

Book reviews

Epstein, Ch.J.: The Consequences of Chromosome Imbalance. Principles, Mechanisms, and Models. Cambridge: Cambridge University Press 1986. xxi + 486 pp., several figs. and tabs. Hard bound £ 45,-.

"Gene dosage effects have always held as fascination for me that I cannot readily explain." This is the first sentence of this very inspiring book. Epstein's fascination originated from his studies on early embryonic development and from his personal contact with numerous cases with aneuploid syndromes. "How can one look at a person with a chromosome abnormality and not wonder how the genetic imbalance produces the phenotype associated with it?"

The book consists of six parts. The clearly written introduction (part I) is followed in part II by a critical discussion of karyotype-phenotype correlations in several aneuploid situations with the aim to determine what general principles might be inferred. The third part considers the mechanisms which may be involved in the primary and secondary effects of aneuploidy and the fourth part delineates the particular virtue and the potential limitations of the mouse as a model system. Part V discusses in detail three major clinical situations prototypic for the problems in human aneuploidy: trisomy 21 (Down syndrome), monosomy X (Turner syndrome) and cancer. The final chapter gives a recapitulation and a synthesis.

The study of aneuploidy might tell us much about the processes of normal development and function, and ultimately also about the mechanisms of the deleterious effects of aneuploidy. Understanding of these mechanisms is a prerequisite for the future development of strategies to counteract the harmful effects of aneuploidy.

The book is highly recommended to all those who are eager to improve their insight in aneuploidy and its consequences. There can be few colleagues in medical genetics, whether laboratory scientists or clinicians, who will not profit by reading it. Several parts of the book are also very valuable for geneticists of non-humans, e.g. parts III and IV.

Epstein's monograph is very interesting and will hopefully serve as a basis for future research issues and actions.

T. Hustinx, Nijmegen

Booth, I.R.; Higgins, C.F. (eds.): The Society for General Microbiology. Symp. 39: Regulation of Gene Expression – 25 Years On. Cambridge, London, New Rochelle, Melbourne, Sydney: Cambridge University Press 1986. viii + 309 pp., several figs. and tabs. £ 32,50.

The first noticeable aspect of the book 'Regulation of Gene Expression – 25 Years On' is the absence of an approach from the higher eukaryotes. Since Jacob and Monod, molecular biology has studied various aspects of gene regulation both in prokaryotes and in eukaryotes and where possible, a comparison between the different systems should be of great value, in particular for those dealing with eukaryotic systems. Concerning the actual content of this book, I must be very positive. Although the book is composed of chapters written by different authors, each approaching the problems from their own viewpoint, the most important general elements of the regulation of gene expression are dealt with, in addition to a few more specific aspects. The various aspects of gene

regulation belong to different levels of regulation: transcriptional-, processing and translational control. In the first instance, the regulation of transcription is explained in physiological terms, although the relation between gene expression and promoter structure is explained well with up-to-date information. In addition to the important promoter sequences, the role of transacting-factors like DNA binding proteins are also described, both from the viewpoint of DNA (promoter binding) as well as from the protein structure itself (binding domains).

In addition to the importance of promoter sequences in gene regulation, attention is also paid to the structural organization of the DNA, for instance with respect to the relationship between promoter activity and supercoiling versus relaxation of the helix; a relationship that still is very poorly understood. Both the role of upstream regions in gene expression and the role of 3' regions in regulation receive attention. This is done in a chapter describing the role of transcription termination and the significance of the rho-factor. Aspects of transcriptional levels of gene regulation, and processing and translational levels are discussed relative to differential gene expression. In this respect, special attention is paid to the role of the ribosomes. The authors mention, however, that the absence of various well-studied examples of differential gene expression prevent the drawing of conclusions. It is clear that regulatory systems at this level are subtle as illustrated by the coregulation of unlinked operons.

Finally, the book pays attention to some specific forms of gene regulation concerning important questions in the molecular biology of transposition, plasmid maintenance and production of antibiotics. Developmental gene expression is described using a well-known, simple lower eukaryotic model-system, *Dictyostelium*. In this respect, the role of such extracellular elements as cAMP in the control of gene expression during differentiation is discussed. The general impression one gains of this book is that it clearly illustrates the progress made in understanding control of gene expression since Jacob and Monod. It is a very valuable book containing up-to-date information of various aspects of the regulation of gene expression. In addition, the book gives a good view of the complexity of gene regulation and the authors are not afraid of explaining certain processes in a hypothetical way if hard evidence is not yet available.

