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Book reviews

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BOOK REVIEWS

CHEMICAL ECOLOGY OF INSECTS 2, R. T. Cardé, W. J. Bell (eds), Chapman and Hall, New York, 1995, Hardback ISBN 0-412-03951-6, Paperback ISBN 0-412-03961-3, 433 pp.

This book will be welcomed by those involved in research in the field of insect chemical ecology. It is a worthy successor to *Chemical Ecology of Insects*, edited by W. J. Bell and R. T. Cardé, published in 1984. More than just a second edition, this comprises a wholly new set of chapters, all differing in content, title and authorship from those in the first edition.

The expansion of the subject since 1984 has necessitated a change of approach. Whereas the first edition set out to cover the field and treat a few topics in depth, the second abandons any attempt at comprehensive coverage, and instead deals with selected areas, providing reviews that outline the boundaries of current knowledge and point to promising directions for future research.

There are four sections with a total of ten chapters: *Chemoreception and Integration* (Behavior and integration by Marion O. Harris and Stephen P. Foster; Effects of experience on host-plant selection by Elizabeth E. Bernays; Parasitoid foraging and learning by Louise E. M. Vet, W. Joe Lewis and Ring T. Cardé); *Orientation Mechanisms* (The role of chemo-orientation in search behavior by William J. Bell, Larry R. Kipp and Robert D. Collins); *Plant-Insect Interactions* (Host-tree chemistry affecting colonization of bark beetles by John A. Byers; Host-plant choice in *Pieris* butterflies by F. S. Chew and J. A. A. Renwick); and *Insect-Insect Interactions* (Trail and territorial communication in social insects by James F. A. Traniello and Simon K. Robson; The chemical basis for nest-mate recognition and mate discrimination in social insects by Brian H. Smith and Micheal D. Breed; Chemical communication in the true bugs parasitoid exploitation by Jeffrey R. Aldrich; and Propaganda, crypsis and slave-making by Ralph W. Howard and Roger D. Akre).

The first chapter gives salutary emphasis to the role of other sensory modalities in the behavioural responses of insects to chemical cues. The second and third describe current theories on the role of experience in the chemosensory responses of phytophagous insects and parasitoids to their hosts, and review relevant research. The questions are clear but, inevitably in a treatment designed to illuminate the limits of current understanding, the findings that bear on them are fragmentary. To some extent, each of these two chapters appears as a pile of jigsaw puzzle pieces. These reviews will surely stimulate the work needed to assemble these two piles of pieces into a coherent picture.

Chapters 5 and 6 consider bark beetles and butterflies of the genus *Pieris* (in the wider sense) respectively, as representative groups in which the chemically-mediated

host-plant relationships are well studied. Chapter 8 reviews experimental studies of the role of chemical cues of exogenous and endogenous origin in the discrimination of nest mates and kin, focusing on *Lasioglossum*, *Apis*, *Polistes* and ants. Few studies can meet the full range of criteria required to demonstrate rigorously that a compound functions as a recognition cue; in many cases the evidence is incomplete. There is abundant scope for further research. Chapter 9, intended as 'a challenge for future students of the Heteroptera', surveys what is known of the gland structure, chemistry and function of pheromones in some terrestrial Heteroptera, illustrating the diversity and oddity of bug pheromonal biology and giving tantalising clues about exploitation by predators and parasitoids. The last chapter presents a fascinating, if teleologically worded, review of some ways in which insects appear to exploit or misinterpret chemical cues produced or adopted by other arthropods. The long gestation period of the book, mentioned in the introduction, seems to be reflected in the rather patchy treatment of post-1992 references in some chapters.

There is much thought-provoking material in this book. With the exception of some aspects of circular lipids as recognition cues, there is little overlap between the chapters. They are not integrated: each stands alone as a review that draws together the literature on its own topic, and will help to stimulate the research that will be needed to reveal a coherent story in the future. Several of the chapters in the first edition provided valuable reading for advanced undergraduate courses. This second edition is more specialised, and correspondingly less appropriate for use at undergraduate level, but it still includes substantial sections that students can appreciate and enjoy. It deserves a place in the library as a useful set of reviews on a selection of topics chosen to give a taste of the excitement and scope of current and future research in insect chemical ecology.

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THE CHEMISTRY OF ATMOSPHERE: OXIDANTS AND OXIDATION IN THE EARTH'S ATMOSPHERE. PROCEEDINGS OF THE 7TH. BOC PRIESTLEY CONFERENCE, R. A. Bandy (editor), publ. Royal Society of Chemistry, ISBN 0-85404-765-4, 228 pp. Price £55.00, Special Publication No. 170.

This volume provides a theme on the "The Chemistry of Atmosphere" pertinent to various themes of Priestley's work in UK and then in America, particularly his discovery of ozone sources. The topic covered by the book include the objective fate of atmospheric pollutants, photochemical smog and the role of ozone, stratospheric ozone and global tropospheric ozone. With ten papers covering these aspects, and eight later chapters of the book also relate to various aspects of the ozone discovery and earlier work during the last century.

The first part of the book convinces us that CH_4 , OH/O_3 and N_2O are important factors in the limitations of ozone. The papers rely on four themes – 1) Oxidation and fate of atmospheric pollutants; and 2) Photochemical smog and ozone; 3)

Stratospheric ozone; and 4) Global tropospheric ozone. One speaker described ozone as representing “the good, the bad and the ugly”, depending on its location in the atmosphere. Ozone presents all of these qualities and the question posed as to whether ozone and other atmospheric pollutants can be reduced in human activities? Previously, earlier estimates of CH_4 and N_2O were grossly estimated, particularly that of natural contributions; there is now a good enough estimate of their sources and control. The following chapters explore some of these options. Failing food production may likely be a product of population increase – will this lead to a problem in reducing NO_x controls, or providing O_3 -resistant crops? Because of the dearth of quality on continental scales, the potential economic quality can't yet be estimated. There is now an effective global monitoring service and various field measurement programmes looking for sponsors.

The second part of the book gives us a dramatic reaction to the way ozone was first recognized, and in spite of Priestley's admonition to define it quantitatively, the difficulties were evident; some of Schonbein's problems means that even some of his tests are still recognised. I found these historic accounts to be most valuable in identifying the problems that arose. The lack of ozone in towns compared with countryside distribution was associated with health problems, this promoted the benefits of sea air and forests to human health which were found beneficial to diseased sufferers, even to the recent times. Questions were raised by other investigators at the time, and after almost a century of interest, the Victorian prediction with ozone was eventually dispelled in spite of its chemico-theology – a creation of the beneficent balance of a Creator!

The papers were contributed mostly by the the American Society of Chemistry and the United Kingdom Royal Society of Chemistry. The former (with one UK and one German contributors) fills the first part of the book, while the later historic account seems largely more a UK exercise helpful in most cases, but some contribution from USA. The writing is helpful in most cases, but some contributions seem rather confusing. The price of the book seems high – £55 – a large price to pay for such material, but perhaps the libraries will find it useful to have it.

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