

BOOK REVIEWS

Progress in Botany, Volume 41: edited by H. ELLENBERG, K. ESSER, K. KUBITZKI, E. SCHNEPF and H. ZIEGLER. Springer, Berlin, 1979. 356 pp. DM 119.

In scanning the latest volume in this annual review series, one is astonished yet again by the breadth and depth of literature coverage achieved by the present team of 25 contributors. While the major aim is a comprehensive survey of the current botanical literature, the reviews are perforce critical since considerable selection is always necessary. Thus, N. Amrhein in a review of the gibberellins and cytokinins had to limit himself to mentioning only some 300 references from among nearly 3000 papers that had accumulated on these topics during the last 3 years. At least all the really important papers do get referred to. Critical selection of topic is also essential; in this issue, under developmental physiology, M. Bopp restricts

himself to seed storage processes and seed germination. His review nicely complements Amrhein's article, since developmental aspects of cytokinins and gibberellins are included in it.

Biochemical topics that receive consideration in Volume 41 include the photosynthetic membrane and chlorophyll-protein complexes (J. Amesz), nitrogen metabolism (E. Kessler, T. Hartmann) and phenylpropanoid biosynthesis (H. R. Schütte). There is also excellent coverage of plant water relations by O. L. Lange and R. Lösch. Finally, under taxonomy, one should mention an extensive review by J. Grau on the systematics of seed plants, which includes useful sections on biochemical systematics and pollination ecology.

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Secondary Plant Products: Encyclopedia of Plant Physiology, New Series Volume 8: edited by E. A. BELL and B. V. CHARLWOOD. Springer, Berlin, 1980. 674 + xvi pp. DM 198 (ca £50).

The format and aims of the encyclopedia are so familiar as not to require description. The first volume has been staring at us from library shelves, rather formidably, since 1955. The 18-odd volumes are now being completely recast, and issued, to the relief of all linguistically crippled Englishmen, completely in English.

Volume 8 of the new series replaces the old volume 10 and concerns secondary plant products. Professor Mothes introduces it and puts the term 'secondary' into a helpful historical perspective. A distinction between metabolites that are essential to almost all cells, and those that are less essential and more restricted was clear a 100 years ago; the description 'secondary' was used by Kossel well before the turn of the century. Perhaps the distinction was drawn a little too clearly, and almost certainly, in view of the techniques available, prematurely. Attitudes have had to change and soften since then as some 'inessential' compounds have been shown to be key metabolites, and as the 'turn-over' of metabolic 'end-products' has been demonstrated. Nowadays, no one would dare write off the most inert compound as a bit of 'flotsam on the metabolic beach' without very carefully considering its environmental implications as well as its physiological role; they would have to consider whether for instance a 'functionless' phenol will decay to soil humus that is beneficial to a plant's progeny, or whether an alkaloid, present in leaves in small traces, effectively repels an unidentified predator. Such changed attitudes are obvious

between the two versions of the encyclopedia, even though comparatively few pages of the second version are specifically devoted to the possible significance of secondary compounds (E. A. Bell).

More groups of compounds are reviewed in the new volume than were in the old, reflecting a deliberate attempt to get a better balance. Phenols, especially tannins and lignins, get less space than previously, although they are very adequately reviewed by J. B. Harborne. The same is probably true of isoprenoids, now reviewed by D. V. Banthorpe and B. V. Charlwood (terpenoids), C. Grunwald (steroids), D. R. Threlfall (polyprenols and quinones) and B. L. Archer (polyisoprene). Prof. T. W. Goodwin reviews the carotenoids and thus has the distinction of being the only contributor common to both old and new volumes. Topics introduced for the first time include alkaloids, classified according to biosynthetic origin and reviewed by E. Leete, by G. B. Fodor, by D. Gröger and by J. G. Roddick; amines reviewed by T. A. Smith; non-protein amino acids reviewed by E. A. Bell; glucosinolates reviewed by E. W. Underhill; cyanogenic glycosides reviewed by E. E. Conn; lipids of taxonomic significance reviewed by G. A. Thompson, and carbohydrates reviewed by A. M. Stephen. Just how the work of the past 25 years has made it necessary to revise the encyclopedia is indicated by the admirable 17 page article on betalains by T. J. Mabry. The earlier volume had just two sentences in the article on flavonoids, drawing attention to "the occurrence of the 'nitrogenous anthocyanin' betanin from red beet, which proved to be a very sensitive and labile pigment... whose structural formula has not been elucidated yet"! Moreover, much of the article on the expression and control of

