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BOOK REVIEWS

O. POLUNIN: *Trees and Bushes of Europe*, with drawings by Barbara Everard. 1014 colour photographs and coloured drawings, 208 + xvi p. Oxford University Press, London, New York, Toronto 1976. £ 5.25.

An attractive looking book about the trees and larger shrubs occurring in the European flora or planted in woods or along avenues. It contains over 1000 colour illustrations, photographs of the entire plants and drawings of details. In most cases the illustrations cover about two thirds of the type page. The majority of the illustrations are of the same size, consequently the pages have a well ordered but rather dull appearance. On the whole the photographs are clear, although many of them have lost much by their small size (compare e.g. the large size reproductions on the dust jacket with the small ones of the same photographs in the book of the Silver Birch on p. 43, c and of the London Plane on p. 71, c). The drawings are excellent and show much detail. The text alongside of the illustrations is concise. The author intends to enable the amateur to identify the species included in his book in a simple way: for the larger genera simple keys are given, for the smaller ones the illustrations must do. Symbols give some information about the leaf shape and the geographic distribution.

At the end colour photographs of the bark of 58 tree species are given and a chapter is added on "uses to man of selected trees and bushes" in which attention is given to characteristics of the wood, medical properties and uses as food of parts of the trees, their use in parks and gardens and the relations with their environment.

The author travels through Europe in a camping car to photograph the trees and bushes and the results are collected in this book. It is a good book for beginners, especially for those who like to look at good pictures, as the information given in the text is hardly sufficient for the layman.

A good addition to the bookshelf of everybody interested in trees.

B. K. BOOM

K. RASBACH, H. RASBACH & O. WILLMANNS. *Die Farn Pflanzen Zentral Europas*. 2. Auflage. 304 Seiten, 154 Abbildungen. Gustav Fischer Verlag, Stuttgart. Price DM. 79,—.

It is no wonder that the first edition of this attractive book on the ferns of Central Europe – "sensu" Flora Europaea – was sold out a few years after its publication and the second edition must be warmly welcomed.

The general outlay remained the same, but the first, general part was revised and brought completely up-to-date, in particular as to the latest developments in chemotaxonomy and especially cytogenetic research. The authors thereby fully recognize that in recent years this was the principal impetus for a "new look" on the pteridophytes in this part of the world, having had a marked influence on the proper determination of specific deliminations and nomenclature, and on new concepts in evolutionary history and geobotany.

The second part, consisting of photographic illustrations from living plants in their respective habitats, together with interesting accounts on the ecology of the various species was supplemented by an "Anhang", treating a number of seven species not included in the first edition. For the most part these entities are newly, convincingly defined taxa, established by the insight recently gained by the research mentioned, and in sofar the emphasis thereon is only realistic and fully warranted.

If one would make an observation, it is the restriction the authors imposed on themselves, in particular by a complete neglect of even a summary acknowledgment of the exigences of taxonomy (and nomenclature) on the specific level. There are no keys, no descriptions and

hardly any indication of even the most important synonymy. This lacuna makes it difficult for the uninitiated to definitely identify his specimens, the more so as a proper determination is not an easy thing in some groups of (European) ferns. The authors apologize for letting prevail in their work the "eigene Interessenrichtung"; that may be, but it makes this book a bit lopsided.

Another remark concerns the selection of the species, treated in the Anhang. If the intention had been to give in this second edition a complete account of all species, to be found in Central Europe, one still misses photographs and ecological data of such rare, but well-known classical species as *Botrychium multifidum* and *lanceolatum*, also of *Asplenium onopteris*. On the other hand the inclusions of *Cystopteris dickieana*, a taxon much alike the widespread *Cystopteris fragilis*, even as to its extreme variability in general aspect, but with spiny spores, is a doubtful case. New research on the ontogeny of the perispore could indicate that differences in the spore-wall need not be a convincing reason for specific recognition.

A fairly extensive survey of recent literature on the study of this fascinating group of plants is included in conclusion, together with a register and a geological time-table.

Summing up, the general part with its lucid, concise account on the subjects mentioned and complemented by a chapter on ontogeny and systematic grouping, the second part with its emphasis on ecology and illustrated by many wonderful photographs of the various species as they grow in the wild, make this book well-worth reading and a recommendable acquisition for "Liebhaber, Lehrer und Forscher", as the authors had intended it to be.

G. J. DE JONCHEERE

R. P. F. GREGORY: *Biochemistry of Photosynthesis*. 2nd Edition. 221 pages, illustrated. John Wiley and Sons Ltd. London, New York, Sydney, Toronto 1977. Price US $ 16.50 / £ 8.50.

