

Bones, Clones, and Biomes: The History and Geography of Recent Neotropical Mammals

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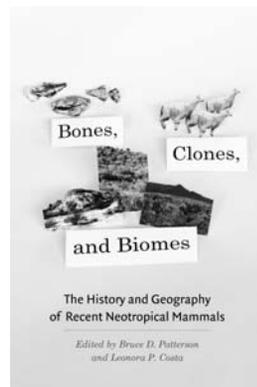
A Splendid Southern Synthesis

Bones, Clones, and Biomes: The History and Geography of Recent Neotropical Mammals. Bruce D. Patterson and Leonora P. Costa, eds. University of Chicago Press, 2012. 432 pp., illus. \$65.00 (ISBN 9780226649191 cloth).

Since Alfred Russel Wallace's (1876) treatise on the distribution of animals on the planet, the biogeography of mammals of the Neotropics has inspired hypotheses and fueled investigations relating to isolation, diversification, endemism, faunal turnover, and extinction. These issues were synthesized in several books published about three decades ago, including *Splendid Isolation*, George Gaylord Simpson's (1980) perspective on the formation of the highly diverse and endemic South American fauna. Similarly, *Bones, Clones, and Biomes: The History and Geography of Recent Neotropical Mammals* is an ambitious attempt to provide a new synthesis of "regional and historical features of the modern Neotropical mammalian fauna." Stemming from a symposium at the 10th International Mammalogical Conference, in Mendoza, Argentina, in 2009, this book significantly expands and updates previous treatments of Neotropical mammalogy. There is also a hopeful departure from past volumes in its significant percentage (more than 75 percent) of Latin American authors, which demonstrates the tremendous talent and potential of local investigators in the Neotropics to push the limits of our knowledge of this incomparable fauna.

Editors Bruce D. Patterson (MacArthur curator of mammals at the Field Museum of Natural History) and Leonora P. Costa (associate professor in the Biological Sciences Department at the Universidade Federal do Espírito Santo, in Vitória, Brazil) assembled 32 additional authors with wide expertise on the biogeography of Neotropical mammals to focus on

a central question: How did changing climates and landscapes, intercontinental connections, and newly evolved lineages interact to populate Central and South America and the Antilles with almost 30 percent of the world's living mammals? After a brief introductory chapter to the entire volume by the editors, the book is divided into two major sections: "The Geological Setting" and "Regional Patterns," each with an overview chapter. The first section of seven chapters sets the stage for interpreting contemporary patterns of regional endemism, diversity, and biogeography—which are further discussed in the final nine chapters of the second section. There is considerable overlap between these two sections, which helps to integrate the work of the contributed material. For example, a molecular genetic study of carnivores is nicely juxtaposed with a chapter on their fossil history in the first section, and in the second section, most of the regional coverage of contemporary biogeography discusses perspectives emanating from both the fossil record and molecular studies.



Bones, Clones, and Biomes draws on a slew of new sites and fossil discoveries and insights gained from molecular genetics that have altered our understanding of the movement of organisms and the timing of major events that shaped the dynamic biogeography of the region, including the diversification and turnover of the Neotropical

fauna. New paleontological perspectives extending to over 250 million years ago (mya) explore endemism, continental interchange, waif arrival, body-size evolution, and Pleistocene megafaunal extinctions. On a global scale, the extinction spasm was most severe in South America, with the loss of two diverse orders of endemic herbivores (notoungulates and litopterns) and four families of xenarthrans. The implications of modern ecosystems (from just 10,000 years ago) having this degree of loss of major faunal components have yet to be thoroughly examined in the Neotropics.

Of note is the introduction of FABI, the First American Biotic Interchange (about 65 mya), an event that complements the much-debated GABI (Great American Biotic Interchange). The initiation of GABI was traditionally thought to occur 3 mya, with the final closure of the Isthmus of Panama, but new revelations from the fossil record indicate the movement of sloths northward to Florida and California as early as 9 mya, pushing the origin of this dynamic exchange and the potential for faunal turnover much further back in time.

Bones, Clones, and Biomes also provides regional knowledge of mammalian biogeography—excluding aquatic and marine mammals—of most of the major biomes of South America. The Chaco (between the Paraguay River and the Andean mountains) and the Valdivian Forest (on the southwestern coast) are missing. Importantly, this synthesis extends to the biomes of Central America and the Antilles. Although some of the regional accounts are a bit uneven in scope, most include traditional taxonomy-based summaries of mammalian diversity, endemism, and biogeography, in addition to molecular phylogenetic and phylogeographic analyses of the origin, expansion, and demographic history of exemplar taxa.

