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AMASSING THE MARVELS OF OUR SOUTHERN PAST: A COMPLETE (BUT FAR FROM FINAL) COLLECTION OF MESOZOIC SOUTH AMERICAN PALEOMAMMALOGY

REVIEW OF "MESOZOIC MAMMALS FROM SOUTH AMERICA AND THEIR FORERUNNERS". *Guillermo W. Rougier, Agustín G. Martinelli, and Analía M. Forasiepi*. 2021. 388 pp. Springer Earth System Sciences. ISSN 2197-9596 and ISSN 2197-960X (electronic). ISBN 978-030-63860-3 and ISBN 978-3-030-63862-7 (eBook).

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PLEASE SCROLL DOWN FOR ARTICLE

MIDDLE PALEOZOIC BIVALVES FROM BOLIVIA

Heteroconchia Cardiomorphi taxa are revised and their paleogeographic relationships with nearby basins of Gondwana are assessed.

BITE FORCE OF LATE TRIASSIC AETOSAURS

Finite Element Method on *Neoetosauroides engaeus* provides support to zoophagy or omnivory.

NEW SPHENODONTINAE FROM THE LATE CRETACEOUS OF PATAGONIA

Tika giacchinoi gen. et sp. nov., based on well-preserved cranial and postcranial remains, is newly described from upper levels of the Candeleros Formation.

AMASSING THE MARVELS OF OUR SOUTHERN PAST: A COMPLETE (BUT FAR FROM FINAL) COLLECTION OF MESOZOIC SOUTH AMERICAN PALEOMAMMALOLOGY

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A principal goal of paleontology is the exploration of the evolutionary history of life in deep time. Progress is typically measured incrementally in papers distributed widely through the literature describing new taxa, new morphology, and new geologic or geographic occurrences; this is certainly the case for mammalian paleontological research. Every so often, a major work collects and synthesizes what is known about the taxonomy, distribution, and evolutionary patterns of fossil mammals. The early summaries of Mesozoic mammal paleontology (e.g., Owen 1871; Simpson 1928, 1929) built a foundation of taxonomic diversity, evolutionary relationships, and biogeography on a fossil record derived almost entirely from the northern hemisphere. The major syntheses that would follow (Lillegraven *et al.*, 1979) highlighted the paucity of data from Gondwanan landmasses but were still understandably biased in their focus on northern continents and their faunas. The state of knowledge of Mesozoic mammals was most recently updated in 2004 (Kielan-Jaworowska *et al.*, 2004) to reflect substantial improvements in the global fossil record. Southern landmasses had by this time yielded fossils that hinted at major endemism (gondwanatherians), broadened the distribution of monotremes (*Monotrematum* from Argentina), and upended the tidy narrative of molar evolution thought so key to the rise of modern therians (via the australosphenidans). We must accept that the story of mammal evolution is complex and our understanding is in a constant state of revision. While discoveries of new forms continue to accumulate from rocks on northern landmasses, some of the most potentially transforming fossils in recent decades have come from Gondwana. The collection, curation, and synthesis of these data, both in the context of the southern landmasses

and globally, are invaluable to generating a full picture of mammalian evolution during the Mesozoic. This new book, *Mesozoic Mammals from South America and Their Forerunners*, expertly addresses the South American record, where fossils are shedding light on every part of the mammal story including exceptionally preserved Triassic non-mammalian cynodonts, survival of endemic non-therian lineages well into the Paleogene, and jaws with complex teeth that have the potential to pull the origin of modern mammals all the way back to the Early Jurassic. This book is an indispensable reference for all students of ancient mammals and shines a much-needed spotlight on the vibrant but often overlooked saga of the South American Mesozoic.

The authors of this new volume, G. W. Rougier, A. G. Martinelli, and A. M. Forasiepi, are exceptionally qualified to narrate the South American record, being personally responsible for both field collection and original descriptions of important material spanning the geologic and phylogenetic range of the book (and beyond). All are still active in the field and heavily invested in the open questions of mammal evolution posited throughout the book. Each chapter opens with a quote, humorous and poignant, from literature or a major figure in early mammal research. These collectively set the tone for this book as a rigorous but comfortable, inviting read, presenting well-organized data and conclusions while at the same time sounding introspective regarding how much is still unknown. The included photographs of real people doing real work in the field, lab, and exhibits as well as personal narratives are inviting and soften the inherently technical nature of a work focused on geology and morphology (the vignette on p. 282, "The Pact of La Amarga," is particularly compelling and should be read