The book consists of two parts. Part 1 successfully aims at introducing the student into the field of photosynthesis, whereas it is also a valuable help in supporting lectures in courses of botany and molecular biology. After a general consideration of the energy of life and the nature of light, photosynthetic structures are described and shown in a number of electron micrographs. Next, the following topics are dealt with: nature, function and arrangement of the photosynthetic pigments, energy conversion, electron transport including redox systems and ATP formation, and both uptake and reduction of carbon. Part 1 concludes with a chapter "Problems". Ten numerical problems, of which nr. 9 is absent, are presented. Comparison with the 1st edition learns that nr. 9 concerns the number of orders of magnitude by which the size of the chloroplast differs from the absorbed wavelengths. Some more problems are meant for discussion. The answers to the numerical problems, including nr. 9, are given at the end of part 2.

Two comments may be added. Firstly, a broken-line arrow in Fig. 2.2 indicates a forbidden transition from the ground state to the triplet ground state. Such an arrow in the opposite direction should be added. Secondly, it is mentioned under "Internal conversion" that the lifetime of both fluorescence and internal conversions is about 10^{-9} sec. For chlorophyll this is true only for the first excited singlet state. For higher states, which do not emit fluorescence, the lifetime for internal conversions amounts to about 10^{-12} sec.

There are no major differences between both editions of Part 1. This cannot be said of Part 2, which aims at informing about the points of view and the data up to 1975, instead of 1970. These are rather useful for students intending to start, or engaged in, experimental research. The presentation is admirable. Quite a number of results and hypotheses, which are conflicting in many cases, are reported in a clear and objective manner, enabling the reader to find out the most urgent or promising ways to start or continue his research in this field. There are only a few, not rather important, comments. Just a single one may be mentioned. When considering the "red drop" it is stated that chlorophylls *b* and *c* enhance the

absorption by chlorophyll *a*. It is preferable to say that the former chlorophylls enhance the effectiveness of light absorbed by chlorophyll *a*. Of the topics, dealt with in Part 2, namely: the two light reactions, structure of the thylakoid, electron transport, phosphorylation and chloroplast metabolism, both latter ones are particularly enlarged by reporting new advances.

The appendix presents physical constants, formulae and answers to numerical problems. All references are compiled at the end of the book, instead of at the end of each chapter, whereas the index of the 1st edition is separated into an author index and a subject index.

This most valuable book certainly can be recommended.

J. B. THOMAS

E. LIBBERT (ed.): *Kompendium der allgemeinen Biologie*. Bearbeitet von E. GÜNTER, L. KÄMPFE, E. LIBBERT, H. J. MÜLLER, H. PENZLIN, 474 p., 179 figs., 12 tabs. VEB G. Fischer, Jena 1976, DM 18.–.

For an honest price in an appealing PVC cover one gets an over-all survey of general biology. The well provided typography makes it easy to get a quick repertory of the most important terms and definitions in a running text, illustrated adequately with clear schemes. The molecular and cellular levels are adequately and exhaustingly treated, as well as genetics, evolution and certain aspects of ecology. This book is intended to be a compendium for students in biology, biochemistry, pharmacy, agriculture and veterinary medicine, and gives a fine outline of general biological principles. Missing are the structural aspects of plant and animal organisms as well as microbiology. Diversification of the plant and animal kindoms is not treated. In the reference list only reviews in the german language are mentioned. So the book is a compromise between the gigantic amount of knowledge in biological fields and the space of a compendium. Therefore the book can be useful for recapitulation of a course in general biology as an additional subject but also for a quick reference on basic biological matters.

H. F. LINSKENS

R. K. S. WOOD and A. GRANITI: *Specificity in Plant Diseases*. 354 pp. 1976. Plenum Press, New York and London. $ 42.00.

It is a well known fact, that many plant pathogenic micro-organisms are restricted in their ability to infect higher plants as far as genera, species and varieties are concerned. Often only special parts of plants become diseased.

The present book comprises the main lectures, given at a NATO Advanced Study Institute on this subject, held in Porto Conte, Sardinia (Italy), from May 4–17, 1975. Each main lecture is followed by a summary of short papers in relation to that lecture as well as some important points of the discussion. And especially this way of presentation is very useful to the reader.

When P. R. Day formulates the hypothesis, that avirulence of a race of a pathogen might arise as the result of a failure to induce susceptibility, a hypothesis, for which he gives some examples to support this, the discussions concentrated around this hypothesis, including other examples which do not fit the postulated hypothesis.

