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Book reviews

Hawkins, C.; Sorgi, M. (eds.): Research – How to Plan, Speak and Write About It. Berlin, Heidelberg, New York, Tokyo: Springer 1985. XI/184 pp., 55 figs. Soft bound DM 32,–.

Experts of the science writing guild present, in this handbook, a useful collection of instructions for: the planning and protocolling of medical research; how to make a literature search; speaking at meetings; and the preparation of talks and articles, including a guide for statistical methods and the preparation of illustrations, slides and overhead sheets. In the appendices practical information is also given: the use of a dictating machine, needless words that cause verbosity, differences between British and American usage of spelling, abbreviations of journal titles, as well as guide-lines for putting up poster displays. Unfortunately, the book is written on the initiative of the editor of the British Medical Journal so that this discussion of better communication in all its forms is strictly directed to potential medical, in particular, clinical, authors. The tips offered, however, are valuable to all hard-boiled experts (Librarians, liaison officers, consultants, editors, writers) and remains helpful to everybody.

H. F. Linskens, Nijmegen

Willemse, M. T. M.; Van Went, J. L. (eds.): Sexual Reproduction in Seed Plants, Ferns and Mosses. Proc. 8th Int. Symp. Sexual Reproduction in Seed Plants, Ferns and Mosses, 20–24 August 1984. Wageningen: Pudoc 1985. 206 pp. + figs. Hfl 73,50.

For the third time (1964, 1974, 1984) a Dutch scientific institution has offered hospitality to the International Symposium on Sexual Reproduction of Higher Plants. The topic during the recent meeting, which was organized by the Department of Botany at Wageningen, was extended to ferns and mosses, although the number of presentations on these groups of plants was small. The editors of the proceedings did a good job in quickly publishing the camera-ready papers of the oral presentations and poster sessions. The proceedings present an excellent overview on the present state of art. The material was divided into three parts (microsporogenesis, microgametogenesis, anther and pollen germination in vitro; stigma, incompatibility and pollen germination in vivo; megasporogenesis, ovary, embryo sac development, fertilization and embryo and endosperm development), each of which was preceeded by a somewhat joky preface (e.g. "The poster display it was fun"). Most of the papers were more or less descriptive if also on the EM level, which makes the proceedings easier reading than listening to the presentations.

Apparently the sexists in botany have now definitively divided into two groups, a schism which can be mourned. The French-Italian-Dutch branch will meet again in 1986 in Reims, and in 1988 at Siena. The "rest of the world" of plant sexists is more devoted to the molecular level, preferring the experimental approach, and met at Pulman Wash. (1969), Villa Carlotta, Lake Como (1975), New Zealand (1979) and at Amherst in 1985. A pity that this secession happened. But it will be never too late to join the efforts again in a field of plant science, which is so important and fundamental for future plant breeding and the genetic engineering of higher plants, using pollen as gene carrier.

H. F. Linskens, Nijmegen

Caspari, E. W.; Scandalios, J. G. (eds.): Advances in Genetics, Vol. 23. Orlando, San Diego, New York, London, Montreal, Sydney, Tokyo: Academic Press 1985. VII + 384 pp., several figs. and tabs. Hard bound $ 42.00.

Again a new volume of Advances in Genetics is presented to the scientific community. There is no doubt about the value of this outstanding periodical as a source of literature references. Due to the policy of this journal the reviews presented are rather uncorrelated and very often deal with only one organism. This holds true for three out of the five reviews found in the present volume. "Recovery, repair and mutagenesis in *Schizosaccharomyces pombe*" by Phipps, Nasim Miller represents a well organized compilation of data, certainly of great value for anyone especially interested in this organism. This is also the case for another "monospecific" contribution: "Y chromosome function and spermatogenesis in *Drosophila hydei*" by Henning. The review "Genetics, cytology and evolution of *gossypium*" by Endrizzi, Turcotte and Kohel is a very comprehensive overview, which certainly may also be considered as a valuable tool for the cotton breeders. "Gene transfer in fungi" (Mishra) directs the attention of the reader to the "renaissance" of fungi in genetic studies caused by their integration into molecular biology and gene cloning. It is a valuable up-to-date compilation of gene transformation in the widest sense of the word. Last not least the paper "Recent developments in population genetics" (Clegg, Epperson) devotes attention, albeit being rather short, to recent developments at the molecular level.

