whiteside[7]
1 - University of Edinburgh, Edinburgh, UK.

2 - University of Birmingham, Birmingham, UK.
3 - Ludwig-Maximilians-Universität München, Munich, Germany.
4 - Universidade Nova de Lisboa, Lisbon, Portugal.
5 - Museu da Lourinhã, Lourinhã, Portugal.
6 - Centre de Recherches en Paléobiodiversité et Paléoenvironnements, Paris, France.
7 - University of Southampton, Southampton, UK.

The Late Triassic (ca. 237-201.5 million years ago) was a transitional interval in the evolution of terrestrial ecosystems, during which 'modern' clades such as archosaurs and mammals were radiating while 'archaic' groups such as temnospondyl amphibians and basal synapsids remained abundant. Little is known about the Triassic terrestrial (non-marine) vertebrates of the Iberian Peninsula. The Algarve Basin of southern Portugal is an extensional rift basin formed during the breakup of Pangaea, which is filled with terrestrial, lacustrine, and marginal marine siliciclastics of the Grés de Silves Formation, interbedded with CAMP basalts that mark the end-Triassic extinction (radioisotopically dated to ~198-201.5 Ma). Since 2009, our field project in the Algarve has discovered numerous vertebrate specimens within the Grés de Silves, including a monodominant bonebed containing hundreds of specimens of metoposaurids, a peculiar group of temnospondyls that filled crocodile-like predatory niches in lacustrine and fluvial environments. These specimens appear to belong to a new species of *Metoposaurus*, similar to *M. diagnosticus* and *M. krasiejowensis* from central Europe but possessing several putative autapomorphies of the braincase and lower jaw. We also discovered a mandible of a phytosaur, the first specimen of these long-snouted, semi-aquatic archosauriforms from the Iberian Peninsula. These discoveries of characteristic Carnian-Norian taxa indicate that the fossil-bearing portion of the Grés de Silves is Late Triassic in age, and provide further evidence that metoposaurids and phytosaurs commonly occurred together in low palaeolatitudes during this time.

Biomechanical evidence of niche partitioning between sympatric sauropod dinosaurs

David Button[1,2], Emily Rayfield[1] & Paul Barrett[2]
1 - University of Bristol, Bristol, UK.
2 - Natural History Museum, London, UK.

The sauropod dinosaurs were the largest terrestrial vertebrates. Given the extreme nature of their biology, sauropods present many problems, not least how they secured sufficient food intake. Furthermore, many sauropod faunas are highly diverse, implying sophisticated resource partitioning between them. The high craniodental diversity differentiating sympatric sauropod taxa has often been cited as evidence of niche partitioning, especially so for the well-known and highly diverse Morrison Formation fauna. In particular, the abundant Morrison taxa *Diplodocus* and *Camarasaurus* represent extremes in the spectrum of sauropod craniodental morphology and have been hypothesized as being adapted towards branch-stripping and production of greater bite forces, respectively. However, these hypotheses have yet to be tested through comparison of these taxa within a rigorous biomechanical context. We rectify this deficit through cranial muscle reconstruction and finite-element modelling of a skull of *C. lentus*, allowing comparison with a pre-existing model of *Diplodocus*. Results