Clearly, *The Birds of Northern Melanesia* represents a labor of love by the authors, who sink their teeth into a rich subject. In doing so, they follow the analytic approach that they have previously shown to be so productive. For those who found their earlier works illuminating, this book will be quite satisfying. For those who desire a comprehensive application of novel tools and new evolutionary perspectives, this work will disappoint. Unencumbered by null models, molecular datasets, or area cladograms, it is, nonetheless, fine natural history.

References and Notes

1. E. Mayr, *Population, Species, and Evolution* (Harvard Univ. Press, Cambridge, MA, 1970). This is an abridgement of Mayr's magistral account in (*3*).
2. J. Diamond, *Avifauna of the Eastern Highlands of New Guinea* (Nuttall Ornithological Club, Cambridge, MA, 1972).
3. E. Mayr, *Animal Species and Evolution* (Harvard Univ. Press, Cambridge, MA, 1963).
4. E. Mayr, L. L. Short, *Species Taxa of North American Birds* (Nuttall Ornithological Club, Cambridge, MA, 1970).

BOOKS: PALEOBIOLOGY

Changes in Life Across Many Temporal Scales

Richard Bambach

This symposium volume is a first-rate review of conceptual issues related to evolutionary pattern in both neontology (laboratory and field biology using living organisms) and paleontology. The studies range in scale from laboratory experiments on single polyps up to theoretical modeling of taxon-age distributions over time spans of 100 million years. *Evolutionary Patterns* is a festschrift in honor of Alan Cheetham, a distinguished paleontologist who has provided breakthrough insights on patterns of colony formation in bryozoans, documented that careful morphometrics can reveal true genetic species in bryozoa, and demonstrated that speciation patterns in fossil bryozoa fit the model of punctuated equilibrium.

Evolutionary Patterns
Growth, Form, and Tempo in the Fossil Record
Jeremy B. C. Jackson, Scott Lidgard, and Frank K. McKinney, Eds.
University of Chicago Press, Chicago, 2001. 415 pp. $85, £54. ISBN 0-226-38930-8. Paper, $30, £19. ISBN 0-226-38931-6.

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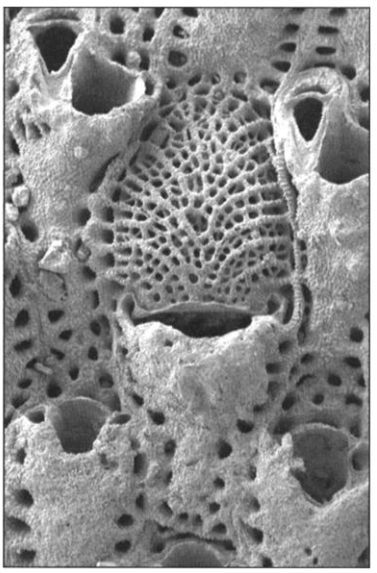
Many of the papers in the volume deal with colonial organisms. The contributions center on three major themes: determinants of colony form; recognition of species and the tempo of speciation and extinction; and macroevolutionary patterns and trends. As is universal with symposium volumes, the writing styles vary (with some papers much more difficult to digest than others). But every chapter contains interesting information, and the book's organization gives more structure to the material than is common for such compilations.

Highlights include the papers by Buss on colony growth in hydroids, Okamura *et al.* on competition versus feeding in determining colony form in bryozoa, Pandolfi *et al.* on the extinction of two Caribbean reef corals, and McKinney *et al.* on differences between diversity and abundance trends in bryozoan evolution. Through a series of clever experimental manipulations, Buss illustrates that some simple hydromechanical conditions influence budding and branching in hydroid colonies. If these signals can be transduced to effect expression of pattern-forming genes, global rules will be responsive to local states. Okamura and colleagues elegantly explain feeding efficiency in bryozoans and predict the distributions of forms under competition for limited space and under various conditions of flow and potential food acquisition. They then test their hypotheses against field data from gradients back into submarine caves. They conclude that the prevalence of spot forms and several zooid types in caves reflects the better adaptation of those forms to low food availability rather than a refuge from spatial competition. Pandolfi and his colleagues document the extinction in the last 80,000 years of two reef coral species formerly common throughout the Caribbean, while the other common Caribbean reef corals persisted. After the disappearance of the "organ-pipe" species of *Montastraea*, one of the dominant modern reef builders (*M. annularis*) developed narrow as well as wide column widths, apparently expanding into the morphospace of its extinct congener. In an expanded version of a study they published with the late Jack Sepkoski [*Science* **281**, 807 (1998)], McKinney, Lidgard, and Taylor review the transition from a predominance of cyclostome bryozoans in the Early Cretaceous to the present-day dominance, in both abundance and diversity, of cheilostomes. Although the shift in taxonomic diversity was nearly monotonic, changes in abundance were not: cyclostomes became more abundant after the end-Cretaceous extinction before declining again. This is an exceptionally elegant demonstration of the need for more complete data in paleontology as well as a warning that one-dimensional analyses may not tell the whole story.



"Punk eek" bryo. The bryozoan genus *Metrarabdotos* shows a pattern of morphological evolution consistent with the punctuated equilibrium model.

CREDIT: ALAN CHEETHAM/DEPARTMENT OF PALEOBIOLOGY, NATIONAL MUSEUM OF NATURAL HISTORY, SMITHSONIAN INSTITUTION

Two issues that plague communication between neontologists and paleontologists are differences between their approaches in temporal scale and the availability of detailed data. Neontologists generally expect more complete data on organisms than a paleontologist can ever hope to have. For instance, several of the papers in this book discuss cytological features (McShea), experimental manipulation (Buss), and the utility of gene sequencing to identify control genes in development (Buss again) or differences in species (Knowlton and Budd). Paleontologists cannot get such data from fossils. On the other hand, the fossil record provides opportunities for directly observing changes in past life in their historical context on a time scale beyond the few centuries within reach of the neontologist. The 80,000-year gaps between data points in the Pandolfi *et al.* study probably seem huge to most biologists, and clearly they do not let us follow the extinction in detail. But neontologists have never observed the extinction of common reef coral species on any time scale, nor have they been able to see how such an extinction affects the morphology and occurrence of other reef-building corals. The paleontological perspective does both and leaves us with the intriguing question, what could cause such a selective extinction in a complex ecosystem?

With its collection of well-constructed studies of evolutionary issues at all temporal scales, *Evolutionary Patterns* is an excellent example of how neontology and paleontology can and should interface. The book illustrates the point that full understanding of the whole range of evolutionary phenomena requires both neontological and paleontological study.