

cumulative index obtained by combining the habitat indications of all of the species in a fauna" and it is determined for extant species "by scoring them for the range of habitats from which they have been recorded." This approach is an intriguing way to quantify the habitat variability for individual species, but it assumes modern analogs for past ecosystems, although Andrews recognizes that past habitat preferences may not have been the same. A potential problem is that many owl species, as Andrews notes, may not be opportunistic feeders and their diets may represent the past environment selectively. It would have been interesting to apply the THI analysis to modern owl pellet accumulations to assess its ability to reflect modern environments.

There is an extensive appendix providing summaries of the general biology of different species of raptors and mammalian carnivores, with important references. These data form the foundation for many of Andrews's taphonomic principles, but the appendix is also a valuable resource for anyone interested in raptors and small carnivores. Information on how these species sample their environments is especially interesting.

*Owls, Caves and Fossils* will be a keystone in the paleoecological interpretation of small mammal accumulations. Like any good piece of research, it raises many new questions and avenues to pursue. The field of microtaphonomy will surely mushroom as a result of its publication.

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## Nitrogen-Fixing Systems

**The Biology of *Frankia* and Actinorhizal Plants.** CHRISTA R. SCHWINTZER and JOHN D. TJEPKEMA, Eds. Academic Press, San Diego, CA, 1990. xviii, 408 pp., illus., \$95.

This well-designed book presents a review of most of the papers that have been published up to 1990 on the biology of actinorhizal plants and their nitrogen-fixing nodule symbionts. It contains 14 readable chapters on various topics in the biology of these plants and 4 chapters that focus on the current and potential uses and management of actinorhizal plants in forestry.

In a historical overview by A. Quispel a clear description is given of the discoveries made before 1950 and in the "modern period" from 1950 to 1978. This period was characterized by the work of G. Bond, to whom the book is dedicated, on root-nodule physiology and by the discovery of new

actinorhizal plants. The "new age," from 1978 to 1990, started with the first isolations of the nodule symbiont, *Frankia*. A significant part of the book deals with progress in the physiology and biochemistry of these newly isolated actinomycete strains and with the environmental factors affecting nitrogen fixation in actinorhizal nodules. W. B. Silvester, S. L. Harris, and J. D. Tjepkema in their excellent review describe the regulatory effects of oxygen in nitrogen fixation and show the unique position of *Frankia* within nitrogen-fixing organisms.

Treatment of the ecology of *Frankia* is restricted to one chapter on the occurrence and distribution of "spore positive" and "spore negative" nodules, which represent different groups of *Frankia* strains. This chapter clearly demonstrates the limits of conventional methods in microbial ecology and the need for molecular techniques in this area.

The chapter by A. Séguin and M. Lalonde on micropropagation and genetic transformation of actinorhizal plants and *Betula* illustrates the progress that has been made in the genetic improvement of actinorhizal species. This chapter and a chapter by J. Bousquet and Lalonde on the genetics of actinorhizal Betulaceae demonstrate the potential of *Betula* as an experimental recipient for host genes or host-gene modifiers involved in the association with *Frankia*, especially in view of the gene delivery systems already available in the Betulaceae.

The book demonstrates the significant progress that has been made in actinorhizal research, though it is still behind that made in research on legumes. The review by B. Mullin and C. S. An of the rapidly developing application of molecular genetics shows that this topic has been left almost completely to the students of the '90s. It is likely that most of the problems related to working with recalcitrant, slow-growing actinomycetes and woody plants can be overcome in the near future by using new molecular techniques.

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## Books Received

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**Atoms and Light Interactions.** John N. Dodd. Plenum, New York, 1991. xiv, 247 pp., illus. \$65. Physics of Atoms and Molecules.

**The Big Bang Never Happened.** Eric J. Lerner. Random House, New York, 1991. xiv, 466 pp., illus. \$21.95.

**Biogeography and Ecology of Forest Bird Communities.** Allen Keast, Ed. SPB Academic Publishing, The Hague, The Netherlands, 1990. vi, 410 pp., illus. \$120.

**Biology of Aging.** Observations and Principles. Robert Arking. Prentice Hall, Englewood Cliffs, NJ, 1991. xii, 420 pp., illus. \$44.

**The Biology of AIDS.** Hung Fan, Ross F. Connor, and Luis P. Villarreal. 2nd ed. Jones and Bartlett, Boston, MA, 1991. xvi, 173 pp., illus. paper, \$25. Jones and Bartlett Series in Biology.

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**Biomechanical Transport Processes.** Florentina Mosora et al., Eds. Plenum, New York, 1990. xii, 414 pp., illus. \$95. NATO Advanced Science Institutes Series, vol. 193. Series A, Life Sciences. From a workshop, Cargèse, France, Oct. 1989.

**Biophysical and Biochemical Aspects of Fluorescence Spectroscopy.** T. Gregory Dewey, Ed. Plenum, New York, 1991. xviii, 294 pp., illus. \$69.50.

**Biotechnology and International Relations.** The Political Dimensions. Thomas C. Wiegler. University of Florida Press, Gainesville, 1991. x, 212 pp. \$22.95.

**Biotechnology and the Future of World Agriculture.** The Fourth Resource. Henk Hobbelenk. Zed Books, Atlantic Highlands, NJ, 1991. x, 159 pp., illus. \$49.95; paper, \$15. Revision of *New Hope or False Promise?*

**Blood Cell Biochemistry.** Vol. 3, Lymphocytes and Granulocytes. J. R. Harris, Ed. Plenum, New York, 1991. xviii, 413 pp., illus. \$89.50.

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**The Boundaries of Humanity.** Humans, Animals, Machines. James J. Sheehan and Morton Sosna, Eds. University of California Press, Berkeley, CA, 1991. x, 274 pp., illus. \$35; paper, \$12.95.

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**Coastal Alert.** Ecosystems, Energy, and Offshore Oil Drilling. Dwight Holing. Island Press, Washington, DC, 1990. xviii, 122 pp., illus. Paper, \$10.95. Island Press Critical Issues Series, no. 2.

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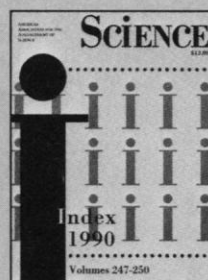


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