G.J. Wullems, Nijmegen

Tilney-Bassett, E.A.E.: Plant Chimeras. London: Edward Arnold 1986. 199 pp., 62 figs., 18 tabs. Soft bound £ 13.60.

The improvement of vegetatively propagated plants by mutation breeding has brought a new impetus in the old art of making chimeras of plants: trees, shrubs and ornamentals. A general oversight of older European, non-English literature has threatened a loss of information – even students of plant breeding and horticulture, who know everything about cybrids and protoplast fusion, are sometimes ignorant of the existence of plant chimeras. A solid presentation of old facts can therefore expect to find its readers. This is the case with the monograph written by this geneticist of the University College of Swansea. It is characterized by a profound erudition of the

list of references. This well-illustrated book treats all aspects of the science of phenomena which originally were considered as deviations, bizarria and abnormalities which showed a blend of two kind of plants, varieties or even species. The author discusses different explanations of the chimera concept and describes the various types: classification and analysis of periclinal chimeras, sectorial and mericlinal chimeras, but also cytochimeras and variegated-leaf chimeras. Special attention is given to potato, flower and fruit chimeras, as well as to mutant skins and scores.

The book can be recommended to all practical breeders and students of applied genetics who are not only interested in methods but also want to get a look on the developmental processes which generate eversporting conifers, bolters, feathery wildlings, striped flowers, readily sporting mutants and all types of variegations.

H. F. Linskens, Nijmegen

Moshkin, V. A. (ed.): Castor. Russian Translation Series, Vol. 43. Rotterdam: A. A. Balkema 1986. XIV/329 pp., 23 figs., 164 tabs. \$ 34.-.

According to FAO statistics castor bean cultivation has reached 1.4 million ha – an increase of 150% during the last 12 years. No wonder, since castor bean oil is not only a traditional laxative but is used nowadays in the production of nitrolacquers, brake fluid, coolant mixtures, transformer oils, nylon, dielectrics, plastizisers, paints, and enamels. Cracking of the oil delivers intermediate products for the perfume industry, especially fragrances of jasmine, peach and other flower and fruit-like scents. Maximum production takes place in Brazil, India, China, Thailand and the Soviet Union. This monograph, written by 33 scientists of the All-Union Scientific Research Institute of Oil Crops, makes the Russian literature on castor accessible. Thus it is no surprise that nearly exclusively Russian references are cited. For complete information, therefore, other sources have to be evaluated. The book is divided into 10 chapters treating economic importance, history and origin of the castor bean; botanical, biological, physiological, biochemical and genetic properties of castor, and a detailed report on the Russian programs, using heterosis, resistance and selection breeding. The main part of the book is devoted to technology and production, the methods of growing, packaging and mechanization of harvesting, as well as pests and diseases and their control. The Soviet Union is the northernmost region for the cultivation of castor. Therefore, emphasis is given to the specific requirements for breeding varieties of this tropic crop. It presents more than half a century of research on an upcoming industrial crop, which should attract more attention from tropical plant breeders.

The review copy, printed in India, was mold contaminated; those readers suffering from allergies are warned of this fact.

H. F. Linskens, Nijmegen

Mulcahy, D. L.: Bergamini Mulcahy, G.: Ottaviano, E. (eds.): Biotechnology and Ecology of Pollen. Proceedings of the International Conference on Biotechnology and Ecology of Pollen, 9–11 July 1985 (Univ. of Massachusetts, Amherst, USA). New York, Berlin, Heidelberg, Tokyo: Springer 1986. 528 pp., 141 figs.

Not always does the written report of a scientific meeting reflect the stimulating and charming atmosphere during the actual lecturing, discussions and get-togethers. But this one does!

