

Throughout the book, there are drawings of the prominent species encountered at Franklin. The text is followed by a list of the insects studied, and a table showing when adults sing during the summer. The author has also compiled two keys: one based on morphology (for the "nonspecialist"); the other a phonetic key to the songs of the crickets, locusts, and meadow grasshoppers. The latter is followed by a descriptive list of the katydid and shield-bearer songs. A short reference is appended. The book offers a pleasant afternoon's reading, and an invitation to listen in field and wood for species-distinguishing snaps, lisps, and clicks.

At the end of the summer, the orthopteran music fell silent for the year, and the only "sounds were the aeolian whispers, sighs, moans, and wails of the wind . . ." But this bleakness can be only temporary, for "we know that the score of the music is inscribed in the developing nervous system and awaits only the construction of an instrument for its expression." Spring will issue forth new concerts and solos.

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The Insects of Australia— A Textbook for Students and Research Workers

Commonwealth Scientific and Industrial
Research Organization
Cornell University, Ithaca, NY, 1991
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ANY REVIEW of *The Insects of Australia* must serve two groups, those who remember and continue to use the first edition (1970) and its supplement (1974, Melbourne University Press, 146 pp.) and those newer students of entomology who did not eagerly await their copies from Australia.

For those developing first impressions, *The Insects of Australia* is one of the best faunal treatments of a large geographic area ever produced. It is, however, much more than just a text of introductory remarks, keys, listings of taxa, and short discussions.

It was, and still is, a benchmark publication. While most texts of this type take a conservative approach to taxonomic treatment, this work takes a "state of the knowledge" approach which some may consider a little too modern and lacking in rigorous testing. Both approaches have positive and negative attributes. However one views the approach taken in this book, its treatment of subjects is thought provoking and, perhaps in some instances, open to debate.

For convenience, the book can be divided into two parts (not equivalent to the two volumes). The first ten chapters treat anatomy and function, general biology, phylogeny, fossil history, biogeography, and systematics as well as entomological history and the roles of insects in science and in their interactions with humans. The remainder of the book is an order by order treatment of insects and related hexapods. Australian as well as non-Australian orders are discussed.

Chapter 1, Skeletal Anatomy and Key to Orders, is a well-organized and relatively complete treatment of general, external morphology and terminology. A new feature of this chapter is a key to hexapod orders and other arthropod groups that are sometimes confused with insects. Identified are both adult and immature forms of the world fauna. The key is illustrated through reference to illustrations in the ordinal treatments in the remainder of volume one and in volume two. Although there is no indication on the illustration of the character used in the key, most character states are easily understood. I had several individuals of differing ability use the key and all found it easy to use and reliable. Chapter two, General Anatomy and Function, covers basic aspects of internal morphology and physiology. The text provides an excellent treatment ideal for a course in general entomology or for anyone interested in general principles. Chapter three, General Biology, is a comprehensive treatment of adaptive and behavioral features. Subjects covered include adaptations to extremes, adaptations to aquatic life, relationships with plants, insects as prey and predators, parasitism, parasitization, and phoresy, color and form, mimicry and polymorphism, social insects, and migration. Indeed, a little of everything. A chapter on Principles and Practice of Systematics is, again, an excellent basic study in classification and systematic theory. The chapter covers the charge of taxonomy as well as theories of classification. It presents short, but succinct, discussions of topics as diverse as defining a study group, the species concept, theories of classification, and zoological nomenclature.

Two chapters, one on Phylogeny of Extant Hexapods and a second on The Fossil History and Evolution of Hexapods, are of value if for no other reason than the rarity of such discussions in the "understandable" literature. Neither are review articles; they present the current state of knowledge from the views of the two authors. I enjoyed both chapters and gained a great deal from them. They may be a little complicated for undergraduate students and the discussion of extant hexapods requires a basic understanding of cladistics.

Biogeography is treated in a separate chapter. The subject is dealt with through the presentation and explanation of basic concepts (e.g., dispersal, ecological and vicariance biogeography, and plate tectonics). Although they use primarily Australian examples, the chapter would serve as a good introduction to biogeographic theory for undergraduate and graduate students.

Before I go on, I want to make a general comment on the first seven chapters of the book as described above. These chapters, taken as a group, represent one of the best discussions of general insect biology and systematics (in a broad sense) available in any single text. They can be used by students anywhere in the world and will surely be used by entomology instructors everywhere to enhance and update their own understanding of the subjects. These chapters cover themes that are important to all entomologists regardless of discipline, and could easily find a place on all departmental reading lists.

The chapter on Biographical History will be of interest to Australian entomologists and those with a delight for entomological history. However, it may be of only passing interest to others. This is not to say the chapter lacks value. The book is, after all, written primarily for an Australian audience! A chapter on Insects and Their Importance to Humans as well as one on Insects in Scientific Research both provided interesting reading.

