

Book reviews

Kleinig, H.; Sitte, P.: Zellbiologie. Ein Lehrbuch. Stuttgart, New York: Fischer 1986. XIV/528 pp., 492 figs., 94 tabs. Hard bound DM 94,-.

Kleinig and Sitte's *Cell Biology* focuses on cell structure, covering both the distribution and organization of cell parts as well as the complex functional relationships that exist among them. The book is an exception to other available cell biology textbooks for it has a clear evolutionary perspective, reflected by its topic and example selection.

A high academic standard and a careful update of information are achieved in a relatively brief text. The frequent systematization of presented information highlights the order and clarity of the book. Red underlining of important terms, a balanced use of blank spaces, an impeccable diagramming, and adequate title hierarchies and figure setting all contribute to a fluid reading of the text. Tables are simple and self-explanatory and micrographs are of excellent quality. Complementary information which deals mainly with methodology is concisely presented in special boxes and a short list of selected references is given in every chapter. A series of appendices at the end of the book briefly cover important information on methodology, units and historical aspects of some topics.

The book is intended for undergraduates requiring cell biology in their curricula, (including medical students) and who have already taken biochemistry courses. The inclusion of a summary and questions at the end of every chapter could be an interesting asset that would aid students test their progress. The book should also prove interesting and highly informative for graduate students and scientists.

Undoubtedly this book should be included among the classical German texts which have had prolonged and deserved prestige in biology teaching. Its success in Latin America will depend on the availability of a relatively low priced edition, compatible with the frequent revisions required by the dynamic changes in this subject matter. An English translation would make it accessible to a wider range of university lecturers, and a Spanish translation would also make it available to students in this part of the world.

I. Noher de Halac, Córdoba (Argentina)

Blonstein, A.D.; King, P.J.: A Genetic Approach to Plant Biochemistry. Plant Gene Research. Basic Knowledge and Application. 291 pp.

The genetic approach to the elucidation of biochemical and physiological processes in plants involves the use of mutant plants or cell lines with altered regulation properties. This book describes the most relevant uses of plant mutants as tools for biochemical and physiological studies with respect to gene expression of particular genes: gibberellin mutants with respect to gibberellin biosynthesis, seed dormancy, flowering and senescence; abscisic acid mutants with respect to biosynthesis and metabolism, seed physiology etc.; mutants with regard to structural and regulatory elements of the photosynthetic apparatus; the alcohol dehydrogenase system in maize which has been most extensively characterized in genetic, physiological and molecular terms; mutants with regard to the genetics of nitrate uptake and reductase, nitrite

reductase, symbiotic nodulation and nitrogen fixation in legumes; mutations involving the endosperm proteins; molecular approaches to plant and pathogen genes; gametophytic gene expression and, finally the isolation of auxotrophs in vitro.

These topics demonstrate the great diversity in studying the many aspects of gene expression by making use of either existing or induced mutations, whereby increasingly molecular techniques are employed. In this respect it is felt as an omission that the possibilities of gene transfer systems based on the Ti plasmid of *Agrobacterium*, though briefly mentioned in connection with nitrate assimilation, have not been treated more extensively, since such systems have become extremely useful in the study of regulated plant genes. Nevertheless, this book provides an excellent update on the use of mutants in plant biochemistry, including physiological aspects.

G. W. M. Barendse, Nijmegen

Ptashne, M.: A Genetic Switch. Gene Control and Phage. Cambridge, Palo Alto, Oxford, Edinburgh, Boston, Carlton: Blackwell. x+128 pp., several figs. and tabs. Soft bound £ 14.50.

About 40 years ago in Paris André Lwoff and his associates showed that lysogeny in bacteriophage λ is due to a gene regulatory mechanism. The switching between two states of the virus, from the dormant form in dividing bacteria to the activated form (e.g. after irradiation by UV light), is an example of the turning on and off of genes.

The author of this little book is a leading authority in λ research who has spent 25 years unraveling the secrets of the regulation of gene expression in the lambda virus.

