Phytochemistry, Vol. 20, No. 10, pp. 2449–2450.
Pergamon Press Ltd. 1981. Printed in Great Britain.

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.