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The tables and illustrations are of reasonable quality, and several of these chapters include useful species lists as appendices.

This excellent volume should therefore generate wide interest as an example of how to integrate science research across disciplines ranging from molecular genetics to paleontology as a means of exploring the dynamic history of a region. As both a synthesis of our current understanding and a user-friendly reference work (both taxonomic and subject indices are included), *Bones, Clones, and Biomes* will find broad use.

A common theme throughout much of the book is that limited sampling remains a key impediment to both paleontological and neontological studies in the Neotropics. Much of what we know is still based on relatively few localities and taxa. If the detailed fossil record available from Patagonia is as distinct from that of the remainder of the Neotropics in the past as their faunas are today, the southern fossil sites used by earlier paleontologists may continue to offer limited insight into paleomammalogy throughout this immense biogeographic realm. Toward that end, *Bones, Clones, and Biomes* summarizes a series of newer discoveries in Chile, Bolivia, and Colombia, among other places.

The urgency of additional fieldwork in the Neotropics cannot be overstated, particularly given the rapid loss of habitat in several of these regional biomes. Primary forest destruction in the Amazon Basin continues in a futile effort to slake our thirst for biofuels, and biomes such as the Atlantic Forest have effectively vanished. One wonders what a synthesis on Neotropical mammalian biogeography will entail in 30 years.

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THE MULTIPLE ORIGINS OF ECOLOGY

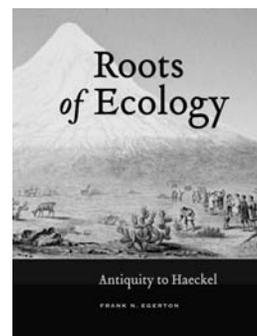
Roots of Ecology: Antiquity to Haeckel.

Frank N. Egerton. University of California Press, 2012. 288 pp., illus. \$75.00 (ISBN 9780520271746 cloth).

Ernst Haeckel coined the term *ecology* in 1866, and the historical development of ecology as a recognizable discipline did not begin in earnest until the very end of the nineteenth century. Despite these relatively recent occurrences, the roots of ecology extend much further into the past, as Frank Egerton's survey ably demonstrates. *Roots of Ecology: Antiquity to Haeckel* is based on extensive scholarship that is carefully documented in hundreds of endnotes. Egerton has amassed a tremendous amount of useful historical information about how older specialties of botany, zoology, natural history, and physiology contributed to what we now recognize as ecology. His encyclopedic treatment of the ecological ideas of Aristotle and other ancient Greek and Roman naturalists to those of nineteenth-century protoecologists fills an important need in historical scholarship. Although much of this information is not new to professional historians of science, compiling it in an attractively illustrated volume serves a useful purpose for other scholars. Biologists interested in ecology's deep history will consider *Roots of Ecology* a helpful reference for tracing the precursors of present-day ecological questions and ideas.

Egerton, who is professor emeritus of history at the University of Wisconsin–Parkside, is considered the

dean of historians of ecology. Beginning in the early 1960s, long before other historians had taken notice of ecology, Egerton explored the origins of population studies and important ecological ideas, such as the balance of nature. Those of us who began writing detailed histories of modern ecology in the late 1970s owe a debt of gratitude to Egerton's pioneering efforts. In addition to his contributions to the professional history of science, Egerton has become the unofficial historian for the Ecological Society of America. Over the years, he has contributed numerous historical articles to the society's journals—most notably, a series of more than 40 historical essays that have appeared in recent volumes of the *Bulletin of the Ecological Society of America*. These short articles provided the raw material for *Roots of Ecology*, although the book is more than a collection of papers.



I admire Egerton's ambitious attempt to write a synthetic historical account of ecological ideas covering more than two millennia. Modern ecology is quite a diverse collection of specialties and its development from earlier natural history traditions was not a simple linear process. Furthermore, Egerton includes important contributions from physiology, medicine, and other fields that also affected this historical development. Unifying this mass of information is a daunting challenge, because no single, central theme is likely to encompass every facet of the history of ecology.

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