Phytochemistry, Vol. 26, No. 5, pp. 1553–1555, 1987.
Pergamon Journals Ltd. Printed in Great Britain.

BOOK REVIEWS

Plant Physiology—A Treatise, Vol 9: Water and Solutes in Plants: edited by F. C. STEWARD, J. F. SUTCLIFFE and J. E. DALE, Academic Press, Orlando, 1986. xvi + 611 pp. £79.

This volume constitutes an updating of the previous volume in the series on these topics, Vol. 2. It contains seven chapters: water relations of plant cells (J. E. Dale and J. F. Sutcliffe), transpiration and the water balance of plants (W. J. Davies), the physiology of stomata (T. A. Mansfield), salt relations of cells, tissues and roots (D. H. Jennings), salt relations of intact plants (J. F. Sutcliffe), phloem transport (J. E. Dale and J. F. Sutcliffe) and solutes in cells (F. C. Steward). As recalled in the introductory explanatory note, Dr. J. F. Sutcliffe was a co-editor of this volume, but his untimely death prevented him from completing the task and Dr. J. E. Dale took over more or less in mid-stream. This obviously was a very difficult task. It clearly led to this volume being very long in the production line. In most of the chapters the most recent references are for 1983 with a few from 1984. This is a distinct disadvantage for a treatise of this kind, especially as the topics covered are currently the subject of lively and fruitful research.

The treatment in all the chapters is extremely thorough and detailed up to the date of submission of the manuscript which appears to have been about 1983. For this reason reference to important recent results is lacking. For example there is no reference to the progress on isolated vacuoles. The section on halophytes and salt tolerance is rather sketchy and does not seem to refer to enzymes and salt tolerance. Growth substances are not very extensively considered, e.g. IAA effects on H^+ extrusion. The amount of information on biochemical processes connected with water and solutes is rather disappointing. In the analyses of stomata some of the recent important results of Zeiger are not mentioned. Water relations of seeds are not mentioned at all. It is inevitable that some of the chapters overlap with those in recent volumes of 'Encyclopedia of Plant Physiology' on the one hand and with some articles in 'Advances in Botanical Sciences' on the other hand.

Despite these blemishes this is a very valuable and comprehensive volume, which will be used as a source of reference and information by all those interested in water and solutes in plants. The production maintains the high standard expected from the series. For this reason it is a pity that the index is so poor—it should be far more detailed. As book prices go this is not an exceptionally expensive book, but I doubt whether the average plant physiologist will rush out to buy it at £79. It is clearly a must for all libraries, if only to maintain the completeness of the series.

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Nuclear Magnetic Resonance: Basic Principles: by ATTA-UR-RAHMAN. Springer, New York, 1986. 358 pp. £42.40.

This book, aimed at undergraduates, represents a praiseworthy and largely successful attempt to summarize and illustrate in 350 pages the basic theory and practice of NMR spectroscopy, at the same time embracing up-to-date techniques in 2D NMR and adding a few problems in spectral interpretation. The coverage is limited to ^{13}C and ^{1}H as nuclei, and is uneven. The longest chapter deals comprehensively with 2D NMR spectroscopy, including references to the literature of 1985. The approach is commendable in that the emphasis is on clear explanations of the appropriate pulse sequences. The discussion is not always as critical as it could be; for example, the limitations of homonuclear 2D *J*-resolved spectroscopy of second order spin systems are not mentioned.

In contrast to the 100 pages devoted to 2D NMR, a mere 8 pages involve the solid state; the very brief section on NMR imaging could and should have been expanded, with the inclusion of more recent references. Dynamic effects also receive a barely adequate treatment. However, the description of pulse Fourier transform NMR is admirable, as are the qualitative explanations of the nuclear Overhauser effect and relaxation times, although p. 126 implies that carbons with long relaxation times will give rise to inverted signals in a normal ^{13}C spectrum. More fundamental aspects, covering the basic theory of chemical shifts and coupling constants, are well written and include many useful tabulations. There is also a section dealing with the analysis of spin-coupled systems, but the brief treatment has led to errors and omissions. The ambiguities associated with the analysis of ABX spin systems are not fully explained, and the discussion on p. 53 wrongly implies that it is impossible for an AB spin system to resemble a 1,3,3,1-quartet with equal separations. There are a number of unfortunate errors. In Figure 1.2 the direction of the applied magnetic field B_0 is in error, and in Figure 1.6 the drawing is confusingly labelled and presented. Figure 3.3 appears to indicate equal populations of the two spin states in the presence of the applied magnetic field.