The remainder of volume one and all of volume two (≈750 pp.) is a systematic treatment of insect orders and related hexapods (e.g., Collembola). I will not discuss each of the chapters independently but will make general comments that relate to all of them. The format of each chapter is basically the same. Each contains a brief introduction, discussions of adult anatomy and the immature stages, biologies, and special features concerning the taxon. Keys are included for the identification of Australian organisms to various levels (at least family and subfamily in many cases). One feature I appreciated was the use of preliminary keys above family level taxa (e.g., suborders or super-

families) which helped to make the keys to families less cumbersome and much easier to use. Families are discussed individually and special features of the Australian fauna are examined. Another valuable feature in the ordinal treatments was a classification scheme for each group that lists the higher classification and all world families as well as the number of Australian species in each family. However, only families occurring in Australia are discussed in detail.

These taxonomic treatments are excellent. It is only the requirement of brevity that keeps me from discussing each one and its special features. It must be noted, however, that the text treats the Australian fauna. Thus, although the great majority of North American families are covered, some are not. The book could not be used as a primary text for an insect taxonomy course (the cost would already exclude it). A set of eight color plates is excellent and is included in volume one. References for all chapters and an index complete volume two. The two volumes are designed to be used as a set and not independently.

Several features of *The Insects of Australia* deserve special mention. The drawings are as good as any found in a biological text. Additionally, photographs and electron micrographs are excellently reproduced. Seventy-one authors from throughout the world were involved in this edition. This creates some inconsistencies, especially in the way terms are used in various chapters. I also spent several days working with the key to Coleoptera families. It is long (264 couplets), and I found it difficult to use. Unless you are very familiar with Coleoptera terminology and morphology, I feel the use of the key would be a formidable task, especially for someone at the undergraduate level. In the treatments of Coleoptera families, each is preceded by a set of telegraphic style abbreviations covering items such as coxal openings, tarsal formulae, and antennal types. I found myself constantly referring back to the list of abbreviations at the beginning of the chapter. I am sure, however, that one would learn the abbreviations in a short period of time if the chapter was used on a continual basis.

The book is well referenced and, although I found a few typographical errors, they do not detract from the overall excellence of this work.

If you have the first edition should you purchase the second? There are several new chapters in this edition that were not in the first. Unfortunately, a short chapter on cytogenetics was eliminated. Each chapter has been revised, some very little, others extensively, and all have been updated. The larger, 8 1/2 by 11, and two volume format make

it much easier to use and should add to the life of the book. I also found it easier to read (perhaps my prejudice) and feel that the format change enhanced the excellence of the illustrations. If you have the first edition and use it on a regular basis, I would invest in the second. For, even at a price of \$215.00, this is one book that I do consider an investment.

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The Honey Bee: A Guide for Beekeepers

V. R. Vickery
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THE COUPLING of scientific information about honey bees with the wide-ranging opinions of beekeepers to explain bee management is a formidable task. V. R. Vickery has synthesized a broad treatment of many topics to produce a text most appropriate for beginning to intermediate beekeepers. *The Honey Bee: A Guide for Beekeepers* also will serve commendably as a text for beekeeping courses; the 240 pages of material were developed as an extension of Vickery's teaching efforts at Macdonald College in Quebec. The book is written in a folksy manner and should be both instructive and enjoyable reading for newcomers to the field of apiculture. The coverage of issues comes from a distinctly northern perspective, and the book uniquely will fill the needs of beekeepers in Canada and the northern United States.

The book is divided into 16 chapters spanning topics from bee biology to applied bee management. Material in each chapter is supported by references given at the conclusion of each chapter. Two chapters on bee biology and activities are somewhat superficial academically, but provide background information sufficient to acquaint prospective beekeepers with the theory behind standard bee management practices. The strength and bulk of the text are descriptions of the how-to's of keeping bees. The usual chapters dealing with equipment, apiary sites, basic seasonal management, swarm prevention, and honey production

and processing are lucid and thorough in their coverage. A beekeeper's touch is evident in passages explaining how to enter a hive. There is a detailed inventory of the progression of floral resources in the north. The author's extensive field experience translates into excellent descriptions and personal accounts of fall and winter management of honey bees in northern areas. Discussions on overwintering bees in Canada and arguments for relying less on queens and packages produced in the south are very timely given current and impending problems with parasitic mites and Africanized bees. Other instructive chapters that enhance the text for progressive beekeepers are explanations of the economics of beekeeping, commercial beekeeping, and the "African" bee problem, although the latter includes excessive speculation and promulgates some myths.

The book is well organized and handsomely assembled. Useful features include both detailed and quick reference Tables of Contents, and chapter indicators on page edges. Short additions include a seasonal schedule, a glossary, and a reference list. There are useful forms that may be photocopied for recording profit and loss, honey production, colony conditions, and equipment inventories. The materials are illustrated by 145 photographs and drawings plus 16 color plates.

The overall quality of the book suffers from a lack of careful editing. The typesetting sometimes produced distracting irregular letter spacing within words. There are numerous misspellings, inconsistencies in spelling (honey bee versus honeybee) and improper word divisions (including single syllable words being split). The anecdotal prose style occasionally yielded passages of questionable value (is *Apis mellifera ligustica*, the Italian bee, really known in some circles as the "Mafia" of the honey bee world because of its predilection to rob honey from other colonies?).

The Honey Bee: A Guide for Beekeepers should serve well as a starting volume for those interested in the art of beekeeping, and it deserves a place as a companion to several other standard beekeeping texts. Instructors of university or extension courses on honey bee management should consider the comprehensive and contemporary guide as a course text.

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