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## BOOK REVIEW

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***Handbook of Paleoherpétology. Part 8. Ichthyopterygia.*** By C. MCGOWAN and R. MOTANI. (2003). Verlag Dr. Friedrich Pfeil, München (Germany). 175 pages, 101 Figures, 19 Plates; 25.5x20.5 cm, hardcover; ISBN 3-89937-007-4; € 100.00.

Ichthyosaurs, as well as all other Mesozoic marine reptiles, are not very popular, and even in scientific accounts they have been overshadowed by dinosaurs. This fact is unfortunate, as these “*sea dragons*” (McGowan, 1991) were extraordinary beasts, with highly modified skeletons for adaptation to life in the sea, and played an important role in Mesozoic oceans. The skeleton modifications, which in post Triassic formed a tunni-form body shape, a dorsal and a caudal fin, and the fore and hind limbs transformed into fins, suggest a great swimming capability, and consequently, a world wide distribution (McGowan, 1978; Sander, 2000). Testimonies of this are the ichthyosaur remains found in many countries around the world, even in Antarctica (Whitham and Doyle, 1989). The unusual morphology of these reptiles compared to all other reptiles was responsible for the lack of consensus among different authors when establishing genealogical affinities between them and the rest of the amniotes. Although these strange reptiles received attention as early as the beginning of the XIX century, the history of scientific knowledge of ichthyosaurs is signalled by a great discontinuity. Contrasting with the first dinosaur discoveries, ichthyosaurs first findings were well-preserved and complete. The extraordinary material exhumed from the Lower Jurassic of Lyme Regis, as well as the thousands specimens found in the quarries of Holzmaden and nearby localities (Lower Jurassic: Toarcian) lightened the excitement of early naturalists. Both the basic knowledge of their anatomy (i.e. Andrews, 1910; Sollas, 1916) and the description of most species considered valid today correspond to studies accomplished by the end of the XIX Century and the beginning of the XX Century. After this first period, there is a gap during which papers on ichthyosaurs were hardly found in palaeontological literature, until McGowan, mainly in the 1970’s, made a major contribution in a series of papers updating and ordering systematic information and analysing paleobiological aspect of these unique reptiles. Nevertheless, their relationships with other amniotes

remained unresolved for the next two decades. In the 1990’s new findings of Triassic material increased our insight into the early evolution of ichthyosaurs. Likewise, significant advances on the knowledge of their palaeobiology has been accomplished in recent years; very interesting ideas on their phylogenetical affinities have been proposed and new taxa have been described. This new information was patchily written in several articles. Also taxonomic information needed to be update according to the new phylogenies proposed. There was a gap to be filled in this regard, and this volume sets out to fill it. For those who work in marine reptiles, this volume represents a long awaited up-to-date review; and McGowan and Motani are two of world’s leading authorities to carry out this task.

The book has a general organisation similar to that of many handbooks, with taxonomic and systematic parts being the most important. As announced by H-D Sues in the Editorial Preface, there is an editorial change starting with this volume of the Handbook of Paleoherpétology series: taxa reviewed must be carried out in an explicitly cladistic framework and authors are asked to provide the character-taxon matrices. Both changes turn out to be very useful and the phylogenetic framework that rules the systematics strongly helps in its reading and interpretation.

The book begins with a historical review of ichthyosaur findings and how the early findings were interpreted. A general presentation of the group, its stratigraphic distribution and an outline of the evolution of the body shape accompany this Introduction. An excellent anatomical section follows it. This section may seem unnecessarily long, but it is not. The peculiar morphology of ichthyosaurs, compared to other reptiles, is the reason why basic anatomical matters such as the identification of limb bones could not be resolved until recently. For instance, the identification of the bones of forms little known by most specialists, such as those of Patagonia, were dubious until few years ago (Motani, 1999a; Fernández, 2001). This is not a minor subject since a correct determination of primary homologies is the essential basis for any phylogenetic analysis. In this context it is widely justified to spend several pages in the detailed

anatomical descriptions of “a Typical Ichthyosaur” based on the genus *Ichthyosaurus*. The descriptive part is complemented by some short introductory sections on the evolution of the body plan which help integrating anatomical information.

The Systematic section is preceded by a Stratigraphy section. Given the wide geological range of the group (from the Early Triassic, Olenekian, to the Late Cretaceous, Cenomanian), and its worldwide distribution, it is certainly useful to have the existing data summarised in one place. The section begins with a review of the stratigraphic position of the major ichthyosaur-producing localities, accompanied by a foldable table with the stratigraphic distribution of valid ichthyosaurian species.

As a handbook, the Systematic section is the most important. In general, systematic chapters are not easy to read, but this is not the case. McGowan and Motani arranged this section in such a way that it is much more than a simple list of names and diagnosis. Major clades are clearly defined and remarks of all the taxa reviewed are very informative. The major observation to this section is that it is not uniformly illustrated. Many Jurassic and Cretaceous taxa are accompanied by line drawings, photos, or both, like *Ophthalmosaurus icenicus*, but it is a pity that no Triassic taxa are illustrated in this section. Line drawings are also not uniform in quality. Compared with line drawings of the anatomical sections, some of the drawings of the systematic section are not very informative. Photos, distributed in nineteen plates, are excellent and informative, but unfortunately, as in the case of line drawings, there are no photos illustrating Triassic taxa. Three of them (Plate 6, 9 and 17) are quite spacious occupying a whole page each. The necessary listing of taxa and names (*Species inquirendae*, *nomina dubia*, *nomina nuda*) and a list of non-ichthyosauria complete the systematic section.

Following the Systematic section is the Phylogenetic and Higher taxonomy section. As it is stated at the beginning of the handbook (p IV) taxa are ordered according with the classification summarised in Table 5, that is, according with the phylogeny proposed by Motani (1999b). An important attribute of this section is that the author (this section has been written by Motani) presents not only his hypothesis on ichthyosaurs phylogeny, but he also analyses those proposed by other authors (i.e. Sander, 2000; Maisch & Matzke, 2000) and points out the elements justifying his choice. This attitude, unfortunately not frequent, is quite noteworthy.

A brief section about the functional morphology and biomechanics follows Phylogenetic and Higher Taxonomy chapters. This section could preferably have been put earlier, after the “Review of Body Part Evolution”. The

whole book ends with lists of alphabetic and categorised taxonomic names, which are necessary and useful for a quick search.

In conclusion, this is an excellent book in which the reader will find much more information than could be expected from a handbook. I recommend it to any specialist working on Mesozoic marine reptiles as well as to anyone teaching vertebrate palaeontology. Although its price at 100 Euros, as well as the price of the other contribution of the series, seems expensive. An important attribute of this book is that the information it contains will certainly be very useful for a long time.

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