Acta Bot. Neerl. **39**(2), June 1990, p. 208–215

Book Reviews

Molecular Mechanisms of Herbicide Selectivity

D.E. Hathway.
Oxford University Press, Oxford, 1989. x + 214 pp. Illustrated (hard cover). £32·50. ISBN 0-19-857642-0.

Herbicide selectivity is the key to chemical weed control, which makes the first book on this subject very welcome. At first sight, the scope of the contents is wider than the title suggests. The chapters (their lengths in relation to the book are given in parentheses) are: weed populations and their control (6%), aspects of plant physiology (14%), herbicide metabolism in plants (42%), genetic resistance to herbicides (6%), improved resistance through genetic engineering (6%), mycoherbicides (3%), and allelochemicals as herbicides (6%). Two useful appendices and the index complete the book. Thus, more than half of the book is devoted to the molecular mechanisms which are described in the chapter on herbicide metabolism and in the two chapters on resistance.

Chapters 6 and 7 could have been omitted because they go beyond the scope of the book's title. Better agreement between content and title could also have been achieved by paring down the two introductory chapters; the first to an introduction on herbicide selectivity, and the second by omitting the details on the translocation and uptake of various herbicides. However, a section on the mode of action of these herbicides should have been included. The arguments for the 'overriding importance of herbicide metabolism to selectivity (p. 33) are not convincing. In various cases uptake and translocation of herbicides are more relevant than metabolism to their selectivity, whereas physical differences in availability of a herbicide to various plant species determine its selectivity in other circumstances.

The chapter on herbicide metabolism is divided into biotransformations in plants, bioactivation of progenitors, detoxification of active herbicides, stimulation of plant-enzyme activities *in vivo*, and contribution of plant-enzyme activities to herbicide design. These distinctions are not the most obvious, and some of these could easily have been amalgamated. Detailed information on various herbicides is clearly presented by using and numbering chemical formulae. More structure in the types of detoxification reactions would have been useful, as would a survey of the degradation pathways in various herbicide groups. Resistance (why 'genetic'?) to herbicides is a logical extension of herbicide selectivity, but not all the molecular mechanisms have been fully recognized yet.

J.L.P. VAN OORSCHOT

Nitrogen Fixation with Non-Legumes

F.A. Skinner, R.M. Boddey and I. Fenrik (eds).
Martinus Nijhoff Publishers, Dordrecht, 1989. ix + 336 pp. Illustrated (hard cover). Dfl. 200.00, US$115.00, £65.00. ISBN 0.79230.0599.

This book contains the proceedings of the 4th symposium on nitrogen fixation with non-legumes held in Rio de Janeiro from 23 to 28 August 1987. Some of the lectures had already been published in Plant and Soil (1988, **110**).

This series of symposia was initiated to stimulate research on nitrogen fixation with other plants than the most commonly studied legumes. They were inspired by the hope that the increased knowledge of microbiology and biochemistry of N_2 fixing organisms and the complicated interactions between legumes and *Rhizobium* might lead to better applications of atmospheric nitrogen for other cultivated plants such as cereals. Unfortunately, the N_2 fixing non-legumes form an assembly of quite unrelated types of plant–microbe associations, such as the only non-leguminous genus with *Rhizobium* root nodules, *Parasponia*, the many actinorhizal root nodules, the symbioses of plants with cyanobacteria, and different rhizosphere associations in which N_2 fixing bacteria like *Azospirillum* are present or were added during the experiments.

Symposia of this type are especially important for those working in the field as they enable a compilation of recent progress and thus give a cross-section of actual progress. On the other hand they form a too casual collection of results to be of much value as a representative review for non-specialists. An exception must be made for the valuable review by Watanabe *et al.* on the physiology and agronomy of the applications of *Azolla*.

Most sections of the book are devoted to rhizosphere associations and contain papers of varying importance. It is increasingly clear that N_2 fixation of any practical importance is limited to the endorhizosphere of certain plants in the tropics. Inoculations with, e.g. *Azospirillum*, to plants in other parts of the world mostly leads to erratic increases of plant growth of at best statistical significance. Even then the increased growth appears to be caused not by N_2 fixation but by other effects on root formation and growth. Most important are those studies in which a study is made about the plant–bacterium interactions as they might yield possibilities for a less erratic use of N_2 fixation by more intimate interactions of, e.g. cereals, with N_2 fixing bacteria. This is stressed by the valuable general introduction on infection processes by J.J. Sprent and M. de Faria and is well expressed in the general

summary and conclusions: 'It is only through such an understanding that the ability to manipulate these systems for agronomic benefits may eventually be achieved'.