secondary metabolism (M. Luckner) with its references to transcription and feed-back control, could not have been anticipated in 1955.

There is a considerable degree of overlap between some of the articles in this volume, and related articles in other recently published books and current reviews. This understandably occurs when lucid and active experts on cyanogenic glucosides, amino acids or phenols, for example, contribute to successive volumes and symposia. However, a brief and cynical comparison of three articles in the present volume with other articles written by the same authors failed to find any paragraphs which had simply been 'lifted' from one article to the other; on the

contrary, it suggested that in the three cases, similar material had been conscientiously tailored and arranged to fit the requirements of the different books. This does credit to the authors, but may only reflect, of course, the influence of clear-headed and strong-willed editors.

The first six pages of the volume sent for review had been erratically bound; the table of content, the preface and the list of contributors were randomly mixed. This is unfortunate in a book that will be consulted for many years to come, and especially when it costs £50. *Caveat emptor!*

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Demography and Evolution in Plant Populations: edited by O. T. SOLBRIG. Botanical Monographs, Vol. 15. Blackwell, Oxford, 1980. 222 pp. £15.00.

This is a timely book. It deals with the life cycles of plants as they occur in populations, their birth, growth, reproduction and death. These factors, of course, are fundamental to an understanding of natural selection, for which there is a great deal of circumstantial evidence in the literature derived from studies of characters presumed to be adaptive. There is very much less information on the direct measurement of natural selection, based on the numbers and properties of individuals through the life cycle, and it is this which is the principal concern of plant demography.

Demographic studies of plants have really only attracted a major research effort during the past decade. Harper's *Population Biology of Plants* (Academic Press, London, 1977) provided a synthesis of a field which he has been prominent in developing. The present volume is very much smaller but brings together a group of contributors who have succinctly provided an overview of the current status of plant demography, its achievements, possibilities and problems. Solbrig's introductory chapter outlines the evolutionary context of demographic studies and is neatly complemented by the second chapter (White), which deals with the problems encountered in measuring demographic factors in plant populations. Chapters on the genetic structure of plant populations (Solbrig), mating patterns (Lloyd) and vegetative reproduction (Abrahamson) provide clear accounts of the role of these

important parameters in demographic studies, whilst the treatment of the biology of seeds in the soil (Cook) provides a fascinating introduction to the demographic importance of seed dormancy and longevity, about which much still remains to be discovered. Many demographic data have been obtained from agricultural research, with its obvious economic importance, and Snaydon's chapter on agricultural systems uses this information to provide a valuable review of the demography of such systems, relating them to the situation in natural ecosystems wherever possible. The final chapter, on tropical systems (Sarukhan), is in marked contrast, dealing as it does with plants for which there is probably least demographic information and the highest threat of extinction.

In addition to providing a readily assimilable overview of the meeting grounds of genetics and ecology, this book will undoubtedly make many more phytochemists consider how their data might be gathered in a form valuable for demographic studies. The chemical monitoring of plants and populations throughout their life cycles will raise many problems, but the potential rewards must be clear from this monograph. The volume has been carefully edited, is generally free of typographical errors and is of a production standard which does justice to the Botanical Monograph Series, to which it belongs. By today's standards the price should permit ready access by all students of plant biology who ought to read it.

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