According to the Preface, the book is written "for students of chemistry and biochemistry as well as for biology students who have chemistry as a subsidiary".

Biology students will surely have difficulties with much of the basic theory, despite the high standard of writing. The book is strongly recommended to chemists of any variety, although the price will probably put it out of their reach as a personal copy; a soft back version is surely the answer, for all concerned.

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The Science of Allelopathy: edited by A. R. PUTNAM and C. S. TANG. Wiley and Sons, New York, 1986, 317 pp. £50.40.

Generally speaking, allelopathy has had a bad press. Although the harmful effects of one plant on another were recognised by De Candolle and other early botanists and although these effects are dramatically illustrated in the aerial photographs of inhibitory zones around *Salvia* shrubs in the Californian chapparal, the subject is often ignored or minimised in ecology textbooks. Whether this book will bring wider recognition to the subject, I am not sure, but it is the first multi-author treatise to address itself to the topic and it therefore deserves to be taken seriously.

The book falls neatly into three parts: six opening chapters on field observations of allelopathy and of autotoxicity; five chapters on techniques; and six final chapters on the chemistry of allelopathy. The contributions come mainly from the USA, though there are two Chinese authors and one Australian. It is thus not entirely representative and a European contribution would have been welcome.

Unfortunately, like much of the primary literature on allelopathy, this book seems to me to be a mixed bag of good and not-so-good papers. On the credit side, there are some useful chapters by such well known figures as N. H. Fischer, C. H. Muller, E. L. Rice and G. R. Waller and the editors themselves provide a well balanced summary chapter. Some of the other chapters, however, are not really particularly helpful in convincing one that allelopathic effects are being dealt with.

The best and most distinctive section of the book is probably that on techniques. It is clear from one of these chapters that some of the practical problems in studying and collecting root exudates have yet to be solved. As C. H. Tang puts it "the major difficulty has been the lack of a reliable sample collection method". The selection of a bioassay technique, which is crucial to the successful analysis of root or leaf exudates, is also considered here. Perhaps the big break-through in allelopathic techniques is about to happen. Then we shall be able to assess much more objectively the contribution of phytochemicals in determining the patterning of vegetation in both natural and disturbed habitats.

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Molecular and Physiological Aspects of Plant Peroxidases: edited by H. GREPPIN, C. PENEL and T. GASPAR. University of Geneva, Switzerland, 1986. 470 pp. 100 Swiss Francs (inc. postage) (only available by sending remittance to Professor Greppin, Lab. de Physiologie végétale, 3 place de l'Université, CH-1211 Geneva 4, Switzerland).

In 1982, these three Swiss plant physiologists, together with T. Thorpe, published a list of over 2000 references to the literature on plant peroxidases. Since that time, several hundred new papers must have appeared on this most versatile and enigmatic of plant enzymes. These same scientists have put us in their debt again by organizing in September 1985 an international symposium of peroxidases and then publishing the proceedings in this relatively inexpensive and handy form. With 49 contributions from all over the world, almost every conceivable aspect of plant peroxidases is covered. A number of papers centre on the role of peroxidase in cell wall formation and in the lignification process, while several others deal with the relationship between peroxidase activity and plant stress. Work on the three-dimensional model of peroxidase is also included, as is the involvement of peroxidases in plant growth processes.

One criticism of the volume is the general lack of abstracts. Also, a few of the papers, presumably those derived from posters, are so short that they are hardly worth having. Otherwise, however, this is an excellent production. It nicely reveals the current state of the art and must be an essential purchase for anyone remotely interested in plant metabolism.

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