K. Esser, Bochum

Pilet, P.-E.: The Physiological Properties of Plant Protoplasts. Berlin, Heidelberg, New York, Tokyo: Springer 1985. XIII + 283 pp., 82 figs. and 35 tabs. Hard bound DM 115,–.

The use of protoplasts has provided plant physiology with new possibilities. Many structures and functions of the cell can now be studied without the influences of cell walls or cell-to-cell interactions. The present book, based on the protoplast as a model system, is composed of thirty well-written reports on different fields of interest in plant physiology. The reports deal with technical (application, isolation, viability), structural (membranes, organelles, cytosol and vacuole) and functional studies (uptake through plasmalemma, intracellular transport of primary and secondary metabolites, cell wall regeneration, auxin, gravireactivity, photoregulated metabolism), have an average length of nine pages each and are supplied with an up-to-date reference list. Unfortunately, chapter numbers have been omitted.

The book illustrates that protoplasts have special physiological properties in which they differ from their original cells. Due to some of these properties (fusion capability, DNA uptake, regeneration) protoplasts have recently become important tools in the genetic manipulation of an increasing number of plant species. Genetic manipulation is often faced with severe physiological problems, mainly concerned with the cultivation of protoplasts and their regeneration into plants.

Physiological manipulation appears to be a prerequisite for successful genetic manipulation. Therefore, knowledge about

the physiological properties of plant protoplasts is indispensable. This book can be seen as a support for the bridge which has to be built between plant physiology and genetic manipulation.

L. J. W. Gilissen, Wageningen

Henschen, A.; Hupe, K.-P.; Lottspeich, F.; Voelter, W.: High Performance Liquid Chromatography in Biochemistry. Weinheim: VCH Verlagsgesellschaft 1985. XIII + 638 pp., several figs. and tabs.

High performance liquid chromatography (HPLC) is a relatively young analytical technique compared to related methods such as classical column chromatography, gas chromatography and thin layer chromatography. A wide range of suitable instruments have become commercially available in the last decade and as a consequence HPLC has brought completely new dimensions to the analytical work in biochemistry as well as in other areas of chemistry. Recent developments such as combined HPLC and mass spectrometry will find numerous new applications. In fact, HPLC has become an indispensable tool in analytical (bio) chemistry. This book provides an excellent and comprehensive treatise of what has been achieved so far, particularly with regard to applications in biochemistry. The first chapters give a general introduction to fundamental chromatographic relationships, the column and instrumentation, respectively. The following chapters present a detailed account of applications to various groups of compounds: Amino acids, peptides, proteins; peptide hormones; biogenic amines; lipids; carbohydrates; nucleo bases, nucleosides, niucleotides; porphyrins; steroid hormones; vitamins; organic acids in humans; and secondary plant constituents. The editors have done an excellent job in bringing together up-to-date information and the numerous applications are well documented with tables and figures. The book is a must for any library serving a biochemical department. For the individual researcher, who will in general have a specialised interest in a particular group of compounds, the book is a good start when entering this field. However, developments in this field are so rapid that this book will not remain up-to-date for a long time.

G. W. M. Barendse, Nijmegen

Vloten-Doting, L. van; Groot, G. S. P.; Hall, T. C.: Molecular Form and Function of the Plant Genome. Ser. A: Life Sciences, Vol. 83. New York, London: Plenum Press 1985. XII-693 pp., several figs. and tabs.

The analysis of the molecular structure, organization, mutability and expression of plant genes and their genetic manipulation is a rapidly developing and expanding field, which during the last decade has made dramatic progress. Since 1977 Plenum Press has published four symposia volumes which report the proceedings of symposia held in Strasbourg (1976), Edinburgh (1979), Porto Portese (1982), and, the subject of the present volume, in Renesse, The Netherlands (July 1984). During these 8 years the elucidation of the genome organization of the plant cell nucleus has progressed rapidly, as well as the investigation of the extranuclear DNAs of plastids and mitochondria, mainly due to the use of newly developed and refined techniques of gene isolation, gene cloning and sequencing.

The present volume is divided into 12 sections of quite different lengths. The biggest section reports on many new findings on the structure and function of plastid (chloroplast) genes. Insights into the location, structure, sequence and expression of plastidal genes of higher and lower plants have occurred so rapidly that one can expect within a relatively short time the DNA sequencing of the whole plastid genome of at least one species. Already the authors of 15 papers report a vast amount of information towards an understanding of the molecular structure and function of the plastid genes. Moreover, the molecular interactions between plastidal and nuclear DNA gain more and more interest.

