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BOOK REVIEWS

Physiological Processes in Plant Ecology: Towards a Synthesis of Atriplex: by C. B. OSMOND, O. BJÖRKMAN and D. J. ANDERSON. Springer, Berlin, 1980. 468 pp. DM 98 (*ca* £25).

The botanical literature in the past has been enriched by a number of monographs recording enormously detailed investigations of particular plant genera, which together have greatly illuminated our knowledge of the plant kingdom in general. Notable among these are Babcock on *Crepis*, Goodspeed on *Nicotiana* and Mirov on *Pinus*. To this list, we can now add this definitive study of the chenopodiaceous genus *Atriplex*, co-authored by three distinguished physiological ecologists, Osmond, Björkman and Anderson. Although as the title indicates this is largely a physiological and ecological study, nevertheless it is wide ranging in its coverage of the genus. Indeed, the first 100 pages or more are concerned with painting in the background and discuss at length the taxonomy, geography, genecology, chromosome numbers, genetics and evolution of the genus. The remaining three quarters of the text then provide an account of *Atriplex* plant communities, of germination and seedling establishment, of ion absorption and uptake, of salinity responses, of responses to water stress, of photosynthesis, and of productivity.

To many, *Atriplex* may seem a strange choice for scientific study—a very ugly group of plants, largely weedy and of little economic value, and described here in the text as "the damnest stinking genus there is, taxonomically". One might, therefore, well ask the question why does it deserve such attention? Perhaps the answer lies in its very success as a weed, which is indicative of its enormous adaptive potential and this more than anything else makes it an ideal model plant group for physiological and ecological experiments. While it is noteworthy for its halophytic members, it is especially important as one of the very few genera where both C_3 and C_4 species are present. Indeed, the classic experiments on the inheritance of the C_4 syndrome in plants were carried out with *Atriplex* species.

The book is extensively and admirably illustrated, is well referenced and in all is a valuable addition to the botanical literature. In general, chemical aspects of *Atriplex* appear to have been little investigated. Something is known of herbivory among these plants but nothing about the modes of chemical defence. This is but one of a number of interesting lines for future research thrown up by this stimulating treatise on an ecologically highly successful, cosmopolitan plant group.

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The Biochemistry of the Carotenoids, Volume I, Plants: by T. W. GOODWIN, Chapman & Hall, London, 1980. 377 pp. £27.50.

In the first edition of this book, published some thirty years ago, complete coverage of the biochemistry of carotenoids in plants and animals was achieved in 356 pages. In this the second edition, some selectivity in the scope and depth of the coverage has had to be exercised in order to keep the treatise to within a reasonable size. Even so, the developments in carotenoid biochemistry in the intervening years since the publication of the first edition have made it necessary to divide the material covered into two volumes: Volume I, Plants; Volume II, Animals.

The first volume contains eleven chapters and covers carotenoids in higher plants and Protista. The first chapter, "Nature and Properties", is concerned with the basic chemical properties of the carotenoids needed for the adequate understanding of the biochemistry and biology which follow in later chapters. It opens with a section on the nomenclature and structures of the carotenoids and then goes on to outline the isolation, purification, physical properties and diagnostically useful chemical properties of these pigments. The next two chapters, "Biosynthesis of Carotenoids" and "Function of Carotenoids" deal with the pathways and stereochemical aspects of carotenoid biosynthesis and the established functions of carotenoids in photosynthesis, photoprotection, phototropism, phototaxis and sporangiophore formation. The special aspects of biosynthesis unique to certain organisms and the "less bizarre" of other functional possibilities are dealt with in appropriate later chapters. The book now reverts to the pattern of the first edition and deals in turn with "Carotenoids in Seed-bearing Plants—Photosynthetic Tissues", "Carotenoids in Higher Plants", "Mosses, Liverworts, and Spore-bearing Vascular Plants", "Algae", "Fungi", "Non-Photosynthetic Bacteria" and "Photosynthetic Bacteria". As an example of the breadth of coverage, the major headings listed for the chapter on photosynthetic tissues in seed-bearing plants are: Qualitative distribution, Quantitative distribution, Localization, Etiolated seedlings, Mutants, Synthesis in germinating seedlings, Effect of environment on synthesis in leaves, Biosynthesis, Regulation of Synthesis, Metabolism, Plant tissue cultures, Parasitic and saprophytic plants, Aquatic higher plants. The book concludes with a short chapter on "Biogeochemistry of Carotenoids".