The papers given by C. Hughes on cell surface membranes and by H. Wheeler on specific and non specific pathotoxins, are very stimulating for further work.

The current knowledge on receptor sites in plant cell membranes to host specific toxins (specific pathotoxins, according to Wheeler) is presented and discussed, as well as possibilities to use results obtained with animal cell membranes.

The papers on phytoalexins, on phytoalexin elicitors and on preformed antifungal compounds give an up-to-date presentation of results, obtained so far; the rôle these compounds might play in host specificity is discussed. This is also the case with interactions of other cell

components of the plant with invading micro-organisms, including reactions of cytoplasma and organelles, and the rôle of nucleic acids and plant hormones. Also specific interactions between higher plants are discussed.

R. K. S. Wood, finally, gives a summing up of the various items of discussion, adding indications for further research.

The book is very useful to plant pathologists and others, interested in specific interactions between micro-organisms and higher plants.

After reading this book, the final question put forward by Wood, whether 'these Proceedings will lead to progress in new ideas and enterprising research', can be answered in the affirmative.

K. VERHOEFF

O. M. JOHARI and R. P. BECKER ed.: *Proceedings of the workshop on biological applications*/1976. Part II: *Scanning Electron Microscopy*, pag. 1–708. IIT Research Institute, Chicago, Illinois 60616, U.S.A. Price Part V, VI, VII and VIII $ 26.50.

In the second volume of the proceedings of the workshops on biological applications of the scanning and scanning transmission electron microscope 1976, a part deals with application of SEM on plant sciences.

In thirteen papers different techniques and subjects are presented and are followed by a discussion. Some papers describe techniques and results of experiments with unfixed material and of a transport analysis of some elements by SEM and X-ray analysis.

Papers on wood preservation and the coaling process of wood show a good application of SEM in such problems. Some taxonomical developmental and surface studies as application of SEM are given as well as the use of SEM functions in solving the taxonomic problems in fungi imperfecta and some species of lichens. SEM of the development of apothecia and fungal wood attack shows a very instructive view on these processes. Surface studies of seed coat, with a long list of references, of the exine of *Lycopodium* as well as structural studies of cellular surfaces are presented. All papers illustrate the successful application of SEM in plant sciences. A bibliography of SEM literature with 1919 references and a subject index is a good and very helpful end of this volume.

The other parts of the volume deal with biomedical, reproductional and zoological application of the SEM.

For the scanning electron microscopy a very useful volume with many up to date informations.

M. T. M. WILLEMSE

J. H. BURNETT: *Fundamentals of Mycology*. Edward Arnold (London). 2nd Edition. 1976. 673 p. £ 27.50.

Traditionally there are many textbooks treating zoology, botany and microbiology as integrated subjects. Fungi mostly receive marginal attention in botany and microbiology texts and the rare books that deal with fungi exclusively are limited to certain aspects such as taxonomy, structure and anatomy, genetics or physiology. In the past decades it has become increasingly clear that fungi represent a separate group of organisms, distinct from plants, animals and prokaryotes, and therefore they deserve treatment as a group. In fact, there is a renewed interest in fungi because they are genuinely eukaryotic, yet they are structurally and genetically far less complex than plants and animals. This makes them favourable objects for those who seek to explore the biology of eukaryotic cells.

The first edition of Burnett's book in 1968 was the first attempt to present a comprehensive text on the biology of fungi and as such it was a most welcome enterprise. Together with complementary texts on taxonomy and on genetics of fungi, it served both the mycologists and those who happened to come across fungi in their work, by giving a splendid overview.

The second edition of the book closely adheres to the structure of the first edition. The four main sections of the book, Structure and Growth, Function, Recombination, and Speciation and Evolution, are maintained. As expected also a large part of the text has remained unchanged as it represents an able account of the older literature. However, the text has been well expanded to cover the literature up to 1975. The chapters on Structure and Fine Structure of Fungal Cells and Hyphal Growth have been rewritten completely because progress in these areas has been very fast in the last decade. Consequently the expansion of these chapters accounts for about half the increase in the number of pages of the book that went from 546 in the first to 673 in this second edition.

Students interested in the molecular biology of fungi will find little in this book that pertains to their immediate interest. When the author touches this subject on p. 361 he says that he has refrained from dealing with it because since 1970 "... publications in this field have come at an increasing rate and, inevitably, almost any account of this active area is out of date before it is published.". We tend to agree that results in this area have not yet settled enough to become incorporated in a book like this. But this should not prevent the molecular mycologist from reading the book because it can provide him with a solid background of 'classical' mycology.