Only 3 papers deal with mitochondrial genes, which is an underrepresentation of the importance of this field. The exciting results about the molecular structure of higher plant mitochondrial DNA (=mtDNA), worked out during the last years, have much contributed to the understanding of mitochondrial inheritance in higher plants. The results reported for wheat mtDNA (and compared with the findings for rape and maize mtDNA) indicate the presence of a circular master mtDNA molecule which can be divided by crossing over into 'partite circular structures'; they can – by principally the same recombination processes – reestablish the master molecule.

A large section of the book deals with plant nuclear genes. The wide use of gene cloning and sequencing has led to stimulating insights into the structure and function of many genes: the gene families for storage proteins, heat shock proteins, the small subunit of rubisco, several gibb-ons (=genes activated by gibberellins) and others. In connection with these findings a review is given on transposable elements in higher plants (especially maize) and a survey on general chromosome structure.

Plant molecular biology and genetics have been intensively promoted by the use of new techniques; this is a continuous process. During the symposium several new cell biological techniques and new ways of genetic manipulation were outlined and discussed: transformation of protoplasts, use of monoclonal antibodies, construction of minichromosomes, etc. A separate section is devoted to Ti and Ri plasmids, their structure and function as well as their use in genetic engineering. Nitrogen fixation by *Rhizobium* and *Anabaena,* herbizide action and resistance and RNA ligation were dealt with, as was the genetic determination and regulation of protein accumulation in cultivated plants. The topic of intercompartmental gene transfer is also mentioned (plastid DNA sequences in mitochondrial DNA of maize).

This voluminous book contains a huge amount of stimulating new results, ideas and suggestions for further experimentation. It is a worthy and recommendable successor of the preceding three symposia volumes on plant molecular biology and genetics.

R. Hagemann, Halle/Saale

Cheremisinoff, P. N.; Ouellette, R. P.: Biotechnology, Applications and Research. Lancaster, Basel: Technomic Publishing Co, Inc. 1985. XIV + 699 pp., several figs, and tabs.

Biotechnology today is undergoing a resurgence in a wide range of applications and this book is intended to supply practitioners and students with an authoritative reference work. Just because of this statement made in the preface it is not clear why the reader is confronted with 49 chapters, which seem to be arranged sometimes in a rather random fashion. For example, it is not logical that chapters dealing with fundamental genetic techniques (e.g. chapters 14, 20 and 36) are not grouped together but rather are placed behind chapters dealing with applications. It would have been an improvement if the editors had chosen for dividing the book into subject categories.

A wide variety of biotechnological applications is described including such diverse topics as fermentation reactions and microbiology of anaerobic digestion, production of hybrid plants through protoplast fusion, production and use of monoclonal antibodies, molecular biological techniques and production of biologically important compounds. In the chapters the reviewer is most familiar with, a number of errors are present, especially in the chapter on the microbiology of anaerobic digestion: e.g. *Methanobacillus* is not a valid genus, spore-forming methanogens are yet unknown, not all methanogens are able to use hydrogen and carbon dioxide. Many chapters are concluded with a rather extensive list of references. It is a pity that a system of alphabetically listed references was not chosen for it is rather difficult to check the references rapidly for a special paper.

Notwithstanding the criticism, this book will be of value to biotechnologists, irrespective of their discipline, as a reference book. However, due to the extreme range of subjects covered most potential users will only be interested in parts of this book.

C. van der Drift, Nijmegen

Andersson, L.C.; Gahmberg, C.G.; Ekblom, P.: Gene Expression During Normal and Malignant Differentiation. Florida: Academic Press 1985. XII + 257 pp., several figs. and tabs. Hard bound $ 30.00.

This book is based on a symposium held at the University of Helsinki in May 1984.

Zoologists may be interested in the article of L. Saxén on morphogenetic tissue interactions. In a second article the complicated architectural regulation of histodifferentiation by physical forces is discussed by D.E. Ingber and J.D. Jamieson. The other 16 articles are strictly biochemically oriented and extremely specialized. Nearly every author failed to cite the work of other participants at this symposium.