A. QUISPEL

Phytotoxins and Plant Pathogens.

A. Graniti, R.D. Durbin and A. Ballio (eds).
Springer-Verlag, Berlin, in cooperation with NATO Scientific Affairs Division, 1989. xv + 508 pp. Hard cover. DM 198.00. ISBN 3-540-18564-X.

This book contains the proceedings of the NATO Advanced Research Workshop on Phytotoxins and Plant Pathogenesis, held at Capri, Italy, 30 May to 3 June, 1988. Apart from a preface, a list of participants and a clear index, this book comprises papers of oral presentations spread over four sessions, and extensive poster abstracts. The sessions concern Structure and biological aspects of phytotoxins, Genetic aspects of toxin production, Mode of action of phytotoxins and effects on plants, and Ecological aspects and applications of phytotoxins.

Emphasis is laid on (non-host-specific) bacterial toxins produced by *Pseudomonas* species. Biochemical and molecular aspects, mode of action and target sites of these toxins are discussed comprehensively. Host-specific toxins produced by the fungi *Alternaria* and *Helminthosporium* (*Cochliobolus*) species also receive much attention; especially their biological activity and biochemistry. A paper by Yoder *et al.* describes the possibilities of molecular biology in elucidating the genetics of toxin production.

Less attention is given to the non-host-specific fungal toxins. Only fusicoccin is dealt with at length. The biological activities and the potential receptor sites of this toxin are discussed. Besides, Ouchi *et al.* present an indication of the involvement of fusaric acid in the pathogenesis of *Fusarium*-tomato.

In a more review-like manner, matters such as toxins and plant resistance, ecological consequences of toxin production and possible applications of toxins are discussed. To be mentioned separately is a paper by Rudolph *et al.* which describes the role of extracellular polysaccharides in pathogenesis. Finally, many new toxins are mentioned, especially in the poster abstracts.

In conclusion, many leading scientists have contributed to these proceedings. This has resulted in a book which both presents the state of the art of phytotoxin research, and offers some more background information. It is recommended for all scientists working in this field, especially those interested in aspects of bacterial toxins or in the biochemistry and biological activity of host-specific fungal toxins.

H.J.M. LÖFFLER

Division and Segregation of Organelles

S.A. Boffey and D.L. Lloyd (eds).
Cambridge University Press, Cambridge, 1988. xiii + 252 pp. Illustrated (hard cover) £30.00, US$59.50. ISBN 0-521-33436-5.

The behaviour of organelles during cell division is a complicated phenomenon, correlated with many cellular processes. The regulation of organelle division and segregation in eukaryotic cells and organisms is of great interest to any scientist working in the field of fundamental or applied cell biology.

This book gives an excellent overview of a wide range of topics, concerning many aspects of division and segregation of chloroplasts and mitochondria. As it covers the behaviour of mitochondria in different organisms such as higher plants, yeasts and mammals, and chloroplast biogenesis in higher plants, it provides an insight into the similarities within and differences between the various systems. The bundling of descriptive data from electron microscopical research, genetic experiments on chloroplast segregation and molecular biological characterization of the organellar genome, elucidates the complex interactions of the division processes in the organelles with the events in the nucleus of the cell. Comparison of DNA replication in organelles with DNA replication in prokaryotes, which are supposed to be the ancestors of the cytoplasmic organelles, reveals many similarities, and suggests the presence of still unknown regulatory pathways in the organelles.

The cited references in most chapters include recent publications up to 1987, which is acceptable for a book that has been published in 1988. The many figures and tables are functional in the text and illustrations are of excellent quality.

This book can be recommended to both researchers and students, because it provides more up to date information on organelle division and segregation than do most currently available textbooks on cell biology. The high price might be the only reason to leave it out of teaching programmes.

H.A. VERHOEVEN

IAWA List of Microscopic Features for Hardwood Identification

IAWA Committee; E.A. Wheeler, P. Baas and P.E. Gasson (eds).
International Association of Wood Anatomists, Utrecht, 1989. Reprinted from IAWA Bulletin n.s. 10(3), 114 pp., 190 figs. Paperback. US$20.00 (US$10.00 for bulk orders for teaching).