This proceedings illustrate the bright, sometimes unusual, view of the editors and kindness of the organizers, who have been able to create the right environment for a fruitful interaction of pollen biologists from all corners of the world. The proceedings also give a good picture of the actual stage of knowledge on gene expression in pollen, pollen-style interaction, pollen physiology and ultrastructure, as well as some aspects on what is called gametophytic ecology. Seventy-eight lectures are presented in full length and the abstracts of 14 posters are also included. Among the highlights is the preface: David Mulcahy considers pollen as a long-time forgotten generation. His main argument is that it was long believed that pollen primarily serves in delivering male gametes to the egg and secondary embryo sac. The second function, to serve as a blocker of transmission of many defective alleles and gene combinations into the next generation, a function which was pointed out by John Heslop-Harrison in 1979, has been neglected. It seems, therefore, time to draw attention to the competitive ability and intergametophytic effects of angiosperm gametophytes. This should be kept in mind when pollen-mediated transformations as a field of special activity in biotechnology is promoted. The new method of dissolution of pollen intine in order to release sporoplasts (Loewus and coworkers) could be an interesting approach. Of the many new insights, the following deserve special mention: a new heterosis model (by D. L. Mulcahy, Garbriella Bergamini Mulcahy and D. MacMillan) and energy dispersive X-ray analysis for the localization of calcium and cereal species (J. S. Heslop-Harrison). Protein release from germination pollen is not merely a passive diffusion but goes rather by way of Golgi-derived secretory vesicles which make their way to the plasma membrane and give their proteins to the outside after exocytosis (J. F. Jackson and R. K. Kamboj). The first announcement of the activity of complex carbohydrates at interacting surfaces during pollen-pistil interactions are given (A. E. Clarke and collaborators), which has had an exciting follow-up.

H. F. Linskens, Nijmegen

Wang, T. L. (ed.): Immunology in Plant Science. Society for Experimental Biology Seminar Series, Vol. 29. Cambridge: Cambridge University Press 1986. 228 pp., 60 figs.

Almost unseen by a majority of botanists and sometimes regarded with disfavour and suspicion immunological techniques were added to the arsenal of modern methods in plant science during the last decade. Advances which have been made possible by the application of immunological techniques in plant science are now documented in a book "Immunology in Plant Science", which presents a wide range of feasible techniques and of subjects in plant science which have been promoted by these techniques.

The book starts with a concise review on cellular aspects of the immune response, the structure of immunoglobulins and their genes and then switches over to the most sophisticated techniques of making antibodies: somatic cell fusion and the ensuing screening and selecting of monoclonal antibodies (McAbs). This article, which provides a more or less overall introduction, is followed by contributions covering diverse special fields of research.

One chapter is dedicated to immunoassays in plant hormone research. Power, problems and prospects inherent in the use of sera and McAbs in this advanced field are discussed; a synopsis of already existing assays (RIAs, EIAs and other ones) is included. Another topic is immunochemistry. Three articles show examples and principles for the use of antibodies in staining with fluorescent dyes, colloidal gold and ferritin.

Impressing pictures of the immunofluorescent cytoskeleton during cell division and metamorphosis are given. Examples of immunogold staining and electron micrographic procedures are included in a chapter reporting on the immunochemical analysis of the legume root nodule, where an approach with McAbs to the problem of surface interactions between bacteroids and the peribacterial membrane is described. Diverse possibilities of the application of sera and McAbs are demonstrated in the chapter on phytochrome, a plant regulatory protein that has been investigated by immunological methods more than any other plant protein. The survey on methods, techniques and subjects is completed by a contribution on the use of antibodies in molecular biology, including immunopurification of polysomes and an article on the application of antibodies in plant pathology.

Although the book is a multiauthor publication and includes advanced applications and first approaches, reviews and reports on genuine research, the chapters present a balanced selection of subjects, topics and methods. Obvious and unnecessary repetitions were avoided. Protocols and recipes appending each chapter are welcome additions to those who are in search easy to start methods.

On a few pages one may be inclined to add sceptic or slightly correcting comments. Some scepticism may be appropriate when prospects for the use of McAbs in plant hormone studies sound too optimistic or when mistreating of hybridomas is recommended (pp. 51, 37). When methods for the purification of antigens are discussed (p. 62), the absence of a note on the possibility of obtaining highly specific McAbs in spite of impure antigen is felt because only then the obvious circle – pure antigen for the immunopurification of pure antigen – would be bypassed. Immunology of phytochrome is a rapidly expanding field and hence in the light of recent publications some statements and results may have to be reconsidered, e.g. epitope location (p. 187; cf. Grimm et al. 1986, *Z Naturforsch* 42c: 993), and the notion that there might be repeating epitopes on phytochrome (p. 184, cf. Hershey et al. 1985, *Nucleic Acid Res* 13: 8543), or the assessment of McAbs discriminating between the P_r and P_f form (p. 187). Such antibodies were also isolated by other investigators (cf. Cordonnier et al. 1985, *Biochemistry* 24: 3246). Their power of discrimination is low.

