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Evolution of the Insects

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BOOK REVIEWS

GRIMALDI, D. AND M. S. ENGEL. 2005. Evolution of the Insects. Cambridge Univ. Press, Cambridge, U.K. xv + 755 pp. Hardback, ISBN 0-521-82149-5, $80.00

This book is printed on glossy alkaline paper. Its large page size and elegant layout with numerous color photographs and diagrams give it almost the appearance of a 'coffee table book.' The authors have accomplished a major feat in reviewing an enormous amount of literature (71 pages of references), some of those cited works very technical and dull to a non-specialist, and producing a very readable book. Perhaps the book is not for bedtime reading because of its size and weight, but it is a reference book that can be read for pleasure. It provides excellent value for its purchase price.

The introduction (Diversity and Evolution) has two components. The first is about the nature and number of species. It is the stuff of which the best television documentaries are made when they discuss insect diversity. The second is an explanation of what it takes to reconstruct evolutionary history. Of course this is knowledge of systematics and evolution, of taxonomy, nomenclature, and classification, and of paleontology. The authors explain those areas of endeavor in the most lucid terms which would do credit to any college lecture.

Next follows a 51-page section on fossil insects, starting with the various processes of fossilization, and how the age of fossils can be determined. It goes on to explain the locations and history of major fossil insect deposits of the Paleozoic, Mesozoic, and Cenozoic with photographs and diagrams.

The next two sections deal with relatives of insects (including Entognatha—Protura, Collembola, and Diplura), and with insect morphology. Then, on page 148 begins a section on the earliest insects (Archaeognatha and Dicondylia, including those insects more familiarly known as bristletails and silverfish). This sets the tone for more sections on Pterygota (including Ephemeroptera and Odonata); Polyneoptera (including Plecoptera, Embiodea, Zoraptera, Orthoptera, Phasmatodea, Dermaptera, Grylloblattodea, Mantophasmatodea, Isoptera, and Blattaria); Paraneoptera (including Psocoptera, Phthiraptera, Thysanoptera, and Hemiptera); Neuropterida (Raphidioptera, Megaloptera, and Neuroptera); Coleoptera and Strepsiptera; Hymenoptera; Panorpida (including Mecoptera, Siphonaptera, and Diptera); and Amphiesmenoptera (Trichoptera and Lepidoptera). Each section integrates information on fossil representatives, some having ordinal names (not listed here) that will be unfamiliar to most readers, with that on extant species. The authors demonstrate a very good grasp of the diversity of the extant groups, but to integrate knowledge of the fossil species is a real achievement.

Page 607 begins a new section called 'Insects become modern: the cretaceous and tertiary periods.' Its strengths are accounts of the evolution of pollinators of flowering plants, and of austral disjunction and vicariance, and it grapples with the subjects of the rate of insect speciation and why there are so many species. A brief 'Epilogue', beginning on page 646, attempts, without much success because of lack of data, to get a grip on the rate of insect extinction

Before the References is an 11-page Glossary. The word there that caught my attention was 'exuvium', an incorrect singular for 'exuviae' (the latter is used correctly on p. 148).

In my view, this is one of the very best books on entomology of the last quarter century, and the authors and editors are to be congratulated for their accomplishment. Of course there are some typographical errors, hard to avoid in a first-edition book of this length, and some mismatched verbs. All scientific names of tribes, families, orders, and higher categories of organisms are plural, both by the forms (Latin, or Latinized Greek) of these names and by statement in the International Code of Zoological Nomenclature, but the authors treat them arbitrarily as singular in some sentences, and plural in others, not a very good example to the students who will benefit from this book.

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