The editors of the *IAWA-Bulletin*, in the last few years, have published several issues devoted to one topic of particular interest to the subscribing wood anatomists. Correctly assuming that these issues may be attractive for others as well, they have also been made available as commercial editions. IAWA-Bulletin

10(3), 1989 is entitled: '*IAWA-List of Microscopic Features for Hardwood Identification*'. In 1988, a workshop was held by 15 wood anatomists from all over the world to revise the previous IAWA-list (*Standard List of Characters Suitable for Computerized Hardwood Identification*, 1981, IANA, Leiden). This previous list included a detailed coding procedure for a computer identification program. The present committee judged that the continuing developments in computer technology and programming make concentration on coding procedures less desirable at the moment. They included definitions, explanatory comments, and illustrations of wood anatomical characters, restricting themselves to those known to be useful for identification purposes.

The result is a list of 163 anatomical features, followed by about 60 geographical, physical and chemical characters. The definitions of the features are clear even for those not familiar with anatomical research, because of the numerous excellent illustrations, the examples given in the text, and not least because of the further explanations in the paragraphs titled 'cautions' at the end of each character description. The list, however, is also useful for experienced wood anatomists, because of the detailed circumscription of characters and the comments; see, for example, 'pore distribution'. The three characters 'porosity', 'vessel arrangement', and 'vessel groups' are carefully defined; for each character, three states are circumscribed. The nine resulting character states are neatly illustrated by 16 photographs which make it virtually impossible to use the wrong character state. In several cases (ray structure, fibre type), the committee has wisely avoided using definitions given by previous authors that have often caused confusion. For other features, character states or categories are taken from former lists of characters, or from other publications (fibre wall) thickness, fibre length, quantitative vessel characters). In most cases references to relevant literature are given, and often the differences between terminology used in previous literature and that in the present list are indicated. One main critical remark remains. As stated above, this time the IAWA-committee has refrained from recommending a particular computerized identification program or coding procedure. In the reviewer's opinion, this is to be regretted. It would have been a strong stimulus toward uniformity if the participants of the workshop could have adopted one particular system. Although much literature about programs already exists, a comparison and discussion of the systems used most frequently would have formed an admirable addition to this publication.

In summary the IAWA list includes definitions of and comments on all diagnostic wood anatomical characters. As it forms a nearly complete protocol, it will considerably facilitate identification procedures.

J. KOEK-NOORMAN

Growth Rings in Tropical Woods

P. Baas and R.E. Vetter (eds).
International Association of Wood Anatomists, Utrecht, The Netherlands, 1989. Reprinted from IAWA Bulletin n.s. 10(2), 80 pp. Illustrated (paperback). US$20.00.

This special issue of the *IAWA Bulletin* contains the proceedings of the joint session of IUFRO-All Division 5 and IAWA on 'Age and Growth Rate Determination in Tropical Trees' held in May 1988.

The booklet contradicts the persistent idea that tropical woody species do not show growth rings. It has been demonstrated that in many woody species of tropical areas with seasonality in rainfall or flooding, distinct annual rings can be found. Although in trees from rain forests one cannot do without time consuming or costly methods, even here it seems worthwhile to use the possibilities of growth ring analysis to enlarge the knowledge on age and growth rate and the functioning of tropical forest ecosystems.

In several articles, methods for growth ring analysis are discussed (Détienne; Vetter & Carboso; Shiokura; Villalba & Boninsegna). Ecological aspects are dealt with by Worbes. Detailed studies in individual tree species are described by, e.g. Boninsegna *et al.*, and Seits & Kanninen. These papers are preceeded by a worldwide overview of tree-ring analysis in tropical regions by Jacoby.

This publication is attractive for specialists in the field as well as for advanced teaching in botany, forestry, dendrochronology and wood anatomy, as it gives a broad survey of pure and applied aspects of tree ring research in the tropics.

J. KOEK-NOORMAN & A.M.W. MENNEGA

Darwinismus und Botanik, Rezeption, Kritik und theoretische Alternativen im Deutschland des 19. Jahrhunderts.

