



Comparative Biogeography: Discovering and Classifying Biogeographical Patterns of a Dynamic Earth.

Author(s): Susanne S. Renner

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vatism) to the practical (e.g., Novacek on how best to engage the public in understanding extinction). Barnosky's examination of our diversion of natural resources to livestock, now currently seven times the total mass of all the magnificent megafauna that roamed the Earth 10,000 years ago, is superb. Finally, Ehrlich and Pringle's closing chapter on the dilemma and possible ways forward is a bit short on detail and makes little use of the preceding chapters, but its measured optimism is exactly what we need. For a broad, intriguing, and sobering overview of extinction, the volume is well worth reading.

SHAHID NAEEM, *Ecology, Evolution & Environmental Biology, Columbia University, New York, New York*

COMPARATIVE BIOGEOGRAPHY: DISCOVERING AND CLASSIFYING BIOGEOGRAPHICAL PATTERNS OF A DYNAMIC EARTH. *Species and Systematics, Volume 2.* By Lynne R. Parenti and Malte C. Ebach. Berkeley (California): University of California Press. \$39.95. xiii + 295 p.; ill.; index. ISBN: 978-0-520-25945-4. 2009.

A quote from the introductory chapter illustrates the paradigm that defines this book: "Croizat is the father of modern biogeography" (p. 3). Croizat developed a biogeographic approach, called panbiogeography, which consists of mapping overlapping distribution patterns ("tracks") of many unrelated species. These tracks are supposed to result from the geological history of the particular areas on which the mapped species occur. Whether species have evolved in an area for a long time or dispersed there recently is disregarded: "To segregate taxa by estimated age *a priori* . . . could conceal potentially informative area relationships" (p. 227). With the advent of molecular data, which provide information on species relationships as well as estimates of lineage diversification times, Croizat's panbiogeography lost the appeal it may have held for a brief period in the 1970s and 1980s, along with vicariance cladistics. This book is probably the last time that panbiogeography will be covered in such detail, namely in ten (albeit highly redundant) chapters, and as such it may well be of historical value. Where else can one find explanations for obscure concepts such as area analogy, area homology, gradistics, and paralogy-free subtree analysis? By contrast, important old and new areas of historical biogeography, such as ancestral range reconstruction methods, phylogeography, and dating of lineages with strict or relaxed molecular clock models, are not dealt with or incorrectly explained. For example, molecular clocks are not dependent on geology and the criticized study of African cichlids did not rely exclusively on geological calibration (p. 91); Dispersal

and Vicariance Analysis (DIVA) does not involve maximum likelihood or Bayesian analyses (p. 141); Brooks Parsimony Analysis (BPA) is not the "most popular" tool used in comparative phylogeography (p. 136), indeed, I cannot think of a single such study that used BPA; and similar inaccuracies abound. If you are looking for an introduction to comparative biogeography, this is not the book to get. If you are looking for a glimpse into the curious world of panbiogeography, this is the best volume to get to obtain that information.

SUSANNE S. RENNER, *Botanisches Institut, Munich, Germany*

ISLANDS IN THE COSMOS: THE EVOLUTION OF LIFE ON LAND. *Life of the Past.*

By Dale A. Russell; Foreword by Simon Conway Morris. Bloomington (Indiana): Indiana University Press. \$34.95. xxiv + 453 p.; ill.; index. ISBN: 978-0-253-35273-6. 2009.

Summaries on the history of the evolution of life on Earth are typically found in historical geology textbooks. The standard format is to work through the necessary billions of years of time, from the Precambrian origin of life up until the present. Russell does this in a text with a few illustrations that are typically photographs of modern environments that he considers analogous to ancient settings. Along the way, numerous fascinating topics in the evolution of life are discussed, including the Archean origin of life, the Ediacara biota, Phanerozoic biodiversity trends and, particularly, the evolution of terrestrial ecosystems. The author is best known for his work on dinosaurs, and this expertise is well reflected in the large chapters on the Jurassic and Cretaceous. Historical geology textbooks are meant to present a straightforward portrayal of what we know about the history of Earth and its life. But the purpose of this synthesis by Russell seems to have a more philosophical nature that is expressed in the preface and epilogue. What the author outlines is a history that he maintains shows increasing levels of evolutionary fitness, which has culminated in the evolution of our own species. Bringing together a variety of viewpoints, including that of the current Pope, he suggests that this pattern or trend is indicative of some supernatural entity operating in the universe. To emphasize this outlook there is a foreword by Simon Conway Morris. This volume, termed an essay by the author, continues in the long tradition of trying to find human meaning in life and its long existence here on Earth.

DAVID J. BOTTJER, *Earth Sciences, University of Southern California, Los Angeles, California*