The introductory chapter gives the reader some basic facts on molecular biology. Chapter one describes how the λ repressor and another regulatory protein (Cro) bind to DNA and interact with RNA polymerase. In this way it is determined which promoters will be used to initiate transcription. These components – representing a “genetic switch” – control efficiently the gene expression that is triggered when a lysogen is irradiated with UV. More details of regulation, the λ repressor and Cro, are given in chapter 2. The mechanism is explained by which these proteins recognize specific base sequences. If the structures of regulatory proteins are complementary to part of the DNA they fit together like lock and key. The phage may lyse the cell or alternatively it becomes dormant in the cell. The first steps of gene regulation that occur after λ infection are identical in both pathways. Now the question arises which factors govern λ whether to grow lytically or to lysogenize a newly infected bacterium. This lysis-lysogeny “decision” is dependent on the environment. Details of these events and the regulatory sequence along each pathway are outlined in chapter 3. In chapter 4 key experiments are presented on which the pictures and conclusions given in chapter 1 and 2 are based.

At the end three appendices are devoted to more general questions, e.g. the control of transcription in eucaryotes and procaryotes. The author argues that a common mechanism exists.

This fascinating essay is clearly written and superbly illustrated. It is essential to all those interested in gene regulation during development.

D. Gröger, Halle (Saale)

Hennig, W. (ed.): Germ Line – Soma Differentiation. Results and Problems in Cell Differentiation. Vol. 13. Berlin, Heidelberg, New York: Springer 1986. 196 pp.

This is the most recent volume in the well-known series of slim green books, the series "Results and Problems in Cell Differentiation". The title of this volume "Germ Line – Soma Differentiation" is somewhat misleading as the contents deal exclusively with the phenomenon of chromosome elimination and diminution. The various manifestations of this process are reviewed in detail in the first chapter by Tobler. It is unfortunate that the title of this chapter does not correspond to its contents: those looking for a review of the "differentiation of germ and somatic cell lines in Nematodes" (the title of this chapter) will be disappointed, while those looking for a general review of chromosome elimination and diminution will be misled and probably skip this chapter. The second chapter by Gerbi deals with sex determination and germ line restricted chromosomes in Sciarid flies. This chapter is well written but the complete lack of molecular insight in this fascinating but conceptually complex matter leaves the reader with a sense of frustration. It is probably the availability of at least some molecular data that makes the chapter about macronuclear differentiation in Ciliates by Steinbruck the most successful one in this book. In the fourth and final chapter Hennig belabors the by now well-established fact that some of the somatic heterochromatin may function in the germ line.

The topic of this book is one that is often considered obscure by the somewhat anthropocentric molecular biologists of today and perhaps that is why so little new information is available. The theoretical discussions about the underlying molecular mechanisms or the biological function of chromosome elimination and diminution or heterochromatin lack a solid experimental basis and are mostly unsatisfying. The possibility that humans may not be the only living beings to have silly habits is ignored. The contents of this book do serve as a useful and necessary reminder that we actually know very little about the structure and function of the eukaryotic genome and as such it deserves a wide readership.

N.H. Lubsen, Nijmegen

Lawrence, T.; Toll, J.; van Sloten, D.H.: Directory of Germplasm Collections. 2. Root and Tuber Crops. 2nd. rev. edn. IBPRG Directories of Germplasm Collection no. 2. IBPGR, Rome 1986, 178 pp.

This new, more detailed edition replaces the one published in 1980. Emphasis is again placed on such staple crops as aroids, cassava, potato, sweet potato and yams. In the section "others" are included root crops of local importance like *Camna edulis*, *Oxalis tuberosa*, *Tropaeolum tuberosum*, *Ullucus tuberosus*, *Cyperus esculentus*, *Arracasia xanthorrhiza* and *Helianthus tuberosus*. Full addresses are given of the institutions which preserve the collections, including the name of the person in charge as well as maintenance, duplication, availability, quarantine, evaluation and documentation of the collection. A useful directory, indeed, which could act as a catalyst in stimulating interest in the conservation and use of the genetic resources of tropical crops which at present rarely attract the attention of plant breeders.