T. Junker.
Deutscher Apotheker Verlag, Stuttgart, 1989. x + 367 pp. Paperback. DM 48.00. ISBN 3 7692 1225 8.

The publication of Darwin's *Origin of Species* confronted every biologist with a dilemma. The evolution of species as an observed fact and natural selection as the proposed mechanism are such cardinal biological topics that they demanded examination and comment from each biologist in his own specialization. At the same time, an acceptance of Darwinism even on purely technical grounds is felt to reveal a philosophical, religious and even political attitude which, however one might feel about it, should certainly be of no concern to scientific investigation. The dissertation by Junker examines how German-speaking botanists in the two decades after the publication of the 'Origin' came to terms with this challenge. Thirty-eight of

them are discussed within the context of their special fields (Morphology, Systematics, Palaeobotany, Geobotany, Flowering Biology). In a separate section, C. Nägeli, A. Wigand, J. Sachs and H. Müller are each accorded about 30 pages in their own right. A final discussion summarizes the history of the reception of Darwin's 'Origin', analyses how age, political conviction, philosophy and religion, and scientific arguments have conditioned and influenced the various authors, and highlights some theories and problems of *Evolutionary Biology* and the *Theory of Science* that recur in the previous analysis. It is evident that each botanist had to arrive at his own personal answer. Junker shows this at the expense of a clear story line and with the necessary repetitions and cross-references. The dissertation is an invaluable source for the individual details. Nobody needs to remember these details, but they must be documented and accessible to prevent a simplified, orderly and utterly false picture of history. Junker's final discussion is especially thought-provoking. He does not say so, but the philosophical problems of 130 years ago are still with us, and some of the scientific questions posed by Darwinism (pp. 317–324) have been conveniently neglected rather than answered.

K. BACHMANN

Flax: Breeding and Utilisation

G. Marshall (ed.).
Martinus Nijhoff, Kluwer Academic Publishers, Dordrecht, 1988. v + 171 pp. Illustrated (hard cover). Dfl. 100.00, US$53.50, £32.50. ISBN 0-7923-0065-3.

This book contains the proceedings of an EEC workshop held in Brussels in 1988. It has three chapters on genetic improvement of flax (*Linum usitatissimum*), six on crop growth and development, five on post-harvest technology, and six on economic considerations and future strategies. Only the first part is of botanical interest, showing for instance the practical impact of biotechnology and more traditional selection on flax breeding programmes, and cunning ways to synchronize fibre and grain maturation. A few physiological parameters are used in the chapter on crop growth.

P. BAAS

Perspectives in Coastal Dune Management

F. van der Meulen, P.D. Jungerius, and J.H. Visser (eds).
SPB Academic Publishing, The Hague, 1989. viii + 335 pp. 120 figures, 24 tables. Paperback. Dfl 105.00, US$52.50. ISBN 90-5103-025-8.

The book represents the proceedings of a European Symposium on Coastal Dune Management (Leiden 1987) which aimed to develop management strategies so that further deterioration and destruction of coastal dunes may be prevented. The thirty contributions are arranged in five sections, emphasizing various aspects of dune management.

In the first section the coasts of Europe are described and their vegetation and geomorphology reviewed. Europe, however, is very narrowly treated, without the dunes in Southern France, Italy, Yugoslavia and Greece. In the second section on ecology and management, the impact of grazing, wildlife and geomorphology on the dynamics of dune vegetations are elaborated. It is disappointing to find dune managers not up to date with recent ecological findings. As an example, De Raere states that 'the soil ecology of the system *Hippophaë*/lower fungi and bacteria/nematodes is one of the major gaps'. Why is there no reference to the research carried out by Oremus (1982, *Growth and nodulation of* Hippophaë rhammoides *L. in the coastal sand dunes of The Netherlands*. Thesis, University of Utrecht) on the growth and nodulation of *Hippophaë*?

The section on management and functions of dunes for society restricts the examples on stabilization to Denmark and The Netherlands; recreation seems only to create problems in The Netherlands and Wales. Old-fashioned views on the nitrophily of *Urtica dioica* are perpetuated. Pigott's (*New Phytol.* 1971, **70**: 953–966) findings on the stimulation by phosphorus are apparently too recent.

The section on policy, planning and management gives some examples of how, in England, France, The Netherlands and Spain, some of the problems of coastal dunes are or will be tackled. The case-studies under the heading 'Special studies' are on landscape ecology, soil development and dune slack vegetation.