The book is written with a clarity and economy of style which make it a delight to read. The text is well laid out, the numerous formulae are well drawn and the data well tabulated. The references are appended at the end of each chapter and the book contains a general index and a species index. Although the text was completed in 1978, Professor Goodwin has been able to include references to work published in 1979–80.

This book provides an excellent up-to-date exposition of our knowledge of the biochemistry of carotenoids in plants. Its main value will be as a useful and convenient source of information to research workers, although without doubt many of the chapters will be used as a source of lecture material and will be recommended reading for advanced students in the appropriate disciplines of the life sciences.

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Terpenoids and Steroids—Volume 10, Specialist Periodical Report: by J. R. HANSON (Senior Reporter). Royal Society of Chemistry, 1981. 284 pp. Hardcover, £45, $115.

It was in 1967 that the Royal Society of Chemistry (or the Chemical Society as it was then called) commenced publication of a series of annual specialist reports aimed at providing systematic and detailed reviews of the literature concerning a whole range of selected topics in chemistry. These reports have proved to be invaluable sources of material over the years in that they have generally been comprehensive in their coverage and accurate in their detail.

The work under review (*Terpenoids and Steroids—Volume* 10) deals with the isolation, structural determination, biosynthesis, biological activity, chemical synthesis and reactions of the title compounds, and covers the literature published between September 1978 and August 1979 (or perhaps a little later in some chapters). The present reviewer finds it a little unfortunate that the usual coverage of the monoterpenoids has been omitted this year (for reasons not specified), but we are promised that this deficit will be rectified in Volume 11. Apart from this omission, the present volume follows the now well-established pattern, with individual chapters dealing with sesquiterpenoids, diterpenoids, triterpenoids, carotenoids and polyterpenoids, and steroids (physical methods, and steroid reactions and partial syntheses). It is interesting to note that more than one-third of the book (i.e. some 100 pages) is devoted entirely to the sesquiterpenes and this is a reflection of the marked increase in reports of sesquiterpene isolation, structural determination and synthesis: indeed over 50 germacrane sesquiterpenes alone were identified or structurally determined during the period under review! This is not to say that other areas have been dormant. It becomes clear from the chapter dealing with diterpenoids that the recent increase in structures described means that the diterpenes now rival the sesquiterpenes in their variety of skeleta.

One can only commend the hard work of the contributors to this volume in combing the literature so efficiently and in presenting their material in such a concise and clearly written manner. This book is not, of course, riveting bed-time reading, but it must surely rank as one of the most important sources for the research worker in the terpenoid field. It has been said many times before, but it is well worth repeating, that no worker can really afford to be without this series, and I have no hesitation in recommending this particular volume. However, at the present price, very few of us will be able to afford to be with this work much longer. If this series is to survive the RSC will have to rethink its price structure and/or production methods. At £45 this book will not be in the hands of those who need it most, and if Volume 11 is published at a higher price it will not even appear on the library shelf.

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Woods Injurious to Human Health: by BJORN HAUSEN. De Gruyter, Berlin, 1981. DM69 (*ca* $30.00).

This book is an English translation of Dr. Hausen's original German volume published in 1973, which has been updated and somewhat enlarged. It is, as Prof. R. H. Thomson's forword indicates, a notable contribution to our knowledge of the effect of the chemical constituents of woods on the health of those who work with them. Most of the toxic effects involve dermatitis and respiratory disorders, but there are more serious ramifications, such as, adenocarcinoma and Hodgkin's disease (disorder of lymphoid tissues) which are associated with those working with wood.

The book has a general introduction, which covers in broad outline the clinical aspects of wood toxicology, taxonomy and chemistry. The main section of the volume is a systematic review which gives the names of the trees and, where known, the causative chemical agents of the various dermatological effects. My only quarrel is that here the author has listed plants in alphabetical order by their *local* names and there is thus no possibility of observing correlations in activity between members of the same genus or family. To some extent, this is overcome by an extensive index system but it might have been supplemented by a few summary tables. The last four chapters of the book deal specifically with respiratory diseases and the more serious illnesses mentioned above.

An important feature of this treatise is the fact that the chemistry is reasonably well dealt with and the formulae of all the important toxic constituents are given. In addition, the author has taken the trouble to show by diagrams and photographs the etiology of the various diseases and has outlined their underlying physiology and biochemistry.

The volume is certainly a notable effort, covering about 280 odd species of trees, many of which of course show multiple effects. The descriptions of each species include origin, use and chemical constituents. Although the author has not drawn attention to the fact that the majority of compounds dealt with most certainly confer resistance of the trees to animals other than ourselves and to phytopathogens, I thoroughly recommend this volume to all who are interested in secondary compounds and their multifarious effects.

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