and well chosen. Any book that treats such a diverse and large body of knowledge, particularly in a rapidly expanding and changing field, cannot escape the occasional error. For example, the authors cite paleobotanical evidence regarding the origin of the angiosperms to support elements of the molecular clock theory in part. Unfortunately, however, the paleobotanical data cited were misdated, and one hopes that such information does not enter into the world of dogma.

The second edition of Graur and Li's *Fundamentals of Molecular Evolution* is an essential tool for an introductory molecular biology or upper level/graduate evolution class, although a wider audience will probably appreciate its comprehensive and abbreviated discussions of multiple theories within different contexts. For example, scientists from other fields who have an interest in the progress of molecular evolutionary studies would find this text very approachable and a valuable desktop reference. It also provides useful information for population geneticists and systematists by clearly explaining the mechanics of molecular biology and, similarly, by demonstrating the application of data in a conceptual and analytical evolutionary framework for molecular biologists. Fortunately, the authors did not refine or shorten the book by excluding certain examples and theories. Instead, they embrace the scientific format and provide an intricate forum for additional discussion and critical thinking.—ANDREW W. DOUGLAS, *Department of Biology, University of Mississippi, University, Mississippi 38677, USA.*

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Ecological Assembly Rules: Perspectives, Advances, Retreats.—Edited by Evan Weiher and Paul Keddy. 1999. Cambridge University Press, Cambridge, United Kingdom. xii + 418 pp. ISBN 0-521-65235-9. Cloth, $90.00.—Community ecology has encountered several crossroads in the past and is currently at another. In the 1960s and 1970, several ecologists recognized that advancement of the field would require testing hypotheses about the relative importance of bottom-up and top-down effects on the structure of communities and food webs. This was evident in the pioneering experiments by Paine, Connell, Dayton, Menge, Lubchenco, and Sousa in intertidal communities (many of which are reviewed in Chapter 3 by D. A. Kelt and J. H. Brown in this volume). In the 1970s and 1980s, a contentious debate began over the existence of what Jared Diamond called "forbidden combinations" of bird assemblages in archipelagoes. This spurred the development of novel statistical approaches (e.g. null models; Connor and Simberloff 1983) to test these ideas. Community ecologists discovered that making inferences about the importance of competition from assemblage patterns was not as straightforward as one might initially think, and the statistical methodology that may have been used mattered.

The current crossroad is different in that it is not about whether people are going to test new hypotheses or develop new statistical methods to advance the state of knowledge in community ecology. Rather, it is about whether the time is right for a synthesis of descriptive and experimental approaches in community ecology. Can the study of community assemblages be taken in a new direction? Fundamental questions such as "Why are there so many species?" and "What factors limit species diversity?" have been addressed primarily with either descriptive or experimental approaches. An important conclusion that I drew after reading Weiher and Keddy's *Ecological Assembly Rules* is that a synthesis of experimental and null-model approaches may be the best way to answer these fundamental but vexing questions.

Inferring process from pattern has its advantages and disadvantages, as illustrated in Part I: "The Search for Meaningful Patterns in Species Assemblages." An advantage of using inference in such an approach is that it aims at describing combinations of species/taxa and, thus, applies to communities as a whole. A disadvantage is the difficulty in ruling out the importance of factors other than competition in structuring assemblages. The difficulties are well illustrated in exchanges between Fox (Chapter 1); Simberloff, Dayan, and Stone (Chapter 2); Kelt and Brown (Chapter 3); and Wilson (Chapter 5). In these chapters, we learn about a dizzying array of type I and type II statistical errors that may occur when using inappropriate null models. These are given colorful names such as "The Narcissus Effect," "The Icarus Effect," "The J.P. Morgan Effect," and "The Jack Horner Effect." Although disputes over methodology are just as contentious today as they were in the 1970s and 1980s, a gentler tone characterizes the debate in the current volume. For example, we find Brown (Chapter 3) betting Simberloff (Chapter 2) a beer over the results of what both agree would be an "interesting study" on the assembly of desert rodent communities.

There are also advantages and disadvantages to strictly experimental approaches in community ecology. One advantage is that factors other than competition can be ruled out unequivocally. One disadvantage, however, is that the results of most experimental studies relate to present-day, short-term processes, usually describing the responses of individual species to competition and other factors, rather than how communities as a whole are structured. Interpretations about the role of competition in structuring communities derived from such stud-

ies may depend on which species and which stages of the life cycle are examined and a consideration of the indirect interactions among three or more species.