It is surprising that in the proceedings of a scientific meeting one-quarter of all articles are without references. Therefore, the first and very urgent task of the European Union for Dune Conservation and Coastal Management will be an upgrading of the ecological knowledge of dune managers and conservationists so that they can manage knowledgeably.

W.H.O. ERNST

Atlas van de Noordbrabantse Flora

J.M.A. Cools.
Kon. Ned. Natuurhistorische Vereniging, Hoogwoud, The Netherlands, 1989. 371 pp. Illustrated (hard cover). Dfl.48.00. ISBN 90.5011.028.2.

This Atlas comprises seven chapters, the first four of which are the most important, dealing with: the origin of the Noord-Brabant landscape; assimilation and account of data; an expatiation on the flora of Noord-Brabant; distribution maps and description of occurrence of the single plant species. Of course the

last-mentioned chapter comprises the greater part of the book.

Altogether some 1200 plant species have been found in the province of Noord-Brabant. The distribution maps give the occurrence of those species (about 1000) that have been recorded since 1970. The grid is based on squares of 5×5 km^2. Preceding this, the former distribution of species now extinct is briefly described, and also partly illustrated with distribution maps.

By taking 1970 as the final date, this Atlas gives a more up-to-date survey of the distribution of plants in this part of The Netherlands than the *Atlas van de Nederlandse Flora*, which has 1950 as the final date. In the text accompanying the maps, attention is paid to the situation before 1970. The decline of plants in Noord-Brabant is proceeding so rapidly that for quite a number of species a further decline in recent years is mentioned. For each species the different kinds of habitat as based on field observations are also discussed, and sometimes yields surprising views on ecological possibilities of plants. The layout of the pages might have been clearer, because one cannot always see immediately which texts and maps belong together.

For the representation of distribution patterns on a province scale a 1×1 km^2 grid is more useful than the 5×5 km^2 grid presented here. This, however, would have required an even greater investigation intensity, which would presumably have prolonged the period of investigation. This in turn would have caused data being outdated to a greater extent: a dilemma which any flora investigation depending on amateurs has to envisage.

These considerations do not detract from the interest this Atlas has to floristics and nature conservation in Noord-Brabant (and indeed to the whole of the country). The fact that it has proved possible to complete a book like this in a big province like Noord-Brabant will also be a stimulus to flora investigations elsewhere in The Netherlands.

J. CORTENRAAD

Spring and Winter Bulbs of the Cape

B. Jeppe and G. Duncan.
Oxford University Press, Cape Town, 1989. viii + 143 pp. 62 colour plates. Hard cover. £34.00. ISBN 0 19 570535 1.

This book illustrates and briefly describes 420 species of bulbous plants (i.e. geophytes with either true bulbs, corms, or tuberous rootstocks) native in the Cape, South Africa. In the introductory part there is also information on geography, climate, cultivation and propagation, pests and diseases, and on the attributes of all 52 genera treated.

The great attraction of the book lies in the well-reproduced paintings by Barbara Jeppe of these beautiful plants, none of which have acquired the pompous showiness of some of their well-known horticultural derivatives. For instance, one will have to search hard to find any cultivated *Gladiolus* which can match the stunning beauty and refinement of a single of the 38 wild taxa illustrated in this book.

The authors have done well in stressing the protected status of these bulbous plants, and by giving guidance on how to obtain seeds or bulbs from agencies or specialized nurseries without endangering the wild flora.

P. BAAS

Flora Malesiana, Series I, Volume 10. Biography of Blume and Revisions

C.G.G.J. van Steenis and W.J.J.O. de Wilde (eds).
Kluwer Academic Publishers, Dordecht, 1989. 748 pp. Illustrated (hard cover). Dfl. 575.00, US$285.00, £185.00. ISBN 07 9230 4217.

With the publication of instalment 10(4), another volume of *Flora Malesiana* has been completed. The contents and scientific merits of this last instalment will be critically reviewed in the next issue of *Acta Botanica Neerlandica*; earlier issues have been reviewed separately in this journal. Volume 10 is of historical significance in several ways. During the publication of its instalments between 1984 and 1989, its general editor, initiator, and inspiring director of the Flora Malesiana Foundation, Professor C.G.G.J. van Steenis died. Volume 10 contains his last posthumous publication: a 43-page dedication to, and biography of Carl Ludwig Blume (1796–1862), eminent pioneer in Malaysian botany, controversial personality, and first Director of the Rijksherbarium.