H. F. Linskens, Nijmegen

Slavkin, H. C. (ed.): Progress in Developmental Biology. Part A and B. Progress in Clinical and Biological Research, Vol. 217A and B. Liss, New York: A.R. 1986. XXVIII/448 and XXVIII/461 pp, numerous figs. Hard bound Hfl. 43.– and Hfl. 43.–.

This type of publication cannot be reviewed adequately in detail: in part because of its heterogeneity as a proceedings of the 10th International Congress of the International Society of Developmental Biologists, held at Los Angeles in 1985, under the presidency of Tokindi S. Okada with the theme "New Discoveries and Technologies", and in part because it sails under the wrong flag. I agree with the president: developmental biology is in a present situation of rapid advances: scopes and technologies are dramatically expanding and changing. However, I do not agree with the text on the cover, that "until recently, biologists have lacked the appropriate methodology to elucidate the mechanisms of development". Surely, the rapid advances in molecular genetics and immunochemistry have provided a means to unravel the problems of gene structure and how genes regulate major events in the formation of the organism, but I would like to emphasize that present progress is based on the experiments and conclusions of H. Spaemann, A. Tyler, W.F. Loomis, J. Brachet, J. Loeb, J. Bonner, A. Lang, R. Goldschmidt, T.H. Morgan, F. von Wettstein, A. Kuehn, E. Zeuthen, and many many others, all of whom should not be forgotten. The previous generation already knew that mutants are crucial for progress in developmental biology and "that molecular genetics is the key to much, perhaps not all – but much, of the understanding of development" (James Bonner). The topics of the symposium are as different as are the problems of developmental biology, starting from transformation and pattern and matrix formation, interactions and differentiation, to fertilization, neural crest cells, ooplasmic determinants, transmembrane modulation, embryogenesis, growth factors and hormones. Looking through this comprehensive two volume set representing the work of an international community of research scientists, it looks strange that except for 3 (three) excellent papers all the contributions concern animal material! It appears that development is restricted to the sea urchin, *Drosophila*, chicken, rat, mouse, ascidia, worm and frog. The hope remains that some day this oneeyed blindness of many developmental biologists will disappear, to be replaced by a general developmental biology on a genetics base.

H.F. Linskens, Nijmegen

Schopfer, P.: Experimentelle Pflanzenphysiologie. Band I: Einführung in die Methoden. Berlin, Heidelberg, New York, Tokyo; Springer 1986. X/178 pp., 45 figs., 14 tabs. Soft bound DM 29.–.

This revised version of a laboratory textbook now divided into a "General Introduction" and (still to be published) "Introduction to Applications" is complementary to the well-known plant physiology textbook by the same author. While not especially directed towards genetics experiments, general principles, such as the planning and evaluation of experiments, collection of data, factor analysis, statistical methods and security in laboratories, are of general importance and interest.

H. F. Linskens, Nijmegen

Levinthal, C. (editor-in-chief): Proteins. Structure, Function and Genetics. 12 issues per year, about 1200 pages. Soft bound. New York: A.R. Liss. Soft bound US\$ 225.–; Europe, Middle East \$ 264.–, other countries \$ 264.–.

In September 1986 a new journal began to publish reports on significant experimental and analytical research in all areas of protein research. Remarkable is the explicit inclusion of genetics. Three justifications for this new journal in a time of journal inflation are given in the editorial by Cyrus Levinthal: site-directed mutagenesis as a way of modifying proteins, the availability of computational power in the investigation of molecular dynamics, and new techniques of structure determinations. According to the editor-in-chief and his 41 man editorial board "it seems reasonable to suppose . . . that a new journal that would report significant advances in these areas of research could provide a greater level of cohesion for those in the fields." A final justification for starting the new journal is the fact "that almost everyone we asked to join the editorial board has accepted" – no wonder the excellent printing and perspectives! No doubt that the new journal will compete with already existing publications like *J. Peptides Protein Res.*, *Adv. Cyclic Nucl. Prot. Phosph. Res.*, *Adv. Protein Chem.*, and with all biochemical and molecular biological periodicals (BBA and PNAS) for the ever shrinking library budgets of institutes and libraries. No doubt also that this journal will make its way in the jungle of existing, surviving, and fading periodicals. The demand is for first-rate-papers, but reviews and comments can also be expected.