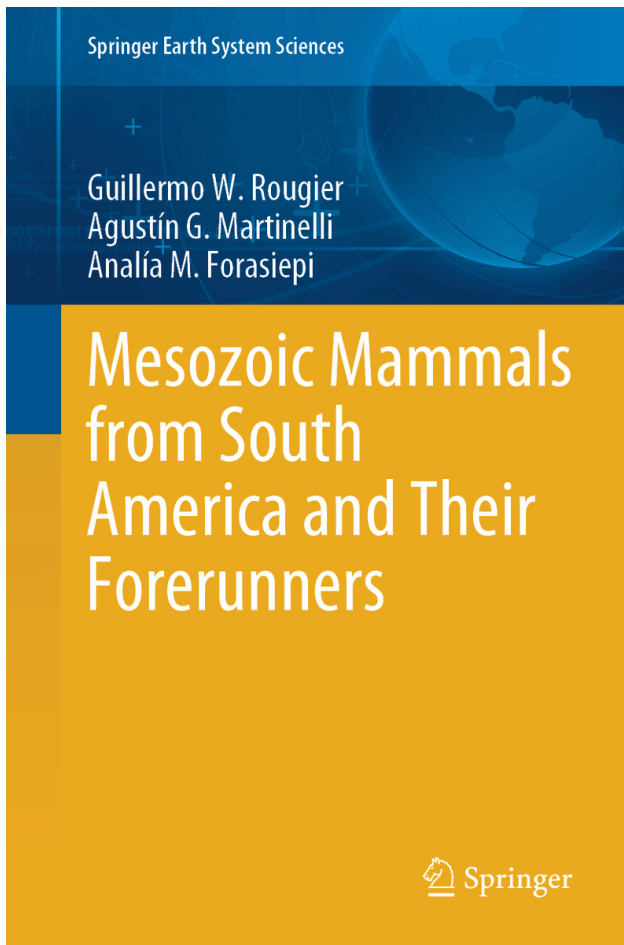


Figura 1. Cover of the textbook entitled *Mesozoic Mammals from South America and Their Forerunners* – Springer.

by all students). The authors are present in the pages, and the reader feels capable and compelled to grab a hoe pick, pack some sunscreen and yerba mate, and strike out to make their own discoveries.

The book is organized logically, beginning with an introductory chapter on methods, conventions, and a history of paleontological efforts in South America. Chapter 2 takes the form of a single, compact repository for locality information; this is of critical value, providing a spatial and temporal context for a century of field work spanning the continent. Locality names, geologic units, and maps are included as well as the taxa known from each; color photographs of outcrops, field crews, and characteristic specimens add richness to this catalogue (though the print quality here leaves a little to be desired). The contents of Chapter 2 are perhaps the most important contribution of the entire volume as this information is otherwise scattered

throughout the literature, often in small journals, and the references section of this chapter alone stretches for a staggering 37 pages.

The following seven chapters (Chapters 3–9) are devoted each to the treatment of a specific taxonomic group. They vary considerably in length based on the diversity or completeness of the particular group, with Chapter 5 (“Triconodonts”, 12 pp.) describing two incomplete taxa from one locality while Chapter 6 (Dryolestoids, 60 pp.) deals with a large, endemic group with a long temporal range. Each chapter includes a phylogeny, systematic and morphologic characterizations with primary references, and, importantly, photographs or illustrations of specimens. Most, if not all, of the holotypes are illustrated, and a large number of these figures are original to this volume; this is another feature that makes this book an invaluable resource. Novel insights by the authors on the structure, relationships, and evolution of these groups rounds out each chapter. Sprinkled throughout the book are life restorations of various taxa by Jorge Blanco; these are elegant and charming, and breathe a vitality into these curious and important ancient creatures. The non-mammalian cynodonts lumber through the start of Chapter 3, while an aerialist eutriconodontan pursues a moth in Chapter 5 (reflecting interpretations from the broader relationships of this taxon). The gigantic *Peligrotherium* (Chapter 6) is captured with a paw raised much as a bear might as it pads across an open clearing, and the dynamics of daily life as preserved in the famous trackways of South America, whether active, skulking, or overburdened, are imagined in the artwork of Chapter 9.

The final chapter ties up the impact of the remarkable fossil record described in the book for big-picture evolutionary trends and looks ahead to the questions begged by these gems of enamel and bone. Paleogeography is a major variable in considering the implications of the South American faunas: the Early Jurassic tribosphenic molars of *Henosferus* appear much earlier than similar forms on northern landmasses, and the stem therian *Vincelestes* occupies a critical place on the phylogenetic tree but seems to lack close ties to later South American groups or contemporaneous Laurasian groups. The endemic dryolestoids and gondwanatherians appear suddenly and thrive during the Cretaceous, some reaching remarkable body masses and surviving until at least the Miocene. Despite recent dis-

coveries, spatial and temporal sampling are still quite poor and the authors underscore the role Africa and Antarctica will certainly play in filling gaps in the Gondwanan fossil record and helping to fold the South American record more broadly into a global perspective of mammal evolution during the Mesozoic; of course, much work remains to be done in the pampas and cordillera. Accordingly, there should be little doubt that the next edition of this book will be considerably thicker! The assemblage of references, locality data, specimen images, and artwork make *Mesozoic Mammals from South America and Their Forerunners* an excellent “southern perspective” of the evolutionary history of our own limb on the tree of life.

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