The editorial task is now ably continued by W.J.J.O. de Wilde. At a recent Flora Malesiana Symposium held in Leiden, support and enthusiasm for the project was voiced by numerous taxonomists from all over the world. At the same time it was realized that in order to achieve an earlier completion of this mammoth project than the calculated 160 years at the current rate of progress, contributors to the Flora may have to sacrifice some of the high scientific standards which have earned it its reputation. With the urgency of well-founded conservation programmes and of studies on sustainable use of natural products from tropical forests, the need of comprehensive floras, able to be used by non-taxonomists, is greater than ever. Volume 11 of *Flora Malesiana* may thus be quite different from it predecessor announced here.

Finally, one commercial consideration: although the price of this and other *Flora Malesiana* volumes is excessively high, in particular for potential users in the region, it is still considerably cheaper than the cumulative price of the four separate instalments of which it is composed.

R.J. JOHNS

Plant Canopies: their Growth, Form and Function. SEB Seminar Series 31

G. Russel, B. Marshall and P.G. Jarvis (eds).
Cambridge University Press, Cambridge, 1989. ix + 178 pp. Illustrated (hard cover). US$47.50, £27.50.
ISBN 0-521-32838-1.

This book originated from an SEB session on plant canopies in 1986. It contains nine chapters on various aspects of plant canopies with much emphasis on models and modelling. The coverage, however, is often limited to monospecific stands of crops and forest trees and not very consistent. Whereas G. Russell states in the foreword that there has been no space for consideration of the manipulation of canopies by chemical means, the reader will find a whole chapter on the effects of nitrogen on canopy development and crop growth (H. van Keulen, J. Goudriaan & N.G. Seligman). Most data reviewed by J.L. Harper under the heading 'Canopies as populations' are on shoot densities, leaf number development in time, and age structure of tree foliage, but the gap to canopy structure and leaf area index is not bridged. The chapter on diurnal leaf movement and productivity in canopies by J.R. Ehleringer and I.N. Forseth is very incomplete; the reader will find nothing about the spectacular leaf movements in the canopy of miombo woodlands and semi-arid tree savannahs. My main criticism of this book concerns what it leaves out rather than what it includes. The function of the canopies as habitat for animals, epiphytes and micro-organisms may be expected from the book title, but is not presented.

Although plant canopies are an important aspect of plant communities and play an important role in the fluxes of gases, water and nutrients, this book demonstrates that appropriate collections of data are scarce and will remain difficult to achieve. As it stands, the book may be especially useful for research workers in agriculture and forestry.

W.H.O. ERNST

Vegetation Science Applications for Rangeland Analysis and Management. Handbook of Vegetation Science 14.

P.T. Tueller (ed.).
Kluwer Academic Publishers, Dordrecht, 1988. xiii + 642 pp. Illustrated (hard cover). Dfl. 325.00 US$175.00, £85.00. ISBN 90.6193.195.9.

In this book, 35 contributors (mostly American) give reviews of the application of vegetation science for rangeland analysis and management, considering areas from the tropics to the sub-arctic. The book is divided in three sections. The first deals with the contribution of basic vegetation science to rangeland management, the second with vegetation distribution and organization, and the third with aspects of reclamation and revegetation.

In the first section, several chapters, e.g. that on rangeland plant taxonomy (S.L. Hatch) and plant ecophysiology (R.E. Sosebee & C. Wan) are obviously written for an introductory course in ecology, but not for the purpose of this handbook. The aspects of new plant developments (E.D. McArthur), the successional concepts (E.L. Smith), the role of non-vascular, free-living plants (K.T. Harper & J.R. Marble) and the importance of seedbanks and dormancy strategies (J.A. Young) are treated in relation to rangeland management. All chapters, however, do not adequately recognize the importance of population differentiation.

The middle section of the book covers regional rangeland studies, i.e. the grasslands in Australia, North America and South Africa, but nothing about the Sahel and South America (!), the range use of shrublands, woodlands and forests. The excellent chapter on vegetation–soil relationships on (semi)arid rangelands (S.G. Leonard, R.L. Miles & P.T. Tueller) is misplaced in this section; the same is true for the methodological chapters on measurement of plant biomass and on the interaction between hydrology and vegetation in the third section.