In Chapter 4, Lockwood, Moulton, and Balent use an experimental null-model approach to examine patterns of successful colonization of islands by introduced avifauna. Thus, statistical approaches and a natural experiment are combined in a powerful demonstration of the importance of assembly rules. Such an experimental approach is revisited by Lockwood and Pimm in Chapter 13, "When does Restoration Succeed?" Because restoration ecology is inherently experimental in nature (or at least it should be), restoration projects may provide the best opportunity to test hypotheses about community assembly. In their review, Lockwood and Pimm discover that full restoration is rarely achieved, but that restoration efforts that include secondary succession are more likely to succeed than those that rely on micromanagement of community structure.

In Part II, the reader learns about other nontraditional perspectives on assembly rules. In the introductory chapter of the book, Keddy and Weiher provocatively state that "asking if there is pattern in nature is akin to asking if bears shit in the woods." In Chapter 9, Weiher and Keddy start with the assumption that nonrandom patterns of assembly exist in natural communities and then ask if it is possible to devise a set of rules that can be used to predict patterns of assembly of functional groups along environmental gradients. Quite interestingly, they find that when the analysis is focused on traits rather than species, some trait patterns show evidence of competition (i.e. limiting similarity inferred from morphological overdispersion), whereas others show evidence of having passed through an environmental filter or sieve (morphological underdispersion). The authors suggest that filtering is more important in stressful habitats, whereas competition appears to be more important in less-stressful habitats. Similarly, Strange and Foin (Chapter 11) expand the concept of assembly rules to include an emphasis of the role of the physical environment on stream fish assemblages. In an extremely well-written chapter, Diaz, Cabido, and Casanoves (Chapter 12) use a similar trait-environmental analysis to identify assemblages of functional groups of plants that are predicted to change with global climate change. They further highlight how changes in functional-group composition of assemblages in response to global environmental change may alter ecosystem function. Other chapters in Part II (e.g. Chapter 8 by Drake et al., Chapter 10 by Lomolino) fruitfully expand the concept of assembly rules to evaluate the spatial and temporal dynamics of community assembly.

To summarize, this timely and important book has much to offer anyone interested in community ecology, avian or otherwise. For those interested in a review and reading about the current status of the debate over the statistical methodology used to test for the existence of "forbidden combinations," this volume suits that purpose perfectly. For those interested in empirical data on assemblages rather than disputes over methodology, read Martin Cody's detailed chapter (no. 6) on plant and bird communities. Booth and Larson's chapter (no. 7) provides an interesting and informative history of the study of assembly rules, pre-Diamond era. For those interested in the potential for expanding the concept of assembly rules beyond Diamond's original intent, all of Part II is helpful.

Ecological Assembly Rules, along with Gotelli and Graves' (1996) *Null Models in Ecology*, is ideal for use in a graduate-level seminar on the assembly of communities. Chapters 4 and 6 deal specifically with bird communities and, thus, could be read in seminars pertaining to avian ecology. Also, the book would serve as excellent supplementary reading in a graduate-level Community Ecology course while also being extremely helpful at suggesting and guiding avenues for research in community ecology. Unfortunately, the exorbitant price ($90.00) may place the book beyond the financial reach of many graduate students. Nevertheless, I highly recommend the book for research and graduate-level teaching.—J. STEPHEN BREWER, *Department of Biology, University of Mississippi, University, Mississippi 38677, USA.*

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John Gould the Bird Man: Correspondence. Volume 1, through 1838.—Gordon C. Sauer. 1998. Maurizio Martino, Mansfield Centre, Connecticut. xiv + 340 pp. ISBN 1-57898-063-1. Cloth, $58.00. **John Gould the Bird Man: Correspondence. Volume 2, 1839 through 1841.**—Gordon C. Sauer. 1998. Maurizio Martino, Mansfield Centre, Connecticut. x + 408 pp. ISBN 1-57898-078-X. Cloth, $64.00 (available from Maurizio Martino Publisher, Box 373, Mansfield Centre, Connecticut 06250).—It is difficult to imagine that anyone had a greater influence on 19th century ornithology than John Gould. In the 50-year