It's a pity that the intention of the organizers of this symposium, namely to stimulate discussions and exchange of ideas, is absent by the exclusion of all discussions from the volume. I cannot help feeling that the book as a whole fortifies my opinion that the current trend in biochemical research toward overspecialization and overcompartementalization is a malignant differentiation itself.

P.H.W. van der Kroon, Nijmegen

Hawkins, J.D.: Gene Structure and Expression. Cambridge, London, New York, New Rochelle, Melbourne, Sydney: Cambridge University Press 1985. XII + 173 pp., several figs. and tabs. Soft bound £ 20.00.

During the last few years a number of text-books have appeared which have the aim of presenting new developments in genetics and molecular biology. The book of Hawkins is no exception since it introduces the modern aspects of molecular genetics. The question for a reviewer is thus whether it contributes anything of value which may recommend it more than other text-books for its purpose. Unfortunately, I must state that here this is not the case. In general, the most important new developments in molecular genetics are adequately treated and a chapter on methodology is included but the presentation is rather compact and in some sections even too restricted. For example the section on transposable elements seems not sufficiently taken care of in view of their potential importance for eukaryotic genome evolution and development. A chapter entitled "Repeated sequences and oncogenesis" does not reflect the real position of both phenomena in the context of genome structure and function. What about the relation between histone genes or ribosomal RNA with oncogenesis (both topics are subsections of this chapter!). Thus the structure of the book in some parts does not meet the requirements of adequate didactic treatment.

More fundamental is the criticism that a book dealing with gene structure and expression does not relate to the actual importance of gene function, i.e. cellular differentiation. An up-to-date text-book should definitely introduce this topic into the relationship between gene function and developmental processes, especially if it is considered 'for use by honours' students and those of medicine.

Criticism must be expressed in other areas as well. I refer to one example from the section on "hybridization of nucleic acids". Here the following explanation is given: "... Complexes between DNA and RNA are known as heteroduplexes, to distinguish them from homoduplexes formed from two complementary single strands of DNA. They are more stable than homoduplexes, so RNA-DNA heteroduplexes will form preferentially in a mixture of denatured double-stranded DNA and RNA. – Since DNA adsorbs strongly to nitrocellulose, DNA solutions can be spotted on to nitrocellulose paper and denatured and fixed by heating..."

Clearly, everything here is mixed up and incorrect. To me it seems to reflect the attitude of some authors issuing "modern" text-books. Bad enough that they teach their students such a nonsense but why can they not, at least, ask competent colleagues to critically read their manuscripts?

In conclusion, I cannot recommend this book as a reasonable alternative, even though some sections are nicely written and illustrated.

W. Hennig, Nijmegen

Ryan, M.J.: The Túngara Frog (A Study in Sexual Selection and Communication). Chicago, London: The University of Chicago Press 1985. XV + 230 pp., several figs. and tabs. Soft bound £ 12.75.

This easy-to-read book by Ryan describes his experimental work on the contribution of sexual and natural selection in the behavior and reproduction ecology of the species *Physalaemus pustulosus.* In nine chapters and an appendix he presents a review of the existing literature concerning the state of the art in the field of sexual selection, the reason for choosing *P. pustulosus* as a subject species, the reproductive behavior of this species, the reproductive success and the role of the advertisement call, and the costs and benefits of vocal communication in relation to reproductive success versus predation. The last chapter comprises his conclusions, some speculations and suggestions for further research. The book is completed with a list of references and an index.

In his autecological study of the reproductive behavior of the túngara frog, the author attracts the readers' attention by an intriguing and fascinating journey through all aspects of vocal communication and its role in species' evolution. He discusses in a pleasant way how 'runaway sexual selection' in this prolonged breeding species is exhibited in the evolution and genetic development; how coevolution of a male trait, the typical vocalization, and the female preference, has influenced genetic evolution as it is influenced by sexual selection, since the result of the female choice is a genetic correlation of the male trait and the female preference.

The book shows how useful it is to attack a biological problem in a multidisciplinary way. A small disadvantage is that a single researcher cannot cover all disciplines in an outstanding way, which results, for example, in an omission on the predation relationship between the frog and predatory

bats (*Trachops cirrhosus*). The author states that the 'chuck' part of the vocalization, which attracts both female frogs and predating bats, is attenuated dramatically in the natural environment. However, he only carried out sound attenuation experiments in the direction parallel to the soil surface through the environment. There may be quite other results in the upward direction from which the bat will arrive, being attracted by the male frogs' vocalization.

