

thinking on a subject or explore some of the nuances of the field. For instance, a review by F. C. Gillett updates results on the Vega phenomenon, discovered by IRAS, for four nearby stars. This phenomenon is an infrared excess attributed to thermal emission by orbiting circumstellar grains that can be interpreted in some cases as indirect evidence for planet formation around other stars. A review by H. J. Habing demonstrates that by careful selection of infrared colors and source brightness we can explore the distribution of stars in our galaxy. Because interstellar extinction has little effect on infrared wavelengths (compared to the visible), IRAS has provided us with an unprecedented view of the Milky Way, revealing for the first time the nuclear bulge and stellar disk of our galaxy.

Other noteworthy contributions include a thought-provoking review by B. G. Elmegreen, who discusses how infrared observations can be used to deduce information on the luminosities of newly forming stars (protostars) and star clusters and the distribution of dust particles around young stars. Elmegreen outlines how our current theories of star formation can be modified by these results, indicating the important role dust can play on the magnetic diffusion rate in dense molecular clouds, an effect that will influence the masses of the stars that form. The three reviews on the composition and properties of interstellar grains by H. C. van de Hulst, J. S. Mathis, and J. M. Greenberg, leaders in the field, are clear and illuminating. These are just some of over 20 invited reviews and over 80 contributed papers contained in this volume.

TERRY HERTER
*Department of Astronomy,
Cornell University,
Ithaca, NY 14853-6801*

Fossils in Phylogeny

Phylogeny Reconstruction in Paleontology. ROBERT M. SCHOCH. Van Nostrand Reinhold, New York, 1986. xii, 353 pp., illus. \$52.95.

The revolution in taxonomic practice brought about by cladistics in the last two decades not only has brought method and rigor into the field of systematics but has also led some to question or reject the traditional role of paleontology in phylogenetic reconstruction. A clear exposition of where paleontology stands in phylogenetic reconstruction is therefore long overdue. Unfortunately, this book is not about what role fossils play in phylogenetic reconstruction but about concepts and methods of analysis that can be applied to fossil data.

Schoch defines phylogeny in an unusually restricted manner to mean the establishment of relationships (taxonomy) and specifically excludes the construction of phylogenetic trees, which he calls "evolutionary phylogeny." Yet this book is about much more than "phylogeny" in Schoch's terms. Of the three sorts of data retrievable from fossils—morphological characteristics, stratigraphical range, and geographical distribution—it is morphology and morphology alone that provides the information on which phylogenetic relationships have to be decided. Only after relationships have been established by the most rigorous method possible can stratigraphical and geographical data be analyzed in a meaningful way to produce phylogenetic trees or biogeographical histories of vicariance. So, although rigor in both stratigraphical and biogeographical analysis is to be applauded, the two chapters dealing with these themes seem largely irrelevant to Schoch's main thesis. Even further removed from phylogenetic reconstruction is the final chapter on macroevolution, since macroevolution theories attempt to explain the patterns of diversity that result from combining stratigraphical and geographical data with hypotheses of relationship. Furthermore, it appears to me that there is insufficient resolution in paleontological data to be able to distinguish unambiguously between any of the competing hypotheses.

I found little to criticize in Schoch's clear analysis of the vast amount of literature that phylogenetic reconstruction has prompted recently but was somewhat disappointed not to find a more paleontological slant or any concrete examples in the text. Fossils provide the only unambiguous guide to past life and their character associations, and the character transformations deduced from paleontological lineages are no more susceptible to problems of interpretation than are ontogenetic character transformations in determining homology and character polarity. It is a shame, for example, that only the briefest mention of Hennig's stem and crown group concept is given, since this seems to me to be one of the most fruitful approaches to the placement of fossils. The plesion concept gets rather more of an airing before being rejected as unnecessary (though for my group, echinoderms, trying to fit all living and fossil forms into a unified taxonomy without plesions would produce the most incredibly unwieldy hierarchy).

Finally, although Schoch is to be commended for trying to provide a guide to the extensive literature covering the theory behind phylogenetic analysis that has appeared over the last 10 to 15 years, I fear that because of all the jargon used only those fully conversant with current arguments will

find this book digestible. There is a glossary, but it is certainly not comprehensive, and the two words that sent me scurrying to it were not included. For anybody starting out in phylogenetic analysis, considerable background reading is required before tackling this book.

ANDREW B. SMITH
*Department of Palaeontology,
British Museum (Natural History),
London SW7 5BD, United Kingdom*

Books Received

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Bryozoa. Ordovician to Recent. Claus Nielsen and Gilbert P. Larwood, Eds. Olsen and Olsen, Fredensborg, Denmark, 1985. viii, 364 pp., illus. Paper, \$85. From a conference, Vienna, July 1983.

The Butterflies of North America. A Natural History and Field Guide. James A. Scott. Stanford University Press, Stanford, CA, 1986. xvi, 583 pp., illus., + plates. \$49.50.

Cancer. The Misguided Cell. David M. Prescott and Abraham S. Flexer. 2nd ed. Sinauer, Sunderland, MA, 1986. xvi, 349 pp., illus. Paper, \$18.95.

Cancer in Atomic Bomb Survivors. Itsuzo Shigematsu and Abraham Kagan, Eds. Japan Scientific Societies Press, Tokyo, and Plenum, New York, 1986. viii, 196 pp., illus. \$55. GANN Monograph on Cancer Research no. 32.

Carbohydrate Metabolism in Cultured Cells. Michael J. Morgan, Ed. Plenum, New York, 1986. xxii, 514 pp., illus. \$69.50.

Endocrine Regulation of Electrolyte Balance. R. Krück and K. Thurnau, Eds. Springer-Verlag, New York, 1986. xii, 150 pp., illus. Paper, \$49.50. From a symposium.

Handbook of Glass Properties. Narottam P. Bansal and R. H. Doremus. Academic Press, Orlando, FL, 1986. x, 680 pp., illus. \$135.

Handbook of Infrared Standards. With Spectral Maps and Transition Assignments between 3 and 2600 μm . Guy Guelachvili and K. Narahari Rao. Academic Press, Orlando, FL, 1986. lxxii, 851 pp., illus. \$75.

Handbook of Nature Study. Anna Botsford Comstock. Comstock (Cornell University Press), Ithaca, NY, 1986. xxiv, 887 pp., illus. \$49.50; paper, \$19.50. Augmented reprint, 1939 ed.

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