Even if there are some more things to be mentioned in this respect, the overall positive impression is scarcely dimmed.

Conspicuously, however, early investigations on the use of McAbs in the purification and characterization of a labile plant enzyme – McAb-screening and selection by the enzymatic reaction of this enzyme, product formation by the immunoimmobilized enzyme (Liedgens et al. 1980, *Z Naturforsch* 35c: 958; Liedgens et al. 1983, *Eur J Biochem* 135: 75) and prospects for taxonomic purposes of McAbs (Schneider and Liedgens 1981, *Z Naturforsch* 36c: 44) – have not been included in the discussions, although to date investigations on plant enzymes using McAbs are more than rare. It may be those investigations were performed before the awareness of botanists for the unique power of McAbs awoke. Experts, however, should be expected to know the relevant publications.

Notwithstanding, the book provides useful information, literature, protocols and prospects which will make the start easier for beginners in this field of research and the orientation sometimes quicker for the more advanced scientist.

The prospects for immunology in plant science do not differ from those in other fields where antibodies are used: Immunology will be indispensable for further progress. More books of related topics and scope will certainly appear in the near future.

H. Schneider-Poetsch, Köln

Callan, H.G.: Lampbrush Chromosomes, Vol. 36. Molecular Biology, Biochemistry and Biophysics. 1st edn. Berlin, Heidelberg, New York, Tokyo: Springer 1986. VII + 254 pp., 67 figs., 3 tabs.

It is a pleasure to read this up-to-date, comprehensive and authoritative review of a highly specialized, yet for fundamental biology, very important field, written by the nestor of modern lampbrush chromosome research. Lampbrush chromosomes have been known by now for slightly over a century, and Callan entered the stage just 40 years ago. A little later, Gall followed. This started an entirely new and rapid development of our understanding of this interesting material, as well as its continuously increasing use for the analysis of phenomena of wide biological importance.

The book starts with a historical introduction as an appetizer. It is an example of good scientific history writing. The second chapter on present day (including older but still useful) techniques is full of practical hints and goes as far as giving detailed information on media and manipulations. The style is such that one continues reading even without planning ever to apply any of the nice possibilities offered. In the third chapter chromosome identification is considered, including genetic variation, and maps with various landmarks. It is the field of descriptive and analytical light microscopy par excellence. For non-specialists the detail is rather overwhelming, and the background of the differences and (correspondences) between the many species discussed does not really become clear. A brief review of taxonomical and evolutionary relations would have helped.

Chapter 4, on the morphology of RNA transcripts, is again fine reading and clearly demonstrates the important role lampbrush chromosomes have played during the last three decades in unraveling transcription. The following chapter (5) on the distribution of repetitive nucleic acid sequences, with emphasis on r-DNA and histone genes, is interesting beyond the specific topic of the book. A presentation more closely following systematics and evolutionary relations would also have been welcome here.

The short sixth chapter deals with alternatives in species where lampbrush chromosomes are not present. The complications of dictyotene are discussed with the maximum possible brevity, which is regrettable. More attention is given to spermatocytes with lampbrush chromosomes (chapter 7) than to oocytes without them, with emphasis, of course on Y-chromosome loops. In four pages (chapter 8) the single botanical example (*Acetabularia*) is discussed. The book closes with a chapter (9) on proteins associated with lampbrush chromosomes, including labelling and immunological approaches.

The 465 references cover the great majority of the relevant literature. The subject index, however, is short.

In conclusion, this well-composed, well-written and well-illustrated book is a must for classical cytogeneticists as well as for molecular and cell biologists and many others, from the graduate student level upward.

J. Sybenga, Wageningen

Cody, V.; Middleton, E.; Harborne, J.B. (eds.): Progress in Clinical and Biological Research, Vol. 213. Plant Flavonoids in Biology and Medicine. Biochemical, Pharmacological and Structure-activity Relationships. New York: A.R. Liss. 614 pp., several figs. and tabs. Hard bound £ 54.00.