The last section of the book considers problems of range management by grazing (domestic and wildlife stock) and fire as well as the possibilities of the reclamation of drastically disturbed rangeland and the revegetation of (semi)arid rangelands.

The books contain a great deal of information and comment. Despite the problems mentioned, the book is well produced. It may be a valuable source of information for rangeland managers.

W.H.O. ERNST

Molecular Biology of the Cell. Second Edition

B. Alberts, D. Bray, J. Lewis, M. Raff, K. Roberts and J.D. Watson.
Garland Publishing, New York, 1989. xxxiv + 1308 pages, 1534 illustrations. Hard cover US$51.95.
ISBN 0-8240-3695-6; Paperback. US$51.95.
ISBN 0-8240-3696-4.

Piles of 'the black book', the first edition of the popular textbook on one of the most rapidly advancing fields of science could be found in scientific bookshops all over the world. An extensively revised version is now on the market. All chapters have been partly rewritten and include appropriate references up to 1988. Two new chapters have been added on gene expression and cancer. It is an excellent textbook, primarily aimed at students in courses of medicine and life sciences, but there is something for anyone interested in

life and its constituent, the cell. The overall structure and style of the first edition have been maintained, comprising biochemistry, molecular organization of cells, and aspects of multicellular organisms, with molecular biology and genetics where needed. The major emphasis is on animal cells, but bacterial work is included where it helps for a better understanding.

Plant cells are again covered in a separate chapter on 'Special features of plant cells', though the chloroplast, the special feature of plant cells *par excellence*, is dealt with together with the mitochondrion in Chapter seven on energy conversion. For the next edition it would be preferable to incorporate the special plant features in the appropriate chapters and to devote a special chapter to the important plant cell wall. The chapter on plant cells is clearly written, and concepts underlying the facts are well explained. New in the chapter on plants is a section on interactions between plants and other organisms. This includes a paragraph on the plant pathogen *Agrobacterium* which is able to transfer genes to its host plant and is exploited as a vector for the genetic transformation of higher plant cells with recombinant DNA. Also new are the paragraphs on the process of fluid-phase endocytosis via coated pits and on the synthesis of cellulose by cellulose synthase, which is probably represented by particle rosettes in the plasma membrane. Much emphasis is given to cellular aspects of plant development.

I would like to recommend the book to anyone: student, teacher, researcher and interested laymen alike. It is invaluable to the teaching of cell biology at a number of levels. The excellent two-colour figures are of very high quality.

One of the authors told me that in the U.S.A. the hard cover copy sells, while Europeans demand the paperback, because they expect it to be cheaper. The prices, however, are the same. Ask your bookseller!

A.M.C. EMONS

Molecular Biology of the Cell. The Problems Book

J. Wilson and T. Hunt.
Garland Publishing, New York, 1989. xiv + 354 pp.
Paperback. US$14.95. ISBN 0-8240-3697-2.

This book is an accompanying volume to *Molecular Biology of the Cell*, 2nd edition. It is a collection of student questions, some of them with answers. The questions are designed to help students judge whether a particular section is understood. Problem questions are arranged around classical experiments. The problems book covers about half of the chapters of the textbook. Regrettably, it does not include the chapter on 'Special features of the plant cells', making it less valuable for specific courses in plant cell biology.

A.M.C. EMONS

Colloidal Gold: a New Perspective for Cytochemical Marking

J.E. Beesley.
Oxford University Press, Oxford, 1989. iv + 58 pp.
Illustrated (paperback). £5.95. ISBN 0-19-856418-X.

This is the 17th volume in the series *Royal Microscopical Society Microscopy Handbooks*. It is a useful introduction to the techniques of colloidal gold labelling. It has only 58 pages but treats all important applications. The up-to-date references give access to valuable further information. The quality of the photographs is good, and they are informative. The tables summarizing methods and preparations step by step are also informative and very useful in practice.

Colloidal gold immunolabelling is a recent immunocytochemical technique developed for the detection of specific proteins *in situ*. It can be used in light and electron microscopy. After two introductory chapters on colloidal gold probes and on antibodies, the book treats the procedures for manufacturing gold spheres and coating these with proteins, and their use in light and electron microscopy. Also, the useful multilabelling techniques are described. The work closes with a number of brief but important chapters on controls, quantifications, immunoblotting and a final chapter on troubleshooting, which is useful when inevitable and frustrating problems arise. It is a valuable book to have on the bench in any laboratory using cytochemistry.

