

monophyletic entity recovered by most recent phylogenetic analyses is quite odd.

Most of the speculations are found in the paleoecological statements. One good example is *Thalassodromeus*, a flying reptile from the Brazilian Romualdo Formation (the author apparently is not aware of the updated nomenclature of the sedimentary sequence of the Araripe Basin, known since 1999; see V. H. Neumann and L. Cabrera. 1999. *Simpósio sobre o Cretáceo do Brasil, Serra Negra* 5:279-285), perhaps reflecting his preferences for a particular pterosaur guru (a term he has used sometimes). Based on the unusual scissor-like anatomy of the rostrum, this animal was hypothesized to have preyed on fish by skimming through the water. Witton criticized the skimming hypothesis for not being based on functional morphological studies. Yet, here we see a reconstruction of this animal hunting larger prey on land (Figure 24.1), a highly speculative interpretation without any scientific foundation—not even anatomy.

Still, in the pterosaur diversity chapters, some information is just not retrievable, including the proportions of the phalanges of the wing finger in thalassodromines: no specimen described in the literature has a complete wing. The same can be said about the supposed juvenile of *Tupuxuara deliradamus* (Figure 8.7B), perhaps the basis of the thalassodromine growth series presented in Chapter 24 (p. 242). The speculative conclusions that follow are one of several examples that can be found throughout the book.

Other issues are more complex and distinct opinions are more likely due to the nature of the pterosaur fossil record. Among these is the question of sexual dimorphism reflected by the presence or absence of cranial crests. Most authors will agree that such questions are hampered by the general lack of deposits with specimens that can be confidently assigned to the same species. In the few instances where this is the case, notably one deposit in Brazil and another in China, where dozens of pterosaur individuals were collected in the same horizon and showed that crests vary during ontogeny and it is not the presence, but the shape of this cranial structure that might be sexually dimorphic (e.g., Wang et al. 2014. *Current Biology* 24:1323-1330). The sole example where females were regarded as crestless and males bear crests consisted of four specimens from Liaoning (China), whose exact stratigraphic horizon is unknown and that were attributed to *Darwinopterus* (Lü et al. 2011a. *Science* 331:321-324) implying that they represent *Darwinopterus modularis*. In the same year (Lü et al. 2011b. *Acta Geologica Sinica* 85:507-514), one of the supposed males became the holotype of another species

(*Darwinopterus robustodens*), casting doubts about the crested male X crestless female hypothesis.

Most of the restrictions presented above completely change if one reads this book as intended for the general public. Here, in order to be marketable and to attract a wide audience, certain creative liberties (i.e., speculations) are admissible to some degree. Perhaps this is also the reason for the very (perhaps occasionally too) informal writing style adopted by the author.

To make a long story short, scientists will have to read this book with caution while nonprofessionals will be thrilled and excited with this stimulating and entertaining volume.

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IN PURSUIT OF EARLY MAMMALS. *Life of the Past.*

By Zofia Kielan-Jaworowska. Bloomington (Indiana): Indiana University Press. \$60.00. xvii + 253 p. + 7 pl.; ill.; index. ISBN: 978-0-253-00817-6. 2013.

The journey to decipher the complex history of early mammalian evolution has been, and continues to be, an arduous path navigated by determined researchers who piece together clues gleaned from oftentimes highly fragmentary fossils. Zofia Kielan-Jaworowska provides a thorough review of the current state of early mammalian paleontology presented through the unique historical filter of someone who was at the forefront of the field for over half a century. She approaches this complex topic not via a formal technical review, but by interweaving informative discussions of the evolutionary history of this group with firsthand accounts of the events and people that were integral to advancing this field. The resulting text is not just a detailed overview of our current knowledge of early mammalian evolution and its paleontological foundation, but also serves as a rich history of paleontological research and exploration in central Asia and Europe during this time period. This format allows readers to understand not just the current state of the field, but also the intricate path traveled by those whose hard work brought the field to its current standing.