H. F. Linskens, Nijmegen

Wang, T.L. (ed.) Immunology in Plant Science. Society for Experimental Biology, Seminar Ser. Vol. 29. Cambridge: Cambridge University Press 1986. 228 pp. Hfl 27.50.

This book is a European, or, more precisely, an English, French, German enterprise: the result of a 1985 meeting in Leeds of the Society for Experimental Biology. It is an excellent introduction to the application of immunological techniques for those not familiar with immunology and illustrates the range of topics in plant biology which can benefit from immunological methods. All chapters are devoted to the practical aspects of using antibodies, with useful schemes by which one can gauge the time and effort required to raise them. We find chapters on the immunoassay of plant hormones, enzyme immunocytochemistry, application of antibodies in the study of cell surfaces and cytoskeleton, molecular biology and analysis of root nodules, phytochrome studies and plant pathology. An extremely useful and handy book which should influence the teaching of plant physiology very much.

H. F. Linskens, Nijmegen

Bachmann, K.: Biologie für Mediziner. 3rd rev. and enlarged edn. Berlin, Heidelberg, New York, Tokyo: Springer 1986. XV/456 pp. 336 partly colored figs. Soft bound DM 59,-.

It is remarkable that more than one-third of the pages in a textbook for medical students cover topics in genetics. This new edition is nearly perfect in its adaptation to the rapid developments in biology and experimental medicine. Immunology has its own chapter. New findings in human genetics are reflected in several chapters. The recent changed views on

evolution induced a complete rewriting of the chapter in question. The special role of DNA is emphasized. One misses, however, references to supplementary literature.

Equipped with the knowledge of this textbook each medical student can be considered prepared for the confrontation with hereditary diseases and their possible treatments, but he is also supplied with basic information for genetic counselling.

H. F. Linskens, Nijmegen

Bajaj, Y. P. S. (ed.) Trees I. Biotechnology in Agriculture and Forestry, Vol. I. Berlin, Heidelberg, New York, Tokyo: Springer, 1986. 515 pp., 150 figs. Hard bound, DM 298,-.

In the preface the editor of this series presents a short outline of his international scientific reputation, which is indeed impressive, and his experience. Both amply qualify him to be compiler (together with J. Reinert) for a series intended towards "bridging the gap between basic and applied research . . . The progress in biotechnology during the last 8 years necessitated the collection of literature and consolidation of views of scientists involved in this field". The result is a multivolume series, of which volume I is now published. Biotechnology is fashionable and surprising enough, age-old practiced methods of tree breeding, such as grafting, rooting, and pollen storage, find themselves reclassified under "biotechnology". Even the induction of haploids and tissue culture, as more advanced methods, can now be found under this attractive label.

Fifty-two experts give the present state of the art in 31 chapters on tree improvement. In addition to the more general chapters, which summarize already published and widely used methods, there are the more interesting ones on the more special methods adopted in 23 important fruit, nut, and forest tree species, as cherry, plum, peach, apple, pear, citrus, papaya, banana (not a tree, but a huge herb), olive, mango, various pines, cryptomeria, juniper, elms, eucalypts, sandalwood, acacia, mulberry, chestnut, almonds and coconut palm. Many others could be mentioned, but these may come in volume II. Each species is treated in a different way, with strong emphasis on tissue culture, sometimes with a comparison of conventional versus nonconventional methods. Surely the book will contribute to the practice that the "unconventional" methods will soon become conventional ones. The terminology found in the various chapters is not always compatible. Descriptions of media for embryo, anther, flower, shoot tip, meristem, callus suspension and cell cultures are given in full detail. For some species even instructions for protoplast isolation and culture are described. Problems of genetics, variability and stability are sometimes discussed and in some cases even diseases are included. The references of the chapters are pooled together, which makes it easier to use the book. This volume, intended for research scientists, teachers and advanced students in forestry, horticulture, botany and genetics, is a new addition to the swelling literature available on biotechnology, not to say some old wine mixed with a new one under a new label.

H. F. Linskens, Nijmegen