This volume comprises lectures which were presented at the Symposium 'Plant Flavonoids in Biology and Medicine' held in Buffalo, New York, in July 1985. It is a multi-author work containing 56 contributions which cover many, and sometimes differing, aspects of research activities in botany,

medicine, and pharmacy. Thirty-three contributions were presented at the meeting by invited speakers and the residual twenty papers have been selected from the poster presentations; the latter give new information on flavonoids. In an introductory part of the volume more general aspects are dealt with. Among these are the evolution of flavonoids, their distribution, function, biosynthesis, isolation, purification, and characterization. Other topics are tannin-protein interactions and the role of flavonoids in plant resistance to insects. A large proportion of the volume is occupied by reviews on a variety of flavonoid effects relevant in such diverse areas as enzymology, virology, immunology, allergy, endocrinology, nutrition, diet, and oncology. Due to the large number of contributions in this part of the volume they cannot be discussed in detail.

Inevitably, the contributions of this volume vary in quality. Nevertheless, the book represents a useful guide to recent aspects of flavonoids in Biology and Medicine.

R. Wiermann, Münster

Avers, C.J.: Molecular Cell Biology. Reading, Menlo Park, Don Mills, Wokingham, Amsterdam, Sydney: Addison-Wesley 1986. ix + 812 pp., + glossary + index, several figs. and tabs.

The study of cells, especially of eukaryotic cells, is greatly enhanced by the combination of traditional cell biology, which

is mainly morphological, and biochemistry/molecular biology. After the establishment of the cell as the unit of life by morphologists, biochemists started to disrupt the cells and to study isolated processes within cells without cells and biochemistry was born. The construction of electron microscopes in the 1940's allowed morphologists a closer look into the structure of the cell. Now, the "old" concept of the interrelationship of form and function has regained the attention of the scientist. It took, however, a long time before this was reflected in textbooks. Charlotte J. Avers' book is, in this respect, the most modern of the present textbooks. After having introduced the general features of both cell morphology and (bio)chemistry (part I), she deals with form and function of the various cellular compartments in parts II through IV and ends with the discussion of reproduction and development (part V) and evolution (part VI). Every part contains one or more chapters, each chapter being concluded with a summary and a list of readings and references, in some cases as recent as 1985.

The book is written in an easy style and well-documented with both schematic drawings and original micrographs. The sequence of the various parts can be changed, as each part contains sufficient information in itself. The glossary and the index at the end of the book are useful. The book, indeed, tells the story of the cell as the dynamic and elegant unit of life.

J. A. van der Donk, Utrecht

Announcement

The 16th International Congress of Genetics will be held at the Metropolitan Toronto Convention Centre, Toronto, Ontario, Canada in August 20-27, 1988

The congress will be sponsored by the International Genetics Federation, the Genetic Society of Canada, the National Research Council of Canada, the Royal Society of Canada and the Biological Council of Canada. It will be organized by a committee with R. H. Haynes acting as Chairman, D. B. Walden as Secretary general, L. Forget as Congress Manager and the members J. W. Drake, R. B. Church, J. A. Heddle, K. J. Kasha and A. Nasim. Honorary President will be L. Siminovitch, Honorary Vice-Presidents will be V. L. Chopra (India), O. H. Frankel (Australia), F. Jacob (France), M. Kimura (Japan), S. E. Luria (USA), Barbara McClintock (USA), R. Riley (UK), P. Starlinger (FRG), V. A. Strunnikov (USSR), C. C. Tan (China), C. Yanofski (USA).

The scientific program will emphasize the most recent and exciting developments in genetics. It consists of symposia,

workshops and posters grouped into four *main divisions* as follows: I. Genes and chromosomes, II. Genomes and organisms, III. Populations and evolution, IV. Genetics and society.

The second announcement will be published in September 1987 and send only to those who applied for.

All *correspondence* should be mailed to: XVI. International Congress of Genetics, National Research Council Canada, Ottawa, Ontario, Canada K1A OR6. Tel.: (613) 993-9009, Telex: 053-3145, Telefax: (613) 993-0603.

A number of pre- and post-congress meetings will be held on specific topics and organized by local committees. The 4th International Congress on Cell Biology will be held at Montreal, Quebec, Canada during the week immediately preceding the Genetics Congress.

Erratum

Theor Appl Genet (1986) 73:223-227. J.-M. Cornuet, A. Daoudi and C. Chevalet: Genetic pollution and number of matings in a black honey bee (*Apis mellifera mellifera*) population

In Fig. 1 (p. 225), the scale along the pB axis goes from 1.00 down to 0.90 instead of going from 0.90 up to 1.00.

The Authors