Nevertheless, apart from a few of such omissions, some misprintings in the text, some unclear captions in figures 3.1 and 5.25, a possible contradiction between the time axis in fig. 3.4 and the text on page 39, and the omission of the type-E call in fig. 5.27, the book is excellent and strongly recommended to all those interested in communication behavior related to genetic evolution.

M. J. M. Martens, Nijmegen

Duve, Chr. de: A Guided Tour of the Living Cell (Student Edition). New York: Scientific American Books 1984. XII + 444 pp., several figs. and tabs. Soft bound £ 24.95.

Shrink to the size of a bacterium, become a cytonaut and follow Christian de Duve in a guided tour of the living cell. The first itinerary passes the cell surface: you will enter the cell by endocytosis and visit the "vacuome", namely the endosomes, lysosomes, Golgi apparatus and endoplasmic reticulum, leaving the cell by exocytosis. For the second itinerary you use a virus-like wrapping to enter the cytosol. Here you will see how the biosynthetic factories work and how energy is generated, observe mitochondria, chloroplasts and microbodies, watch the skeletal and motile elements and learn how ribosomes spin out polypeptides. When the nuclear envelope opens during mitosis, the third itinerary begins. You can follow how genetic messages are packaged, transcribed, replicated and recombined and how they are distributed in mitosis and meiosis. Finally, you will leave the cell by budding, like a virion.

De Duve is a guide who makes the student familiar with cell biology in an easy and unusual but always very competent and exact way. He also provides many new insights for the expert. I have seldom read a scientific book of such a high standard with so much pleasure and profit.

E. Schnepf, Heidelberg

Walkey, D. G. A.: Applied Plant Virology. London, Melbourne, Toronto, Johannesburg, Auckland: Heinemann 1985. XIV + 429 pp., several figs. and tabs. Soft bound £ 12.95.

This handsome book aims successfully at acquainting the reader with aspects of plant virology that are inherent in the study of viruses and virus diseases in crop plants, and their remedy. The author does not dwell on the molecular biology of viruses. Only in the first chapter does he briefly deal with the composition and structure of virus particles. The information presented here helps understand subsequent chapters.

All topics relevant to the book's aim are treated: purification, transmission and ecology of viruses, as well as methods of control including the use of resistant cultivars and the production of virus-free plants. Separate chapters are devoted to a synopsis of viruses infecting plants and other plant classes, and virus identification, respectively. The last (12th) chapter is a practical guide with descriptions of procedures for plant virus research. The book includes a glossary of terms and an index.

The text of each chapter is well-documented by lists of references and further selected reading. The various figures satisfactorily illustrate the easy-to-read text. It is a good book which could be still further improved by avoiding the use of misnomers such as 'virus-like diseases' or 'mycoplasma and rickettsia-like plant diseases'. It would also be advisable to distinguish between the ecology of viruses and the epidemiology of virus diseases.

J. P. H. van der Want, Wageningen

Hogrefe, C.: Zur Genetik der Wasserstoffoxidation; Lokalisierung und Klonierung plasmidkodierter Hydrogenasegene aus *Alcaligenes eutrophus*. Bern, Stuttgart, Toronto: Hans Huber 1984. 81 pp., 23 figs. and 14 tabs. Soft bound DM 29,–.

Physiological specialists amongst bacteria attract the attention of biochemists not only because of theoretical reasons, but increasingly so because these organisms offer potential possibilities for practical applications. Such specialists are the hydrogen bacteria which are able to satisfy their energy requirement for autotrophic CO_2 fixation from the oxidation of molecular hydrogen. Herewith the reaction $2H_2 + O_2 \rightarrow 2H_2O$ is catalyzed by enzymes called hydrogenases. In her Ph.D. thesis the author shows that the structural genes for the two hydrogenases of *Alcaligenes eutrophus* H16 are localized on a transferable megaplasmid 450 kb long. She describes the isolation procedure of the megaplasmid. The hydrogenase genes could be identified by means of the transposon Tn5; they were isolated and subsequently cloned on *E. coli*. The thesis is terminated by a list of 92 references. The studies of C. Hogrefe can be seen as a firm basis for forthcoming studies on the interesting group of hydrogen bacteria by means of genetic engineering methods.

C. K. Stumm, Nijmegen