Although the systematics chapters of this book are formatted as broad overviews of individual early mammalian clades, with readers referred to additional resources for more thorough reviews, detailed treatment of the paleontological evidence concerning the timing and development of several key mammalian traits is provided. Those discussions are supplemented by a wealth of technical drawings and life reconstructions of key taxa, both original and modified from prior publications,

many of which will serve as excellent teaching aids. Importantly, the text also points out those areas where uncertainty remains or disagreement between researchers is prevalent, making it clear where paleontological evidence is lacking or additional research is needed. In this way Kielan-Jaworowska makes it clear not just how far the field has come, but also how much more work still remains.

One potential criticism of this volume is that discussions of higher taxa and their positions within the traditional Linnaean rank-based classification scheme at times bog down the narrative. But Kielan-Jaworowska again uses this as a teaching moment, exposing readers to another unresolved discussion among paleontologists (and biologists in general): the difficulty of conforming the complexities of evolutionary history into a hierarchical taxonomic framework. Overall, these instances are infrequent and should not dissuade anyone from picking up this book and setting out with Kielan-Jaworowska in pursuit of early mammals.

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## ECOLOGY

### ECOLOGY OF AUSTRALIAN TEMPERATE REEFS: THE UNIQUE SOUTH.

*Edited by Scoresby Shepherd and Graham Edgar. Collingwood (Australia): CSIRO Publishing. AU \$130.00. xxxii + 488 p.; ill.; index. ISBN: 978-1-486-30009-9. 2013.*

Biologists are drawn to the study of nature because of their fascination of the wondrous mysteries to be found in nature. Shepherd and Edgar describe their book as providing insight into “[s]ubtidal reefs [which] are incredibly diverse and dynamic, (for which) . . . our fascination grows with our understanding of the ecology and life history of just a few of the many players in the system” (p. xi). Indeed, their wonderfully detailed 20 chapters that provide an unbiased and balanced account of the ecology of Australia’s unique south humbled me.

The editors arrive at a critical juncture in the 40-plus year history of subtidal ecology. Since the advent of fisheries science and SCUBA, our quest to understand the ecology of temperate reefs has, quite properly, been focused on the life history, ecology, and behavior of organisms in the environments in which they live. Yet, in the last decade

there has been declining effort for studying nature in nature. Ranging from administrators’ management of threat of litigation by preventing us from teaching and researching in nature to research-exclusions of temperate marine parks, administrators are eliminating our access to nature. Research has been increasingly withdrawn from the wondrous mysteries of the outdoors to the vastly simplified environments of the experimental tank and desktop analysis. Nature is decoupling from ecology.

This book, therefore, is of disproportionate value from this time onward. It provides current and future biologists with perhaps one of the most up-to-date, detailed, and balanced accounts of the ecology of the unique south. Having intensively dived, observed, and labored with field-based experiments across this 5,500 km coastline for more than 20 years, I am impressed by the accuracy and fairness with which the authors bring together field, laboratory, and fisheries information to present as complete account as possible for many species. This stated aim of completeness was achieved in five parts: starting with the geological and environmental history and biogeography of the southern coast of Australia, then dedicating individual parts to algae, invertebrates, and vertebrates, before finishing with ecosystem-level insights and their conservation. Few key references have been omitted, except of course for the rapidly developing literature of climate change across this coast.

In summary, I hope that Shepherd and Edgar will slow the process of decoupling of nature from ecology by providing us with a landmark textbook that fulfills two prerequisites for generating wisdom: creativity and reflection. Without a balanced account of nature in nature we would have little to wonder about.

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### SYMBIOSIS IN FISHES: THE BIOLOGY OF INTERSPECIFIC PARTNERSHIPS.

*By Ilan Karplus. Hoboken (New Jersey): Wiley-Blackwell. \$199.99. x + 449 p.; ill.; species and subject indexes. ISBN: 978-1-4051-8589-9. 2014.*

After reading this volume, I was struck by the feeling that it is difficult to imagine a type of interspecific interaction that has not been engaged in by a fish. This book provides a wealth of information regarding the state of current knowledge on the types of interactions fishes participate in with myriad invertebrate heterospecifics.

*Symbiosis in Fishes* is worth reading simply to be amazed by the plethora of natural history strategies employed by fishes and their partners. For example, did you know that certain species of