

Form, Function and Palaeobiology: Preface

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This Special Issue of the *Earth & Environmental Science Transactions of The Royal Society of Edinburgh* comprises a collection of papers presented at the Symposium “Form, Function and Palaeobiology”, chaired by SFV and ENKC during the IV International Palaeontological Congress held in Mendoza, Argentina, September 28–October 3, 2014.

The Symposium included 32 oral and poster contributions, encompassing a wide variety of subjects, from plants to invertebrates and vertebrates, from widespread temporal and geographic ranges and with a broad range of methodological scopes, by authors from a more than interesting diversity of countries (and continents), such as Argentina, Australia, Brazil, China, Germany, Great Britain, Japan, Spain, Sweden, Switzerland and the USA, just considering the first authors. Twelve of the original 32 contributions were submitted to this volume and its content is more biased to vertebrates and South America (and mostly Argentina), than originally expected by us.

Despite this constraint, the papers in this volume cover a wide range of topics and are written by both experts in their field and young researchers, who are bringing ‘fresh air’ to palaeontological research in South America, focusing more and more on palaeobiology. Using modern devices, methodologies and approaches, they are dealing with issues that were previously treated in a more intuitive way by palaeontologists who had to solve systematic, phylogenetic and biostratigraphic problems. As a consequence, the reconstruction of the biology of extinct taxa is becoming more the result of testing and generating hypotheses than of inductivism.

Due to the wide scope of the papers, they are arranged by broad issues. This volume starts with two articles on invertebrates. The first, by Schoenemann & Clarkson, is a review of what we know about vision in early animals, based on fossilised eyes. In the second, Echevarría *et al.* study the shell/ligament system in bivalves, contributing to the relatively less

developed studies in functional morphology in extinct invertebrates as compared to vertebrates.

Then there are three articles on non-avian archosaurs: Candeiro *et al.* report dental wear in relation to feeding, in dinosaurs from Brazil; Bona *et al.* study the neuroanatomy of a Miocene gavial from Argentina, considering morphological variation in extinct and extant relatives; and Herrera *et al.* consider alternative hypotheses on the reproductive strategies of mosasaurs, providing a superb discussion on epistemological approaches to infer behaviour in extinct forms without clear extant analogues.

The remaining articles are on Cenozoic South American birds and mammals. Degrange studies the proportion of the limb bones of terror birds to envision their styles of ground locomotion, Echarri *et al.* analyse the mandible morphology of marsupials, and Toledo *et al.* consider the influence of body size on the different biological traits of sloths and anteaters. Cassini *et al.* present an analysis of the relationship between teeth dimensions and body size in early Miocene notoungulates, and Muñoz *et al.* perform a 3-D study of the articular surfaces in relation to the ecomorphology of small mammals, as represented by early Miocene notoungulates. Finally, Tarquini *et al.* and Ercoli provide the first ecomorphological and morphofunctional studies on late Miocene–early Pleistocene raccoons and Pleistocene weasels.

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