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new information', p. xxii). The web address has since changed and I was unable to locate the new one. Though I happily agree that this could potentially be a very useful resource, given the rapidly changing environment of the internet, the publication of a second volume would perhaps be the most reliable option.

In summary, this is an excellent reference work that combines readability with academic rigour throughout. Its broad coverage of the field, high quality of production and reasonable price makes it an essential purchase for any university with departments teaching or researching within the broad spectrum of ecology, as well as for individual researchers of species invasions.

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Edited by Markus Eichhorn

book review

A piscine history of the Neotropics

Historical biogeography of Neotropical freshwater fishes, by J.S. Albert and R.R. Reis (editors)
2011, University of California Press, 408 pp. ISBN: 9780520268685
Price £59 (Hardback); <http://www.ucpress.edu/>

The Neotropics leave an indelible impression on everyone who visits them. The seeds of some of the most important concepts in ecology and evolution were sown during the South American travels of influential 19th century thinkers. For example, the latitudinal gradient of diversity, now recognized as ecology's oldest pattern (Hawkins, 2001), was first identified by von Humboldt, while Bates documented the variety and adaptations of species in Amazonian forests, and Wallace and Darwin pondered the mechanisms responsible for the myriad forms of life they encountered. Although the Neotropics have played a crucial role in our understanding of the diversity of life on earth, in many ways they continue to represent an unexplored frontier. This is particularly clear in the case of Neotropical freshwater fish, a group estimated to consist of more than 7000 species, and that accounts for over half the freshwater fish on

the planet and around 10% of all vertebrate species.

James Albert and Roberto Reis' goal as editors of the *Historical Biogeography of Neotropical Freshwater Fishes* is to examine the evolutionary forces responsible for this diversity. In doing so they make the case that multiple processes of diversification were involved and that these operated over long periods of time as well as on a continental scale. The book itself is divided into two parts, the first of which examines current knowledge on the biogeography of the region, while the second is a regional analysis that links contemporary geographical patterns with geological history. The book is ambitious in scope and brings together previously fragmented material to provide an authoritative overview of this impressive group of fish. And while a fish-eye view of the Neotropical ichthyofauna is inevitably drawn to the Ama-

zon, the book has broad coverage, embracing the Andes and extending through Central America and into southern Mexico. As it makes clear, it is necessary to have a continental perspective to understand the diversity and distribution of this impressive group.

I particularly liked the care and thought involved in putting the book together. It is a beautifully presented volume with informative tables and figures, many of them in colour. However, more important than this is that the editors have a strong sense of what the important issues are and how these should be best dealt with. Indeed the book is an essential reference for anyone wanting to learn more about the diversity or history of South American fishes.

One of the most challenging questions in ecology is explaining why different habitats support different numbers of species. The extent of a habitat accounts for much of the variation but South America has an excess of species relative to its area. The core of the continent, particularly the Amazon, is responsible for a disproportionate amount of this diversity. It is tempting to attribute this exceptional richness to the unique geological and environmental features of the Amazon. However many of the fishes that inhabit this river system are older than the Amazon Basin itself. Moreover, the Amazonian ichthyofauna has been accumulated gradually through tens of millions of years. The explanation, Albert, Petry and Reis argue, is rooted in the repeated subdivision and merging of adjacent river basins and their faunas, with dispersal limitation and environmental filtering playing important roles. The exceptionally high diversity seems to be less to do with exceptional speciation rates than with low rates of extinction. However, diversity is not just a measure of the numbers of species that co-occur but also of the types of species that are found together. A universal feature of natural assemblages is that some families contribute a much higher fraction of spe-

cies than others. The Neotropics are no exception. Ten families of fish account for 75% of the Neotropical ichthyofauna. Characidae (including piranhas and tetras) and Cichlidae (such as discus) are particularly big hitters. One possibility is that this unevenness is simply the result of chance. Alternatively, historical and biological factors, either separately or together, could contribute. E.O. Wilson (2003) has argued that an ancient origin, combined with small body size, widespread geographic distribution and key innovations contribute to the success of some groups relative to others. On the basis of the evidence presented by Neotropical fish, Albert, Bart and Reis conclude that these features are necessary but not sufficient. Indeed they note that clades can be ancient (e.g. *Arapaima*, which is of Cretaceous origin), widespread (*Arapaima* again) or with small body size (e.g. *Amazonsprattus*) yet be represented by a handful of species at most. On the other hand sexual and trophic innovation may play a role. Ecological specialisation is also important. For example, Crampton notes that groups of closely related Gymnotiform electric fish species tend to be found in a narrow range of habitat types but may be spread across large geographic areas. The factors that underpin diversification are the same as those that come into play in the explosive speciation that characterizes the African rift lakes. The difference here is that the game is played out on a continental scale as opposed to a local arena.

Of course, much remains to be learnt about the phylogenetic histories of Neotropical fishes and of the geological context in which these species evolved. Nonetheless, as this book makes clear, the nature and timing of key events is becoming much better understood. The contributions to the book demonstrate how the growing body of molecular data, and its integration with ecological theory and earth sciences, has underpinned the recent and rapid progress in understanding this system.

Your participation in **frontiers of biogeography** is encouraged. Please send us your articles, comments and/or reviews, as well as pictures, drawings and/or cartoons. We are also open to suggestions on content and/or structure.

Please check <http://www.biogeography.org/html/fb.html> for more information, or contact us at ibs@mncn.csic.es and frontiersofbiogeography@gmail.com.

There have been many studies of tropical diversity but until now Neotropical fishes have received relatively little attention. This contrasts with South American birds, a group that has been prominent in tests of macroecological hypotheses (e.g. Rahbek et al., 2007). Fish are responsible for more diversity and deserve to be more fully studied. This book provides the knowledge that will inform these exciting research opportunities.

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Edited by Markus Eichhorn

books noted with interest

Principles of terrestrial ecosystem ecology

F. Stuart Chapin III, Pamela A. Matson & Peter M. Vitousek

2011, 2nd edition, Springer, 529 pp.

£135 (Hardback), £44.99 (Paperback)

ISBN: 9781441995032 / 9781441995025

<http://www.springer.com/>

An outstanding textbook which, after definitions, sets the stage with primers on Earth's climate system and geological processes. What follows is a magisterial and comprehensive account of the movements of water, energy, carbon and nutrients through natural systems. Along with standard generalisations, the authors delve into the finer detail and explain how biological processes can have important modulating effects through space and time. A final reflective pair of chapters considers global changes and the implications for ecosystem management. The book is well written throughout and punctuated with excellent colour illustrations; no-one from undergraduates to established researchers can fail to learn something from it.

Guide to standard floras of the World: An annotated, geographically arranged systematic bibliography of the principal floras, enumerations, checklists and chorological atlases of different areas

David F. Frodin

2001, 2nd edition, Cambridge University Press, 1100 pp.

£198 (Hardback), £90 (Paperback), US\$120 (e-book)

ISBN: 9780521790772 / 9780521189774

<http://www.cambridge.org/>

While not generally our policy to feature reprints, this standard text has newly appeared in paperback, bringing it within affordable reach of a greater number of researchers. It does exactly what it says on the cover, making it the definitive reference for anyone commencing work on the flora of a new region. Despite its not receiving any further updates and its coverage ending in 1999, there remain no resources to rival it, either in print or online. It also contains insightful reviews on the history of floristic description. An essential book which belongs in the library of every plant biogeographer.