In summary, the book can be highly recommended to all interested in fungal research and in teaching fungi. It serves both as a useful reference text for a first introduction in the field and as a book that makes for pleasant reading and stimulating thoughts.

J. G. H. WESSELS

E. THOMAS and M. R. DAVEY: From single cells to plants. 1975, 171 p. The Wykeham Science Series, No 38. Wykeham Publications Ltd, London and Winchester. Price £2.50 net in U.K.

From the title and the announcement of the publishers the prospective reader of this book might get the impression to deal with a practical guide to the propagation of useful plants through tissue culture. That subject, however, has got only sophisticated attention by the authors. Based on Haberlands postulation of the totipotency of the cell they give an enthusiastic survey of modern knowledge in the field of plant cell culture, protoplast isolation, and morphogenesis in cell cultures. This approach led to neglect of items as composition of the nutrient media, and the influence of light and temperature.

One page of "Further Readings" can not satisfy the interested reader. Instead of an appendix on the preparation and handling of a few nutrient media most readers would have preferred a complete list of references.

The Wykeham Science Series "is intended to bridge the gap between the syllabus work of school science and the more advanced and specialized work of a university course". One wonders if the announced third author, J. I. Williams, responsible for the down levelling of the scientific text has been discarded from the front cover because he could not give his consent to the rather elaborate content of the book.

This is not at all a negative criticism. The more advanced interested botanist will find a clearly written valuable compilation of the above mentioned subjects. Figures and print of the book are excellent and the price is very moderate.

G. STARITSKY

Encyclopedia of Plant Physiology, New Series, editors A. PIRSON and M. H. ZIMMERMAN, vol. 4, *Physiological Plant Pathology*, editors: R. HEITEFUSS, University of Göttingen, Germany, and P. H. WILLIAMS, University of Wisconsin, Madison, Wis., U.S.A. 92 figs, XX + 890 pages. 1976. Cloth DM 194,–; US $ 79.60. Springer-Verlag, Berlin-Heidelberg-New York.

World wide interest in the physiological and biochemical aspects of the relation between plant and parasite has led to a rapidly increasing number of publications during recent years. The appearance of an advanced treatise on physiological plant pathology is therefore very appropriate, also in view of the fact that since 1967 no extensive handbooks covering this area of phytopathological research have appeared.

To this volume, which covers virtually all aspects of the subject, 36 outstanding specialists have contributed. In an introductory chapter (1) historical and general aspects are discussed. The following chapters deal with spore germination and the effects of roots on fungal activity before penetration (2), cytology and physiology of penetration and establishment (3), forces by which the pathogen attacks the host, including toxins and cell wall degrading enzymes (4), the physiology of host response to infection, a.o. changes in permeability, water status, respiration, photosynthesis, translocation, nucleic acid and protein metabolism, growth regulating activities, oxidative enzymes, and the induction in the plant of fungitoxic compounds (5), and the modification of host response to pathogens by various abiotic factors and by agronomic practices (6). Although a discussion of the in vitro culture of plant pathogens is considered to be outside the scope of this volume, an exception is made for those biotrophic pathogens (e.g. some rust fungi) which until a decennium ago were considered to be obligate parasites. This seems relevant as these studies may shed light upon the biotrophic nature of these and other pathogens (7). A final chapter (8) treats the genetic aspects of host-parasite interactions in relation to the physiological-biochemical aspects.

Although most of the emphasis in this volume is on the reactions of higher plants with fungi and bacteria, also mycoplasma's, viruses and nematodes, have been included. Abiotic factors as disease inciting agents deliberately were not discussed.

This treatise provides a virtual complete coverage of the literature concerning physiological-biochemical studies of plant diseases. It may be mentioned that the index contains the names of more than five thousand authors. The high quality of the contributions and the well planned compilation of the separate parts into one coherent volume make it an outstanding and up to date treatise of the progress made in this field.

Although there is, in view of the excellent qualities of this book, little reason for criticism, a few minor remarks might be made. The title is identical with that of the leading journal in this field, which sometimes may be confusing. Addition of a chapter reviewing the various types of resistance, might have been valuable. Among the chemicals which influence the response of the host to pathogens, the activity of synthetic non-fungicidal compound which increase the resistance of the host, might have been discussed; such chemicals may prove valuable tools for the study of the physiology of parasitism.

This volume can be highly recommended to research workers and students in plant physiology and plant pathology. It is the book we have been waiting for. The careful editing makes it, in my opinion, also useful for botanists, phytopathologists and others who are not specialized in this field, but who want to be informed about new developments in the physiology of parasitism; the conclusions at the end of most paragraphs and the logical composition of the book may prove helpful to these readers.

J. DEKKER