A.M.C. EMONS

Cytochemical and Immunological Approaches to Plant Cell Biology

E.L. Vigil and C. Hawes (eds).
Academic Press, London, 1989. x + 152 pp.
Illustrated (paperback). £14.95. ISBN 0-12-721930-7.

The book has been reprinted from a special issue of the *Cell Biology International Reports*, Volume 13, Number 1, January 1989. It contains papers presented at a mini-symposium on Histochemistry of Botanical Samples organized for the 8th International Congress of Histochemistry and Cytochemistry held in August 1988 in Washington. The first two papers by McFadden and by Harris *et al.* examine the parameters that determine the usefulness of *in-situ* hybridization. Herman *et al.* describe immunogold procedures for electron microscopy, Vigil *et al.* the analysis of protein body development with electron microscopy and quantitative image analysis. Sautter describes immunolocalization studies in the biogenesis of plant microbodies, and the fate of glyoxysomal malate dehydrogenase from watermelon after heterologous *in-vivo* translations in *Xenopus* oocytes, and illustrates the usefulness of heterologous systems.

Donaldson and Gonzales describe the application of reversed-phase high performance liquid chromatography to protein extracts from purified glyoxysomal and endoplasmic reticulum membranes. Wick *et al.* report an analysis of microtubule arrays across tissues, Qiao *et al.* on the detection of myosin heavy chains, Hawes *et al.* on advances in the study of plant coated vesicles and Mineyuki *et al.* report an innovative approach for determining chemical regulation of cell plate formation using 3-substituted xanthines. In the last chapter, Cassab and Varner discuss the application of tissue printing of plant material on nitrocellulose paper.

By mentioning the techniques used in the different chapters individually, I would like to stress the increasing importance of cytochemical and immunological approaches to plant cell biology, which have given a great impulse not only to the description but also to the understanding of plant cell structure. The book is recommended to all plant cell biologists and it is to be hoped that a similar work can be published from contributions on plant cell biology of the next Histochemistry congress, to be held in 1992 in Maastricht under the auspices of The Netherlands Society of Cell Biology.

A.M.C. EMONS

Plant Fibers. Modern Methods of Plant Analysis. New Series, vol. 10.

H.F. Linskens and J.F. Jackson (eds).
Springer-Verlag, Berlin, 1989. xxiii + 377 pp.
Illustrated (hard cover). DM 278.00.
ISBN 3-540-50332-3.

The title of this book adds to the confusion of what plant fibres are. Plant fibre, in biological terms, means fusiform elements of sclerenchyma, or, according to the definition given in Chapter 13, it denotes all the polysaccharides and lignin in the diet that is not digested by the endogenous secretions of the human digestive tract and embraces the polysaccharides and lignin of plant cell walls. In the introduction, plant fibre is defined as cellulose fibre. A quick look at the titles of the chapters makes it clear to the reader that the book deals primarily with aspects of plant cell walls of a great diversity of cells. These aspects include not only the biosynthesis of cell wall polysaccharides, the cross-links in growing cell walls, a methodology for dissecting complex saccharide structures, immunogold localization of wall components, oxygen and hydrogen isotope measurements analysis of lignin–carbohydrate complexes, fluorimetric measurement of callose, visualization of β-glucans, biodegradation of lignin, analysis of extensin, and analysis of dietary fibre, but also measurement of lint production, factors affecting yield, analysis of carbohydrates conferring hardness, methods used in monitoring and controlling the quality of bread, analytical methods for gelation of soybean protein and techniques of solar crop dryers. The latter 6 chapters are out of place in this volume.

It does not become clear why a chapter on methods for studying the cytoskeleton is included. The role of the cytoskeleton in orienting cellulose microfibrils is debatable; moreover, the chapter does not concern this role. After reading this amalgamation of subjects somehow related to the plant cell wall, I wondered why chapters on oligosaccharins, development-related glycoproteins and arabinogalactan proteins were not included.

I hesitate to recommend this book. Some of its chapters really possess high quality, but can be found in other works on plant cell biology in a more appropriate context.

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